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Frame-Constructional Verb Classes

Change and Theft verbs in English and German

Ryan Dux

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Volume 28

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Frame-Constructional Verb Classes

Change and Theft verbs in English and German

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Soli Deo Gloria

CHAPTER 1

Introduction

1.1 Introduction

1.1.1 Overview and purpose

While the theoretical construct of the verb class is prevalent in the linguistics literature, the field has yet to establish a standard definition of this concept. Simply put, a verb class is a group of verbs that share some aspects of meaning, grammatical behavior, or both. Research on verb classes and verb classification is largely guided by the assumption that a verb's meaning determines its grammatical behavior and vice versa. Ideally, once we can identify which aspects of meaning are grammatically relevant – or conversely, which grammatical features correlate to certain meaning components – we should be able to predict a large range of a verb's semantic and syntactic behavior simply by referring to the verb's class membership.

Of course, a great number of verb classifications have been proposed, and these differ significantly with respect to the number and size of classes, to the specific syntactic and semantic properties targeted in the classification, and to whether semantic or syntactic uniformity is emphasized in the classification. However, a critical review of these numerous classifications reveals that they each focus only on a limited range of semantic and/or syntactic properties, and many rely on sparse data or linguists' intuitions rather than the rich and authentic data found in large linguistic corpora. That is, the field yet lacks a formulation of verb classes that adequately accounts for both the similarities among verbs in a given class as well as differences between individual verbs of the class from both a semantic and syntactic perspective.

This book therefore offers a new approach to verb classes which is based on detailed, empirically-grounded analyses of the meanings and syntactic behavior of individual verbs and sets of related verbs, in order to account for both shared and idiosyncratic properties of verbs within a class. By bringing together a diverse array of theoretical concepts and methodological tools, particularly drawing on recent developments in cognitive and usage-based linguistics, the present account goes beyond traditional approaches to verb classification. Specifically, the proposed approach allows for verbs to be classified at different levels of granularity, demonstrates how not only lexical verbs but also grammatical constructions exhibit class-like organization, and addresses questions of frequency and entrenchment to tease apart conventional and creative language production. Furthermore, the item-specific, empirical data informing the present approach can be intuitively employed in comparisons of verb classes across semantic domains and across languages and in the development of practical lexicographic and pedagogical applications.

1.1.2 The intuitive basis of verb classes

To begin, consider how a "verb class" can be arrived at through basic intuitions by a normal (non-linguist) native speaker of English. Two simple questions can be asked to determine whether verbs may form a class. The first reads "What other verbs mean approximately the same thing as verb X?" and captures the semantic similarity of verbs. The second question reads "What set of verbs can be used in grammatical context X?" and serves to identify groups of grammatically similar verbs.

For example, if we ask a typical native speaker of English which verbs are similar to the verb *change*, they will likely list verbs such as those given in (1.1).[1]

(1.1) *transform, turn, modify, alter, convert*, …

If we would then ask about which words can be used in the context in (1.2), the native speaker would likely answer with the same list of verbs above.

(1.2) The person ________ it from one thing into something else.

Thus, the verbs in (1.1) show the potential to form a verb class due to their similarities in both meaning and syntax. Indeed, these verbs are classified together in two of the most prominent (and fine-grained) verb classifications of the English lexicon (Levin 1993, FrameNet: Ruppenhofer et al. 2010).

However, a closer investigation of these verbs reveals they are in fact not entirely interchangeable. If the context given in (1.2) is replaced with others that describe more accurately the event under question, one may begin to question the semantic homogeneity of our proposed "verb class". For instance, the context in (1.3) from a well-known fairy tale scene would likely evoke a different response than that above.

(1.3) The witch {changed/transformed /??converted/*altered} the prince from a man into a frog.

1. The keen linguist will note that a large portion of the English lexicon – namely "change-of-state" verbs – entail the meaning of *change*, but it seems unlikely that non-linguists would respond to this question with words such as *dye, break, lengthen,* or *petrify*.

Here, the respondent would likely still list the verbs *change, transform,* and *turn*, but would be reluctant to include the other verbs in our list (*alter, convert, modify*). Native speakers are also likely to offer different responses when varying syntactic contexts are given, such as that in (1.4).

(1.4) The witch {turned/*changed/*altered} the prince green.

In this case, the informant would likely list verbs such as *turn* or *make* but not *change* or *transform* (and much less so *alter* or *modify*), because the grammatical context specifies the changed entitiy's resulting state with a simple adjective rather than a prepositional phrase. However, despite eliciting different sets of verbs when providing more specific semantic or syntactic contexts, the informant nonetheless recognizes the intuitive similarity among the set of verbs in (1.1).

More specifically, when comparing the verbs in (1.1) against other verbs with more drastically different meanings (such as *blow, cover, eat,* or *take*), the similarities cannot be ignored. All of the verbs refer generally to the same types of events, and they occur in the same general range of grammatical contexts, some of which are listed in (1.5). These contexts also share properties with one another, for instance in that the transitive object corresponds to the intransitive subject, as in (1.5a)–(1.5b), and in the occurrence of certain prepositions (*from, into, to*) but not others (e.g. *across, at, of, with*).

(1.5)	a.	[NP V NP]	Sam changed Pat.
	b.	[NP V]	Pat changed.
	c.	[NP V from N into N]	Pat changed from a human into a frog.
	d.	[NP V NP to NP]	Pat turned to stone.

In contrast, aside from the highly frequent basic transitive (1.5a) and intransitive (1.5b) patterns, semantically unrelated verbs appear in a markedly different set of grammatical contexts. For instance, Change verbs cannot occur in other patterns that are available to verbs with different meanings, such as the intransitive construction with only a *from* PP (1.6a) or the conative construction (1.6b).

(1.6)	a.	[NP V from NP]	Pat {departed/ran/stole/*changed/*altered} from the house.
	b.	[NP V at NP]	Pat {ate/gobbled/kicked/*changed/*altered} at the apple.

Furthermore, the syntax-semantics correspondences identified for English verb classes carry over, at least in some respects, to other languages. German, like English, also has a group of verbs similar to *change*, including *ändern, verändern,* and *verwandeln*. An investigation of the syntactic contexts in which the German verbs occur reveals interesting similarities and differences across the languages. For instance, the German verbs also occur with similar types of arguments, such as those expressing the original state and final state, and these arguments occur in similar grammatical forms, namely prepositional phrases employing prepositions closely related to the English ones: *von* ('from') for the original state and *in/zu* ('in/into') for the final state (1.7a). German Change verbs also express changes with either the overt expression of the entity causing the change, as with *Sam* in (1.5a) above, or without explicit mention of this causing entity, as with (1.5b–d). However, while English expresses the latter using intransitive constructions, German instead employs the reflexive construction, in which the changed entity appears as subject and is also referred back to with a reflexive object pronoun, as in (1.7b).

(1.7) a. Sam {verändert/verwandelt} Pat.
 b. Pat {verändert/verwandelt} sich.

In fact, this distinction between English intransitive and German reflexive constructions is much more systematic and wide-ranging, as it is not limited to the Change verbs discussed here but a much broader subset of the verbal lexicon, often referred to as "change-of-state" verbs, such as *öffnen* ('open'), *ärgern* ('anger'), *zerbrechen* ('break'), or *kühlen* ('cool').

This cursory analysis of a potential verb class of "change verbs" previews several phenomena lying at the heart of verb classification research in general and the present monograph in particular: Verbs can intuitively be grouped together based on semantic and/or syntactic similarity, but it is rarely (if ever) the case that two or more verbs exhibit precisely the same meaning and syntactic distribution. At the same time, the practice of classifying verbs according to shared properties serves various purposes, such as providing structure to the lexicon, comparing aspects of verb meaning and syntactic patterns across domains, and identifying similarities and differences across languages.

1.2 Verb class research

1.2.1 Various approaches to verb classes

The construct of verb classes is not only intuitively plausible, as shown above, but has also enjoyed prominent status in the field of linguistics, a major goal of which is to discern and formalize the relationship between the meanings and formal properties of linguistic items. A primary object of analysis in this endeavor has been the relation between the semantics of verbs and the grammatical expression of their arguments (i.e. valency, argument realization). Research on this topic has been guided by a long-standing assumption that a verb's meaning determines its syntactic behavior; as put by Levin (1993: 1), "the behavior of a verb, particularly with respect to the expression and interpretation of its arguments, is to a large extent determined by its meaning." Verb classification is an important methodological tool and outcome of research investigating precisely what aspects of verb meaning influence what aspects of argument realization. By positing verb classes that capture similarities in verbal semantics and syntax, linguists can also fulfill the desideratum of reducing the information in lexical entries, which ideally only include idiosyncratic information.[2] That is, by identifying classes that accurately map a verb's meaning to its syntactic behavior, one only needs to list the class a verb belongs to in order to predict the syntactic structures it may appear in, thus factoring out this grammatically predictable information from the verb's lexical entry and reducing it only to idiosyncratic properties of the verb. However, while the plethora of studies on verb classes and verb classification have certainly enhanced our understanding of language, a strict and systematic classification of verbs that accurately links meaning to argument realization remains elusive at best.

The wide range of criteria that can be employed in verb classification has resulted in verb classes of varying levels of granularity and uniformity. At an extremely rudimentary level, (English) verbs can be classified according to transitivity, but this simplistic classification results in very large and semantically diverse classes of verbs, which are less than informative and do not account for a wide range of phenomena, such as the realization of oblique arguments or the ability of some verbs to be used both transitively and intransitively.

Dating back at least to Charles Fillmore's (1967, 1968) seminal work on the grammar of hitting and breaking, the identification of "grammatically relevant meaning components" has been central to research on verb classification and argument realization more generally (Fillmore 1968; Dowty 1979; Van Valin and LaPolla 1997; Levin and Rappaport-Hovav 2005; Croft 2012). Specifically, Fillmore found a correlation between a transitive verb's ability to appear in intransitive constructions, as in (1.5a–b) above, and the semantic structure of the event encoded by such verbs. Namely, transitive verbs entailing a "cause change" meaning component (like *break, change*, *close,* or *increase*) occur in intransitive patterns in which the transitive object is realized as subject, but those without this component do not (like *hit* or *kick*). These insights gave rise to a major strand of research which analyzes verb meanings according to their event structure, building on Vendler's (1957) original coarse-grained aspectual classes (Dowty 1979; Tenny 1994; Van Valin 1993; Rappaport Hovav and Levin 1998; Croft 2012). Current research in this area draws on techniques such as predicate decomposition, which abstracts away from the

2. "[T]he ideal lexical entry for a word should minimize the information provided for that word. This goal can be achieved by factoring predictable information out of the lexical entries, leaving only idiosyncratic information". (Levin 1993: 11)

specific rich meanings of verbs (i.e. the meanings that differentiate *break, change, close,* and *increase*) and identifies only the core grammatically relevant meaning components (e.g. "cause change"), which serve as criteria for classifying verbs.[3] A notable classification in this respect is that between manner and result verbs, which has been shown to account for a wide range of verbal argument realization behavior within and across languages (Rappaport Hovav and Levin 2010; Beavers and Koontz-Garboden 2012; Levin 2015). While these approaches to verb classification are certainly more sophisticated than a simple transitivity-based classification, their resulting classes are also very coarse-grained, defined using abstract and empirically unwieldy features, and unable to account for richer aspects of verb meaning or for subtle differences in syntactic distribution across semantically related verbs.

In contrast to these broad classes, other researchers have proposed much richer classifications of English verbs, which capture meaning-form correspondences at a much higher level of granularity. The most prominent such classifications are that of Levin (1993) – which groups 3,024 English verbs into 193 classes – and of the Berkeley FrameNet Project (Fillmore 1985; Ruppenhofer et al. 2010) – which currently classifies 13,640 lexical units into 1,224 frames.[4] While both of these classifications propose drastically more classes and a closer meaning-form fit within classes compared with earlier approaches, the methods they employ to arrive at classes differ significantly. Levin's (1993) classification relies on syntactic criteria, specifically "argument structure alternations" such as the causative-inchoative alternation (Levin 1993: 27f.) shown in (1.5a–b) above or the total transformation alternation (1993: 57f.) in (1.5b–c) above. Specifically, Levin posits a verb class when a group of verbs undergo the same set of argument structure alternations, and subsequently seeks to identify what aspect of meaning is shared by all verbs in these alternation-based classes. For example, Levin (1993: 177–178) posits a class of *Turn* verbs, listed in (1.8), based on their ability to occur in certain argument structure alternations.

(1.8) Levin's *Turn* verbs:
alter, change, convert, metamorphose, transform, transmute, turn

In contrast, FrameNet's (Fillmore and Baker 2009; Ruppenhofer et al. 2010) classification relies solely on semantic criteria, drawing on the theory of Frame

3. Tenny (1994: 2), for instance, describes why one may abstract away from encyclopedic meanings to identify only those which are grammatically relevant, stating that "[t]he universal principles of mapping between thematic structure and syntactic argument structure are governed by aspectual properties. […] Only the aspectual part of thematic structure is visible to the universal linking principles".

4. These figures correspond to the state of FrameNet on 9 August 2018. The FrameNet database can be accessed at: https://framenet.icsi.berkeley.edu.

Semantics (Fillmore 1982, 1985). Specifically, "lexical units"[5] are classified together when they evoke the same semantic frame, which are richly defined scenarios or events characterized according to Frame Elements (semantic participants, which may be realized as arguments) and the interrelations holding between them. For instance, the FrameNet `Cause_change` frame captures words describing situations in which an agent causes something to change from one state to another.[6] The verbs FrameNet lists as evoking this frame are given in (1.9); the underlined verbs are also included in Levin's *Turn* class.

(1.9) FrameNet `Cause_change` verbs:
<u>alter</u>, <u>change</u>, <u>convert</u>, deform, make, modify, reshape, shift, <u>transform</u>, <u>turn</u>, vary

As FrameNet's classes are defined solely according to semantic criteria, FrameNet does not explicitly address verbal syntax or identify shared aspects of argument realization among class members, but instead provides annotated corpus-based descriptions of argument realization behavior for each lexical unit. However, despite the difference in Levin's alternation-based and FrameNet's semantics-based methods, there is a great deal of overlap in the verbs comprising Levin's and FrameNet's classes, thus providing further support for the assumed relation between verb meaning and syntax.

Given that the coarse-grained verb classes discussed above, such as manner vs. result verbs, can account for a wide range of argument realization behavior based on fairly abstract meaning components, one would expect that the fine-grained verb classes of Levin (1993) and FrameNet would enable an even more accurate prediction of a verb's grammatical behavior. However, a cursory analysis of the distribution of Change verbs (i.e. Levin's *Turn* verbs, FrameNet's `Cause_change` verbs) demonstrates that this is not the case. The data in (1.10) demonstrate that the verbs are far from completely interchangeable, as they differ drastically in the precise contexts in which they may occur.

(1.10) a. Pat {changed/turned/transformed/?altered/??modified} Sam into a frog.
b. Pat {changed/transformed/altered/?modified/*turned} Sam.
c. Sam {changed/transformed/?altered/*modified/*turned}.
d. Sam {turned/??changed/*transformed/*altered/*modified} red.

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5. In FrameNet, a "lexical unit" is a word in one of its senses. Lexical units are not limited to verbs but can be of any part of speech, as well as multi-word expressions. A word (or lexeme) can correspond to multiple lexical units when it is polysemous, and separate lexical units are posited for each sense of the word, as with *steal* which evokes both the `Theft` frame (as in *steal goods from a store*) and the `Self-Motion` frame (as in *steal across the room*). It is standard practice to write FrameNet frames in Courier New font.

6. See Section 3.1 for the official FrameNet definition of Change verbs.

These data and the preceding discussion thus reveal strikingly contradictory findings regarding the nature of verb classes. On the one hand, very coarse-grained semantic distinctions of verb classes, such as that between result verbs and manner verbs, are claimed to predict a wide range of syntactic behavior. Similarly, verb classifications developed using well-defined syntactic (Levin 1993) or semantic (FrameNet) criteria appear to offer fine-grained verb classes that capture a close fit between verb meaning and syntax. On the other hand, the empirical data demonstrate that even such fine-grained classes are unable to account for the precise range of semantic and syntactic contexts in which a verb may appear. These contradictory findings give rise to numerous questions about the nature and status of verb classes.

1.2.2 Insights from cognitive and usage-based linguistics

Since the mid-20th century, much linguistic research (particularly in the American tradition) has been influenced by Chomsky's (1957, 1965) Generative Grammar, which seeks to define highly abstract and formalized rules that capture broad-ranging phenomena across entire languages or all languages (i.e. universals), and consequently downplays the unpredictable and idiosyncratic properties of words and linguistic structures, as well as more humanistic aspects of language such as variation across speakers and contexts. This linguistic philosophy partially underlies the approaches to verb classification and argument realization discussed at the start of the previous section, as seen in the endeavor to fit many, if not all (English) verbs into a small set of event-structural classes or the binary classification of manner vs. result verbs.

In recent years, however, there has been a drastic increase in scholars and publications in the fields of Cognitive and Usage-based Linguistics. In contrast to earlier, generative approaches, research in these frameworks generally employs data-rich empirical methods, takes a comprehensive and integrative view of linguistic structure (rather than separating traditional modules of language, e.g. lexicon, syntax, semantics), and emphasizes the relation between language and other aspects of cognition. As a comprehensive review of these frameworks is given in Chapter 3, here I briefly describe some important insights from these fields that should be integrated into an improved account of verb classes such as that proposed in this monograph. These include an appreciation for the idiosyncratic and unpredictable nature of argument realization, the role of corpus data and frequency-based analysis, and a recognition that grammatical constructions – like words – contribute to sentential meaning.

While American linguistics was largely characterized by the ideas of generativism, researchers in Europe, particularly in Germany, were concurrently developing the theory of Valency Grammar and applying it to the creation of "valency dictionaries," which document the argument realization (i.e. valency) patterns available to individual words (see Section 3.3. for a more detailed historical overview of Valency Grammar). A major motivation for this work was the recognition that many, if not all, words' grammatical behavior is not predictable from their meaning (or class membership), thus causing problems for learners and requiring item-specific accounts of valency behavior. A hallmark example of this unpredictability is the varying acceptability of Communication verbs in the ditransitive (or double-object) construction:

(1.11) *Pat {told/ wrote/explained/said} something to Sam.*
*Pat {told/wrote/*explained/*said} Sam something.*

While such differences have traditionally been viewed as minor and peripheral exceptions, empirical analysis shows that this is not the case. This fact is most pointedly demonstrated by Faulhaber (2011; see Section 3.3), whose corpus-based study of the valency behavior of verbs in 22 different classes (or "verb groups" in her terms) reveals that the majority of syntactic (i.e. valency) differences among near-synonymous verbs cannot be traced to any meaning components and are thus by no means peripheral, leading her to the following conclusion.

> [T]he number of restrictions [to the expected argument realization behavior based on verb meaning] found is, by far, too high for these to be regarded as a peripheral phenomenon. (Faulhaber 2011: 325)

In order to reconcile Faulhaber's findings with the traditional assumption of form-meaning predictability in verb classification research, a revised view of verb classes must capture both the shared syntactic and semantic properties of (traditional) verb classes as well as the idiosyncratic properties setting apart near-synonymous verbs.

While Faulhaber's study was situated in the longstanding field of Valency Grammar, this general appreciation for the item-specific nature of linguistic knowledge has grown significantly in mainstream American linguistics, particularly within Construction Grammar (Goldberg 1995, 2006; Croft 2001; Boas 2003) and the broader field of Usage-based Linguistics (Bybee 2007, 2010). In these frameworks, most analyses rely on quantitative analysis of large amounts of empirical corpus data, which not only allow for more accurate claims but also for the identification of interesting phenomena that elude native speaker intuition or more rudimentary empirical analysis. The role of frequency also plays a central role in these frameworks, particularly given its relevance in corroborating linguistic findings with those of other cognitive domains such as categorization, perception, and neuromotor automation. Applying these insights to a revised view of verb classes, it is essential that proposals for classes rely on empirical corpus analysis and account for the frequency with which verbs occur in the range of constructions that define the class.

A final major insight from recent linguistic theory that advances the field's understanding of verb classes is the view that grammatical constructions have meaning. This view arises from research in (Cognitive) Construction Grammar (Goldberg 1995, 2006; see Section 3.2), in which all linguistic units – ranging from idiomatic phrases over morphological markers to abstract "argument structure constructions" such as the resultative or ditransitive construction – are form-meaning pairings in the sense of de Saussure (1916). This view was initially developed to account for non-compositional idiomatic phrases such as the *let alone* construction (Fillmore et al. 1988) or the *What's X doing Y* construction (Kay and Fillmore 1999), which could not be accounted for in generative grammar, as its focus on core syntax precluded the accurate interpretation of idiomatic structures involving both lexical and grammatical features. Building on such constructional accounts of idioms, Goldberg (1995) extended the idea to "argument structure constructions" (ASCs), to account for the use of verbs in novel and unpredictable syntactic contexts, such as the occurrence of verbs without a "Transfer" meaning in the ditransitive (1.12a) or of intransitive verbs in transitive contexts (1.12b).

(1.12) a. Sam baked Pat a cake.
b. Pat sneezed the napkin off the table.

In particular, Goldberg argues that these ASCs are meaningful in their own right, with semantic properties similar to those of lexical items (including polysemy and prototype meanings), and defines the formal and semantic properties of constructions such as the ditransitive ASC, exemplified in (1.12a) and the caused-motion ASC (1.12b). Furthermore, ASCs (and constructions in general) are assumed to relate to one another by means of various "inheritance relations" to form a network-like hierarchical structure: for instance, the caused-motion ASC in (1.12b) is related to the resultative ASC (i.e. *sneeze the napkin to shreds*).

Goldberg's proposals have given rise to a wealth of research that has deepened our understanding of ASCs and their constructional properties, such as their varying semantic interpretations, their ability to occur with different types of verbs (and verb classes), their relation to other constructions, and the processes underlying their acquisition and historical development.[7] However, these studies have largely been limited to broad-scale analyses of individual (or small sets of) ASCs proposed by Goldberg (1995), which are semantically non-compositional

7. This research is described in more detail in Section 3.2, and includes the works of Boas (2003) on the resultative construction, Croft (2003) on the ditransitive construction, (2003), Iwata (2008) on the locative alternation, and Barðdal (2008) on the Icelandic inchoative construction.

and highly productive, in that they occur with verbs from a wide range of semantic classes. At present, there has been relatively little, if any, research investigating the sets of constructions shared across members of verb classes – such as the sets of alternations Levin (1993) uses to define her verb classes. While many verb classes certainly are compatible with the traditional ASCs of Goldberg, such constructions only comprise a fraction of all possible argument realization patterns in a given language, and verbs of a given class generally appear in a much wider range of constructions not traditionally identified as ASCs due to their relative lack of productivity and non-compositionality.[8] Therefore, to improve our understanding of verb classes, we must also investigate more rigorously the full range of constructions that are associated with – or even define – each verb class. This goal may be achieved by developing methods and theoretical constructs to identify how the individual constructions of a given class relate to one another, as well as how the (set of) constructions relate(s) to the scenario defining the class's semantics (i.e. the semantic frame evoked by the class).

1.2.3 Verb classes across domains and languages

The preceding discussion pointed to important recent insights that must be integrated into a revised approach to verb classes, namely a need to reconcile verb-specific idiosyncrasies with predictive relation between verb meaning and argument realization, an increased reliance on empirical corpus data and frequency-based analysis, and a more comprehensive account of the relation between grammatical constructions, verb classes, and meaning. While these advances will improve the formulation of accurate and adequate verb classes, a further desideratum is that verb classes be formulated in such a way as to facilitate or, better yet, to enhance comparisons of classes across semantic domains and languages.

Previous studies comparing verbs of different classes within a given language largely fall into two types, with the first focusing on very broad-scale classes such as result vs. manner verbs or those based on verbal aspect (e.g. Rappaport Hovav and Levin 2010; Beavers and Koontz-Garboden 2012; Croft 2012) and the second comparing fine-grained subclasses of verbs within a given semantic domain such as Motion, Communication, or Transfer (e.g. Urban and Ruppenhofer 2001; Goldberg and Jackendoff 2004; Boas 2010c). At present, very few studies have explicitly compared fine-grained verb classes from distinct semantic domains. The latter chapters of this monograph provide such comparisons (specifically between Change verbs and Theft verbs), which serve various purposes. For one, they allow

8. Herbst (2011, 2014) also observes that a large number of so-called "valency constructions" have been overlooked in Construction Grammar research.

for an assessment of whether the formulation of the verb class concept based on a given class can be carried over to other classes with extremely different syntactic and semantic properties. Furthermore, the semantic property of "verb descriptivity" – roughly equivalent to semantic richness – has been shown to influence not only verb meanings (Snell-Hornby 1983; see also Chapter 5) but also their constructional properties (Boas 2008b), but has to this point only been applied to individual verbs within a given class rather than to entire verb classes. Thus, by comparing verb classes of varying levels of descriptivity (as well as different semantic domains), we may further refine the concept of verb classes and also assess the implications of a verb class's semantic domain and descriptivity level on the behavior of its member verbs, as these may influence the degree of semantic and/or syntactic uniformity among class members, the number and nature of constructions occurring with the class's verbs, and the types of (additional) meaning components that set apart individual verbs within the class. Finally, cross-linguistic comparisons of semantically distinct verb classes may also reveal differences in the translatability of verb meanings and constructions, findings which are important for linguists, translators, and language learners and teachers.

This last point touches on the final aspect of verb class research central to the present monograph, namely the cross-linguistic comparison, i.e. contrastive analysis, of verb classes. It is important that our improved concept of verb classes not be founded solely on English data and that any English-based class proposals be subject to empirically grounded, cross-linguistic comparisons of verb meanings and syntax. While numerous studies have compared verb classes across languages, the majority of these focus on coarse-grained classes and/or meaning components (Levin 2015; cf. Croft 2001: Chapter 5) or on a single grammatical construction across numerous verb classes (Michaelis and Ruppenhofer 2001; Iwata 2008). At present, there exist few studies which use corpus and frequency data to compare the detailed meanings and precise valency distribution of fine-grained verb classes across languages.[9] Furthermore, traditional contrastive and typological studies have been critiqued for imposing English-specific categories onto unrelated languages (Croft 2001).

9. Indeed, contrastive and typological research on verb meaning and valency has been a mainstay of linguistic research, as seen, for instance, in the work of scholars such as Leonard Talmy and Joseph Greenberg, in the dedication of an entire issue of *Cognitive Linguistics* (2007: 18(2)) to cross-linguistic analyses of verbs such as *cut* and *break*, and in the work of the Leipzig Valency Classes Project (https://www.eva.mpg.de/lingua/valency/index.php). However, most of this research typically seeks to identify broad-scale generalizations over numerous languages, rather than investigating in detail the richness and cross-linguistic diversity of lexical items and constructions used to express a given specific real-world scenarios (i.e. semantic frames).

However, recent advances, particularly in the fields of Frame Semantics and Construction Grammar, offer promising methodologies for comprehensive and empirically adequate cross-linguistic comparisons of verb classes. In particular, insights from Contrastive Construction Grammar (Boas 2010a, 2010b) have demonstrated how meaning representations based on semantic frames allow for empirical cross-linguistic comparison, because semantic frames are not language-specific but correspond to language-independent, real-world scenarios which can be intuitively compared across languages and cultures. Further, the richly defined Frame Elements that underlie semantic frames (see Section 3.1) allow for a clear assessment of cross-linguistic similarity, and their formal and grammatical realization can be empirically documented in any language (i.e. regardless of the language's specific grammatical structures). Given these properties of semantic frames, frame-based contrastive analyses facilitate the identification of semantically equivalent grammatical constructions by identifying which constructions may be used in each language to express a given frame (or a given constellation of Frame Elements). The present monograph therefore does not formulate verb classes on the basis of English alone, but also compares English-based classes with German data. These comparisons allow us to test the cross-linguistic (or even universal) validity of a given verb class, to identify equivalencies and differences in the meanings and constructions of semantically related verb classes across languages, and to determine whether translation gaps are purely idiosyncratic, culturally-motived, or influenced by wider-ranging structural properties of different languages.

1.3 Overview and structure of the monograph

This monograph develops a new approach to verb classes and classification, drawing primarily on data from Change verbs (*alter, change, transform,* etc.) and Theft verbs (*steal, embezzle, pilfer,* etc.) in English and German. As discussed in the previous section, the approach presented here draws on recent developments in cognitive and usage-based frameworks and demonstrates how verb classes, their meanings, and the syntactic constructions characterizing them, can be compared across semantic domains and languages. These goals are achieved in discussions and analyses that can be roughly divided into three major parts, around which this monograph is structured.

1.3.1 Theoretical background

The first part of the investigation, discussed in Chapters 2 and 3, critically reviews existing approaches to verb classification (and argument realization more generally) in order to identify the methodological tools and theoretical constructs that are most suitable for formulating verb classes which are accurate, comprehensive, and comparable. Many of the approaches to be reviewed were briefly mentioned above, but in the following chapters are discussed, compared, and evaluated in more detail, particularly with respect to their treatment of the Change verbs introduced above. Chapter 2 briefly summarizes the origins and trajectory of verb classification research and then describes various approaches that are more-or-less associated with the traditional assumption of a highly predictive relationship between a verb's meaning and its syntactic behavior. Specifically, Section 2.2 introduces the concept of semantic roles and their role in characterizing verbal arguments and their syntactic realization (Fillmore 1967, 1968; Dowty 1991; Van Valin 1999), and Section 2.3 discusses event-structural approaches that decompose a verb's meaning into primitive predicate structures (Pinker 1989; Jackendoff 1990; Rappaport Hovav and Levin 1998). Finally, Section 2.4 describes and evaluates Levin's (1993) classification of English verbs and her employment of argument structure alternations in formulating verb classes.

Chapter 3 presents research from more cognitively-oriented and usage-based frameworks, focusing on more recent theoretical and methodological developments that can help inform our understanding of verb classes (as briefly outlined in Section 1.2.3 above). In Section 3.1, I present Frame Semantics (Fillmore 1982, 1985; Fillmore and Baker 2009) and its implementation in FrameNet (Ruppenhofer et al. 2010), showing how its rich frame-semantic characterization of word (including verb) classes and semantic roles facilitates empirical investigations into the relation between verb meaning and syntactic form within and across languages and semantic domains. In Section 3.2, I discuss the motivations, tenets, and research methods of Construction Grammar, focusing on Goldberg's (1995, 2006) approach to the study of verb meaning and syntax. Particularly relevant for the present analysis are Construction Grammar's assumption that all constructions (including ASCs) are meaningful and its detailed investigations of ASCs and their interaction with verbs and verb classes. In Section 3.3, I introduce Valency Grammar (Herbst 1983; Helbig 1992; Schumacher 2007) and the detailed item-specific valency descriptions arising from this framework (as found in *The Valency Dictionary of English*; Herbst et. al 2004). Of particular interest is Faulhaber's study demonstrating the idiosyncratic, unpredictable nature of argument realization (Faulhaber 2011) and recent works investigating connections between Valency Grammar and Construction Grammar (Herbst 2011, 2014).

While the theoretical backdrop and methods of the subsequent analyses draw largely on insights from Frame Semantics, Construction Grammar, and Valency Grammar, these theories were not selected a priori but rather prove to be the most useful for the types of analyses undertaken. The discussion in Chapter 3 not only demonstrates how a usage-based, constructional approach overcomes issues in generative and projectionist accounts of the phenomena at hand, but it also points out weaknesses of the three frameworks and describes how their strengths complement one another to provide a more detailed and adequate account of verb classes.[10]

1.3.2 A novel approach to verb classes

Chapter 4 comprises the second major part of this monograph, in which the new approach to verb classes is developed on the basis of data from English Change verbs. The first sections of this chapter assess precisely how similar verbs within this fine-grained class are with respect to their meaning and valency behavior. In Section 4.2, the verbs' meanings are arrived at through analyses of dictionary definitions and, to a lesser extent, corpus data, specifically by identifying both the *shared meaning* characterizing the semantics of all verbs within the class and the *(additional) meaning components* which set apart individual verbs' semantics. Section 4.3 then presents the results of a corpus analysis through which I identify the *valency constructions* (i.e. argument realization patterns/constructions) in which English Change verbs appear and determine the *valency distribution* of each verb: the specific set of valency constructions the verb occurs in and its frequency in each (based on the corpus sample).

Drawing on this data, I develop formalizations of the verb class and of verbal lexical entries. The central constructs of this method are the *frame-constructional verb class* (FCVC), which captures generalizations over all verbs in the class, and *multi-grained verb entries*, which capture properties of individual verbs at various levels of granularity. The theoretical construct of the FCVC is presented in Section 4.4. The FCVC is formulated as a construction and, as such, is associated with both a meaning and a form side. The meaning side of the FCVC, or the class's shared meaning, is defined using principles of Frame Semantics (i.e. based on real-world experiential knowledge and formalized in terms of Frame Elements), but goes beyond traditional FrameNet frame definitions by associating the frame with the meaning components that distinguish individual verbs, by more clearly describing arguments that are not required by the frame (as with traditional "arguments") but nonetheless influence its semantics (i.e. peripheral or non-core Frame Elements), and by explicitly stating how this class differs from related classes, particularly the broad set of "change-of-state" verbs. The syntactic side of the FCVC

10. Furthermore, the analyses in Chapters 4–6 are 'data-driven' rather than 'theory-driven,' in that I first present the data in as theory-neutral a manner as possible and I then employ theory-specific constructs and methods that are most suitable for the data at hand.

is characterized in terms of its *constructional range*. Simply put, the constructional range is the set of valency constructions that occur with (one or more) verbs of the class. (In semantic terms, it is the set of constructions capable of expressing the meaning associated with the verb class.) However, the constructional range is not a simple list of patterns, but is organized in a structured, network-like fashion that captures interrelations among the individual constructions, associated with semantic properties pertaining to both the broader (Change) semantic frame and to individual verbs' meanings, and distinguished explicitly from constructional ranges associated with other verb classes such as Motion verbs or "change-of-state" verbs by appealing to the notion of "allostructions" recently developed in the Construction Grammar literature (see Cappelle 2006; Herbst 2011, 2014, Perek 2015).

While the FCVC captures properties shared among all members of verb classes, multi-grained verb entries (MGVEs) must be posited for each verb to capture item-specific semantic and syntactic properties that cannot be predicted from their class membership, as described in detail in Section 4.5. The MGVE is named as such because the entries include information at varying levels of granularity. At the highest level in the present analysis (see below), the verb is associated with the FCVC: that is, it exhibits the semantics defined in the shared meaning of the FCVC and it may potentially appear in the set of valency constructions comprising the FCVC's constructional range. However, given that individual verbs normally (if not always) differ in their precise meaning and valency distribution, the lowest level of the MGVE specifies verb-specific semantic properties – namely the (additional) meaning components that further specify the verb's meaning relative to the FCVC's shared meaning – and syntactic properties – namely the verb's precise valency distribution, specifying which (types of) valency constructions the verb appears in (and which are frequent, rare, etc.). Finally, at a medium-grained level, some verbs may be associated with *syntactic-semantic subclasses*, which are subsets of verbs within the (already fine-grained) class that share both additional meaning components and similar tendencies with respect to their valency behavior.

In Section 4.6, I briefly assess the predictive power of the FCVC/MGVE approach through a secondary analysis of another prospective Change verb that bears the same shared meaning as the Change verbs analyzed in the primary analysis. Based on this analysis, I determine how much of the "novel" verb's syntactic behavior is predicted by the FCVC (i.e. whether the constructions it occurs in are identified in the FCVC's constructional range) and whether a new syntactic-semantic subclass may be posited based on its similarities to another Change verb.

1.3.3 Comparative aspects of verb classes

The final portion of the monograph discusses how verb classes can be compared across domains (Chapter 5 and Section 6.3) and across languages (Chapter 6). In Chapter 5, I analyze English Theft verbs and contrast them with the Change verbs analyzed in detail in the preceding chapter. In addition to ensuring that the proposed verb class approach can apply to verbs of drastically different semantic domains, this comparative investigation also seeks to scale up previous research on verb descriptivity and its influence on verb meaning and syntax (see Section 1.2.3 above) by comparing entire classes with distinct levels of descriptivity. After establishing that Theft verbs have much richer meanings (i.e. higher descriptivity) than Change verbs (Section 5.1), I go on to compare the number and nature of (additional) meaning components that differentiate individual verbs within the classes (Section 5.2). In Section 5.3, I then compare the number of valency constructions identified for each class, leading to a theoretical discussion of the difficulties in delimiting syntactic constructions and the semantic roles (or Frame Elements) that define them. To conclude this chapter, I describe how the proposed FCVC/MGVE approach, developed in detail for English Change verbs, is not only suitable for, but also necessary to accurately capture both the shared and verb-specific properties of Theft verbs (Section 5.4).

Chapter 6 discusses the cross-linguistic applicability of verb classes and the implications of verb descriptivity on contrastive analysis by comparing the preceding English findings against similar analyses of German Change and Theft verbs. In Section 6.1, I review existing contrastive and German-specific research on verb classification and argument realization, focusing on frame-semantic and constructional research, particularly Boas's (2010a, 2010b) Contrastive Construction Grammar which informs the chapter's methodology. Section 6.2 reports on a detailed investigation of the German Change verb class and determines the degree to which the verb meanings, valency constructions, and grammatically relevant meaning components correspond to those found for English Change verbs in Chapter 4. This analysis also identifies cross-linguistic mismatches relevant for translation and language pedagogy and develops methods for assessing the formal and semantic equivalence of (verb-class-specific) valency constructions which can be reproduced for other classes and language pairs and which go beyond existing contrastive constructional research that focuses on more abstract and broad-ranging constructions such as Goldberg's (1995, 2006) ASCs. In Section 6.3, I investigate German Theft verbs in light of the cross-domain comparison of Chapter 5 with the goal of identifying whether the semantic domain and descriptivity level of verb classes influences their degree of cross-linguistic similarity in verb meanings and valency constructions.

1.3.4 Data, scope, limitations

To conclude this introduction, some disclaimers regarding the scope and data in the present analyses are in order. As noted above, the investigations here are largely limited to a selected number of verbs in two fine-grained verb classes in two languages each. The analyses focus on five to seven verbs per class in each language, but each class contains other verbs that are not analyzed in detail (such as the English verbs *convert, develop*, and *morph* for Change and *filch, rustle*, and *snitch* for Theft). However, I believe the analyzed verbs are representative of (the potential variation within) the class and sufficient to demonstrate the proposed verb class approach. Also, the classes under analysis are small and richly defined, similar to those of Levin (1993) and FrameNet, but unlike the larger classes proposed in more generatively-oriented and typological research, such as the aspectual classes, the large classes of manner and result verbs, or semantic classes of broader domains such as Transfer verbs, Communication verbs, or change-of-state verbs. However, given that the proposed approach allows verb classes to be defined at varying levels of granularity, it can presumably be scaled up to assess the nature and degree of semantic and syntactic similarity among verbs of these broader classes. Another obvious limitation is that the cross-linguistic investigation relies only on data from two closely related languages, so those findings must be interpreted in light of the relatively high structural similarity of German and English and future work must investigate these (and other) classes in a wider range of languages, especially more distantly-related languages.[11] While the limitations discussed in this paragraph are certainly recognized, the investigation intentionally draws on two very unrelated classes across two languages to ensure that and demonstrate how the proposed methods and approaches can be carried over to other verbs, classes, and languages.

The semantic analyses in this monograph rely primarily on dictionary definitions, but it is well understood that dictionaries are often inaccurate or incomplete (Fillmore and Atkins 2000), a problem which I sought to resolve by consulting multiple dictionaries and complementing these findings with native speaker intuition and corpus evidence. The semantic analysis also does not directly address the role of polysemy for verbs with multiple senses but is limited to the sense(s) characterizing the class under investigation (e.g. I discuss only "change" senses of *turn* but not its other senses involving motion, as in *turn the car*, or metaphorical uses, as in *turn to someone for help*). I also only cursorily address the verbs' collocational behavior (as with *alter clothing* or *embezzle funds*) or idiomatic uses

11. The present study also cannot offer discussions of the etymological origins and historical development of verb classes, nor of potential genre- or register-related aspects of verb classes. However, see Section 7.3 for a brief discussion of future research avenues.

(e.g. *turn* [age], *steal a kiss*), which are certainly necessary for a full picture of their meaning and usage, but beyond the scope of this monograph. Finally, while I discuss the meanings of valency constructions relative to the meaning of the class and its member verbs, some sets of closely related constructions may exhibit subtle semantic distinctions that could not be ascertained using the methods employed here but could emerge in more detailed investigations.[12] While the analyzed verbs and constructions may (and likely do) exhibit elusive semantic differences that are not identified here, such differences are probably very subtle and minor and beyond the scope of this monograph, which focuses on defining verb classes and their constructional properties and comparing these within and across classes and languages.

Finally, the syntactic valency analyses rely on corpus data, as expected and necessary for empirical accuracy in usage-based frameworks.[13] However, the number of examples analyzed – approximately 80 to 120 sentences per verb – is indeed quite modest (especially when compared to more sophisticated analyses employing automated corpus analysis methods) and should certainly be scaled up in future work. The syntactic analysis is also limited in that the corpus sample includes only active, finite clauses, while non-canonical clause types such as passives and certain relative and infinitival clauses are omitted to avoid blurring the analysis of valency constructions and other constructions not directly related to verb (class) meaning. Further, the valency constructions are defined and annotated only with respect to the core Frame Elements, but could be more richly described when adverbial or peripheral arguments are accounted for.[14] While recent advances in corpus linguistics and quantitative analysis (e.g. Stefanowitsch and Gries 2003; Gries and Stefanowitsch 2004) can potentially be employed to scale up the syntactic investigations presented here, various issues such as the formal similarity of distinct argument types and the polysemous nature of verbs (and preposi-

12. Of particular interest here are sets of Change constructions which may realize the final state using different prepositions, such as *change to X* vs. *change into X*, but a cursory comparison of the types of arguments occurring with the various prepositions revealed no clear semantic differences.

13. The English data come from the Corpus of Contemporary American English (COCA; Davies 2008–) and the German data come from the DWDS Kernkorpus (http://www.dwds.de; 'Digital Dictionary of the German Language') and, to a much lesser extent, from *Deutsches Referenzkorpus* (DeReKo; Kupietz et al. 2010).

14. Although I use the term Frame Elements in my analysis, in some cases they are defined at a somewhat more coarse-grained level than those proposed in the FrameNet database, especially in the case of the Change verb classes, for which FrameNet posits a highly intricate and complex array of Frame Elements that go beyond the purpose of the present investigation.

tions) make it difficult to fully automate the annotation of valency constructions from raw corpus data. While it is certainly desirable to base the analysis of verb valency on larger datasets and deeper semantic analyses, the data and analyses presented here nevertheless give a good picture of the verbs' valency distribution, especially for the purpose of assessing the degree of syntactic variation among individual verbs of a class. Furthermore, given the dynamic nature of the lexicon and language structure more generally, it is still virtually impossible to gain a fully "complete" picture of a verb's (or verb class's) precise grammatical behavior, which can only be achieved by analyzing all instances in which each verb has been used and also by accounting for diachronic change in the valency behavior of a given verb and the coining of new verbs.

CHAPTER 2

Approaches to verb classification

This chapter introduces the major concepts and approaches in research on verb classification. After describing traditional lexical semantic methods for analyzing word meaning and surveying various types of verb classifications (Section 2.1), I then discuss two major research strains for relating verb meaning to argument realization, namely case roles (Section 2.2) and event structure (Section 2.3). Finally, I describe Levin's (1993) classification of English verbs, which is perhaps the most well-known verb classification resources in the field (Section 2.4). The discussion shows that, while these traditional approaches are useful in accounting for major syntactic differences among verbs across the entire lexicon, many of their underlying tenets and methods must be revised or abandoned to account for the properties of verb classes discussed in Chapter 1.

2.1 Lexical semantics, syntax-semantics interface, and verb classes: An overview

2.1.1 Lexical semantics

Lexical semantics – the study of word meaning – has developed numerous methods and theories throughout its long history that are as rich and diverse as word meanings themselves. A thorough review of this field is well beyond the scope of this book, so I limit the present discussion to the field's most prominent concepts and methodologies, especially those relating to argument realization and verb classification.[1] Analyses of word meaning can broadly be classified according to two major distinctions. The first pertains to the perspective taken in the analysis, whereby semasiological approaches take a certain expression as their starting point and investigate what (range of) situations or concepts it may be used to describe. Conversely, onomasiological approaches begin with a given situation or concept and ask what (range of) linguistic expressions may be used to describe it. Verb classes are relevant both semasiologically, as verbs of a class all denote a given

1. See Geeraerts (2009) for a detailed historical overview of lexical semantics.

concept, and onomasiologically because a given concept can be expressed by the set of verbs comprising a class.

The second major distinction relates to the types of properties investigated while analyzing word meaning: syntagmatic properties of a word refer to the types of linguistic material (specific words, phrase types) that cooccur with a given word, whereas paradigmatic properties refer to which other words may occur in the same or similar contexts as the word under analysis. Here again, verb classes can be analyzed with respect to both of these properties: verbs of a given class show syntagmatic similarity in that they occur with the same types of arguments and in the same syntactic contexts, and paradigmatic similarity in that they are (often) interchangeable in these contexts.

The study of lexical semantics became popular in the first half of the 20th century during the structuralist boom in linguistics and in the social sciences more generally. As the name suggests, structuralists such as Leonard Bloomfield (1933) viewed language as a system with internal structure and believed that the object of study should be the relations that hold among the parts of this structure. On this view, a word's meaning can only be understood through its position within the system in relation to other words. Structuralist lexical semanticists provided three useful theoretical tools for describing these relationships: lexical fields, semantic relations, and componential analysis. Lexical fields are sets of lexical units which belong to a given domain (e.g. kinship, furniture, emotions) and are often represented in a visual field organized so similarities and differences may be seen (cf. Trier 1931). Different types of relations hold among words within a lexical field, the most prominent among these being antonymy (*hot/cold, mother/father*), synonymy (*sofa/couch, hot/steaming*), and hyponymy (a *mare* is a type of *horse*). To describe these relations with more precision and detail, these scholars employed the method of componential analysis, whereby they identify features that are "necessary and sufficient" to distinguish individual lexical items of a given lexical field from one another (Nida 1951, 1975; Coseriu 1964; Bierwisch 1970). Although these analyses have largely been abandoned in modern theoretical linguistics, many of the methods and concepts of structuralist lexical semantics still play a role in some modern approaches. For instance, the popular resource, WordNet (Miller 1995; Fellbaum 1998; Princeton University 2010), offers a classification of the (English) lexicon based on lexical relations such as synonymy, hyponymy, and hyperonymy. The Natural Semantic Metalanguage approach (Goddard 1998, 2008; Wierzbicka 1972, 2006) is also reminiscent of structuralism, in that words are defined and differentiated from on another using a limited, structured, and purportedly universal set of semantic primitives. And of course, verb classes share many properties with traditional lexical fields, namely that the verbs of a class come from a specific domain and may differ in their specific perspective or construal of that domain.

A major reason that structuralist methods are no longer employed is the difficulty of identifying and providing specific labels for the rich, encyclopedic nature of word meaning, particularly for words with rich cultural meanings (e.g. *marriage, bachelor*) or from abstract and non-physical domains (e.g. *cinnamon, weekend*). (The strict ideological requirement that componential analysis rely on features that are binary and somehow "primitive" certainly also did not help the longevity of this framework.) These types of concepts served as a primary motivation for research on word meaning from the field of cognitive science, which was gaining ground in the 1970s after structuralism was losing its stronghold. The well-cited studies of cognitive researchers such as Eleanor Rosch (1978) and George Lakoff (Lakoff and Johnson 1980; Lakoff 1987) emphasized that most, if not all, word meanings are not fixed, stable, and analyzable with respect to specific (binary) features with simple labels, but instead reflect the rich and dynamic nature of the real (physical, mental, and cultural) world and are more easily characterized with reference to prototypes, cultural scripts and models, and/or semantic frames.

While the concepts and methods of lexical semantics outlined above indeed inform our understanding of verb classes, they are generally limited to the analysis and documentation of word meanings alone and do not explicitly relate meaning to the syntactic behavior of verbs or verb classes. I therefore now briefly introduce major concepts and approaches for investigating grammatical properties of verbs and their application to the formulation of verb classes.

2.1.2 Goals and challenges of verb classification and syntax-semantics interface research

Research on argument realization and valency investigates how predicate-dependent constituents, or arguments, are formally expressed. While other parts of speech such as nouns and adjectives are capable of bearing arguments, verbs play a major role in this field because they are the most prototypical argument-taking predicators. Tesnière (1959) describes verbs as evoking a *petit drame* ('little drama'): they describe an event or scenario which involves a specific set of participants (*actants*) that interact in a given setting or set of circumstances (*circonstants*). The *actants* of a verb often equate to the nominal phrases it appears with, while *circonstants* include (normally optional) adverbial modifiers which specify, among other things, the place or time of the scenario. In argument realization research, verbs are associated with a certain valency, i.e. a set of arguments that must fill empty slots provided by the verb. For instance, verbs such as *sleep* or *sneeze* require only a single argument and are thus said to have a valency of 1. This argument fills the grammatical function of subject, is realized formally as a noun phrase, and is semantically limited to animate objects (which are capable of sleeping or sneezing).

In contrast, verbs such as *hit* or *create* have a valency of 2, as they require not only a subject but also a direct object, which is also typically realized as a noun phrase and, for these verbs, is less restricted to specific semantic types. Verbs such as *give* or *show* have a valency of 3, as they (typically) require yet a third argument in addition to subject and direct object, which is often referred to as the indirect object, associated with certain formal phrase type realizations, and (with these verbs) semantically characterized as the recipient or beneficiary of the event.

These basic distinctions regarding the number of arguments associated with verbs reflects one of the broadest and most basic classifications of the (English) verbal lexicon, whereby verbs are classified according to their level of transitivity. This classification is very coarse-grained and divides the lexicon into approximately three large classes: intransitive verbs with valency 1, transitive verbs with valency 2, and ditransitive verbs with valency 3. Of course, a classification that divides all verbs of a language into such a small set of classes based only on their number of (required) arguments runs into two obvious problems. For one, verbs within a given transitivity class are semantically very diverse and cannot be ascribed a unified meaning. Of course, one may say that intransitive verbs describe events that involve just one actor or participant, but the role this participant plays in the event will differ significantly across verbs.

Secondly, these broad transitivity classes also do not account for numerous aspects of argument realization beyond the number of required arguments. For instance, some arguments (particularly oblique arguments) are not necessarily obligatory but nonetheless relate closely to the verb rather than specifying the situational information characteristic of non-obligatory modifiers (or adjuncts). A verb such as *change*, for example, is grammatical in intransitive uses with no oblique phrase (2.1a), but it can also occur with a prepositional phrase headed by *into* or *to* (2.1b). Although this oblique argument is not an obligatory complement, it is unlike typical modifiers in that it pertains directly to (the end state of) the changing event denoted by the verb. *Change* can also occur with a *from* PP realizing the initial state of the change (2.1c); like the *into* PP, this phrase is neither obligatory nor a (verb-independent) modifier, but at the same time it (typically) requires that the *into* PP expressing the result of the change is expressed. Thus, characterizing verbs according to a strict division between obligatory arguments and optional modifiers is too simplistic.[2]

2. Przepiórkowski (2016, 2017) also argues against a strict distinction between arguments and adjuncts (i.e. modifiers) and demonstrates how the two can receive a uniform treatment, formalizing the treatment within the framework of Lexical Functional Grammar and drawing on insights from FrameNet.

(2.1) a. Pat changed.
b. Pat changed into a frog.
c. Pat changed from a prince into a frog.

Furthermore, this rudimentary classification fails to address the related phenomena of *multiple argument realization*, whereby a single verb exhibits different formal realizations of the same argument(s), and *(argument structure) alternations*, whereby these different syntactic constellations are viewed as alternation variants. In addition to the alternations in (2.1) above, in which a verb may occur with or without certain (oblique) phrases, other alternations involve a single argument which may fill different grammatical functions, such as the causative-inchoative alternation in (2.2) below.

The identification of classes that are more sophisticated and fine-grained than transitivity classes is thus a major goal of verb classification research. In particular, most classifications rely on detailed analyses of the multiple argument realization and alternating behavior of (sets of) verbs. As a brief demonstration, let us consider the data and logic underlying another well-known classification that further sub-classifies transitive verbs, namely that between manner and result verbs. The verb *change*, for instance, undergoes the so-called causative-inchoative alternation (Levin 1993: 27–31), whereby the intransitive subject undergoing the change may also occur as a direct object when the cause of the change is realized (as the transitive subject). Similar alternating behavior is exhibited by a range of verbs, such as *break, grow,* and *increase*.

(2.2) a. Sam {changed/broke/grew/increased} the things.
b. The things {changed/broke/grew/increased}.

In contrast, other verbs, such as *eat, speak, run* and *steal* may also be used both transitively (2.3a) and intransitively (2.3b), but these differ in that the subject of both uses remains the same and the intransitive variant merely omits the direct object (which is sometimes more or less recoverable from context).

(2.3) a. Pat {eats food / speaks German / runs a mile / steals money}.
b. Pat {eats / speaks / runs / steals}.

In addition to this varying syntactic behavior, the sets of alternating and non-alternating verbs also exhibit a systematic, though fairly abstract, semantic distinction. Specifically, the alternating verbs in (2.2) are classified as result verbs, as they entail that the transitive direct object argument undergoes a change of state, but do not describe in detail how the change was brought about. In contrast, manner verbs, such as those in (2.3), lack the entailment of a change in the transitive object but describe the manner in which the subject acts on it. These data thus found the basis for a major sub-classification of (transitive) verbs, known as the manner/result distinction (Fillmore 1970; Rapaport Hovav and Levin 1998).

These types of analyses have been a mainstay of research on verb classification, which seeks to identify classes of verbs exhibiting similarities in both their meanings and their argument realization properties. Verb classes are useful for a number of reasons. First, they provide a structure to the lexicon of a language which captures shared properties among groups of verbs. They also facilitate the identification of meaning components which are relevant for syntactic behavior, ideally enabling the linguist to predict a verb's meaning from its syntactic behavior, and vice versa. Verb classes have also proven useful in a variety of pedagogical and computational applications.

In the remainder of this chapter, I describe various approaches to verb classification and the mapping of verb meaning to argument realization. While introducing these approaches, I show how their methodological, theoretical, and lexicographic shortcomings necessitate a revised approach to verb classification, which is developed in this monograph.

2.2 Role-based approaches to argument realization

One approach to the syntax-semantics interface relies on the theoretical construct of semantic roles (a.k.a. case roles, thematic roles, theta roles), which are coarsely defined argument types which occur with a wide range of different verbs.[3] Semantic roles were introduced to American linguistics as early as the 1960s (Gruber 1965) and popularized in Fillmore's Case Grammar (1967, 1968, 1970), though they find their roots in European research on Valency Grammar (Tesnière 1959; Helbig and Schenkel 1969). They are used to account for similar behavior of the same argument type across numerous predicates, specifically by classifying arguments according to coarse-grained semantic types (roles) and mapping these to specific syntactic positions.[4] Three important theoretical tools are associated with this line of research: semantic role lists, linking rules, and role hierarchies (Fillmore 1971; Jackendoff 1990; Dowty 1991, inter alia).

3. This section focuses on Case Grammar as popularized by Fillmore (1967, 1968) and further developed primarily by American linguists as outlined here. Section 3.3 discusses Valency Grammar (Helbig and Schenkel 1969; Herbst et al. 2004), which also focuses on the relation between verbs and their arguments but has until recently been more limited to European scholarship.

4. As described below, Fillmore (1977a) clarifies in his later work that his original work on case roles was merely intended as a method for describing argument realization properties across verbs rather than a full-fledged "Case Grammar" (see also Boas and Dux 2017).

Semantic role lists are predetermined sets of labels that identify arguments according to the semantic relation they bear to their verb. These limited lists of roles should be applicable to any argument of any verb.[5] Table 2.1 provides a list of some common semantic roles.

Table 2.1 Common semantic roles and their definitions (adapted from Fillmore 1971: 376)[6]

Agent (A)	the instigator of the event
Patient (P)	the entity that undergoes a change of state
Theme (T)	the entity that undergoes a change of location
Instrument (I)	the stimulus or immediate physical cause of an event
Source (S)	the place from which something moves
Goal (G)	the place to which something moves
Experiencer (E)	the entity which receives or accepts or undergoes the effect of an action

Semantic roles are meant to bring out similarities and differences in verb meaning that are reflected in argument expression. The mapping of arguments to semantic roles is demonstrated in (2.4): *John* is the Agent because he instigates the breaking, *the window* is Patient because it undergoes a change, and *the rock* is the Instrument because it is used by the Agent to undertake the breaking action. The Agent is realized as a subject NP, the Patient as a direct object NP, and the Instrument occurs in a PP headed by *with*.

(2.4)	*John*	broke	*the window*	*with a rock.*
	Agent		Patient	Instrument

Semantic roles proved useful because they account for the ability for certain argument types to occupy different syntactic positions. For example, in active transitive sentences, Agent arguments regularly occur as the subject, while Patient arguments regularly occur as the direct object. These types of findings gave rise to "linking rules" whereby semantic roles are assigned a certain position in the syntax, and their surface realization can be predicted based solely on this syntactic

5. The desire for a small set of roles applicable to all arguments that characterized early research on semantic roles was inspired by developments in phonology, particularly the identification of phonological features that capture a highly diverse range of phonemes in many languages (Levin and Rappaport Hovav 2005: 36).

6. The Patient role label in this table and used in this section was labeled "Counter-Agent" in Fillmore (1971) and defined as "the force of resistance against which the action is carried out". However, the more general Patient role is more appropriate for the present discussion. The Theme label was also not included in the original table but added here for the sake of discussion.

positioning regardless of the specific verb used. For instance, Baker's (1988: 46) Uniformity of Theta Assignment Hypothesis (UTAH) posits that the same case role will occur in the same (underlying) syntactic position regardless of the verb (e.g. Agents appear as subjects).

However, such a strict formulation of linking rules does not account for alternations, in which a single participant (i.e. semantic role) may occur in different syntactic positions, even when used with the same verb, as in (2.5).

(2.5) a. John broke the window with a rock.
b. A rock broke the window.
c. The window broke.

Here, the Agent may appear as subject (2.5a), but it may be omitted, in which case an Instrument (2.5b) or Patient (2.5c) may take the subject position. To account for different realizations of a given semantic role, as with *the window* in (2.5b) and (2.5c), traditional approaches (such as UTAH) claim that the syntactic position of a role/argument is posited in D-structure (the underlying 'deep' structure). After positioning the roles into syntactic slots in the D-structure, further rules are then applied to generate the actual surface realization based on the underlying syntactic positioning.[7]

Data such as that in (2.5) give rise to semantic role hierarchies which assign positions to a given set of (potentially) cooccurring semantic roles. For example, a hierarchy that determines the subject of sentences such as those in (2.5) is given in (2.6).

(2.6) Agent > Instrument > Patient
(Levin and Rappaport Hovav: 156; cf. Fillmore 1968: 33)

This hierarchy states that the Agent is subject if it is realized, the Instrument is subject if no Agent is realized, and so forth. Various hierarchies have been proposed to account for various types of behavior. For instance, Van Valin (2005: 61) proposes a hierarchy based on an argument's position in a decomposition of the verb's event structure, and Croft (2012) formulates hierarchies based on force-dynamic notions of causation. Levin and Rappaport Hovav (2005: 162f.) emphasize that different hierarchies are required for different aspects of grammatical behavior.

Although semantic role lists and hierarchies have been refined significantly, the basic assumptions guiding (especially early) formulations of role-based linking rules have proven unable to account accurately for the full range of empirical data.

7. Section 3.2 discusses empirical and theoretical problems that arise with positing an invisible, underlying structure separate from surface realization, as well as how these problems are overcome in functional and cognitive approaches, specifically Construction Grammar.

I forego a detailed discussion of these shortcomings, as they are amply described in numerous other works (Fillmore 2003; Levin and Rappaport Hovav 2005; Dux 2016: 31–35; Boas and Dux 2017), and instead summarize the major problems and the theoretical assumptions leading to them. First, one assumption is that there is a limited set of primitive semantic roles which can apply to all verbs, yet there is no consensus on precisely which or how many roles there are. Many of the proposed roles are also defined too vaguely, e.g. the Patient and Theme labels can potentially apply to nearly all types of direct objects. Furthermore, even a modified assumption of one-to-one correspondence fails to account for instances in which one role may have two realizations or in which one argument bears properties of two roles simultaneously, as with the sentence *Pat rolled down the hill on purpose*, whereby the subject is both Agent (instigates the event) and Theme (changes its location).[8] More generally, these approaches do not distinguish frequent role combination (e.g. Agent, Patient) from those that are infrequent or unattested (e.g. Location, Instrument, Source). Finally, traditional role-based approaches lack explanatory power, as they merely document the realization of roles but do not say why a given (set of) role(s) appears in specific grammatical categories.

Various approaches have been developed to address these issues. Some of these maintain the construct of semantic roles but seek to define them more rigorously by means of semantic entailments. For instance, Dowty (1989, 1991) argues that semantic roles can be defined in terms of truth-conditional entailments and proposes proto-roles in order to account for generalizations in the mapping of arguments to subject and object position.[9] He proposes two proto-roles, Proto-Agent and Proto-Patient, which are not defined with necessary and sufficient conditions, but with lists of prototypical features (e.g. Proto-Agents may be sentient and volitional, Proto-Patients may be affected and undergo changes). Individual arguments need not possess all features associated with a proto-role and may in fact possess features associated with both roles.[10] Dowty's Argument Selection Principle accounts for subject and object selection with transitive verbs by stating

8. Jackendoff (1990) accounts for these data by developing a two-tier thematic role system in which an argument can bear two different roles.

9. As suggested by the name, Dowty's approach is influenced by prototype theory, as developed by Rosch (1973, 1978).

10. In Dowty's approach, arguments bearing properties of both proto-roles may be realized as either subject or object, depending on the verb, thus accounting for verb pairs such as *fear* and *frighten*, whereby the 'experiencer' is agent-like because it is sentient, but patient-like because it changes state, and the 'feared entity' is agent-like because it causes another entity to change state, but patient-like because it is not agentive and need not be sentient.

that the argument with more Proto-Agent features will be realized as a subject and the one with more Proto-Patient features as object.[11]

Dowty's approach has been criticized for its lack of coverage and for the lack of structure in the proto-role features (Levin and Rappaport Hovav 2005: 59–65). First, Dowty's proto-roles and his Argument Selection Principle only account for subject and object selection with transitive verbs, but not pure intransitives, intransitives with prepositional objects, or ditransitives. Furthermore, while the generalized role approach works well for English and other well-studied languages, its initial formulation does not account for the full range of cross-linguistic differences in subject and object selection. It may turn out that richer semantic information and additional proto-roles may be needed to improve this approach. Other objections to proto-roles stem from observations that some proto-role features are more syntactically relevant than others (e.g. causation appears to be the most influential proto-Agent features) and that certain features of the two proto-roles depend on each other (e.g., the features "cause change" and "undergo change").[12]

While much recent work on argument realization maintains many assumptions associated with semantic role lists (as outlined in the following section), another branch of research, particularly embedded within the umbrella of Cognitive Linguistics, has emphasized the need for bottom-up analyses of semantic roles and their mapping to syntax. In fact, even the figurehead of role-based approaches, Charles Fillmore, abandoned these pre-theoretical assumptions by the 1980s and developed a richer and more empirically testable approach to semantic roles in the form of Frame Semantics (Fillmore 1985; Fillmore and Baker 2009; Dux and Boas 2017). In Section 3.1, I discuss the frame-semantic equivalent of semantic roles, Frame Elements. In contrast to the case roles discussed here, these types of "roles" are analyzable with respect to their verb and its semantic frame, far more numerous and semantically specific than the limited set of case roles, and not assumed to correspond one-to-one with syntactic argument slots.

11. A similar approach is found in the generalized macro-roles used in Role and Reference Grammar (Van Valin 1990; Van Valin and Wilkins 1996; Van Valin and LaPolla 1997). In this framework, the two macro-roles, Actor and Undergoer, are coarse-grained roles that encompass a number of more specific roles. Actor, for instance, is a generalization over Agents and Experiencers. These mid-grained roles are, in turn, generalizations over more specific roles associated with individual verbs (e.g. the Agent role is an abstraction over the verb-specific 'giver,' 'runner,' or 'speaker' roles). Verb-specific arguments (e.g. Giver) are mapped to more abstract roles higher up in the hierarchy (e.g. Actor). As with Dowty's Proto-Agent and Proto-Patient, the macro-roles predict the mapping to grammatical functions: the argument which maps to Actor is subject, and the argument mapping to Undergoer is object.

12. These issues are addressed in various ways by Primus (1999), Ackerman and Moore (2001), and Beavers (2010).

2.3 Event-structural approaches to argument realization and verb classes

2.3.1 The relation between event structure, verb meaning, and argument realization

While approaches such as Dowty's (1991) proto-roles and Van Valin and LaPolla's (1997) generalized macro-roles seek to overcome the shortcomings of traditional semantic role list approaches by defining semantic roles according to their entailments, another significant branch of research takes a rather different view of verb meanings, arguments, and their mapping to syntax. These approaches fall under the umbrella term of "event structure" and assume that verb meanings can be decomposed into smaller (primitive) units that predict a wide range of the verb's argument realization behavior (Jackendoff 1990; Rappaport Hovav and Levin 1998; Beavers 2006, 2010).[13] Here, I introduce the main tenets of these approaches, drawing especially on Rappaport Hovav and Levin (1998).

Building on the initial findings of the two broad classes of manner and result verbs introduced in Section 2.1, a large strand of research arose focusing on additional properties of these two classes and identifying further (sub-)classes and the grammatically relevant meaning components which motivate them.[14] Manner and result verbs differ from one another not only with respect to their behavior on the causative-inchoative alternation shown above, but more generally in the ability of manner verbs like *sweep* to occur in a much wider range of syntactic patterns than result verbs like *break*, as evidenced in (2.7)–(2.8).

(2.7) a. Terry swept.
b. Terry swept the floor.
c. Terry swept the crumbs into the corner.
d. Terry swept the leaves off the sidewalk.
e. Terry swept the floor clean.
f. Terry swept the leaves into a pile.

(Rappaport Hovav and Levin 1998: 97–98)

13. The approach(es) presented here are also called "lexicalist" or "projectionist" approaches, as they view argument realization behavior to be projected from the verbal lexical item. These labels are generally used to differentiate them from a "constructional" approach (Goldberg 1995, 2006; see Section 3.2), in which argument realization is attributed not only to the verb but also to the syntactic constructions themselves.

14. See, among others, Gropen et al. 1991; Beavers et al. 2010, and Rappaport Hovav and Levin 2010.

(2.8) a. *Terry broke.[15]
b. Terry broke the vase.
c. *Terry broke the vase onto the floor.
d. *Terry broke the vase off the table.
e. *Terry broke the vase shattered.
f. *Terry broke the vase into a pile of shards.
(cf. Rappaport Hovav and Levin 1998)

Originally, the difference between these two verb types was attributed solely to the observation that the meaning of *break*, as well as other result verbs such as *open, dry,* or *shatter*, entail some type of causation, whereas the meanings of manner verbs (*sweep, whistle, run*) do not (Fillmore 1968, 1970). However, the data in (2.7)–(2.8) are problematic for theories assuming a direct mapping from a verb's meaning (or its "lexical semantic representation" [Rappaport Hovav and Levin 1998: 98]) to the expression of its arguments. Namely, such an approach must posit (at least) six separate entries for *sweep*, which seems counterintuitive given that *sweep* describes the same the scenario across all the various contexts in (2.7) and differs only in specifications of the swept area, swept item(s), and/or result of the sweeping. A more suitable solution to this problem of multiple argument realization is to identify general principles that predict the range of argument realization patterns or "meanings" (Rappaport Hovav and Levin 1998: 99) available to a given verb. Ideally, these principles apply not to individual verbs, but to classes of semantically related verbs.

Within event-structural approaches, these general principles governing argument realization involve the decomposition of a verb's meaning such that the structural (i.e. grammatically relevant) parts of meaning are factored out and separated from idiosyncratic meaning aspects that are purportedly "not relevant for argument realization" (Rappaport Hovav and Levin 1998: 106).[16] The structural portion of verb meaning is assumed to be the basis for the formulation of grammatically relevant ("semantic") verb classes and is typically defined in terms

15. While this sentence is acceptable under the interpretation of Terry being the entity which broke, it is unacceptable under the interpretation parallel to (2.7a) with *sweep*, namely that Terry is the agent who broke something.

16. Rappaport Hovav and Levin (1998: 106) claim that the division of a verb's meaning into grammatically relevant and idiosyncratic components is widely accepted and "a major achievement of recent lexical semantic research", citing Grimshaw (1993) and Hale and Keyser (1993), among others. This view dates back to Bloomfield's (1933) statement that the lexicon is merely an appendix of the grammar. The discussion in Chapter 3 demonstrates that such a division does not always stand up to comprehensive empirical analysis.

of an “event structure” which represents the temporal and/or causal structure of an event.[17]

Event structures correspond closely to the aspectual classes popularized by Vendler (1957) and subsequently refined by various scholars (Dowty 1979; Mourelatos 1981; Dahl 1985; Croft 2012). Vendler (1957) distinguishes four different event types based on their aspectual properties: states, activities, accomplishments, and achievements. These aspectual types contrast with each other along three dimensions: stative vs. dynamic, durative vs. punctual, and bounded vs. unbounded (Mourelatos 1981: 201–202). For instance, activities such as *sing* or *sweep* involve action of the subject (dynamic), which is continuous (durative) and does not have a clear culmination or endpoint (unbounded; as opposed to a bounded accomplishment, e.g. *sing Ode to Joy*). The Mourelatos features associated with each aspectual type and examples demonstrating them are given in Table 2.2.

Table 2.2 Vendler’s aspectual types and Mourelatos features (cf. Croft 2012: 33–34)

Aspectual type				Examples
State	stative	durative	unbounded	*be Polish, be polite, love*
Activity	dynamic	durative	unbounded	*sing, dance, sweep*
Achievement	dynamic	punctual	bounded	*shatter, reach (the summit)*
Accomplishment	dynamic	durative	bounded	*cross (street), read (book), break* (tr.)

While these aspectual classes were originally employed to explain how verbs behave with respect to tense, aspect, and modality, they have more recently been applied to account for argument realization behavior.[18] Two important assumptions guide such accounts: For one, the lexical-aspectual classification of a verb, or its event structure, determines the grammatical properties of the verb, whereas the idiosyncratic portion of its meaning (its “root” or “constant”) does not influence grammatical behavior, but only serves to differentiate individual verbs with the same event structure. Secondly, verbs are associated with a single “basic” event structure and their occurrence in argument realization patterns associated with other event structures is accounted for by means of additional syntactic processes, such as “template augmentation” (Rappaport Hovav and Levin 1998: 111f.), as described presently.

17. Levin and Rappaport Hovav (2005: Chapter 4) offer a detailed discussion and comparison of localist, causal, and aspectual characterizations of event structure.

18. See Levin and Rappaport Hovav (2005: Chapters 5–7) for an overview of such accounts, and Croft (2012: 33f.) for a critical discussion of Vendler’s aspectual classes and the diagnostics for determining them.

A verb's "basic" event structure and can be represented in terms of a predicate decomposition. The event structure templates proposed by Rappaport Hovav and Levin (1998: 108) are provided in (2.9).

(2.9) a. $[\text{x ACT}_{<\textit{MANNER}>}]$ (activity)
b. [x <*STATE*>] (state)
c. [BECOME [x < *STATE* >]] (achievement)
d. $[[\text{x ACT}_{<\textit{MANNER}>}]$ CAUSE [BECOME [y < *STATE* >]]] (accomplishment)
e. [x CAUSE [BECOME [y < *STATE* >]]] (accomplishment)

Manner verbs such as *sweep*, *whistle*, or *run* have a basic event structure of activities (2.9a): they involve some participant (*x*) that acts (ACT)[19] in some manner ($_{<\textit{MANNER}>}$).[20] In contrast, result verbs such as *break* or *open* are associated with the accomplishment event structure in (2.9d): they involve a participant (*x*) that acts in some manner, and as a result of this action, some other participant (*y*) changes into (i.e. *becomes*) a new state.

On an event-structural approach, the basic meaning of *sweep* is associated with the intransitive pattern exemplified in (2.7a) above, as *sweep*'s basic event structure is activity, shown in (2.9a). This is formally represented in (2.10): the *x* in the template corresponds to the subject *Terry* and the <*MANNER*> is specified by the root *sweep* realized by the verb.

(2.10) Example: *Terry swept.*
Template: $[\text{x ACT}_{<\textit{MANNER}>}]$[21]
Representation: $[\text{x ACT}_{<\textit{SWEEP}>}]$ (x = Terry)

19. The capitalized portions of the event structure representations (e.g. ACT, BECOME, CAUSE) are typically assumed to be primitive (and/or universal) predicates. However, Levin and Rappaport Hovav (2005: 74) discuss how different approaches arrive at different numbers and types of primitives.

20. The representation of manner as a subscript in italics captures two features of these verb types. That it is in sub-script represents that the manner is not overtly expressed (as opposed to the non-sub-script <*STATE*> of the state, achievement, and accomplishment templates, which must be overtly expressed). That it is in italics represents that the name of the verb corresponds to the manner of the activity (e.g. the verb *sweep* refers to a participant acting in a sweeping manner).

21. More precisely, the basic event structure of *sweep* in this approach reads $[\text{x ACT}_{<\textit{MANNER}>}\ \underline{\text{y}}]$, because sweeping events involve both a sweeper (x) and a swept surface, typically a floor (y). However, the surface need not be expressed (as indicated by underlining the *y*) because it is embedded in the root *sweep* due to the prototypical association of sweeping events with floors as surface (Rappaport Hovav and Levin 1998: 113, 115).

In contrast, the basic meaning of *break* has the accomplishment template (more precisely, the *externally caused change of state* template [Rappaport Hovav and Levin 1998: 116f.]) shown in (2.11): the *x* of the template corresponds to *Terry*, who acts in some manner and thereby causes the *y* (*the vase*) to enter into a new *STATE* (namely, being broken).

(2.11) Example: *Terry broke the vase.*
Template: [[x ACT $_{<\mathit{MANNER}>}$] CAUSE [BECOME [y < *STATE* >]]]
Representation: [[x ACT $_{<\mathit{MANNER}>}$] CAUSE [BECOME [y < *BROKEN* >]]]
(x = Terry, y = vase)

However, *sweep* was shown above (2.7c–f) to occur in argument structures that do not correspond to those of activities. To account for such cases, Rappaport Hovav and Levin (1998: 111) introduce the construct of *template augmentation*.

(2.12) **Template Augmentation:** Event structure templates may be freely augmented up to other possible templates in the basic inventory of event structure templates. (1998: 111)

Template augmentation allows an activity verb like *sweep* to occur with event structures associated with accomplishments involving a change of state in (2.7c, d) above, a change of location (2.7e), or the creation of an object (2.7f). Specifically, the event structure template of an activity repeated in (2.13a) corresponds to a subpart (specifically the causing act) of another template in the basic inventory, namely that of accomplishments. The identity of the activity template with the subpart of the accomplishment template is set off by bold font in (2.13b).

(2.13) a. [x ACT $_{<\mathit{MANNER}>}$] (activity)
b. [[**x ACT** $_{<\boldsymbol{\mathit{MANNER}}>}$] CAUSE [BECOME [y < *STATE* >]]] (accomplishment)

Given the identity of *sweep*'s basic event structure with the causing sub-part of the accomplishment event structure, *sweep* may be used in contexts associated with (externally caused) accomplishments, as shown in (2.14).

(2.14) [[x ACT $_{<\mathit{SWEEP}>}$] CAUSE [BECOME [y <*CLEAN*>]]] (x = Terry; y = floor)
Terry swept the floor clean.

In this way, the meanings of verbs with simpler basic event structures can be built up through template augmentation to appear in contexts (i.e. with "meanings") associated with verbs of more complex event structures.

Rappaport Hovav and Levin (1998: 112–113) also posit two well-formedness conditions on template augmentation that determine the relation between event templates and argument realization, as well as constraining certain verb types (i.e.

verbs with certain basic event structures) from occurring in unattested contexts. Their Argument Realization Condition is given in (2.15).

(2.15) **Argument Realization Condition**:
 a. There must be an argument XP in the syntax for each structure participant in the event structure.
 b. Each argument XP in the syntax must be associated with an identified subevent in the event structure. (Rappaport Hovav and Levin 1998: 113)

The Argument Realization Condition accounts for the varying behavior of manner and result verbs shown in (2.7) and (2.8) above. Specifically, manner verbs like *sweep* are licensed in intransitive contexts, because the subject argument corresponds to the *x* argument of the activity template in (2.9a), thereby fulfilling the first part of the condition, and because the subject argument is identified with the entire [x ACT $_{<MANNER>}$] subevent of the event structure, thereby fulfilling the second part. In contrast, result verbs like *break* cannot occur in intransitive sentences like *Terry broke* (where the *Terry* is the 'breaker'). Specifically, this sentence has only one argument XP in the syntax (*Terry*), but the result-verb event structure of *break* includes two structure participants (cause of breaking, broken entity) thus violating the first part of the Argument Realization Condition, and it includes two subevents (CAUSE, BECOME) and thereby violates the condition's second part. Based on these observations, Rappaport Hovav and Levin conclude that "the sharp difference between *break* and *sweep* with respect to the obligatoriness of the direct object arises from the difference in their event structures". (1998: 117).

The second condition on template augmentation is defined in (2.16).

(2.16) **Subevent Identification Condition**:
Each subevent in the event structure must be identified by a lexical head (e.g., a V, an A, or a P) in the syntax.
(Rappaport Hovav and Levin 1998: 112)

Although discussed in less detail than the Argument Realization Condition, Rappaport Hovav and Levin (1998) point out how the Subevent Identification Condition is formulated in such a way that it allows accomplishment verbs like *break* to occur in non-causative, intransitive sentences (e.g. *The vase broke*) while maintaining its basic classification as an accomplishment (more precisely, an externally caused change of state) verb. Specifically, because break bears this basic classification, its meaning incorporates both the CAUSE sub-event and the BECOME subevent. Therefore, each of the two subevents of the accomplishment event structure in (2.9d) above is identified by the verbal lexical head *break* ("a V"), thereby fulfilling the Subevent Identification Condition.[22]

Event-structural approaches to argument realization overcome several issues associated with role-based approaches (described in Section 2.2), including reformulations of traditional semantic role list approaches such as Dowty (1991) and Van Valin and LaPolla (1997). For one, it is easier to identify the status of an argument when drawing on the limited set of event structure templates (i.e. the five templates shown in (2.9)) than on a potentially unlimited set of thematic roles.[23] Furthermore, the discussion in Section 2.2 emphasized that argument roles are better defined with respect to specific verb meanings rather than as independent entities, and event-structural approaches define arguments according to their position within the decomposition of a verb's meaning and the types of primitive predicates it occurs with (Pinker 1989: 166–167; Grimshaw 1993). This approach allows for subevent analyses that identify the internal complexity of events and for the organization of verb meanings and arguments into hierarchical relations, both of which are important in the mapping of verbal arguments to syntax (see Levin and Rappaport Hovav 2005: 75).

2.3.2 Problems with event-structural approaches

While event-structural approaches to the syntax-semantics interface are certainly more sophisticated and formally complex than the role-based accounts introduced in the previous sections, they also fail to adequately address the full range of empirical data at the heart of this monograph, particularly the syntactic differences among near-synonymous verbs. Like traditional role-based approaches, the framework outlined here also succumbs to a strict adherence to empirically unfounded theoretical tenets and seeks to fit the richness and variety of linguistic data into a small

22. The intransitive (inchoative) use of *break* appears to violate the Argument Realization Condition, as the syntax contains one argument but the event structure contains two sub-events and two participants. Rappaport Hovav and Levin (1998: 117–118) address this problem with data from other languages, in which intransitive uses of accomplishment verbs are morphologically marked (e.g. with reflexive pronouns). They claim that these morphological markers serve to satisfy the condition and that English is unique in that it does not morphologically mark these intransitive uses. This strategy likely draws skepticism from linguists in usage-based frameworks (see Section 3.2) which deny the existence of unexpressed elements, because it appears that Rappaport Hovav and Levin (1998) claim that there is an invisible morpheme in English.

23. However, as with semantic roles of role-based approaches, the precise number of event structures or primitive predicates is not agreed on. For instance, Jackendoff (1972) proposes five primitive predicates, but Jackendoff (1990) proposes 12 primitive predicates. See also Levin and Rappaport Hovav (2005: 74).

set of pre-selected theoretical categories. In particular, such approaches assume that there is a strict division between grammatically relevant and grammatically irrelevant meaning components, that the latter consist of a small set of (around five) event structural templates, and that each verb is associated with only a single template.

As other scholars in cognitive and usage-based frameworks have amply documented the shortcomings of these approaches (Boas 2005a, 2008b; Michaelis and Ruppenhofer 2001; Perek 2015: 15–23), here I draw on remarks from scholars who themselves work in event-structural frameworks to demonstrate the problematic nature of assumptions guiding such approaches, particularly relating to the treatment of verbal roots ("constants" in Rappaport Hovav and Levin 1998). The root refers to the idiosyncratic portion of a verb's meaning that is not relevant for syntax; the grammatically relevant portion of verb meaning is its event structure, while the root only serves to differentiate individual verbs with the same event structure. In contrast to the limited set of event structures, the number of verbal roots is open-ended (which accounts for the countless differences between verb meanings within and across languages). The discussion here cites evidence, identified primarily by proponents of event-structural approaches, suggesting that certain aspects of the root are in fact relevant for argument realization. These data demonstrate the need for more detailed analyses of the argument realization behavior of verbs with closely related roots, precisely the types of analyses described in this monograph.

In Rappaport Hovav and Levin's (1998) theory, the ontological type of the root (e.g. manner, place, instrument, internally/externally caused state) determines the basic event structure of the verb bearing it. They propose the *canonical realization rules* in Table 2.3 mapping the ontological type of roots to their event structures. Roots are integrated into a verb's event structure either as an argument of a predicate (within the event structure) or as a modifier of a predicate. The position of the root within the event structure is signified by the italicized and

Table 2.3 Canonical realization rules (Rappaport Hovav and Levin 1998: 109)

Constant	Event structure template	Verbs
manner	[x ACT $_{<\mathit{MANNER}>}$]	*jog, run, creak, whistle*
instrument	[x ACT $_{<\mathit{INSTRUMENT}>}$]	*brush, hammer, saw, shovel*
placeable object	[x CAUSE [BECOME [y WITH <*THING*>]]]	*butter, oil, paper, tile, wax*
place	[x CAUSE [BECOME [y <*PLACE*>]]]	*bag, box, cage, crate*
internally caused state	[x <*STATE*>]	*bloom, blossom, decay, flower, rot*
externally caused state	[[x ACT] CAUSE [BECOME [y <*STATE*>]]	*break, dry, harden, melt, open*

angle-bracketed portion of the event structure representations above, with modifier arguments set off in sub-script (as with "manner" and "instrument" roots) and argument modifiers in their appropriate position in the relevant sub-event (as with the other root types).

Although Rappaport Hovav and Levin (1998: 106) claim that roots are not grammatically relevant, they also mention several cases in which the root determines properties of argument realization that may be deemed grammatically relevant in other frameworks (see Chapter 3). For one, as just shown, their canonical realization rules state that the ontological type of the root determines their basic event structure, which in turn determines a great deal of their argument realization behavior. That is, because the root *sweep* lexicalizes the concept of a sweeping activity, it is associated with the activity event structure. Secondly, the root determines the number and types of participants minimally associated with the concept the verb denotes. For example, while *run* and *sweep* are both associated with activity event structures, *run* is only associated with one participant (the runner), but *sweep* is associated with two participants (the sweeper, the swept surface).[24] At the same time, when these event-structurally equivalent "activity" verbs are used in the same syntactic context (i.e. simple transitive patterns), *run* yields an accomplishment reading but *sweep* yields an activity reading for (2.17).

(2.17) a. Terry ran a mile. (Accomplishment)
b. Terry swept the floor. (Activity)

Rappaport Hovav and Levin (1998: 115) go on to point out a grammatical difference resulting from subtle differences in the roots of two closely related verbs, *sweep* and *wipe*. Specifically, *sweep* may omit the direct object (*Terry swept*). While *wipe* may not (**Terry wiped*). Because *sweep* is associated with a prototypical type of surface, namely a floor, while *wipe* (and other verbs such as *rub* or *scrub*) are not. These data clearly clash with the claim that verbal roots are not relevant for grammatical behavior, unless phenomena such as number of arguments, the ability to omit arguments, and the interpretation of an argument in a given context are deemed to be outside of the scope of "grammar".

In fact, subsequent research in event-structural frameworks has emphasized that the supposedly idiosyncratic portion of verb meaning does in fact play a role in argument realization (i.e. grammatical) behavior. While much research on idiosyncrasies of verb meaning has been embedded in cognitive and constructional

24. However, the substance, e.g. dirt that is swept, is not viewed as a necessary participant, as sentences such as *Terry swept the crumbs* are claimed to be ungrammatical by Rappaport Hovav and Levin (1998: 118–120). However, it is unclear that such sentences are indeed unattested and, if they are, how the proposed meaning of *sweep* would be reformulated.

frameworks (Taylor 1996; Boas 2003, 2006; Iwata 2008), proponents of projectionist approaches to argument realization have also repeatedly encountered problems empirically teasing apart the structural and idiosyncratic portions of verb meaning. The following quotations from the main proponents of this approach, Beth Levin and Malka Rappaport Hovav, further emphasize the need for bottom-up studies focusing on subtle differences in verbal roots.

– "[T]he major challenge facing any effort to handle verbal polysemy is the delineation of the exact range of meanings available for any individual verb." (Rappaport Hovav and Levin 1998: 129)
– "Research into the nature of the root and the articulation of general principles which govern the integration of the idiosyncratic and event-based facets of meaning is of the utmost importance." (Levin and Rappaport Hovav: 2005: 193)
– "[D]ifferences among verbs in argument realization options could be traced to differences in the ways that their roots pair up with event structure types." (Levin and Rappaport Hovav: 2005: 74)
– "Such accounts [of distribution of verbs across alternations] emphasize once again how much can be gained from a better understanding of how roots and event structure are integrated, yet much remains to be done to fully understand how this integration happens." (Levin and Rappaport Hovav: 2005: 234)
– "The distribution of verbs across the alternating and nonalternating classes is not completely idiosyncratic, but is governed by fine-grained semantic properties of the events these verbs describe" (Levin and Rappaport Hovav: 2005: 239; cf. Dowty 1991 and Pinker 1989)

Indeed, much recent work within event-structural approaches has focused on idiosyncratic aspects of verb meaning, yet much of this work still seeks to fit these idiosyncratic data into a rigid and pre-determined set of primitive event structures.[25]

Before concluding, I remind the reader of the Change verb data introduced in Chapter 1, as the syntactic differences among these semantically related verbs demonstrate the inability of event-structural approaches to account for syntactic differences among near-synonyms. Given the assumption that verbs' event-structural properties determine their syntactic behavior and more nuanced aspects of meaning are not grammatically relevant, one would expect that this class of near-synonymous verbs would fall into the same event-structural classes (i.e.

25. See for instance Dowty (2000), Stringer (2003, 2006), Beavers (2006, 2010), Beavers and Koontz-Garboden (2012), and the recent work of scholars such as Maya Arad, Hagit Borer, Artemis Alexiadou, Heidi Harley, Lisa Levinson, and Antje Rossdeutscher. Similar approaches developed in other, non-projectionist, frameworks include those of Slobin (1987, 1997, 2003) and Haspelmath (1993), achievements and/or accomplishments). In this case, we would expect a more uniform syntactic distribution among Change verbs; however, the brief examples introduced in Chapter 1 demonstrate the syntactic heterogeneity of these near synonyms (which will become more apparent in the corpus-based syntactic investigation described in Chapter 4). Thus, while event-structural approaches may account for broad-scale differences across large verb classes, they show little promise in accounting for well-attested data demonstrating that semantically related (or even near-identical) verbs exhibit differences in argument realization behavior.[26]

In sum, while event-structural approaches to argument realization and verb classification appear capable of capturing broad generalizations about the grammatical behavior of large sets of verbs, the top-down orientation characterizing these approaches (i.e. assuming a limited set of event structures and attempting to fit the data into these) must be complemented with bottom-up analyses identifying the precise grammatical behavior of verbs without assuming pre-existing categories. Such bottom-up analyses provide empirical data that guide the formulation of event-structural theories and contribute to the delineation of grammatically relevant from idiosyncratic aspects of verb meaning. The analyses conducted in Chapters 4–6 provide a detailed, corpus-based analysis of verbs with highly similar roots, thereby providing useful data that informs any theory of argument realization and verb classification regardless of theoretical persuasion.

2.4 Levin's (1993) alternation-based classification of English verbs

2.4.1 Overview

To conclude this chapter, I describe Levin's (1993) seminal work on English verb classification and argument structure alternations, which is perhaps the most

26. Croft (2012) offers a promising alternative to projectionist approaches to event structure and argument realization. After developing an expanded taxonomy of the Vendlerian aspectual classes – including five types and 11 total subtypes – Croft argues that a verb's aspectual properties are more relevant for its behavior with respect to tense, aspect, and modality, whereas argument realization is more readily predicted from causal structure. His account of causal structure relies on concepts from Cognitive Linguistics (e.g. the 'causal chain' of Langacker 1991: 283) and posits hierarchies similar to those found in role-based approaches, but advances these by emphasizing relations among participants in a given scene and accounting for the realization of oblique arguments. His comprehensive account of the meaning and grammar of verbs and sentences employs a 3-d representation of both causal and aspectual structure. Unfortunately, the large-scale cross-linguistic perspective of his theory appears (at least in its 2012 formulation) to help little for the present analysis of finer-grained verb classes in English and German. See Dux (2016: 51–64) for a more detailed discussion of Croft (2012) and its application to English Change verbs and sentences.

widely-cited work on the topic and proposes fine-grained classes with a much higher degree of syntactic and semantic uniformity than those discussed in the preceding sections.[27] The first part of Levin (1993) describes roughly 80 diathesis alternations, transitivity alternations, and morphological features, which are purportedly sensitive to grammatically relevant components of verb meaning.[28] In the second part, Levin tests the distribution of 3,024 verbs (4,186 verb senses) with respect to (sets of) these alternations and patterns and posits a total of 193 verb classes, each consisting of verbs with (near-)identical distribution in these contexts.

To demonstrate how alternating behavior is operationalized in Levin's (1993) classification, I return to the discussion of verbs such as *break* and *hit* introduced at the start of this chapter (cf. Fillmore 1967; 1968; Guerssel et al. 1985; Hale and Keyser 1986, 1987). Levin builds on these analyses by investigating syntax-semantics correspondences among a wider range of verbs. To begin, the verbs *break, hit, cut,* and *touch* can all occur in simple transitive patterns (2.18a,b), but they differ with respect to their behavior in other alternations.[29]

(2.18) a. Jan {cut/broke/touched/hit} the bread.
b. Jan {cut/touched/hit/broke} John's leg.
c. Jan {cut/touched/hit/*broke} John on the leg.
d. The bread {cuts/breaks/*touches/*hits} easily.
e. Jan {hit/cut/*broke/*touched} at the bread. (cf. Levin 1993: 6)

Of the four verbs, *cut, touch* and *hit*, but not *break* participate in the body part possessor ascension alternation, as in (2.18b–c).[30] *Cut* and *break,* but not *hit* or *touch* participate in the middle alternation (2.18d). Finally, *cut* and *hit*, but not *break* or *touch*, participate in the conative alternation (2.18e).[31]

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27. The only other verb classification resource that provides such fine-grained and uniform classes is the Berkeley FrameNet database (Ruppenhofer et al. 2012; https://framenet.icsi.berkeley.edu), which is discussed in detail and compared against Levin (1993) in Section 3.1.

28. Diathesis alternations are alternations which affect the argument realization properties of verbs. Transitivity alternations affect a verb's transitivity. Morphological features include the existence of zero-related nominals for verbs, such as *a bottle/to bottle* or *a cut/to cut*.

29. Levin uses intuition to arrive at grammaticality judgments, but these may vary from speaker to speaker. The judgments presented here are cited directly from Levin (1993).

30. "The body-part possessor ascension alternation is characterized by a change in the expression of a possessed body part: either the body part may be expressed as the direct object [...] or the possessor may be expressed as the object of the verb, with the possessed body part expressed in a prepositional phrase [...]" (Levin 1993: 7).

31. "[I]n the conative construction, the argument corresponding to the object of the transitive variant is expressed in a prepositional phrase headed by *at*" (Levin 1993: 6).

After establishing each verb's alternating behavior, Levin then compares the semantics of each verb to determine what aspects of meaning influence the verbs' ability to undergo these alternations. For example, the body part possessor alternation requires that the verb involve some contact between two entities. This meaning component is entailed by *cut, hit,* and *touch*, whereas *break* is a "pure change of state verb" and does not entail a 'contact' meaning (Levin 1993: 8). The middle alternation, which omits the expression of the agent, requires that the patient (i.e., transitive direct object) of the verb undergo a change of state. The patient of *cut*, like that of *break*, undergoes a change of state by becoming broken or cut. Levin (1993: 8–9) points out that this is reflected in the zero-related nouns for these words; *a cut* and *a break* are visible results of the event, while *a touch* and *a hit* refer to the events themselves. Finally, the conative alternation requires that the verb have both a motion and contact component. Levin claims that this is the case for *hit* and *cut*, but neither *break* nor *touch* entail motion.

These findings are summarized in Table 2.4, which displays the meaning components as they are associated with the four verbs, and in Figure 2.1, which shows the meaning components that allow the verbs to undergo the alternations. For instance, *break* involves a change of state and the middle alternation requires this meaning component, so *break* can undergo the middle alternation.

Table 2.4 Meaning components for *break, cut, hit* and *touch*

Verb	Change of state	Motion	Contact
break	+	–	–
cut	+	+	+
hit	–	+	+
touch	–	–	+

Body part possessor:	requires contact (*cut, hit, touch*)
Conative:	requires contact and motion (*cut, hit*)
Middle:	requires change of state (*break, cut*)

Figure 2.1 Syntactic alternations, relevant meaning components, and applicable verbs

Through this investigation, Levin (1993) shows that the meaning components 'change of state', 'motion' and 'contact' are relevant for a verb's syntactic behavior. She goes on to identify other verbs that exhibit the same alternating behavior and meaning components of each of the four verbs above. This leads Levin to postulate verb classes such as those in (2.19).

(2.19) *Break* verbs: break, crack, rip, shatter, snap …
Cut verbs: cut, hack, saw, scratch, slash …
Touch verbs: pat, stroke, tickle, touch …
Hit verbs: bash, hit, kick, pound, tap, whack … (Levin 1993: 7)

As with the role-based and event-structural approaches discussed above, Levin's classification is also guided by the assumption that the "behavior of a verb, particularly with respect to the expression and interpretation of its arguments, is to a large extent determined by its meaning" (Levin 1993: 1) and is motivated by the theoretical desideratum that "the ideal lexical entry for a word should minimize the information provided for that word" (Levin 1993: 11).[32] Specifically, on this approach, once one identifies the meaning components shared by members of a syntactically coherent verb class, one may simply list the grammatically relevant meaning component of the verb (class) and need not list other components that are not "grammatically relevant" (e.g. the difference between *kick*, *pound*, and *tap*). This approach thus theoretically avoids redundancy in verbal lexical entries, as "some properties that might have been included in lexical entries because they were thought to be idiosyncratic could turn out on further examination to be predictable from verb meaning and could be eliminated from a verb's lexical entry" (Levin 1993: 12).

2.4.2 Change verbs in Levin (1993)

To demonstrate Levin's approach, I now discuss how she classifies and characterizes the Change verbs introduced in Chapter 1 (Levin 1993: 177f.). These verbs fall into Levin's class of "*Turn* verbs" which is a sub-class of the broader category of "Verbs of Creation and Transformation" (172–178).[33] The verbs in Levin's *Turn* class are listed in Figure 2.2, and example sentences demonstrating their alternating behavior are given in (2.20)–(2.26) below (from Levin 1993: 177–178).

alter, change, convert, metamorphose, transform, transmute, turn

Figure 2.2 Levin's *Turn* verbs

32. This assumption is in line with other research, such as Chomsky (1986) and Pinker (1989) and can be traced back to Bloomfield (1933), who claims that many aspects of meaning are irrelevant for grammatical behavior.

33. Other classes of Verbs of Creation and Transformation include *Build* verbs, *Grow* verbs, Verbs of Preparing (e.g. *bake*), and Performance verbs (e.g. *paint a picture*), among others.

After listing the alternation behavior characterizing this verb class, Levin offers a brief prose description of the verbs' characteristics. Levin dedicates only one phrase to the semantic characterization of the verbs, noting that they "describe a complete transformation" (1993: 178). The remainder of the description focuses on syntactic properties such as alternating behavior, transitivity, and the cooccurrence of certain arguments.[34]

(2.20) The witch turned him from a prince into a frog.

(2.21) **Total Transformation Alternation (transitive)**
a. The witch turned him into a frog.
b. The witch turned him from a prince into a frog.

(2.22) **Total Transformation Alternation (intransitive; most verbs)**
a. He turned into a frog.
b. He turned from a prince into a frog.

(2.23) **Causative/Inchoative Alternation (most verbs)**
a. The witch turned him into a frog.
He turned into a frog.
b. The witch turned him from a prince into a frog.
He turned from a prince into a frog.

(2.24) ***Material/Product Alternation (transitive)**
a. *The witch turned him from a prince.
b. The witch turned him into a frog.

(2.25) ***Material/Product Alternation (intransitive)**
*He turned from a prince.
He turned into a frog.

(2.26) *The witch turned him.

34. Specifically, Levin (1993: 178) gives a brief description of the participants realized with these verbs: "these verbs take the following three arguments […]: the entity undergoing the transformation, as well as the initial ("source") and final ("goal") forms of this entity. When transitive, these verbs also take an agent." She also briefly describes subtler observations regarding the verbs' argument realization properties, including that "most [*Turn* verbs] participate in the causative-inchoative alternation and, therefore, are found in transitive and intransitive forms", and that the "final state always must be expressed, while the initial sate can only be expressed if the final state is expressed".

2.4.3 Evaluation of Levin (1993)

Levin (1993) has received widespread acclaim and is well-cited in the literature. It certainly succeeds in offering a detailed, comprehensive, and fine-grained classification of the English verbal lexicon. And while most of Levin's classes are largely homogeneous with respect to both meaning and argument realization, several subsequent works have pointed out important problems with Levin's approach and results.[35] Here I only briefly review the results-oriented problems and focus rather on those pertaining to Levin's data and methodology. For one, the verbs in many of Levin's classes are semantically heterogeneous and the meaning associated with a class is normally only given a brief and vague description. While the verbs in Levin's *Turn* class are relatively similar in meaning (if one overlooks the intuitively apparent differences e.g. between *alter, convert,* and *metamorphose*), other classes contain verbs with drastically different meanings. For instance, Levin's (1993: 244f.) class of Other Alternating Verbs of Change of State contains hundreds of verbs which most non-linguists would not deem semantically similar such as *collapse, char, quadruple,* and *westernize*. This type of semantic diversity among verbs deemed to have (near-)identical grammatical behavior calls into question Levin's (1993) assumption that shared alternating behavior is reflective of shared meaning.

Levin's classes also do not always exhibit syntactic uniformity. Many classes contain verbs that differ in their behavior with respect to the alternations used to define the class. This is the case with her *Turn* verbs: only some verbs may appear in the simple transitive pattern (2.27) or the total transformation alternation (2.28). While this differing behavior is noted in the class description with the phrases "some verbs" or "most verbs", no mention is made of precisely how many or which verbs these labels apply to.

(2.27) The witch {changed/altered/*turned} the man.[36]

(2.28) He {changed/turned/?converted/*altered} into a frog.

In other cases, a criterial pattern/alternation is listed as incompatible with a given class, when in fact both intuition and corpus data show that (some) verbs may occur in the pattern. For instance, most *Turn* verbs (apart from *turn*) may actually appear in the simple transitive pattern in (2.27) above. (In fact, this appears to

35. See for instance Baker and Ruppenhofer (2002), Boas (2006, 2008, 2011a), Dowty (2000), Dux (2011, 2016), and Iwata (2008), among others.

36. For some speakers, *turn* is acceptable in this context, but exhibits a meaning of 'cause to change sides [e.g. in a war or conflict]' rather than the Change meaning Levin ascribes to this class.

be the most frequent pattern for many verbs in Levin's *Turn* class.) Furthermore, some syntactic patterns in which the relevant verbs occur are not mentioned by Levin. In many cases, these patterns reveal further syntactic differences among the verbs of a proposed class. For example, some but not all *Turn* verbs appear in bare intransitive patterns (2.29), and the verb *turn* frequently occurs in patterns with a bare adjective expressing the final state, as in (2.30). However, Levin does not address these patterns when defining the class.[37]

(2.29) The man {changed/*turned/*altered}.

(2.30) The man {turned/*changed/*altered} red.

That Levin's classes exhibit both semantic and syntactic heterogeneity leaves her approach open to critique. In particular, it is unclear how Levin chooses the specific set of alternations/patterns to define a given class and why other patterns are omitted in the description. and to what extent classes are defined by shared semantics rather than shared alternating behavior.

Two other, more general critiques have been raised against Levin's (1993) classification. For one, Levin does not discuss the relationships between her classes, providing no structure in her classification of English verbs. While her 193 classes are categorized into around 50 more general groups, the relations among both the narrower classes and broader groups are not discussed. Further, Levin cross-classifies certain verbal lexemes based on sense distinctions but is either not explicit about how senses are divided or posits separate senses when certain uses of a lexeme do not exhibit the same syntactic distribution as semantically similar verbs in a certain class, suggesting a potential issue of circularity.[38]

The prevalence of syntactic differences within Levin's classes appears to contradict Levin's methodology and the underlying theoretical assumption of a predictive relation between uniform syntax and shared meaning. These (sometimes glaring) oversights in describing the data result from a more drastic issue with Levin's approach – namely the use of intuition rather than empirical data that reflects natural language use. While linguistic corpora which provide such data were not as readily available when this classification was published, it seems reasonable that Levin's findings could have been amended in subsequent work. One goal

37. See Boas (2011a) for similar findings among Levin's *Build* verbs.

38. For example, Levin (1993: 6) claims that one sense of *hit* entails the meaning component 'contact through the motion of an instrument' and does not undergo the middle alternation (*Babe hit the wall. – *The wall hits well.*), while the other entails 'contact using an instrument and set in motion' and undergoes the middle alternation (*Babe hits the baseball. ~ This baseball hits well*).

of the present work is to provide a more comprehensive and empirically-based account of the syntactic behavior of (some) Levin classes.

2.4.4 The status of argument structure alternations

Scholars have also raised questions relating to the status of Levin's alternations for verb classification. For one, Baker and Ruppenhofer (2002) observe that the meanings Levin ascribes to certain alternations are not always correct. In particular, some alternations that Levin associates with a given meaning component readily occur with verbs that do not have these meaning components.[39] Boas (2006, 2011a) further demonstrates methodological issues in Levin's selection and omission of alternation variants for defining classes, drawing on data showing syntactic differences between near-synonyms, similar to the Change verb examples in (2.27)–(2.30). Boas argues that an adequate analysis should consider a verb's ability to occur in the entire range of possible alternation variants ("constructions") rather than a limited and pre-determined set of identified patterns.

At a broader level, the theoretical construct of argument structure alternations has been called into question over the past two decades. The earliest analyses of alternations account for the two variants by positing lexical rules which perform syntactic transformations on a verb's basic valence (Pinker 1989). Such scholars seek to establish one sense of a verb (i.e. the verb in one of the variants) as basic and the other sense as derived through more general syntactic processes. A major issue with this approach (exemplified in detail by Boas 2008 and 2011b) is that there are no adequate tests to determine which variant is more basic, particularly if data assessing frequency and cognitive entrenchment are not taken into account. Furthermore, closer analyses of alternations reveal that some alternation variants exhibit (sometimes significant) semantic and pragmatic differences which restrict the types of verbs and arguments that may occur in them (cf. Goldberg 1995, 2002, 2006).[40] Perhaps the most well-cited among these is the ditransitive alternation, in which a recipient-type argument may be realized in a prepositional phrase (2.31a) or as a first (dative) object (2.31b). While an inanimate location may be

39. For instance, Baker and Ruppenhofer (2002: 31–32) critique Levin's (1993: 200–202) claim that a verb's ability to undergo the reciprocal object alternation is evidence that their meaning entails reciprocal actions of social engagement: while this is the case with a verb such as *meet* (*Jim met with Sue. ~ Jim and Sue met.*), the verb *jog* also undergoes this alternation but does not entail a 'reciprocal social interaction' meaning component (*Jim jogged with Sue. ~ Jim and Sue jogged.*).

40. Recent research in Construction Grammar, however, suggests that not all alternation pairs exhibit semantic or pragmatic distinctions (Cappelle 2006; Perek 2015).

realized in the prepositional variant (2.32a), it is infelicitous in the double-object variant (2.32b).

(2.31) a. She sent a package to the man.
b. She sent the man a package.

(2.32) a. She sent a package to Texas.
b. ??She sent Texas a package.

Another issue pertains to the notion of "partial productivity" of alternation variants, whereby sets of near-synonymous verbs differ in their ability to occur in a given variant. These findings have led many researchers to take a different view of alternations: rather than relating alternation variants by means of abstract syntactic operations, each pattern (i.e., construction) is associated with its own semantic and pragmatic properties. One influential approach that takes this view is Construction Grammar (Goldberg 1995, 2006; Croft 2001; Boas and Sag 2012), which rejects the verb-centric analyses characteristic of earlier approaches and instead attempts to describe the properties and restrictions associated with individual constructions (i.e. alternation variants) in order to account for their fusion with verbs (or verb classes). These approaches are discussed in detail in Section 3.2.

2.4.5 Summary

In summary, Levin (1993) offers a comprehensive classification of English verbs based on their syntactic properties, primarily their behavior in argument alternations. These fine-grained and relatively uniform classes have enjoyed widespread popularity in the literature, but also exhibit problems relating to the lack of empirical data, the unsystematic employment of alternation variants for defining classes, and a strict adherence to debatable assumptions of a predictive relation between syntax (i.e. alternating behavior) and verb meaning and of a clear division between grammatically relevant and idiosyncratic aspects of meaning. Given that her preliminary findings (and the book's subtitle is *A Preliminary Investigation*) offer a great starting point for a more accurate and systematic classification of (English) verbs, it is highly unfortunate that the subsequent research of Beth Levin and many of her contemporaries largely abandons the fine-grained and low-level classes she proposes and the pressing questions regarding variation among near-synonymous verbs and the relation between specific alternation variants and verb meaning, but instead seeks high-level generalizations based on event structure, as described in the previous section.

Fortunately, recent research in functional and cognitive linguistics has begun to address these issues and provided important tools for an empirically-based reformulation of Levin's classes. In the following chapter, I compare this strand of research to Levin's approach and demonstrate how it offers a new picture of verb classes that captures the broad generalizations associated with event-structural and role-based approaches as well as the similarities among fine-grained classes such as Levin's, while at the same time accounting for the subtler differences in meaning and syntax among near-synonymous verbs.

2.5 Summary and conclusion

In this chapter, I introduced the main concepts and methods of research on argument realization and verb classification and reviewed three major approaches to these topics. In Section 2.2, I demonstrated that the methodological assumptions guiding traditional role-based approaches prohibit an adequate account of the richness of verb meaning and the flexibility of argument realization that is readily apparent in linguistic data. In Section 2.3, I described event-structural approaches, which eschew many of the issues with role-based approaches, particularly in linking argument realization directly to a verb's meaning (more specifically its event-structural classification) rather than to individual arguments. Yet like role-based accounts, event-structural approaches are also limited by problematic assumptions such as that of a (more-or-less) direct mapping between argument realization behavior and a verb's classification into a small set of event-structural classes and that of a clear separation between grammatically relevant and idiosyncratic verb meaning components. Both role-based and event-structural approaches may indeed prove useful in accounting for broad-scale differences across large portions of the lexicon or across numerous language families (e.g. the manner-result distinction), but they offer little help in identifying intuitively natural verb classes with similar meanings shared syntax and even less so in accounting for subtler differences across verbs of such classes. While Levin's (1993) alternation-based classification of English verbs, described in Section 2.4, is highly detailed and comprehensive and many of her proposed classes are fine-grained and homogeneous, her approach exhibits several methodological issues and results in empirical inaccuracy and potential circularity. Unfortunately, Levin and many of her collaborators largely abandoned this detailed and rigorous work in pursuit of highly abstract generalizations based on top-down analyses relying on intuition rather than empirical corpus data.

In the remainder of this monograph, I seek to remedy this situation by providing an alternative view of verb classes, drawing on methods and theoretical constructs developed in cognitive and usage-based frameworks that are less restricted by predetermined theoretical assumptions and desiderata. In the following chapter, I describe Frame Semantics (Fillmore 1985) and its corresponding classification of the English lexicon (Fillmore and Baker 2009; Ruppenhofer et al. 2010), which proposes classes that are semantically richer and more well-defined than those of Levin (1993) and documents syntactic behavior based on corpus data. I also describe how Construction Grammar (Goldberg 1995, 2006) provides a more comprehensive and empirically grounded account of individual constructions (i.e., alternation variants), relations between constructions, and the role of frequency and cognitive entrenchment in the combination of verbs and constructions. Finally, I describe research in Valency Grammar (Herbst 2009, 2014, Faulhaber 2011) that has called into question the long-standing assumption of a clear correspondence between verb meaning and argument realization and developed methods for bottom-up, corpus-based descriptions of verb meaning and syntax.

CHAPTER 3

Frame Semantics, Construction Grammar, and Valency Grammar

Having introduced traditional approaches to verb classification and argument realization and their associated shortcomings, I now discuss recent research in cognitive and usage-based linguistics, particularly Frame Semantics, Construction Grammar, and Valency Grammar. These frameworks take a very different approach to the relation between verb meaning and syntax than those discussed in the previous chapter and offer important theoretical constructs and methods that enable a more accurate picture of verb classes. Although these approaches focus on different aspects of the syntax-semantics interface, they share many fundamental principles and are highly compatible with one another. This chapter demonstrates how analyses that combine these approaches overcome their individual weaknesses and enable a comprehensive and empirically accurate picture of verb classes.

3.1 Frame Semantics

I begin by introducing Frame Semantics (Fillmore 1985; Fillmore and Baker 2009) and its related online database, FrameNet (Ruppenhofer et al. 2010). FrameNet offers a classification of the English lexicon that is as detailed and comprehensive as Levin (1993), but employs a more systematic, sophisticated, and data-driven approach and thereby overcomes many shortcomings identified with Levin's classification. After describing the tenets and development of the theory of Frame Semantics, I discuss how English verbs (and other parts of speech) are classified and characterized in FrameNet. I then lay out the major differences between this framework and those discussed in Chapter 2 and establish its advantages over those approaches, before pointing out certain shortcomings of the FrameNet database and proposing possible solutions to these. In this discussion, I draw on data from both the Change verbs introduced in Chapter 1 and from Theft verbs (discussed in Chapter 5), in order to demonstrate how two very different verb classes are treated in FrameNet.

3.1.1 Background and introduction to Frame Semantics

The essence of Frame Semantics and its approach to lexical analysis can be concisely summarized in the following quote:

> A word's meaning can be understood only with reference to a structured background of experience, beliefs, or practices, constituting a kind of conceptual prerequisite for understanding the meaning. Speakers can be said to know the meaning of the word only by first understanding the background frames that motivate the concept that the word encodes. (Fillmore and Atkins 1992: 76–77).

The theory of Frame Semantics was developed primarily by Charles Fillmore (1977b, 1982, 1985), initially as a response to "truth-conditional" approaches to meaning, which focused primarily on developing logical formalisms for determining the truth of a proposition based on possible worlds or inferences from other true or false propositions.[1] Fillmore argued that truth-conditional approaches in which utterances are assigned a meaning of 1 (true) or 0 (not true) fail to capture the rich information embedded in the meanings of linguistic expressions. He demonstrated the need for a "semantics of understanding" which captures the more basic and essential nature of meaning in natural language use, emphasizing that interlocutors can only properly use and understand linguistic items when they have knowledge of the more fundamental concepts (many of which involve rich cultural and social information) that underlie and motivate expressions.

The earliest formulations of Frame Semantics referred to the rich encyclopedic knowledge necessary for understanding culture-specific concepts, and thus corresponded to the contemporaneous explosion of cognitive research on themes such as prototypes (Rosch 1973, 1978), mental spaces (Fauconnier 1994), and other cultural aspects of linguistic knowledge (Lakoff 1987). Fillmore (1982) presents a number of conceptually and culturally rich words and describes the detailed background knowledge their understanding requires. The word *weekend*, for instance, requires the understanding of a time division of seven ordered days, in which the final two days are not used for work but leisure.

While Frame Semantics is still employed to investigate the rich encyclopedic knowledge required for understanding, Fillmore and his colleagues in Berkeley increasingly focused on how frames and their associated participants are real-

1. The concept of frames was actually employed much earlier in the fields of psychology, computer science, and the social sciences (where they were also referred to as scripts and schemas), but Fillmore pioneered the application of frames to linguistic analysis. Busse (2012) provides a detailed description of early formulations of the frame concept and its integration into Fillmore's Frame Semantics.

ized in linguistic utterances, particularly with respect to verbal valency.[2] To put it simply, lexical units (LUs) are said to evoke semantic frames. Each frame is associated with a certain number and type(s) of participants (Frame Elements; FEs). When a frame-evoking LU is used in a sentence, its arguments correspond to the FEs of the frame evoked by the LU. The `Cause_change` frame, for instance, refers to situations in which an AGENT changes an ENTITY from an INITIAL_CATEGORY to a FINAL_CATEGORY, and these four entities are (some of) the FEs associated with the frame.[3] This frame is evoked by verbs such as *alter* and *change*, nouns such as *change* and *transformation*, and adjectives such as *modified*. In (3.1), for example, the verb *turn* evokes the `Cause_change` and its arguments instantiate the FEs of the frame

(3.1)	The witch turned	*the man*	*into a frog.*
	AGENT	ENTITY	FINAL_CATEGORY

One aim of Frame Semantics is the facilitation of claims about the relation between semantic frames and argument realization. The data here show that, when the verb *turn* is used to describe a `Cause_change` scenario, the AGENT, ENTITY, and FINAL_CATEGORY FEs of the frame can be realized as Subject NP, Object NP, and Oblique *into* PP, respectively. Furthermore, frames are hierarchically organized by means of various relations. The `Cause_change` frame, for instance, is inherited by the `Change_event_time` (e.g. *lengthen*) and `Exchange_currency` (*exchange*) frames and stands in a Causative_of relation to the `Undergo_change` frame.

FrameNet (Fillmore and Baker 2009; Ruppenhofer et al. 2010) is an online lexical database which documents a wide variety of frame-semantic and syntactic information for the English lexicon.[4] The "Frame Description" page offers a brief definition of the frame and its related FEs, a description of the frame relations it has with other frames, and a list of LUs which evoke the frame. Each LU is linked to a "Lexical Entry" page, which includes a brief definition of the LU and a comprehensive description of how individual FEs are realized syntactically, based on

2. See Ziem (2008) for a more detailed discussion of how Frame Semantics developed from a culture-oriented to a grammar-oriented theory.

3. In accordance with the standard practice, FrameNet frame names are in Courier New font and FrameNet FE names are in small caps. I do not use these font styles when I refer to verb classes or semantic role labels that differ from those in FrameNet.

4. The FrameNet database can be accessed at: http://framenet.icsi.berkeley.edu. The FrameNet data discussed in this monograph correspond to the state of FrameNet in Fall 2015. As the FrameNet team continues to add to the database, some FrameNet data may have changed from the state described here.

annotated corpus sentences which are found on the "Annotation Report" page.[5] Finally, the Frame Grapher tool provides graphic visualizations of (hierarchical) relations between individual frames. As of April 2017, FrameNet has documented 13,640 LUs in 1,224 frames. The following sub-section describes these theoretical concepts (frames, LUs, FEs, and frame relations) in more detail with reference to how FrameNet documents verbal LUs of the `Cause_change`, `Undergo_change`, and `Theft` frames.[6]

3.1.2 FrameNet classes, Frame Elements, Lexical Units, and the FrameNet hierarchy

3.1.2.1 *Frames and Lexical Units*

One of the main contributions of FrameNet is a classification of the English vocabulary according to lexical (frame) semantics. Individual frames are defined on "Frame Description" pages through brief, schematic frame definitions in English prose, which describe the relations that hold among the individual (core) FEs. To demonstrate, the definition of the `Undergo_change` and `Theft` frames are given in (3.2) (Ruppenhofer et al. 2010).[7]

(3.2) `Undergo_change`: An **ENTITY** changes, either in its category membership or in terms of the value of an **ATTRIBUTE**. In the former case, an **INITIAL_CATEGORY** and a **FINAL_CATEGORY** may be expressed, in the latter case an **INITIAL_VALUE** and a **FINAL_VALUE** can be specified.

`Theft`: […] a **PERPETRATOR** takes **GOODS** from a **VICTIM** or a **SOURCE**. […]

LUs (i.e. frame-evoking senses of verbs, nouns, adjectives, and phrasal items) are categorized as LUs of the same frame when they meet various requirements, such as involving the same number and types of FEs, profiling the same set of FEs, and entailing the same aspectual properties and presuppositions, among others (Ruppenhofer et al. 2010: 9f.). These requirements lead to relatively fine-grained

5. Most of FrameNet's annotated corpus come from the British National Corpus (BNC), and more recently newswire text data have been added from the Linguistic Data Consortium.

6. For more on the workflow of FrameNet, see Baker et al. (2003), Johnson et al. (2003), Petruck et al. (2004), Boas (2005b), and Ruppenhofer et al. (2010).

7. As described below, the `Undergo_change` frame differs from `Cause_change` in that it is not associated with an AGENT or CAUSE which brings about the change, thus only covering intransitive uses of Change verbs. The bold-faced words in the frame definition are core Frame Elements, which are essential for the understanding of the frame, as defined below.

classes, which often separate related verbs in different classes even when they could be viewed as being in the same class from a more syntax-oriented perspective. For instance, while *steal* involves identical aspectual properties and similar argument types to *take*, it is listed as a LU of a different frame because of semantic differences, such as the inference that the agent is committing a wrongdoing (which is not available to the verb *take*). Furthermore, many lexemes may evoke different frames when used in different grammatical contexts. The practice in FrameNet is to posit multiple LUs for these verbs, one for each frame evoked. For instance, the verb *change* is listed as a LU of several frames, including the `Cause_change` frame (*She changed him*), the `Undergo_change` frame (*He changed*), and the `Replacing` frame (*She changed diapers*), among others. Finally, FrameNet classes do not rely on alternating behavior as a main criterion for classification, unlike Levin (1993). The dramatically different criteria for verb classification in FrameNet and Levin (1993) often lead to (sometimes radically) different classifications in the two approaches, as discussed in more detail in the following subsection.

3.1.2.2 *Frame Elements and Frame Element relations*

The "Frame Description" page also provides detailed information about each of the FEs associated with the frame. The FEs are also defined in English prose and (often) include an annotated example sentence for demonstration, as shown in (3.3) for the FE INITIAL_CATEGORY in the `Cause_change` frame and the PERPETRATOR in the `Theft` frame.

(3.3) **INITIAL_CATEGORY** (***`Cause_change`***)

Definition: The category that the Entity belongs to before it undergoes the change.

Example: The vicar CHANGED **from a professional clergyman** into an anti-ecclesiastical activist.

PERPETRATOR (***`Theft`***)

Definition: Perpetrator is the person (or other agent) that takes the goods away.

Example: Leslie STOLE the watch from Kim.

Semantic Type: Sentient

Certain FEs are also associated with a specific semantic type, such as "Animate" or "Physical_object", which constrains the type of entity that can instantiate this FE in a sentence. This does not apply to any of the Core FEs of the `Undergo_change` frame, suggesting that these FEs are neutral with respect to the ontological type of phrases which instantiate them. In the `Theft` frame, however, the PERPETRATOR FE is of the type "Sentient", as only sentient entities can commit an act of theft.

There are a number of important distinctions and relations between FEs. One such distinction is that between core and non-core FEs (Ruppenhofer et al. 2010: 19f.). Core FEs are central participants of the frame, essential for its understanding, and frequently occur as overt arguments across most LUs evoking the frame. Frames are also set apart based on detailed semantic characterizations of core FEs. For instance, the varying presuppositions of *take* and *steal* mentioned above are reflected in the names of the FEs: the more generic AGENT and THEME of the `Taking` frame are defined as PERPETRATOR and GOODS in the `Theft` frame, respectively. Non-core FEs, on the other hand, specify the background or setting for the event described by the frame and are typically adverbial in nature.[8] They are not essential for understanding the scenario denoted by the frame nor do they set it apart as distinct from other frames. Non-core FEs are further sub-classified into peripheral FEs, such as TIME, PLACE, or MANNER, and extra-thematic FEs, such as ITERATION (e.g. *twice*) or CONTAINING_EVENT (e.g. *while driving*).

Further theoretical constructs are proposed to capture interrelations among individual FEs of a given frame. A core(ness) set, for instance, refers to sets of two or more FEs that have "an informational and conceptual interdependence" (Ruppenhofer et al. 2010: 21), i.e. if the two FEs can be viewed as specific instantiations of a more broadly defined participant. In many cases, the occurrence of one member of a core set in a given utterance may render the expression of the other member(s) optional or even ungrammatical, as with SOURCE, PATH, and GOAL FEs among predicates describing motion. Sets of FEs exhibit an "Excludes" when the realization of one FE precludes the expression of another FE, and the "Requires" relation holds when one FE of a frame requires the realization of another FE.[9] Having discussed how FEs serve to define a semantic frame, I now move on to address how FrameNet documents the valency behavior of English verbs (and other LUs) in terms of the syntactic realization of Frame Elements.

3.1.2.3 *Valency data in FrameNet*

Unlike the approaches discussed in Chapter 2, Frame Semantics is not motivated by the a priori assumption that shared meaning reflects shared syntax and therefore does not posit explicit linking rules or other constructs that govern the mapping between FEs and their syntactic realizations. However, FrameNet provides

8. As such, core FEs roughly correspond to the (obligatory) "arguments" and "complements", and non-core FEs to (optional) "adjuncts" or "modifiers", of traditional approaches to argument realization (cf. Section 2.1).

9. Although it is not explicitly documented in FrameNet, it is conceivable that the INITIAL_CATEGORY FE requires a FINAL_CATEGORY FE, given the infelicity of sentences such as: **The man changed from a frog.*

data about the realization of FEs in corpus sentences, which can be employed to develop such generalizations, albeit from a bottom-up and corpus-based perspective. Most LUs in FrameNet are linked to an "Annotation Report" page, which lists all of the FEs realized with the LU in question, along with several (generally between 10 and 20) corpus sentences containing the LU, annotated by color-coding each of the (core) FEs. (3.4) demonstrates how corpus data is documented with respect to the LUs and FEs of the `Undergo_change` frame.

(3.4) As [$_{\text{Entity}}$ it] *CHANGED*$^{\text{Target}}$ [$_{\text{Initial\_category}}$ from mob gambling town] [$_{\text{Final\_category}}$ to corporate gaming venue], […] (FrameNet)

Data from the annotation report is summarized in two tables found on the "Lexical Entry" page. The first of these, called "Frame Elements and Their Syntactic Realizations", lists each FE occurring in the data, its number of occurrences, and each of its realization patterns (pairing of grammatical function and phrase type; e.g. NP.Ext stands for subject noun phrase). Table 3.1 shows a portion of this data for *change* in the `Undergo_change` frame.

Table 3.1 Portion of Frame Element Realization Report for *change* (`Undergo_change`)

Frame Element	Number annotated	Realization(s)
Attribute	(3)	INI.– (1) NP.Ext (2)
Cause	(1)	PP[with].Dep (1)
Circumstances	(1)	Sub.Dep (1)
Degree	(3)	AVP.Dep (3)

The first column of the table lists the FE, the second lists the number of times it was annotated in the corpus data, and the third column lists its phrase type and grammatical function realization in each annotated sentence (along with the number of times it was annotated with this phrase-type/grammatical function combination). The row labeled "Cause", for instance, indicates that the CAUSE FE was annotated one time, and that it appeared as a dependent prepositional phrase headed by *with*.[10]

The second type of data on the "Lexical Entry" page is the "Valence Patterns" table, which lists each documented combination of FEs, grammatical functions, and phrase types (a "Frame Element Configuration"; FEC), along with the number of sentences annotated with this FEC. A portion of this table for *change* in `Undergo_change` is given in Table 3.2.

10. The actual example reads: *That would change dramatically with the 1966 arrival of billionaire Howard Hughes.*

Table 3.2 Portion of Valence Pattern report for *change* (`Undergo_change`)

Number annotated	Patterns			
1 TOTAL	Attribute	Final_category	Initial_category	Manner
(1)	NP Ext	DNI –	DNI –	AVP Dep
1 TOTAL	Attribute	Value_range		
(1)	NP Ext	INI –		
1 TOTAL	Cause	Degree	Entity	Final_category
(1)	PP[with] Dep	AVP Dep	NP Ext	DNI –

Each FEC is linked to the annotated sentence(s) that exhibit it (in the left-most column) and thus demonstrates the relation between the report tables and the annotated sentences. For instance, the first FEC in Table 3.2 comes from the sentence in (3.5). The ATTRIBUTE FE *this* is the nominal subject (NP.Ext) and the non-core MANNER FE *quickly* is also annotated as an adverbial phrase. The FINAL_CATEGORY and INITIAL_CATEGORY FEs are omitted under Definite Null Instantiation, described in more detail in the following paragraph, because the initial and final states of the changed entity can be inferred from context.

(3.5) Though the two cities remained unlinked by rail, [$_{\text{Attribute}}$ this] was about to *CHANGE* [$_{\text{Manner}}$ quickly]. [$_{\text{Final\_category}}$ DNI] [$_{\text{Initial\_category}}$ DNI] (FrameNet)

The DNI marking for the INITIAL_CATEGORY and FINAL_CATEGORY FEs pertains to FrameNet's system for documenting (Core) FEs that are not overtly realized under so-called "null-instantiated". Based on Fillmore (1986), FrameNet posits three different types of null-instantiation: Constructional null-instantiation (CNI) applies when the FE is omitted according to general constructions of the language which require its omission, such as the omission of active subject in passive contexts. When FEs are omitted in situations outside of those covered by general constructions of the language, they are interpreted as either definite null-instantiation (DNI) if they can be recovered through context or as indefinite null-instantiation (INI) when they are interpreted generically and need not be mentioned in the discourse. For instance, the omitted object of *win* in *We won*, is DNI because a specific contest is understood in the context, but the omitted object of *We ate*, is INI because the ingested food is generic and need not apply to a specific entity.[11]

11. Ruppenhofer and Michaelis (2014) claim that the interpretation of omitted arguments is predictable from the frame evoked by the target LU. See Ruppenhofer et al. (2010: 24–26) for more on null-instantiation within FrameNet and Lyngfelt (2012) for a richer classification of null-instantiation types.

Although Frame Semantics makes no overt generalizations about the mapping of arguments to syntactic functions, the valency data documented in FrameNet facilitates the formulation of potential linking rules that are more low-level and data-based than those proposed in the frameworks discussed in Chapter 2. Scholars such as Boas (2006, 2008, 2011a), Dux and Boas (2011), and Gotsoulia (2012) have exploited this data to get a better picture of the relation between the frame-semantics of LUs and FEs and their syntactic behavior and potentially arrive at larger-scale generalizations and linking rules.

3.1.2.4 *Frame-to-frame relations and the Frame Grapher*

Finally, FrameNet has identified a variety of relations which hold between frames in order to account for how individual frames relate to one another. One of the most important of these relations is the Inheritance relation. The daughter frame of an Inheritance relation involves the same set of FEs as the mother frame, but they are more semantically specific and have more restrictions. As noted above, the `Cause_change` frame is inherited by the `Change_event_duration` frame, which is evoked by LUs such as *extend* or *cut short*. The more general ENTITY FE of `Cause_change` is substituted with the more specific EVENT FE in the daughter frame, as it is restricted to events and not semantically general as with `Cause_change` predicates, as shown in the following examples.

(3.6) a. She changed {the length of the meeting/her address/her boyfriend}.
b. She extended {(the length of) the meeting/*her address/*her boyfriend}.

While the Inheritance relation does not necessarily reflect syntactic differences among frames, other frame-to-frame relations capture systematic syntactic differences across related frames. The Causative-Inchoative relation, for instance, accounts for the similarity between frames in which an agent-type FE that brings about a change is overtly realized and those in which this FE is omitted. This relation captures the systematic relation between the `Undergo_change` and `Cause_change` frames shown in (3.7).[12]

(3.7) a. She changed him into a frog. (`Cause_change`)
b. He changed into a frog. (`Undergo_change`)

12. The Causative-Inchoative relation captures the alternating behavior of Change verbs in a rather different way than Levin (1993). Specifically, Levin (1993) posits a single lexical unit (verb sense) which may occur in either of the variants, whereas FrameNet posits separate lexical units of each verb, one for each syntactic context, because the events in the two variants differ semantically and are thus seen as evoking distinct semantic frames.

The Perspective_on relation also accounts for some cases in which similar FEs appear in different syntactic functions. This relation holds when two frames involve the same types of FEs but differ in their relative profiling. For instance, the `Theft` frame (*steal, swipe*) and the `Robbery` frame (*rob, mug*) stand in such a relation: they both involve a PERPETRATOR taking GOODS from a VICTIM, but `Theft` predicates profile the GOODS FE as direct object, while `Robbery` verbs profile the VICTIM, as in (3.8).

(3.8) a. She stole a wallet from the man.
b. She robbed the man of his wallet.

Other frame relations include Using, in which one frame refers to another frame but does not involve the same FEs, Precedes, in which frames form a chronological sequence, and Subframe, in which lower-order frames refer to phases within a superordinate frame.[13] The Frame Grapher tool on the FrameNet website provides visual hierarchies which show the frame relations for a given frame.[14] Figure 3.1 shows a portion of the FrameNet hierarchy surrounding the `Cause_change` frame. The solid lines signify Inheritance relations, while the dashed lines signify Using relations.

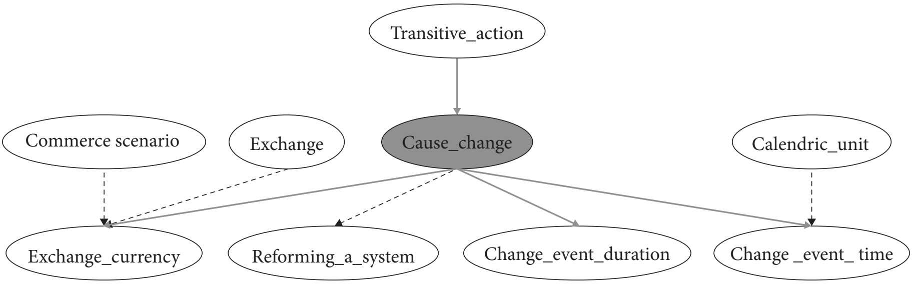

Figure 3.1 Frame hierarchy surrounding `Cause_change` frame

Having described how the theory of Frame Semantics is implemented in FrameNet to provide a detailed frame-semantic characterization the English lexicon, I now compare and contrast Frame Semantics and FrameNet with the approaches discussed in Chapter 2.

13. See Petruck (2004), Ruppenhofer et al. (2010: 73f.), and Fillmore and Baker (2009) for more on frame-to-frame relations.

14. The Frame Grapher can be accessed at: https://framenet.icsi.berkeley.edu/fndrupal/FrameGrapher

3.1.3 Comparing Frame Semantics to other approaches to the syntax-semantics interface

3.1.3.1 *Frame Semantics and semantic roles*

In Section 2.2, I demonstrated that traditional semantic role-based approaches to argument realization encounter problems, primarily due to their assumptions of a small set of roles and a strict mapping between roles and grammatical categories, which limit the scope and detail of phenomena they may be used to analyze. For one, the assumption of a small set of role labels applicable to all verbs makes it difficult to determine exactly which role an argument bears. The view that semantic roles are unanalyzable primitives precludes the comparison of documented similarities between different roles. Finally, the assumption of a one-to-one correspondence between roles, arguments, and grammatical functions, does not stand up to data in which a single argument bears multiple roles, multiple arguments bear the same role, or a single role may be realized in different ways across predicates.

In his preliminary work on Frame Semantics, Fillmore (1975, 1977b) addressed the shortcomings of Case Grammar (1968, 1970, 1971, cf. Section 2.2). He concluded that that case roles are not primitive and universal, but that they are determined by events and more generally that "meaning is relativized to scenes" (1977b: 59). Specifically, rather than defining verb meanings and their arguments using a restricted set of highly general semantic roles, individual situation types (i.e. frames) must be defined in their own right, along with richly defined frame-specific participants characterizing these situations. Frame Semantics thus takes a radically different view of semantic roles by abandoning or reformulating the assumptions characterizing traditional role-based approaches.

While early work on Frame Semantics (Fillmore 1982, 1985) focused on semantically rich words to assess the diverse range of frames and roles associated with linguistic items, more recent frame-semantic research – particularly on the development of the FrameNet database – turned again to questions of how arguments are syntactically realized. Indeed, this line of research shares some features of role-based approaches: argument-bearing predicates (LUs) are seen as the locus of sentential meaning and open up slots for arguments (FEs) which are defined using abstract labels that apply across individual utterances and semantically similar predicators (i.e. all LUs of a given frame). However, given the centrality of real-world and cultural/social knowledge in Frame Semantics, FrameNet posits numerous frames and even more numerous roles (in the form of FEs) to account for the wide variety of situations and experiences speakers use language to describe. In contrast to the abstract and "primitive" roles of Case Grammar, FrameNet defines its FEs with respect to real-world, extralinguistic semantic frames, particularly detailing the interrelations among individual FEs of the frame. Frame Semantics can thus analyze relations between FEs and accounts for these by means of frame relations and FE relation.

To demonstrate, the arguments associated with the verbs *take* and *steal* would be labeled Agent, Theme, and Source in traditional role-based approaches, without distinguishing the roles across the two verbs and thereby missing out on not only essential semantic differences but also syntactic differences that set *steal* apart from *take*. Semantically, the Agent of *steal* commits a wrongdoing, the Source may be either a person or a location, and the Theme does not belong to the Agent; syntactically, *steal* but not *take* may be used in intransitive contexts (e.g. *Pat steals/*takes often*) to describe a habitual action of the agent/subject. Frame Semantics accounts for these important differences between theft events and more general taking events by positing a separate `Theft frame` with more FEs that are more specifically labeled and defined, but also captures similarities through the Inheritance relation between the `Theft` and `Taking` frames and their associated FEs. The similarities and differences between the general Change verbs (e.g. *change, alter, turn*) and more specific change-of-state verbs are also captured by positing separate frames and inheritance relations between the general Change frame(s) and more specific frames such as `Change_event_duration` and `Exchange_currency`.

Frame Semantics and FrameNet also overcome two other problems of traditional valency-based approaches. First, they avoid problems arising from a strict distinction between obligatory arguments and optional adjuncts by positing various categories of FEs for a given frame (core, non-core, peripheral), not according to their syntactic obligatoriness but to how central they are to understanding the frame. Secondly, FrameNet's approach to omitted or "null-instantiated" arguments accounts for cases in which a purportedly "obligatory" argument is not overtly expressed and classifies such omissions both syntactically (CNI vs. DNI/INI) and semantically (DNI vs. INI).

3.1.3.2 *Frame Semantics and aspectual approaches*

Little work has been done explicitly comparing Frame Semantics to the aspectual and event-structural approaches discussed in Section 2.3 (e.g. Vendler 1957; Rappaport Hovav and Levin 1998). I therefore here only briefly describe how Frame Semantics treats verbal aspect and potential shortcomings thereof, but offer a more detailed comparison of event-structural approaches against those employing concepts of Construction Grammar in the following section. While Frame Semantics does not explicitly refer to aspectual properties, the methodology for categorizing LUs into frames appears to specify that all LUs of a frame exhibit the same aspectual behavior. Specifically, Ruppenhofer et al. (2010: 10) state that "in aspectually complex frames, the lexical units should all entail the same set of stages and transitions". Often, frame relations account for aspectual correspondences between frames. Petruck et al. (2004), for instance, describe how the Causative_of and Inchoative_of relations have been integrated into FrameNet to capture such correspondences. This relation results in the classification of Change verbs into two frames: `Cause_change` LUs involve an agent which carries out an activity leading to a change of state in the patient, whereas `Undergo_change` LUs do not involve this activity of an agent.

However, it is not clear that FrameNet sufficiently accounts for all types of verbal aspectual behavior. Osswald and Van Valin (2014), for instance, argue that FrameNet lacks an explicit representation of the temporal unfolding of the event specified by the frame. Drawing on FrameNet data from Cutting verbs (e.g. *cut, chop, hew*), they claim that FrameNet classes fail to capture event-structural relations between frames, as it is limited by its empirical, bottom-up approach. In particular, they point to the need for "a richer frame representation which systematically takes into account the inner structure of an event and thereby inherently captures structural relations between frames" (Osswald and Van Valin 2014: 125).[15] In this respect, it appears that Frame Semantics and FrameNet may benefit from a more rigorous treatment of aspectual properties of frames and their LUs, yet I am unaware of any current research in this direction.

3.1.3.3 *Frame Semantics and Levin (1993)*

In Section 2.4, I demonstrated how Levin (1993) arrives at fine-grained classes of English verbs with a relatively high degree of semantic and syntactic uniformity, but also pointed out various issues with its proposed classes, which largely result from the lack of empirical evidence, the status of alternations as classification criteria, and the unsystematic and seemingly inconsistent employment of these alternations. Here, I describe some essential differences in FrameNet's approach to verb (or more generally lexical) classification and how this approach overcomes many of the shortcomings of Levin (1993).

The primary difference between the two approaches is that Levin's (1993) classification relies on syntactic criteria (specifically behavior in argument structure alternations), while FrameNet relies solely on frame-semantic criteria. This approach leads Levin (1993) to formulate classes that may be uniform with respect to (a pre-selected set of) alternations, but exhibit little intuitive semantic similarity. In Section 2.4, I pointed out the drastic semantic heterogeneity in Levin's (1993: 244f.) class of Other Alternating Verbs of Change of State (containing e.g. *westernize, char,* and *collapse*), but even among semantically more uniform Levin classes, one encounters semantic differences that are more adequately captured

15. See Dux (2016: 51–64) for a discussion of Croft's (2012) integration of frame-semantic concepts and event structure.

using the FrameNet approach. For instance, Levin's class of *Steal* verbs includes Taking verbs which do not necessarily have a "wrongdoing" interpretation, such as *take, withdraw*, and *rescue*. The frame-based classification of FrameNet not only ensures that all LUs of a frame involve uniform semantics but also captures semantic similarities across frames. For example, the FrameNet `Theft` frame only contains LUs that clearly entail illegal or wrongful taking and identifies separate frames for those without it (e.g. *take* is in the `Taking` frame, and *withdraw* in the `Removing` frame) but it also captures both the similarities and differences between these LUs' meanings and those in other frames through various frame-to-frame relations (e.g. `Theft` inherits from `Taking` and `Committing_crime`).

A second major difference between the two classifications pertains to the data employed to arrive at verb classes. Levin's (1993) classification is problematic in that it relies largely on intuition rather than empirical data and it is unclear why a certain set of alternations is used to define a given class. As pointed out in Section 2.4, Levin's *Turn* class contains many verbs that differ in their ability to occur in the alternations selected as criteria for the class (and implicitly deemed to be reflective of shared meaning across the verbs). Also, other patterns in which Levin's *Turn* verbs appear (in some cases with high frequency, as with *turn* in sentences such as *Her face turned red*) are not used as criteria for the classification, and many of these alternations occur with only some but not all *Turn* verbs, again calling in to question Levin's application of alternations as classification criteria. Furthermore, many of Levin's alternations are ascribed meanings that do not necessarily reflect the meaning of the verb classes they define. For instance, Dux (2011) shows that Levin's *Steal* class is defined by the verbs' ability to occur in a single pattern (i.e. *The thief stole the painting from the museum*) and their inability to occur in potential alternation variants of this pattern (e.g. the conative pattern: **The thief stole at the painting*). Dux goes on to identify several verbs that exhibit the same distribution across these class-defining patterns but do not have a meaning similar to other *Steal* verbs, such as *borrow, transport*, and *save*. The workflow of FrameNet, in contrast, prevents such inaccurate classifications, because any proposed classification of a LU is tested against empirical corpus data, and against the intuitions of several FrameNet team members, to ensure that the classification is accurate. The annotated valency data in FrameNet (though not used as criterial for classification) further prevents inaccurate classifications, for instance when the LU occurs with arguments that do not correspond with FEs identified as criterial for the frame. The FrameNet practice of testing theoretical hypotheses against natural corpus data also allows for revisions of proposed classes and LU-frame pairings when new or previously overlooked data show that earlier hypotheses were inaccurate.[16]

Another important difference between the two approaches involves their treatment of verbal polysemy. Levin takes a "lumping" approach to polysemy, as she often posits a single lexical entry for verbs with multiple senses (e.g. when a verb participates in two variants of an alternation). FrameNet, on the other hand, takes a "splitting" approach by positing separate lexical entries (one lexical unit for each frame) when a verb can be used to evoke multiple frames. This leads to important differences in the classes resulting from the two approaches. For instance, many (but not all) of the Change verbs can describe two different scenarios, one in which an entity changes without a clear (expression of the) cause for the change, and one in which a cause is explicitly mentioned. FrameNet captures these two different uses by posting two frames: the `Undergo_change` frame corresponds to uses without a cause and the `Cause_change` to those with the cause expressed. The verbs *change* and *turn* are associated with both frames (3.9a-c), while the verb *make* only evokes the `Cause_change` frame (3.9a) and the verb *plummet* only evokes the `Undergo_change` frame (3.9c).

(3.9) a. She {changed/turned/made/*plummeted} him into a frog.
b. He {changed/turned/*made} into a frog.
c. He {changed/turned/plummeted/*made} to weeping. (based on FrameNet example)

FrameNet accounts for this behavior by positing two LUs for *turn* and *change*, one for each of the two frames in question. The similarity between *make* and these verbs in the transitive (`Cause_change`), and of *plummet* in the intransitive (`Undergo_change`) context is captured by including *make* as a LU of the former and *plummet* in the latter frame, but not listing them as LUs of the frame associated with the other context.

Table 3.3 Lexical units of the `Cause_change` and `Undergo_change` frames

Frame	**LUs**
`Cause_change`	*change, turn, make, ...*
`Undergo_change`	*change, turn, plummet, ...*

FrameNet's employment of the "splitting" approach leads to an interesting difference from Levin's *Turn* class, which relates to a verb's ability to appear in

16. In Section 3.2 I describe how alternations are viewed in Construction Grammar, whereby alternation variants are analyzed as independent (but often related) constructions that are semantically compatible with the same verbs.

"alternations" such as the causative-inchoative alternation in (3.9a–b). Because *make* only appears in the causative variant (`Cause_change` pattern) and thus does not undergo the alternation, it cannot be included as a *Turn* verb in her classification. Levin's approach therefore cannot account for the similarity of *make* to other Change verbs in contexts such as (3.9a) above.[17] However, although FrameNet does not rely on syntactic properties (such as alternating behavior) for verb classification, FrameNet classes are typically more syntactically uniform than Levin classes (as described above with the classification of *make, turn,* and *change*) as its methodology ensures that LUs of the same class occur with the same number and types of arguments (FEs).[18]

FrameNet also offers a more systematic and empirically-based structure to its classification, which facilitates the investigation of commonalities and differences between frames and their associated FEs. While Levin's 193 classes fall roughly into 50 broad categories, neither the interrelations between individual classes within a given category nor the relations between the (sets of) alternations used to define them are not made explicit. Furthermore, Levin's approach does not (systematically) employ any means of labeling or otherwise characterizing the participants/arguments associated with a class, even though these may shed light into how classes differ from one another. In contrast, FrameNet's rich system of frame-to-frame relations makes clear how frames and FEs are related to one another in terms of syntax (e.g. the Causative-Inchoative relation), semantics (e.g. the Inheritance and Using relations), and a combination of these (e.g. the Perspective_on relation).[19]

Because FrameNet frames (and their associated FEs) are semantically uniform, related systematically to one another, and associated with corpus-based valency data, FrameNet – unlike Levin (1993) – offers tools necessary to formulate broader generalizations about how semantic frames map to grammatical categories. In contrast to classifications such as Levin's, which take a top-down approach by first formulating a broad-scale hypothesis and adjusting it to accommodate new data, generalizations arrived at through FrameNet data move from the bottom up

17. See also Baker & Ruppenhofer (2002) and Boas (2006, 2011a) on differences between Levin (1993) and FrameNet.

18. Although FrameNet posits different frames for Change verbs depending on whether they appear in transitive/causative contexts or in intransitive/inchoative contexts, it does not posit different senses based on other alternations such as the double object alternation. For instance, only one LU is posited for *give* in the `Giving` frame, even though it may realize a RECIPIENT FE as either a first object or as a (*to*) PP.

19. For instance, Levin (1993) offers very little explicit discussion of the relations and differences between her *Steal* class and the related *Cheat* class including verbs such as *rob* and *mug*.

by first conducting detailed analyses of individual frames and LUs based on natural language data and then observing commonalities and differences across LUs of related frames. For instance, Dux and Boas (2011) discuss how empirical data in the form of annotated sentences and valency reports can be implemented in investigations of the linking between semantic frames (and their FEs) and syntax.

3.1.3.4 *FrameNet and WordNet*

Before moving on, I briefly compare FrameNet against another well-known verb classification resource. WordNet (Miller 1995; Fellbaum 1998, 2005; Princeton University 2010; https://wordnetprinceton.edu) is an online database that organizes the English lexicon according to lexical relations (cf. Section 2.1; Lyons 1963; Geeraerts 2009: 80f.). The central organizational category in WordNet is the "synset", or a set of (near-)synonymous words.[20] Synsets are defined using a simple gloss, some synsets are also presented along with a handful of example sentences, and different senses of polysemous lexemes are listed in different synsets. Currently, WordNet documents 117,000 different synsets, including separate sets for nouns, verbs, adjectives, adverbs and function words. Synsets are connected to one another by means of lexical relations, most notably synonymy, entailment, meronymy, and hyponymy. Synsets containing verbs are additionally linked in a hierarchical manner by means of the troponymy relation, whereby a more specific verb is a "troponym" of a more general verb with a similar meaning. For example, *whisper* is a troponym of *talk*, which is a troponym of *communicate*. Given this organizational structure, WordNet is useful for identifying which words may be substituted for one another and for establishing the relative richness of a word's meaning.

At the same time, WordNet has some disadvantages that make it less useful for the present analysis of the syntactic and semantic uniformity of verb classes. For one, WordNet does not include any syntactic information, which is essential for a study addressing verb valency behavior. WordNet's classification method is also language-internal and language-specific, as words are classified with respect to other words (in the English language), whereas FrameNet classifies words according to non-linguistic and language-independent semantic frames, thereby allowing for cross-linguistic comparisons of word meanings and classes. The method for distinguishing similar synsets and splitting word senses has also come under criticism, as many words are listed in different synsets without an explicit statement of the semantic differences between the different synsets. As put by Hanks and Pustejovsky (2005: 66): "[…] many of WordNet's senses are indistinguishable

20. On the WordNet website, synsets are defines as "words that denote the same concept and are interchangeable in many contexts" (https://wordnet.princeton.edu/, accessed on 17 April 2018).

from one another by any criterion". For these reasons, I do not employ WordNet in this study directly, but it is cited in the comparison of Change and Theft verb in Chapter 5 to establish semantic differences between verbs of the two classes.[21]

3.1.4 Problems with Frame Semantics

Despite the advantages of Frame Semantics and FrameNet over alternative verb classification approaches, these also exhibit some methodological and empirical shortcomings that complicate a detailed analysis of (verbs within) verb classes, such as that conducted in the following chapters. Here, I first describe some general issues with FrameNet's practices and then discuss specific issues with its formulation of the `Cause_change` and `Undergo_change` frames, as these will be relevant for my approach to these frames in the following chapter.

One area in which FrameNet data is insufficient for the present study pertains to the detail provided in its frame descriptions and LU definitions. For one, the LU definitions on the "Lexical Entry" pages are often very brief and do not make clear whether and, if so, how individual LUs differ in their construal of or perspective on the more general semantic frame. Some LU definitions also exhibit circularity and inaccuracy, as with the verb *transform* in the `Cause_change` frame, whose definition reads "cause to have an altered nature". This definition contains words referring both to the frame name (*cause*) and another LU in the frame (*alter*), and it also does not adequately capture the difference between *transform* (which typically describes fairly drastic changes) and some other verbs in the frame such as *alter* or *modify* (which describe less drastic changes). Indeed, at this point in its development, FrameNet has not yet sought to provide a detailed explication of subtle differences between individual LUs within a given frame. Given the significant work involved in documenting over 1,200 frames and identifying relations between frames and their FEs, for practical purposes FrameNet takes its LU definitions, whenever possible, directly from the *Concise Oxford Dictionary*, 10th Ed. (Ruppenhofer et al. 2016). At the same time, investigations into lower-level (i.e. LU-specific) semantic properties would benefit from a more detailed and systematic treatment of LU meaning in FrameNet.[22]

While frame descriptions are more detailed than LU definitions, many lack an explicit statement of all concepts that motivate the frame's meaning or a systematic description of potential differences from related frames. For instance, the

21. Baker and Fellbaum (2009) offer a more detailed comparison of FrameNet and WordNet.

22. A more detailed and sophisticated treatment of meaning below the level of semantic frames is also desirable for applied and computational research drawing on FrameNet, such as sentiment analysis (see, e.g. Ruppenhofer and Rehbein 2012).

definition of the `Theft` frame, shown in (3.2) above, does not specifically mention possession, legality, or wrongdoing. While in many of these cases, relevant semantic information may be indirectly interpreted from other information such as FE labels (e.g. PERPETRATOR, VICTIM for `Theft` vs. AGENT, THEME for `Taking`) and/or frame relations (i.e. `Theft` inherits from both `Committing_crime` and `Taking`), it seems that these aspects of meaning are taken for granted and a more explicit statement of more basic concepts underlying a frame's meaning and of its relation to other frames is desirable.

The elusive relation between lexicon and real-world scenarios also affects the formulation of verb classes in FrameNet. It is unclear exactly how similar an individual verb's arguments must be to the FEs specified for a given frame. Often, two verbs listed in the same frame have arguments of the same general type, but which exhibit different semantic restrictions and entailments. For instance, while *modify* and *transform* are both in the `Cause_change` frame, they differ in the types of changes they may express (e.g. ??*The witch modified the prince into a frog*; ??*He slightly transformed his behavior*). In the `Theft` frame, the typical objects of *embezzle* and *misappropriate* are restricted to abstract financial property and thus differ from the more unrestricted GOODS FE of LUs such as *steal* (Dux 2011). Of course, these issues reflect a central challenge of any linguistic or lexicographic work, namely the decision of where to draw the line between capturing all features of a given unit (i.e. all aspects of a word's meaning) and offering a fruitful generalization that captures shared properties across units. Of course, to capture every aspect of every verb's behavior would lead to very small classes of verbs (or a separate class for nearly every verb) and therefore defeat the purpose of a "classification" of verbs. Nonetheless, the present investigation of uniformity and idiosyncrasy within verb classes requires a more detailed and nuanced treatment of verbal semantics than that offered by FrameNet.

FrameNet and Frame Semantics also exhibit some shortcomings in their treatment of syntactic information. Given their semantic and lexicographic focus, these approaches do not explicitly address generalizations that predict argument realization from verb meaning. Nevertheless, FrameNet's corpus-based valency descriptions provide valuable, item-specific data that facilitate the identification of broader-level mappings between (verb) meaning and syntax (see Section 3.2.3.4 below). Unfortunately, in many cases this data is not sufficient or systematic enough for detailed and comprehensive analyses of verb valency.[23] Most LUs are associated with only a limited number of annotated corpus sentences and therefore do not capture the full range of FECs available to a given LU. For instance, the valency

23. Despite its broad coverage, it is unlikely that FrameNet will ever achieve "full coverage" of the English lexicon, because language changes and new words are constantly introduced.

description of the LU *turn*.v in `Undergo_change` only includes a single annotated sentence (as of 22 February 2016).[24] The example is listed in (3.10) and the annotation report for *turn* is given in Table 3.4.

(3.10) [$_{\text{Entity}}$ Jamaica] is not simply turning blindly [$_{\text{Final\_category}}$ into a small version of its bigger brother].

Table 3.4 Annotation report for *turn.v* in Undergo_change

Number annotated	**Patterns**			
1 TOTAL	**Entity**	**Final_category**	**Manner**	**Manner**
(1)	NP Ext	PP[into] Dep	AVP Dep	AVP Dep

If one were to take the annotation reports listed in the Lexical Entries in FrameNet as an indicator of a verb's valency behavior, one would be led to believe that the only valency pattern available to *turn* is that found in (5.10), where the ENTITY is a nominal subject and the FINAL_CATEGORY is a PP headed by *into*. However, this sense of *turn* can appear in a variety of other constructions, such as those expressing an Initial_category (or O), as in *The river was turning from blue to a color somewhere between slate and sapphire* (COCA). Although FrameNet annotated sentences are intended to represent the full range of patterns for a LU, the current incompleteness of FrameNet valency data makes it necessary to conduct separate corpus analyses for each individual LU to gain an accurate picture of a verb's syntactic behavior.[25]

Furthermore, the annotations in FrameNet frequently exhibit inconsistencies. This is particularly problematic for null-instantiated arguments, as the (inexplicit) requirement that core FEs must be annotated in each corpus sentence occasionally forces annotators to make intuitive decisions that are not supported by corpus evidence. For example, when an omitted argument can be potentially interpreted as one of multiple different FEs (as with groups of FEs in a CoreSet, or the CAUSE and AGENT of the Change frames), FrameNet annotators must assign the null-instantiated argument a FE label without (necessarily) having evidence to label it as one or the other of the FEs. For instance, in the annotation for *transform* in the `Cause_change` frame, two sentences appear in passive voice, omitting the subject. The omitted (CNI) argument is labeled as CAUSE for one such sentence (3.11), but as AGENT for the other (3.12).

24. *Turn* is also listed in the `Becoming` frame, which contains 14 annotated examples. The distinction between this frame and `Undergo_change` is not made explicit in FrameNet.

25. Boas (2010a: 8), for instance, claims that FrameNet entries provide "a summary of *all* valence patterns found with the lexical unit". (Emphasis added.)

(3.11) [$_{\text{Entity}}$The embryo] has been *TRANSFORMED*$^{\text{Target}}$ [$_{\text{Initial_category}}$from a sphere] [$_{\text{Final_category}}$into a torus]; from a bun into a doughnut. [$_{\textbf{Cause}}$**CNI**] (FrameNet)

(3.12) [$_{\text{Time}}$When it returned] [$_{\text{Entity}}$it] was [$_{\text{Degree}}$completely] *TRANSFORMED*$^{\text{Target}}$ [$_{\text{Attribute}}$in appearance]. [$_{\text{Final_value}}$INI][$_{\text{Initial_value}}$INI][$_{\textbf{Agent}}$**CNI**] (FrameNet)

Although the context for (3.11) suggests that the change was caused by natural processes rather than a sentient, intentional agent, the sentence in (3.12) lacks sufficient context to label the omitted argument as AGENT or CAUSE.[26] Such data suggest that FrameNet annotation procedures often rely on intuitive judgments by annotators and thus are not entirely empirically justifiable.

There are also some questions regarding the formulation of FE-to-FE relations. Within the `Cause_change` frame, for instance, the only coreset pair listed is that of {ATTRIBUTE, ENTITY}, which captures the semantic relation between different types of arguments expressing the changed entity: e.g. *She changed his hair/the color of his hair*. However, it seems that AGENT and CAUSE should also form a core set, as they can both occur as subjects of transitive sentences and are often "conceptually dependent" and the occurrence of one makes that of the other superfluous. Rather than formulating a core set relation between these arguments, FrameNet lists AGENT as a core Frame Element which "Excludes" the CAUSE argument, and the CAUSE argument as a Core Unexpressed element without mentioning its ("Excludes") relation to AGENT. In addition to formulating this relation in only one direction, it does not appear that AGENT necessarily excludes CAUSE, as both can cooccur in sentences such as (3.13). (Of course, the *with* PP of this sentence could also be labeled as a MEANS or INSTRUMENT FE, which are not core in the Change frames.)

(3.13) [The witch $_{\text{AGENT}}$] transformed the man [with a magic spell $_{\text{CAUSE}}$]. (Invented)

At present, it is unclear why different mechanisms (core sets and Excludes) are posited to account for an apparently identical relation between two pairs of LUs (ATTRIBUTE/ENTITY and AGENT/CAUSE, respectively).

26. The annotation of omitted CATEGORY or VALUE FEs is also unclear – when these are omitted one cannot clearly say whether the entity changes its category completely or merely with respect to one attribute. The below example shows the omitted arguments labeled as category (e.g. change from a society to an anarchy/dystopia), but it is more plausible to infer a change in value interpretation (e.g. change from a good society to a bad society).

[$_{\text{Cause}}$The state] can (and does) *TRANSFORM*$^{\text{Target}}$ [$_{\text{Entity}}$society]. [$_{\text{Final_category}}$INI] [$_{\text{Initial_category}}$INI] (FrameNet)

The aforementioned issues are particularly problematic when dealing with the rich FE distinctions FrameNet posits for its Change frames and laid out in detail by Dux (2016: 85–87, 176–184). Specifically, Change verbs often occur in contexts that do not provide enough information to empirically determine which fine-grained FE a given argument should be assigned (e.g. ATTRIBUTE vs. ENTITY, AGENT vs. CAUSE). Further, they frequently exhibit null-instantiation, with only the UNDERGO_CHANGE FE being consistently realized in all (active) examples (as will be shown in the following chapter), making such decisions even more difficult. In the following chapters' analyses of Change verbs, I therefore employ a simpler set of FEs than FrameNet's rich sets of FEs and their intricate distinctions, in order to avoid these empirical problems. While a more detailed analysis of FrameNet's richer FEs may certainly reveal some interesting findings, the simplified FEs used in my analysis nonetheless suffice to give a clear picture of the (differences in) valency behavior of Change verbs.

3.1.5 Summary

This section described how Frame Semantics offers a rich semantic-based characterization and classification of lexical items and the semantic frames that motivate them. The practical implementation of this theory, FrameNet, documents frame-semantic information for a large portion of the English lexicon; it describes a multitude of semantic frames, characterizes them according to (the relations between) richly defined Frame Elements, and structures these frames using a sophisticated taxonomy of frame-to-frame relations. FrameNet also characterizes (individual senses of) lexical items according to the semantic frame they evoke and provides useful data on how semantic frames and Frame Elements are formally realized through annotations of corpus data. I then demonstrated that a frame-semantic approach improves on several shortcomings observed with the approaches discussed in Chapter 2, as it is not motivated by the (potentially flawed) assumption that much of argument realization behavior can be predicted from verb meaning based on highly general and abstract linking rules. Instead, FrameNet focuses on characterizing rich aspects of "meaning" and documents syntactic behavior at an item-specific level based on natural data, which facilitates empirically grounded investigations into the relation between meaning and form. However, FrameNet also exhibits some issues areas that can benefit from more rigorous verb class studies. These include the relative sparseness of semantic information for individual verbs, the absence of broad-scale linking rules, the incompleteness of FrameNet's coverage, and inconsistencies in annotation and FE-relation formulation. Throughout this chapter and in the analyses in the remainder of this book, I show how a combination of frame-semantic concepts with insights from other cognitively-oriented theories, particularly Construction Grammar and Valency Grammar, may solve many of these issues.

3.2 Construction Grammar

3.2.1 Construction Grammar: An introduction

In this section, I introduce Construction Grammar (CxG), which seeks to develop a comprehensive, monostratal account of all aspects of language from a cognitivist perspective (Goldberg 1995, 2006; Croft 2001; Boas and Sag 2012; Hoffmann and Trousdale 2013). There are many different types and applications of CxG, but each of these shares assumptions and methods that differ drastically from most research undertaken in the generative paradigm that characterized (American) linguistics in the second half of the 20th century. These include the view that all units of language consist of Saussurean form-meaning pairings (i.e. constructions) which precludes the positing of abstract 'invisible' grammatical categories or features that are not overtly expressed, as well as the shared goal of achieving an empirically-based and cognitively-grounded account of the entirety of language rather than separate analyses of linguistic modules (e.g. semantics, syntax, phonology) that have been viewed as independent in earlier approaches. By emphasizing that every 'module' of language can be described in terms of constructions, or pairings of forms and meanings, CxG differs from previous accounts in that syntactic patterns (or "argument structure constructions"') have meanings like normal lexical items. Methodologically, CxG emphasizes the importance of natural language data and integrates insights from other fields of cognitive science and psychology to address how language is acquired and organized mentally. Among the various strands of CxG, Goldberg's (1995, 2006) Cognitive Construction Grammar is of particular importance, as it deals specifically with the relationship between verbs and argument realization. A seminal example of the need for a CxG approach to argument realization is given in (3.14).

(3.14) Pat sneezed the napkin off the table.

The sentence in (3.14) is interesting because *sneeze* is an intransitive verb which does not take an object, yet it is completely grammatical (if somewhat humorous) in this transitive sentence with an *into* PP. Rather than positing an additional sense for *sneeze* to account for this meaning (e.g. "cause to move by sneezing"), Goldberg's (1995, 2006) Cognitive CxG argues that syntactic patterns, more precisely configurations of arguments around a verb (here [NP _ NP into N]), are meaningful in themselves. These "argument structure constructions", like any other linguistic structure, are form-meaning pairings that contribute to the meaning of the sentence. Specifically, the construction has the form [X verb Y off Z] and the meaning "X acts in the manner specified by the verb, and causes Y to move off of Z". This view that not only verbs, but also argument structure constructions, contribute to sentential meaning has led to fruitful research on the relation between verb meaning and syntax. After introducing the basic concepts of CxG and the goals and tenets shared among its various implementations, I then present Goldberg's (1995, 2006) approach to argument realization and discuss various phenomena that complicate the characterization of argument structure constructions. Finally, I describe recent research that integrates CxG with Frame Semantics.

CxG represents a break from syntacticocentric theories such as Government and Binding (Chomsky 1981), Minimalism (Chomsky 1993, 1995), Lexical-Functional Grammar (Bresnan 1982), or Categorial Grammar (Wood 1993), which focus primarily on formal descriptions of language competence (see Croft and Cruse 2004: 225f.). As such, CxG abandons many traditional assumptions and distinctions found in traditional generative grammar, such as that between *core* and *periphery, performance* and *competence,* and between various 'modules' of language (see Chomsky 1981). CxG differs from generative grammars in that it is comprehensive and non-modular, thus seeking to account for all traditional aspects of language (lexicon, syntax, semantics) without assuming there is an 'ideal' (*competence*) grammar which is somehow flawed in actual language performance (Chomsky 1965, 1986).[27] CxG is also non-reductionist: whereas generative approaches seek a minimal formalized representation of primarily syntactic phenomena with the goal of capturing language universals, CxG believes that linguistic descriptions must often be quite rich and detailed to account for actual behavior of linguistic material.[28]

CxG primarily developed out of analyses of various linguistic data which are not readily accounted for by traditional approaches. In traditional generative grammar, (argument structure) constructions are viewed as merely an epiphenomenon which result from lower-level, syntactic rules governed by universal principles and specified by language-specific parameters (Chomsky 1965, 1981; see also Boas 2013). However, language is full of examples which are not clearly accounted for in such a view, as pointed out in detail by Fillmore et al. (1988). In particular, idiomatic expressions often have characteristics of both schematic syntactic

27. For example, Chomsky (1995: 20) claims that the purpose of the Principles and Parameters linguistic theory is "to focus on the core system, putting aside phenomena that result from historical accident, dialect mixture, personal idiosyncrasies, and the like".

28. Croft and Cruse (2004: Chapters 9-11) offer a detailed account of CxG's development and its differences from traditional generative grammars.

structures and contentful lexical constituents. Various scholars have investigated non-core constructions such as the *let alone* construction (Fillmore et al. 1988) or the *What's X doing Y* construction (Kay and Fillmore 1999) and compared them with both core syntactic process such as subject-auxiliary inversion (*So will she / Where have you been*) and items traditionally belonging to the lexicon. These studies demonstrate that there is a continuum from schematic constructions (traditionally viewed as strictly syntactic phenomena), over idiomatic, partially-filled constructions, to fully specified lexical items. A small sample of different construction types of varying levels of specificity/abstraction are given in (3.15).

(3.15) a. word construction: e.g. apple
[æpl] – 'apple'
b. idiom construction: e.g. *X take Y for granted*
[X TAKE Y *for granted*] – 'X doesn't value Y'
c. comparative construction: e.g. *John is taller than you*
[X BE Adj comparative *than* Y] – 'X is more Adj than Y'
d. ditransitive construction: e.g. *She gave Pat a cake*
[X VERB Y Z] – X causes Y to receive Z
(cf. Hoffmann and Trousdale 2013b: 2)

The word construction in (3.15a) is fully specified and conventionalized, the ditransitive construction in (3.15d) contains purely unspecified schematic material, and the other two constructions include both specific lexical items and schematic slots.[29] The variation among the above construction types further demonstrate that CxG does not separate syntax from semantics and pragmatics, or idiomatic constructions such as (3.15b) from 'core' syntactic constructions as in (3.15d). Furthermore, these construction types are just some of those identified in CxG research, but constructions are not assumed to fall into a limited set of classes, but instead fall into a multi-dimensional continuum depending on their degree of schematicity, level of productivity, and specificity of meaning, among others.

Because CxG deals with all aspects of language and its relation to human cognition, several versions of Construction Grammar have been formulated over the past decade, each with a different purpose. The most relevant for the present study (and probably the most popular) is Goldberg's (1995, 2006) Cognitive Construction Grammar, which seeks a cognitive, usage-based account of constructions. Radical Construction Grammar (Croft 2001) focuses on typological cross-linguistic analysis, Sign-based Construction Grammar (Boas and Sag 2012) attempts to

29. By positing constructions at all levels of language, CxG avoids the "rule-list fallacy" (Langacker 1987: Chapter I.A.2) found in most linguistic theories, whereby linguistic units must either be generated by abstract rules or stored in a list (i.e. lexicon).

formalize the properties of constructions, and Embodied Construction Grammar (Feldman et al. 2009) is employed in artificial intelligence. In this dissertation, I focus primarily on Goldberg's (1995, 2006) Cognitive Construction Grammar. Before discussing her theory in more detail in Section 3.2.3, I first describe some of the central notions shared by all flavors of CxG.

3.2.2 Principles of CxG

3.2.2.1 *Definition of "construction" and formalization*

Central to the definition and representation of constructions in CxG is Saussure's notion of the linguistic sign as a pairing of form and meaning (Saussure 1916). In CxG, every aspect of language ranging from phonemes to discourse patterns is described in terms of such form-meaning pairings. The original definition of constructions in Goldberg (1995: 4) is as follows:

> C is a construction iff$_{def}$ C is a form-meaning pair <F_i, S_i> such that some aspect of F_i or some aspect of S_i is not strictly predictable from C's component parts or from other previously established constructions. (Goldberg 1995: 4)

This definition emphasizes the role of non-compositionality in identifying constructions. Specifically, constructions are only posited when a given linguistic form has a meaning that is not predictable from its individual parts, or vice versa. In this view, larger utterances such as sentences are not viewed as constructions in and of themselves, but instead as a combination of numerous lower-level constructions. More recently, many Construction Grammarians have adopted a broader definition of constructions, given below, whereby fully compositional units/strings with high frequency and conventionality are also attributed status as linguistic units, i.e. constructions. This definition is in line with usage-based approaches which emphasize psycholinguistic notions such as frequency and entrenchment.[30]

> Any linguistic pattern is recognized as a construction as long as some aspect of its form or function is not strictly predictable from its component parts or from other constructions recognized to exist. In addition, patterns are stored as constructions even if they are fully predictable as long as they occur with sufficient frequency. (Goldberg 2006: 5)

30. Bybee (2013: 51) describes the motivation for this broadened definition of constructions: "From the broader perspective of usage-based theory, however, constructions can be viewed as processing units or chunks – sequences of words (or morphemes) that have been used often enough to be accessed together. This would mean that word sequences that are often used are constructions even if they do not have idiosyncrasies of meaning or form […]".

Constructions of all types are represented as such form-meaning pairings, as in Figures 3.2 and 3.3.

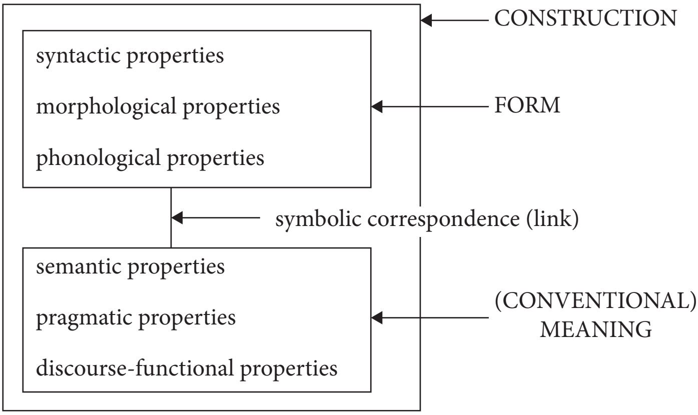

Figure 3.2 The symbolic structure of a construction (Croft and Cruse 2004: 258)

Figure 3.2 demonstrates the general structure of a construction – a pairing of form and meaning. The entire box represents the construction itself, the box on the top represents the form side of the construction and lists the types of information it may include, and the lower box represents the meaning side of the construction and lists the types of information associated with constructional meaning. The form and meaning portions of the construction are combined by a symbolic correspondence link.

Figure 3.3 gives a cursory demonstration of the formal representation of the sentence *Heather sings* and its individual components.

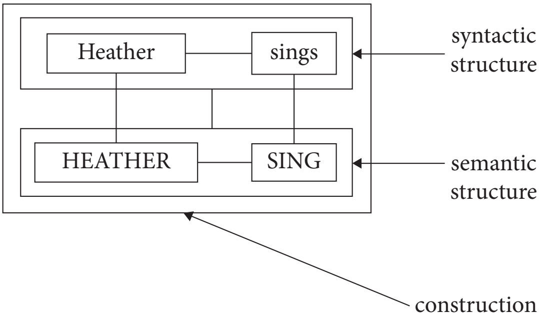

Figure 3.3 Constructional representation of the sentence *Heather sings* (adapted from Croft and Cruse 2004: 260)

The top of the figure describes the formal side of the construction: the two smaller boxes denoting the lexical constructions, namely *Heather* and *sings*, and the box containing both of these captures their relative ordering in the phonetic string.[31] The lower box represents the semantics of the construction: the smaller boxes with the capitalized words HEATHER and SING represent the meaning typically associated with the word (e.g. the act of singing for SING) the larger box containing both HEATHER and SING represents the sentence's meaning. Of course, the representation in Figure 3.3 is simplified for clarity; a complete formalization of this utterance is much more complex, as it would also account for (at a minimum) the individual phonemes comprising the two words, the construction instantiated by the *-s* suffix on *sing*, and the interpretation of the more abstract/schematic intransitive construction.

3.2.2.2 *Construction Grammar, Usage-based Theory, and Corpus Linguistics*

The cognitive orientation of CxG associates it closely with the related fields of Usage-based Theory (Langacker 1987, 2000; Kemmer and Barlow 2000; Bybee and Beckner 2009) and Corpus Linguistics (Gries and Stefanowitsch 2004; Lüdeling and Kytö 2009; Gries 2013). One of the basic tenets of Usage-based Theory is that speakers learn, conceptualize, and produce language by means of general cognitive processes (e.g. categorization, neuromotor automation) rather than an abstract language-specific apparatus independent of from the rest of cognition (i.e. the "language acquisition device" introduced by Chomsky 1965). When applied to language acquisition, this view suggests that speakers develop linguistic knowledge by abstracting and categorizing over the vast number of concrete experiences with language, referred to as *exemplars* in usage-based linguistics. A single utterance consists of several exemplars of different types, including but not limited to phonetic, lexical, and syntactic characterizations of the utterance. Upon repeated exposure to concrete exemplars, speakers identify similarities across distinct usage events and arrive at more abstract characterizations of them, corresponding to what linguists identify as linguistic categories (e.g. phonemes, clause types, morphological processes).

This view of language is highly compatible with CxG and has been increasingly integrated into constructional analyses, which are not limited to specific language modules and readily account for non-compositional expressions. For one, many constructions identified in CxG include both grammatical and lexical material, as well as both fixed and schematic elements. A prime example of this is the "drive crazy" construction (Boas 2003; Bybee 2013), represented in Figure 3.4.

31. A fully spelled-out formalization of this utterance would be much more complex, as the actual form of these constructions consist of all the individual phonemes of the words. These are taken as given in this figure but are not formally represented for reasons of simplicity.

$$\text{SUBJECT} \quad \begin{array}{l}[\text{DRIVE}]\\ [\textsc{send}]\\ [\textsc{make}]\end{array} \left\{\begin{array}{l} \textit{her}\\ \textit{him}\\ \textit{me}\\ \textit{you}\\ \textit{them}\\ \text{NP}\\ ..\\ ..\end{array}\right\} \left\{\begin{array}{l} \text{wild}\\ \text{mad}\\ \textit{crazy}\\ \textit{up the wall}\\ \textit{nuts}\\ \textit{batty}\\ \\ \\ \end{array}\right\}$$

Figure 3.4 Fixed and schematic elements in the "drive crazy" construction (Bybee 2013: 61)

A usage-based approach is necessary to account fully for the interpretation and distribution of lexical items in this construction. For one, if speakers rely solely on minimal lexical entries and abstract syntactic processes, they would not be able to correctly interpret the sentence, as it does not involve driving or any motion at all.[32] Instead, after repeated exposure to such utterances (exemplars), speakers learn to interpret the construction as a whole rather than as a composition of independent lexical items. Speakers also become aware that certain portions of the construction are highly restricted (e.g. the verb *drive*), some are virtually unrestricted (e.g. the subject and object positions), and some are only partially restricted (e.g. the resultative phrase must be *crazy* or a semantically related expression).[33]

Frequency also plays an important role in usage-based linguistics and helps account for the productivity, acquisition, development, and creative use of constructions. An important distinction is that between token frequency and type frequency. Within CxG, token frequency corresponds to the overall frequency with which a construction occurs. Frequently-occurring exemplars, such as the *-ed* past tense marker or highly conventionalized sentences (e.g. *I don't know*), have high token frequency and are claimed to have a correspondingly high degree of cognitive entrenchment because speakers repeatedly hear and produce them. Highly entrenched constructions are cognitively accessed as whole "chunks"

32. Of course, the 'drive crazy' construction can likely be interpreted compositionally, given recent findings that conceptual metaphor is part of general cognitive processing. Specifically, the 'States are Locations' conceptual metaphor – whereby abstract states are expressed and conceptualized as concrete locations (Lakoff and Johnson 1999: 180–193) – could facilitate the proper interpretation of the 'drive crazy' construction and preclude the necessity of specifying it as a separate construction. However, other criteria for constructional status (besides non-compositionality) would apply to drive-crazy and motivate its status as a construction, specifically its high degree of frequency and entrenchment.

33. In addition to synonyms of *crazy* such as *mad* or *up the wall*, Boas (2003) also identifies resultative phrases that are only indirectly related to the concept of "crazy", such as *to desperation* or *to suicide*.

rather than being interpreted based on their individual parts, which leads to diachronic changes such as phonological reduction (e.g. *I dunno* for *I don't know*) and reanalysis, whereby a string of linguistic units is no longer interpreted compositionally (Bybee 1985, 1988; Hay 2011; Tomasello 2003).[34] Type frequency, on the other hand, "refers to the number of distinct items that can occur in the open slot of a construction" (Bybee 2007: 14) and has been employed to account for the productivity and potential for creative extension of constructions. In the "drive crazy" construction for instance, the verb slot has extremely low type frequency as it is largely restricted to the verb *drive*, whereas the resultative argument slot has slightly higher type frequency, as it allows not only *crazy* but also related expressions. In contrast, a more general construction such as the Transitive Construction has extremely high type frequency, as it may occur with a countless combination of verbs and arguments.

The relevance of type and token frequency for the nature of linguistic constructions corresponds with the development and application of corpus linguistic methods within CxG (Gries and Stefanowitsch 2006; Gries 2013). As CxG strives for a comprehensive, empirically-grounded theory of language, the role of introspection in linguistic analysis is (slowly but surely) being replaced with more measurable data, specifically involving the statistical analysis of linguistic corpora. The collostructional analysis method developed by Stefanowitsch and Gries (2003) and Gries and Stefanowitsch (2004), for instance, is employed to determine the degree to which linguistic elements are attracted to one another and aids in identifying linguistic facts that may elude native speaker intuitions.[35] Specific applications of this method have shed light on the relation between verb and construction meaning. For instance, Perek (2015: 46) shows that constructions' meanings are more readily processed when they occur with verbs that are generally frequent with that construction, as speakers readily associate the verb's meaning with that of the construction. Further, some constructions' meanings correspond very closely to the meaning of the verb which occurs in them most frequently, as with *give* in the ditransitive construction or *put* in the caused-motion construction (Gries 2003; Goldberg et al. 2004), though Perek (2015) demonstrates that other constructions, such as the conative construction, exhibit subsenses clustering around similarly frequent verbs with different meanings. (Collostructional) corpus analysis thus

34. The second, broader definition of "construction" of Goldberg (2006: 5) was formulated to capture the unit-like status of these frequently occurring, yet compositional, strings.

35. For instance, collostructional analysis has shown that specific verb types are more frequent in *try to* V vs. *try* V-*ing* constructions (Wulff 2006, 2008) and has revealed differences in which verbs British and American English speakers use in the "persuasion" construction (e.g. *He talked/provoked me into doing it*; Wulff et al. 2005).

allows for a more empirical identification of linguistic facts that are either unidentified or untestable based solely on native speaker intuition.

3.2.2.3 *Constructional inheritance networks*

In order to account for the mental organization of the vast number of constructions language users must know, CxG argues that constructions exist at different levels along a continuum, ranging from those which are abstract, schematic, productive, and predictable on one end, to those which are specific exemplars/ instances of these constructions and often exhibit idiosyncratic behavior that is not predictable from the higher-level construction. As such, a given utterance can be viewed as either a high-level or low-level construction, depending on the type of analysis. By positing constructions at different levels of granularity and abstractness, CxG accounts for both language acquisition and creative language use. Specifically, when acquiring a new language, children and learners are repeatedly exposed to concrete exemplars of a given construction, and they eventually abstract over these exemplars to acquire more general constructions. For instance, after hearing phrases such as *drive X through Y, walk X into Y,* and *throw X across Y*, etc., learners come to realize that the pattern [verb X preposition Y] can be used to express caused-motion with a wide range of verbs, prepositions, and nouns. Upon acquiring this high-level abstract caused-motion construction, speakers may expand upon the exemplars they have heard and produce novel utterances, such as *sneeze the napkin off the table*, which employs an intransitive verb without a "motion" sense (e.g. *sneeze*). Without knowing that an independent caused-motion construction exists, speakers would be unable to productively use verbs in novel argument structure patterns. Such an approach thus accounts for both regularities and generalizations in language structure as well as creativity in language use.[36]

In addition to the distinction between concrete exemplars and abstract, productive schemas, individual constructions are related to one another in a variety of ways. One of the key relations between individual constructions within the hierarchy is that of *inheritance*, and inheritance relations among constructions have been represented by means of constructional networks.[37] Figure 3.5 shows a con-

36. Positing constructions at different granularity levels also overcomes the "rule-list fallacy" (Langacker 1987: Chapter I.A.2), whereby a strict division is assumed between abstract productive grammatical rules and idiosyncratic lexical entries. This strict separation of rule-based and list-based information in language dates back to Bloomfield's work in structuralism: "The lexicon is really an appendix of the grammar, a list of basic irregularities" (Bloomfield 1933: 274).

37. Constructional networks are also referred to as *inheritance networks* (Hoffmann 2013: 312), a *hierarchical lexicon* (Booij 2013: 257), *taxonomic hierarchies* (Croft and Cruse 2004: 199f.),and *inheritance hierarchies* (Goldberg 2013: 18). As constructions capture highly diverse types of structional network relating low-level idiomatic constructions (such as *kick the bucket*) to the highly schematic "clause" construction.

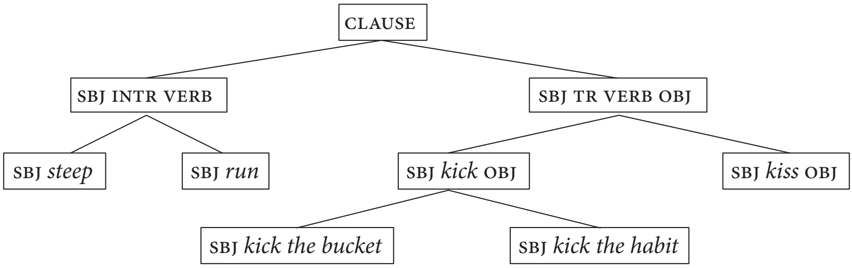

Figure 3.5 Hierarchy from *kick the bucket* idiom to general clause construction (Croft and Cruse 2004: 264)

The figure demonstrates that both the transitive and intransitive constructions inherit from the more general clause construction. The transitive clause construction is inherited by more specific constructions in which the verb position is filled by an actual verb (e.g. *kick, kiss*). At the lowest level in are idioms that inherit the form of the verb-filled transitive construction but differ in their semantic interpretation. The specific types of inheritance among these constructions differ and are accounted for by positing different *inheritance links* accordingly.

At the lowest level of the figure are the idioms *kick the bucket* and *kick the habit*, which are fully specified aside from the schematic subject slot. These idiomatic expressions inherit formal properties from the "transitive *kick*" construction (with non-figurative meaning) but differ in the restriction of the object NP and in their figurative interpretation. These constructions are related through a *metaphorical link* (Goldberg 1995: 81f.), whereby a lower-level construction's form is identical to but exhibits a different (metaphorical) interpretation from the higher-level construction. The metaphorical link also captures the systematic relation between the concrete caused-motion construction (e.g. *drive so. to school*) and the figurative resultative construction (e.g. *drive so. to despair*).[38]

The constructions [SBJ *kick* OBJ] and [SBJ *kiss* OBJ] in Figure 3.5 are related to the higher-level transitive construction (with form [SBJ TRANSVB OBJ]), which does not specify the verb and is thus instantiated by any simple transitive utterance (*John ate food, Pat scrubbed the floor,* etc.). This relation is captured by a proposed

linguistic structures, the exact form and content of hierarchies and their individual nodes differ. For instance, Booij (2013) proposes a constructional network for morphological process and Goldberg (2013) for idiomatic preposition-noun constructions (e.g. *at work, in bed*).

38. In Section 4.4, I discuss the close relation between the range of constructions associated with Change verbs and those associated with Motion verbs.

instance link (Goldberg 1995: 79), which refers to cases in which one construction is a special case of another construction and has different restrictions and potential for creative expansion. The lower-level constructions, such as "transitive *kick*" fulfills the formal requirements and shares the same general semantics as the transitive construction, namely that the subject NP carries out an act specified by the verb onto the object NP (e.g. Subject kicks Object). However, it is more specific in specifying the type of activity carried out and the types of entities that can instantiate the subject and object slots (e.g. animate entity with a foot for the subject). The *instance link* also captures the relation between the more restricted "drive crazy" construction and the more general resultative construction that can occur with a wide range of verbs and result phrases (e.g. *shoot sb. dead, hammer sth. flat, wipe sth. clean*). Even the completely unspecified transitive construction can be viewed as an instance of a higher-level clause construction, which relates clause types such as transitive and intransitive, as in the top of Figure 3.5.

A further *polysemy link* (not shown in Figure 3.5) has been posited to capture relations between constructions which share formal (syntactic) properties but vary subtly in their semantic interpretation (Goldberg 1995: 75f.). A prime example of constructions related by polysemy links is the set of English ditransitive constructions, whereby the formal pattern [NP V NP NP] is associated with slightly different interpretations depending on the (class membership of the) verb it occurs with, e.g. verbs such as *give* or *hand* yield a 'successful transfer' interpretation, *bake* or *send* have a 'intended transfer' interpretation. The various ditransitive constructions, for instance, all appear to modulate the meaning "X causes Y to receive Z" that is associated with verbs such as *give, hand,* and *pass*, among others. As such, this sense can be seen as the "core sense" (Goldberg 1995: 75), and the individual constructions associated with specific modulations of this sense are related by polysemy links.[39]

Another inheritance type is that of a *subpart link* (Goldberg 1995: 78–79), which accounts for cases in which one construction forms a proper subpart of another, independently existing construction. Such a link is posited to connect sentences with the intransitive motion construction (*The dog walked to the park*) with those involving the caused-motion construction (*Pat walked the dog to the park*), as shown in Figure 3.6 below. The figure represents that the intransitive motion construction is a subpart of (i.e. related through a subpart link to) the caused-motion construction by connecting the representations of each construction (the lower and upper boxes) with an arrow marked "I_S: cause". This link captures the similarity of the constructions, namely that the two roles of the intransitive

39. Some sets of constructions related by polysemy links can be represented in terms of radial categories surrounding a prototype (see Lakoff 1987: 483–87).

motion construction (theme, goal) are also in the (transitive) caused-motion construction, as well as the differences between them, namely that the caused-motion construction also includes an additional cause role, which causes the theme to move to the goal.

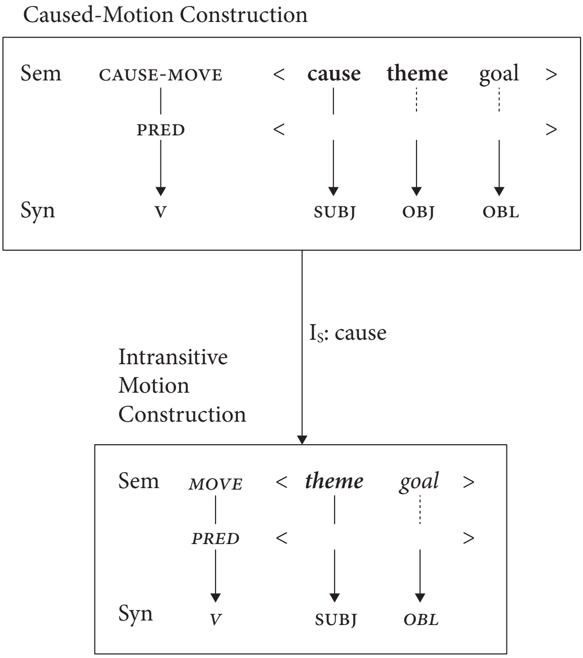

Figure 3.6 Subpart inheritance link between caused-motion and intransitive motion constructions (Goldberg 1995: 78)

The above description of the hierarchy in Figure 3.5 reveals that lower-level constructions do not inherit all formal and semantic properties of higher-level constructions, but instead are related by default inheritance rather than complete inheritance.[40] As such, lower-level constructions inherit by default all properties from higher-level constructions, but may specify differences from the more abstract schema. As put by Booij (2013: 257): "By using inheritance as a default mechanism, we allow for individual *–able* adjectives [or concrete exemplars in general] to have idiosyncratic properties that differ from what is predicted by the schema". The actual content of constructions in the hierarchy can thus be represented in two ways. In the *impoverished entry* representation, the lower-level

40. Goldberg (1995: 73–74) refers to this distinction in terms of normal mode inheritance vs. complete mode inheritance, following Flickinger, Pollard, and Wasow (1985). Lakoff (1985) refers to default inheritance as "inheritance with override".

constructions only list properties which set it apart from higher-level constructions. In the *full entry* representation, all constructions contain all of the relevant information, even if it is redundant and can be predicted from higher-level constructions (Jackendoff 1975; Jurafsky 1992; Goldberg 1995: 74).[41]

To this point, most work on constructional networks focuses either on abstract argument structure constructions that occur across a wide range of verb classes or on the relation between constructions with fixed elements and those with schematic slots, yet no work has been conducted on how the set of constructions occurring with a verb class (i.e. set of verbs evoking a given semantic frame) are related to one another in a hierarchical network structure. The analysis and discussion in the following chapter fills this research gap by proposing a constructional network to capture the interrelations among constructions occurring with English Change verbs.

3.2.3 Constructional approaches to argument realization

3.2.3.1 *Goldberg (1995, 2006): Argument Structure Constructions*

Having described the main concepts which unite various strands of CxG, I now discuss Goldberg's (1995, 2006) Cognitive Construction Grammar in more detail, as it deals explicitly with the combination of verbs and argument structure constructions, a topic central to the present investigation. Goldberg demonstrates how argument realization patterns can be viewed as constructions with meanings independent of the verbs they occur with. These constructions are called *argument structure constructions* (ASCs), defined as "a special subclass of constructions that provides the basic means of clausal expression in a language" (1995: 3). Well-established ASCs include the ditransitive ASC (*She baked him a cake*), the caused-motion ASC (*She walked the dog to the park*), and the *Way* ASC (*We worked our way through the chapter*). Figure 3.7 demonstrates Goldberg's formulation of the resultative ASC, which captures the acceptability of both "ordinary" sentences such as *Pat wiped the table clean* and of more novel sentences such as *Pat sneezed the napkin off the table.*

As with all constructions, ASCs are form-meaning pairings and are thus represented in Figure 3.7 with a mapping of a semantic side (on the top) and a syntactic side (on the bottom). The semantic side provides the meaning of the entire construction (CAUSE-BECOME; or more precisely *X causes Y to be in state or location Z*) as well as coarse-grained characterizations of the "constructional roles"

41. Despite this redundancy, the full entry approach is cognitively more plausible, as speakers likely still associate low-level exemplars with the properties which characterize higher-level schemas (i.e. they still see them as instances thereof) (see Sag et al. 2003: Chapter 8; Booij 2013: 257).

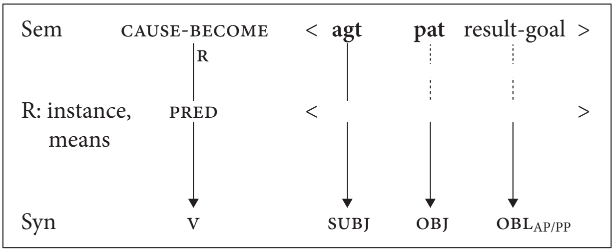

Figure 3.7 Formal representation of the Resultative Construction (Goldberg 1995: 189)

it is associated with: Agent (agt), Patient (pat), and Result-goal. The bottom portion of the figure shows the syntactic form of the construction and how each of the constructional roles maps to its syntactic form (Agent is subject, Patient is object, Result-goal is an oblique adjectival or prepositional phrase).

To account for how constructions fuse with verbs, Goldberg posits (fairly minimal) verbal lexical entries such as those in (3.16).

(3.16) sneeze: < **sneezer** >
wipe: < **wiper** wiped >

These entries list the "participant roles" (arguments in traditional Case Grammar, core FEs in Frame Semantics) associated with the verb, with "profiled" participant roles marked in bold. Goldberg (1995: 44) defines a role as profiled if it is "obligatorily accessed and function as focal points within the scene, achieving a special degree of prominence (Langacker 1987)". As such, profiled roles are more central to the verb's meaning (and often more obligatory) than non-profiled roles.

Returning to the description of Figure 3.7, the middle portion of the figure represents the fusion of constructional roles with verbal participant roles. The solid line connecting the Agent to the subject signifies that the verb occurring in the construction must have a profiled participant role that can fuse with the constructional role. The dotted lines coming down from the other two constructional roles signify that the verb need not be associated with compatible participant roles; instead, the construction itself may supply the roles. The PRED and its related description in the left of the middle portion specifies that the verb occurring in the construction describes the means by which the more general CAUSE-BECOME semantics is achieved. Examples (3.17)–(3.18) demonstrate how the verbs *wipe* and *sneeze* combine with the Resultative ASC.

(3.17)	*Sentence*:	Pat	wiped	the table	clean.
	Cx roles:	Agt		Pat	Result-goal
	Verb roles:	**wiper**		**wiped**	–

(3.18)	*Sentence*:	Pat	sneezed	the napkin	off the table.
	Cx roles:	Agt		Pat	Result-goal
	Verb roles:	**sneeze**		–	–

In (3.17), *Pat* instantiates the Agent constructional role which fuses with the profiled "wiper" role of the verb and *the table* instantiates the Patient role which fuses with the "wiped" participant role. The Result-goal constructional role, however, does not correspond to a verbal participant role, because *wipe* is only associated with the two roles (wiper, wiped). Instead, this argument is supplied by the construction alone. The representation of (3.18) differs slightly from (3.17) in order to capture that the verb *sneeze* supplies only one participant role (the "sneezer") while *wipe* supplies both the subject ("wiper") and direct object (*the napkin*, "wiped"); in both cases the ASC itself supplies the remaining roles.

To illustrate the sensitivity of constructions to detailed aspects of verb meaning, Goldberg (1995: 45f.) discusses syntactic differences among the near-synonymous verbs *rob* and *steal*. While both verbs describe scenarios in which a thief takes some goods from a 'target' (i.e. source or victim), the verbs differ in which argument is grammatically profiled. Goldberg claims that the grammatical functions of subject and direct object have higher prominence than obliques and that semantically profiled arguments of a verb appear in prominent syntactic positions. With *rob*, the victim of the theft event is profiled, because it appears in the prominent direct object position (3.19a). With *steal*, the goods argument of the event is profiled as direct object (3.19b). The non-profiled arguments appear in an oblique prepositional phrase which may be omitted.

(3.19) a. She robbed the woman (of her purse).
b. She stole the purse (from the woman).

A closer analysis of the constructions in which these verbs occur reveals further semantic differences, e.g. that the 'target' argument of *steal* may be an inanimate location, while that of *rob* must be animate or at least sentient and that *rob* but not *steal* entails the victim is negatively affected (Goldberg 1995: 48; see also Pinker 1989: 396f).[42]

Based on these observations, Goldberg argues that the seemingly similar verbs *rob* and *steal* in fact exhibit semantic differences that are relevant for their constructional behavior. *Rob* profiles the 'target' while *steal* profiles the stolen goods. Goldberg represents this difference in the verbs' lexical entries, in which profiled arguments are in bold-faced font:

42. However, see Stefanowitsch (2011) for evidence that the animacy restriction of *rob* is not a strict rule but rather a tendency.

(3.20) a. rob <**robber victim** goods >
b. steal <**stealer** source **goods** > (Goldberg 1995: 48)

Goldberg ties the verbs' occurrence in different syntactic patterns to the way these two syntactic constructions differ in the construal of participants in the theft event. The profiled victim of *rob* and the profiled goods of *steal* both occur in the profiled grammatical function of direct object, while the goods of *rob* and the source of *steal* are optional oblique phrases.

Goldberg (1995: 50) posits two principles that govern the fusion of verbs and constructions. The Semantic Coherence Principle requires that the specific participant role(s) of a verbal argument be semantically compatible with the more general argument role(s) of the construction.[43] For instance, the construction occurring with *steal* has the argument role slots Agent, Patient, and Location, which can be fused with the stealer, goods, and source participants of *steal*, respectively. Goldberg (1995: 50) also posits a second principle, the Correspondence Principle, which states that all profiled participants of a verb must be expressed as an argument of the construction. The Correspondence Principle is a default principle, as it may be overridden when the construction's function is to suppress prominent arguments (e.g. passive, middle constructions).

3.2.3.2 *Questions about the combination of verbs and constructions*

While Goldberg's principles seem adequate for the specific case of *rob* and *steal*, scholars have argued that (particularly) the Semantic Coherence Principle is not informative enough to account for the full range of data (Iwata 2008; Boas 2011b, 2011c; Stefanowitsch 2011), referring to issues which suggest that the combination of verbs and constructions is not entirely predictable, particularly relating to the partial productivity of constructions, constructional polysemy, and the granularity of constructional analyses.

Partial productivity refers to the phenomenon that, although a construction may appear with a particular verb, it does not always appear with semantically similar verbs (Barðdal 2008; Goldberg 1995: Chapter 5). Some constructions, such as the transitive construction, are highly productive in that they occur with a wide range of verbs, and with all members of semantically related classes of verbs, such

43. Goldberg's (1995: 50) formulation of the Semantic Coherence Principle reads: "Only roles which are semantically compatible can be fused. Two roles r_1 and r_2 are semantically compatible if either r_1 can be construed as an instance of r_2, or r_2 can be construed as an instance of r_1. For example, the kicker participant of the *kick* frame may be fused with the agent role of the ditransitive construction because the kicker role can be construed as an instance of the agent role. Whether a role can be construed as an instance of another role is determined by general categorization principles."

as communication verbs (3.21a). However, many constructions are partially productive, as they only occur with a limited number of verbs. One such construction is the ditransitive construction which occurs with some (3.21b) but not all communication verbs (3.21c).

(3.21) a. She {told/read/explained/reported} the story/news.
b. She {told/read} him the story/news.
c. *She {explained/reported} him the story/news.

Partial productivity raises problems for Goldberg's Semantic Coherence Principle, as it does not account for the infelicity of sentences such as those in (3.21c). Indeed, the Principle correctly captures the data in (3.21b): the participants of the verbs *tell* and *read* (i.e. speaker, addressee, message) are semantically compatible with the arguments of the ditransitive construction. However, it is unclear why the verbs *explain* and *report* are not found in the ditransitive construction, despite being associated with the same roles *tell* and *read*.

A second major topic in CxG research involves the notion of constructional polysemy. Many constructions exhibit different senses, often as variations on a central or prototypical sense, as described for the Ditransitive ASC(s) above (Goldberg 1995: 31f., Boas 2003, 2008b). Recent research has investigated how individual senses of a construction are related to one another and how verbs fall into classes according to the polysemy sense which arises when they are combined with the construction. Dowty's (1999) analysis of *swarm* type constructions and Michaelis and Ruppenhofer's (2001) analysis of the German applicative (*be-* prefix) pattern demonstrate how the same syntactic frame may receive subtly different interpretations when combined with different verbs. Further, the studies of Boas (2011b) and Dux (2018) described below appeal to frame-semantic verb classes in order to account for constructional polysemy. Similarly, Perek's (2015) collostructional analysis of of the conative construction and its various interpretations demonstrates the advantages of lower-level, verb-(class-)specific analyses over a more monolithic view of the verbal lexicon. The phenomena of partial productivity and constructional polysemy are likely best explained in a usage-based approach to language, as described in the previous sub-section. The notions of type frequency and entrenchment are of particular relevance for determining whether a verb may be used in a certain construction. Specifically, when a given verb is frequently used within a certain construction, verbs with similar meanings may also be used in the same context by analogy to the frequent example.

A third relevant discussion in the CxG literature involves the proper level of granularity at which constructional behavior should be analyzed. Scholars have observed that Goldberg's ASCs and the Semantic Coherence Principle are defined too abstractly to properly account for the full range of data surrounding the combination of verbs and ASCs. Drawing on data from the resultative construction (Boas 2003), ditransitive construction (Croft 2003), and locative alternation (Iwata 2008), these scholars argue that constructional analyses must proceed from the bottom up, first accounting for constructions in combination with individual verbs and then seeking generalizations over wider verb classes and the construction as a whole (see also Gries 2011). This approach accords with the emphasis in usage-based theories on low-level analyses of actual data.[44] In contrast to Goldberg's high-level ASCs, these scholars claim that more fruitful analyses are possible at the level of medium-level verb-class-specific constructions or low-level verb-specific constructions (or "mini-constructions" in Boas's [2003] terminology). Figure 3.8 below shows how the ditransitive construction can be analyzed at various levels of granularity.

The lowest portion of Figure 3.8 shows instances (i.e. exemplars) of verb-specific ditransitive constructions, including specific verbs (*give, bake*) and nominal arguments. At this level of analysis, the types of arguments may be more or less restricted depending on the verb (e.g. *bake* occurs with baked foods as object, while *give* is much more flexible). The middle rows represent verb-class-specific ditransitive constructions, with the classes of Giving and Cooking. Croft (2003) argues that the specific interpretation of the ditransitive is determined at this level, with verbs of Giving denoting actual transfer events (in which the recipient actually receives the theme) and verbs of Cooking associated with intended transfer events (while the agent intends for the recipient to receive the cake, it is not entailed that the recipient actually receives it).

ASC level:				
Ditransitive Cx:	Agent	Verb	Recipient	Theme
Medium (verb class) level:				
Giving:	Giver	{give/donate}	Recipient	Given_item
Cooking:	Cook	{bake/cook}	Recipient	Produced_food
Low (verb) level:				
give:	John	gave	Susan	a present.
bake:	John	baked	his friend	a cake.

Figure 3.8 The ditransitive construction at various levels of granularity

At the highest level is the abstract ASC (as in Goldberg 1995, 2006) which does not specify the verb (class) or the specific interpretation: this level is nevertheless necessary to capture novel uses of verbs in the ditransitive construction. As will be

44. In the following section, I discuss how this view also aligns with recent work in Valency Grammar (Herbst 2009, 2014) which focuses on item-specific valency properties.

shown in the following chapters, a comprehensive and accurate account of ASCs and their combination with verbs and verb classes must employ all three levels of analysis described here.

3.2.3.3 *Constructional and projectionist approaches to argument structure*

The constructional approach to argument structure outlined above is frequently contrasted with the approaches discussed in Sections 2.3 and 2.4 (see Croft 2003; 2012: Chapter 9; Boas 2006; Levin and Rappaport Hovav 2005).[45] The primary difference between these approaches is whether argument realization is attributed to verb-independent constructions or to the verb(‘s meaning). As discussed above, projectionist approaches view argument realization behavior as a product of (grammatically relevant aspects of) verb meaning. On this view, verb meanings correspond to event structures and are formalized using predicate decompositions which employ primitive predicates such as CAUSE, BECOME, and ACT. In Rappaport Hovav and Levin’s (1998) formulation, each verb is associated with a basic event structure template (i.e. a basic meaning) and certain template types can be augmented thus allowing the verb to occur in argument structures (i.e. constructions) not associated with the basic template. This approach, for instance, accounts for why manner verbs such as *sweep* or *run* require only a single participant but can also appear in transitive, resultative, caused-motion, and other syntactic contexts, whereas result verbs such as *break* or *kill* (typically) require two participants and cannot be augmented and used in contexts such as resultative or caused-motion.

In contrast, constructional approaches (as formulated by Goldberg 1995, 2006) view argument realization as a property of independently existing (argument structure) constructions. The construction determines the number and syntactic realization of arguments, while the verb is associated with a minimal lexical entry specifying its meaning (i.e. its frame semantics) and associated participant roles. One motivation for the development of constructional approaches is the widespread and unpredictable nature of multiple argument realization, whereby a single verb may occur in multiple syntactic contexts. On a strict projectionist view, one must posit numerous senses of a verb (i.e. numerous event structure templates) or numerous rules governing the augmentation of ‘basic’ senses/templates in order to account for a verb’s occurrence in different syntactic contexts (e.g. *Pat swept, Pat swept the floor clean, Pat swept the leaves into a pile*). While such ‘sense

45. The distinction in these approaches has been defined as that between “constructional” vs. “projectionist” (Levin and Rappaport Hovav 2005) or as between “phrasal” vs. “lexical” approaches (Müller and Wechsler 2014). The intensity of this scholarly debate is demonstrated, for instance, by the publication of an entire issue of *Theoretical Linguistics* (2004, vol. 40, iss. 1/2) to a discussion of the two approaches.

proliferation' is not problematic in its own right,[46] the approach has been criticized because it allows implausible senses of a verb to be posited (e.g. *sneeze* having an inherent cause-motion sense), it requires identifying a verb's 'basic' sense from which all others are derived despite lacking accepted empirical tests, and it does not recognize that ASCs themselves contribute to sentential semantics. These issues do not surface on a constructional view, in which verb meanings are static and the realization and interpretation of arguments is determined by the ASC.

Constructional approaches also overcome issues associated with three interacting assumptions that guide (traditional) projectionist approaches: that a verb's meaning is divisible into a grammatically relevant event structure and a "root" that is not grammatically relevant, that each verb is associated with a single "basic" event structure from a limited set of event structures, and that the event structure determines how the verb's arguments are projected (i.e. syntactically realized).[47] If there are a small set of "basic" event structures that determine argument realization, then one would also expect there to be a small set of verb classes, with each verb of a given class exhibiting the same syntactic distribution. However, as shown in the discussion of partial productivity above, this is not the case. Even verbs with near-identical meanings (i.e. the same "basic" event structure) may differ in their precise options for argument realization. The assumptions above prohibit an accurate account of this behavior, which would require one to allow verbal roots to determine grammatical behavior, to posit a much larger number of event structure templates, and/or to recognize that event structure templates only determine a limited range of a verb's argument realization properties.

Indeed, more recent projectionist research has also recognized these issues and emphasized the need for more detailed descriptions of verb meaning, including encyclopedic real-world aspects of meaning (traditionally relegated to the grammatically non-relevant "root"). As discussed in Section 2.3, Rappaport Hovav and Levin (1998) discuss how a verb's root determines its basic event structure and its number of (required) arguments. Pinker (1989) posits "narrow range" rules to account for how fine-grained semantic features influence alternational and argument

46. Criticisms against sense proliferation solely for reasons of parsimony and economy have come under scrutiny in cognitive frameworks, given the psycholinguistic evidence for humans' immense storage capacity and their ability for redundant storage, e.g. to have entries for both an individual verb sense and as part of a larger, compositionally-interpreted construction. See also Croft (2003), Langacker (2009: 251–255), and Perek (2015: 32–34).

47. Croft (2012: 191–192) also notes that the assumption of a basic sense conflicts with how we interact with language: verbs are always used in sentences which include argument structure properties, and, given multiple argument realization, each verb can be viewed as exhibiting a wide range of meanings. Therefore, a verb's basic meaning is essentially an abstraction over all of its uses in various contexts.

realization behavior. More recently, Beavers and Koontz-Garboden (2012) make a specific case that root meanings are relevant for other grammatical features such as sublexical scope. Although they approach the problem from a different perspective, these formulations of verb roots are not dissimilar to work in constructional approaches seeking to better understand issues such as partial productivity and verb classification (Boas 2003; Croft 2003; Nemoto 2005; Iwata 2008).

In recent years, scholars have increasingly appreciated the compatibility and complementarity of projectionist and constructional approaches to argument realization. Croft (2012: Chapter 9) clearly and succinctly points out that the major difference depends on whether one attributes multiple argument realization to verbs or constructions.[48] This decision, in turn, depends on whether one denies or assumes the existence of grammatical constructions. Yet there is significant supporting evidence for their existence, including the polysemous nature of syntactic configurations (i.e. constructional polysemy; cf. Levin and Rappaport Hovav 2005: 189–190), the inability to interpret certain (idiomatic) syntactic structures on the basis of general syntactic principles (Fillmore et al. 1988; Croft 2001), and further evidence from language processing and language acquisition studies (cf. Croft 2012: Chapter 9). As such, the present analysis assumes the existence of constructions and eschews the assumptions associated with projectionist approaches, but also recognizes the compatibility of the two approaches and the need for detailed analyses of verb meanings and their interaction with ASCs. In the following, I discuss how Frame Semantics is employed to arrive at such detailed analyses.

3.2.3.4 *Frame Semantics and Construction Grammar*

In recent years, a rich body of research has investigated the extent to which CxG and Frame Semantics can be integrated to provide an even more comprehensive approach to linguistic description. Various questions which cannot directly be answered by CxG alone are better suited for approaches which combine these theories. As discussed above, such questions include why certain verbs but not semantically related verbs occur in a given construction (partial productivity), how to capture similarities between verbs which 'force' a certain interpretation of a polysemous construction, how to represent inheritance relations among various constructions in a given language, and how to compare constructions across languages. Here, I discuss research showing how Frame Semantics aids in constructional analyses of these problems.

48. The compatibility of the two approaches is also evidenced by article titles such as "Lexical rules vs. constructions: a false dichotomy" (Croft 2003) or "Lexical and phrasal approaches to argument structure: Two sides of the same coin" (Boas 2014).

The phenomenon of partial productivity is treated in detail by Boas (2008b), who attempts to account for the varying constructional behavior among `Self_motion` verbs by appealing to detailed frame-semantic properties of the verb and its arguments. One proposed solution is to identify specific entailments of a verb which allow it to appear in the construction. Boas proposes that `Self_motion` verbs may appear in the caused-motion construction when they entail that the SELF_MOVER is moving quickly and energetically (cf. *He jogged/*crawled her off the sidewalk)*. He also suggests that a verb's constructional behavior may be related to its semantic weight. Here, he appeals to Snell-Hornby's (1983) notion of verb descriptivity (discussed in more detail in Section 5.1). Put simply, verbs with a low level of verb descriptivity verbs have fairly general meanings, such as *walk* or *run*, while high-descriptivity verbs describe the situation in more detail, as with *wander* or *crawl*. In particular, Boas argues that low-descriptivity verbs occur in a wider range of constructions than high-descriptivity verbs. Dux (2011) observes similar behavior among verbs evoking the `Theft` frame, showing that high-descriptivity *shoplift* and *embezzle* appear in fewer syntactic patterns than lower-descriptivity *pilfer* and *swipe*.[49]

As discussed above, certain ASCs may receive different interpretations depending on the verb they occur with. The examples in (3.25)–(3.27) above show that the ditransitive construction is polysemous, as it denotes a typical receiving event with *give*, a future receiving with *promise*, and prevented receiving with *deny*. Boas (2010a: 11) ties the notion of constructional polysemy directly to Frame Semantics, arguing that the polysemy of constructions results from their ability to combine with verbs of different semantic frames.

> […] each syntactic frame expressing a specific aspect of a lexical unit's frame-semantic meaning can be regarded as a grammatical construction. This means that each syntactic frame may be polysemous because it may be used to express the semantics of a broad variety of semantic frames […] (Boas 2010a: 11)

Research on such polysemous constructions (Goldberg 1995: 31f., Croft 2012: Chapter 9; Dux 2018) has recognized that semantically related verbs are often associated with the same sense of a polysemous construction, giving rise to verb classes that are defined according to the interpretation yielded when they combine with a given construction.

Dux (2018) argues that such classes may be identical to FrameNet classes, demonstrating that verbs evoking the same frame receive the same interpretation

49. The analysis in Chapter 5 builds on these verb-class-specific studies by comparing the number and types of constructions found with low-descriptivity Change verbs and those of high-descriptivity of Theft verbs.

when appearing in a given construction (although verbs may differ in their ability to appear with the construction). For instance, other verbs of the `Giving` frame (*give, hand, pass*) each receive the prototypical 'giving' interpretation, and other verbs in the `Deny_permission` frame (*deny, forbid*) receive the 'deny receiving' interpretation.

(3.22) a. He {gave/handed/passed} me a football.
b. He {denied/forbade} us entry into the building.

Ruppenhofer and Michaelis (2010, 2014) also show the usefulness of FrameNet classes for predicting and disambiguating senses of polysemous constructions. In particular, they demonstrate that when a FE of a given frame is left unexpressed in an utterance, it will consistently receive either a definite or an indefinite interpretation, regardless of the specific verb. Such findings suggest that FrameNet classes are not merely sets of semantically related verbs, but also have predictive power in various phenomena at the syntax-semantics interface, particularly when paired with principles from CxG.

Another goal of CxG research is the identification and documentation of the set of constructions existing in English and the interrelations between these constructions. Fillmore et al. (2012) demonstrate how findings about English constructions can be represented in a "Constructicon", which has a very similar structure to FrameNet.[50] Table 3.5 summarizes the parallels between the two resources as they are discussed by Fillmore (2008) and Fillmore et al. (2012).

Table 3.5 Entries in FrameNet and Constructicon (cf. Fillmore 2008; Fillmore et al. 2012)

FrameNet lexicon	**'Constructicon'**
Lexical entries: description of frame elements (= valency pattern/semantic roles), frame-to-frame-relations, annotated examples	Constructional entries: description of (i) constructional elements (= syntactic components/functions), (ii) meaning of the construction, (iii) the position in the network
Frame elements = semantic roles in a frame	Constructional elements = syntactic functions
Examples illustrate lexical units in context	Examples illustrate constructional units in context
Illustration of frame-to-frame-relations and inheritance links in a network	Illustration of relations to familiar constructions and inheritance links

A FrameNet lexical entry corresponds to a constructional entry in the Constructicon, which includes information about constructional elements, the meaning of the construction, and its relation to other constructions in the inheritance network.

50. See also Fillmore et al. (2012), Ziem (2014) and Boas (2017).

FEs in FrameNet correspond to construct elements (CEs) in the Constructicon, which are the constituent syntactic functions that make up the construction (e.g. such as the word *way* and a Path specification in the *Way*-construction). The Constructicon also includes corpus examples in which constructional units are annotated, as well as a hierarchy which illustrates relations between similar constructions. Recently, researchers have begun developing a Multilingual Constructicon, focusing initially on Brazilian Portuguese, English, German, and Swedish (cf. Bäckström et al. 2014, Torrent et al. 2014, and Boas and Ziem 2018).[51] Work in this project seeks to distinguish cross-linguistically equivalent from language-specific constructions and to investigate subtle differences in related constructions across languages.

3.2.4 Change verbs in CxG

Having discussed research combining Frame Semantics with Construction Grammar, I now present a brief constructional analysis of one construction associated with Change verbs and describe its relation to other constructions and its behavior with respect to partial productivity and constructional polysemy. A typical syntactic frame for Change verbs is given in (3.23).

(3.23) She changed the man into a frog.

For an analysis of verb valency and argument realization, this particular construct involves (at least) four construct elements: subject, verb, direct object, and *into* prepositional object.[52] These elements are respectively mapped to the sentence arguments *she, the man,* and *a frog*. In Goldberg's analysis, each of the constructional slots is filled by a schematic participant role which is instantiated by the phrases in the sentence, as shown in Figure 3.9.

51. Contrastive and cross-linguistic research integrating the principles of Frame Semantics and CxG, particularly research employing insights from Contrastive CxG (Boas 2010a, 2010b), is discussed in more detail at the start of Chapter 6, as it informs the contrastive German-English analyses discussed in that chapter.

52. This sentence actually exhibits a large number of constructions, only a few of which can be described here. First, each of the words in the sentence is a construction, pairing the phonological string (form) to the entity it describes in the world (meaning). The verb *changed* is an instance of a more complex construction which combines the verb *change* with past suffix *-ed*. Additionally, the noun phrases *the man* and *a frog* each result from constructions which combine nouns with determiners/articles. Furthermore, the entire grammatical structure [NP V NP into N] involves a construction which combines a bare transitive construction [NP V NP] with a prepositional phrase [into N].

Syntax:	NP.Subject	Verb	NP.Object	PP.into
Semantics:	Cause-Agent		Patient/Ch_entity	Final_state
Example:	She	changed	the man	into a frog.

Figure 3.9 Transitive + *into* PP construction with *change*

The degree of specificity for the schematic roles in the "Semantics" line is a matter of debate: it is unclear whether to use abstract roles such as Agent and Goal or verb-class specific roles such as Cause_change or Final_state (see Croft 2003; Herbst 2014). While using abstract roles allows various senses of the construction to be subsumed under one general construction (as with Goldberg's ASCs), verb-class specific roles show that the combination of syntactic frame and arguments, may receive different interpretations when it appears with a different verb as with Boas's (2003) or Iwata's (2008) low-level constructions. To demonstrate, consider an example where the same syntactic frame is used with a different verb, namely *walk*.

(3.24) She walked the dog into the park.

There are a number of similarities and differences between the examples in (3.23) and (3.24), making it difficult to decide at which level to posit an (argument structure) construction. Apart from the syntactic similarities, semantic similarities include the agency of the subject and its influence on the direct object. Also, in the *change* sentence, the object is *caused to be in the state of* a frog, and the object of *walk* is *caused to be located at* the park. This parallel suggests that the constructions are similar to the extent that states and locations are similar. However, there are also differences between the two sentences. Syntactically, the prepositional phrase used to introduce the Final_state argument of *change* must be headed by *into* (or *to*), whereas the Goal argument of *walk* may be expressed with a wide range of prepositions (*through/around/out of the park*). Semantically, the subject of *change* does not change its location, while that of *walk* changes their location in parallel with the object. Also, while the object of *change* (*the man*) is no longer visible as such after undergoing the change, the object of *walk* (*the dog*) remains intact in its original form. These data show that it is necessary to posit both high-level constructions to account for similarities between various interpretations of the same syntactic frame, and low-level constructions to tease out the meaning differences associated with the different verbs.

While the above discussion demonstrated the polysemy of constructions with Change verbs, there is also evidence that many constructions are partially productive with Change verbs. As mentioned in the preceding chapters, numerous constructions appear with some, but not all, Change verbs. These examples are repeated in (3.25).[53]

(3.25) a. The witch {changed/*turned/altered} the man.
b. He {changed/turned/*altered/*modified} into a frog.
c. The man {changed/*turned/*altered}.

The data in (3.25a) show that *change* and *alter,* but not *turn*, may appear in simple transitive constructions without prepositional phrases, and (3.25b) shows that *change* and *turn* may appear intransitively with an *into* PP, while *alter* and *modify* are ungrammatical in this context. Finally, (3.25c) shows that *change*, but not *turn* or *alter*, may appear in simple intransitive constructions without PPs.[54] In sum, a constructional analysis of Change verbs raises the same questions as other constructional analyses, which are addressed in the following chapters: Why do semantically related verbs exhibit different constructional behavior? Why do constructions have different meanings when they appear with different verbs? What level of constructional analysis is best suited to answer these questions?

3.2.5 Summary of CxG

In this section, I have introduced CxG as a comprehensive, cognitively-oriented approach to language description. I pointed out relevant differences between CxG and generative grammars, emphasizing the importance of idiomatic expressions for the development of this framework. I then presented important principles for analyzing constructions, including the Saussurean concept of form-meaning pairings, the unified representation of all aspects (syntax, semantics, phonology) of constructions, and the organization of constructions into inheritance networks. I then described Goldberg's (1995, 2006) concept of argument structure constructions and her principles for the fusion of verbs with constructions, as well as issues which challenge Goldberg's approach, including partial productivity, constructional polysemy, and the proper granularity of constructional analysis. I then described research which seeks to integrate CxG with Frame Semantics to provide a more unified, comprehensive account of the relation between verbs and

53. The intuitive-based judgments in these examples correspond to corpus data discussed in Chapter 4.

54. Boas's (2008b) hypothesis that verbs with lower descriptivity appear in a wider range of constructions does not clearly hold for this data (see Dux 2016: 235–237). While the restricted range of constructions for *alter* and *modify* may result from their relatively high descriptivity, both *change* and *turn* are quite low in descriptivity and exhibit nearly the same meaning, but the two verbs are not compatible with the same range of constructions.

constructions. Finally, I undertook a brief analysis of constructions appearing with Change verbs and discussed its implications for answering various questions relevant in the CxG literature, which are further addressed in the following chapters.

3.3 Valency Grammar

3.3.1 Introduction and the VDE

In this section, I briefly introduce the theory of Valency Grammar.[55] Like the theories described above, Valency Grammar focuses on the relation between lexis and grammar, specifically that between valence-bearing lexical units and the constituents they cooccur with. However, Valency Grammar emphasizes item-specific descriptive analyses and the idiosyncratic nature of (verbal) argument realization behavior. The descriptive, documentary nature of Valency Grammar has resulted from its employment in the development of resources for lexicography and foreign language learning (Helbig et al. 1969; Herbst et al. 2004; Schumacher et al. 2004).

Valency Grammar – as its name suggests – focuses on the valency behavior of linguistic items (primarily verbs, but also nouns, adjectives, and multi-word expressions) and employs many of the constructs associated with Case Grammar and transitivity classes (Sections 2.1–2.2). While traditional work in Valency Grammar maintained the distinction between obligatory 'arguments' and optional 'adjuncts' to varying extents in different flavors of the theory, more recent work has discussed the problematic nature of this binary distinction and promoted a more gradient view thereof (Herbst and Schüller 2008: 113–116; Herbst 2014: 162–163). The items which fill valency slots are also given semantic characterizations as with the semantic roles of Case Grammar and FrameNet's Frame Elements. While many Valency Grammar works – such as the *Valency Dictionary of English* (VDE; Herbst et al. 2004) – employ very general role labels (e.g. *something, somebody*), Valency Grammarians also debate how many and what types of roles are needed for a given analysis (Helbig 1992; Herbst and Schüller 2008: 126–135).

55. This discussion focuses on recent work in Valency Grammar (Herbst and Schüller 2008; Faulhaber 2011; Herbst 2014) which build on insights from the creation of the *Valency Dictionary of English* (Herbst et al. 2004). However, Valency Grammar was a prominent framework in the European linguistics community from the 1960s to 1980s, particularly in the former East Germany (see Helbig and Schenkel 1969; Helbig 1992; Welke 2011) and in the work of the Institute for German Language in West Germany. It is still highly relevant in European linguistics but is only recently being adopted by American scholars. Valency Grammar also bears a strong relationship to Dependency Grammar, particularly as formulated by Tesnière (1959). See Welke (2011) for additional discussion.

A major motivation for work in Valency Grammar is that (foreign) language learners require detailed, item-specific information about lexical units in order to use them correctly, as discussed with respect to the partial productivity of constructions above. A prime example of these challenges can be found among Communication verbs, whereby the verbs *tell* and *read* may realize the "Addressee" participant as a dative object, whereas the closely related verbs *explain* and *report* may not. Given its pedagogical focus, Valency Grammar research has resulted in numerous valency dictionaries that provide detailed descriptions of valency-bearing items, such as the VDE or the German *Valenzwörterbuch deutscher Verben* (VALBU; Helmut et al. 2004).

Dux (2016) offers a critical discussion of the VDE in general and its treatment of (the valency behavior of) the verb *change* in particular (see also Fillmore 2009). He shows that the VDE largely accounts for the entire range of valency behavior for the lexical items it documents and thus offers valuable empirical data for a wide range of argument realization analyses. However, the coverage and goals of the VDE make it unsuitable for direct use in the verb class analyses undertaken here. The detailed nature of its entries limits the number of items covered (around 1,300 words, including 511 verbs), and its item-specific approach does not identify relations among similar verbs or their associated (vaguely defined) roles. For example, of the Change verbs listed in Levin (1993) and FrameNet, the VDE includes only *change* and *turn* but does not mention that their roles or meanings are potentially related. The valency data of the VDE also exhibits issues, most notably the lack of frequency information (e.g. to distinguish frequent from rare uses of a verb) and of organizational structure showing how valency patterns are related. These shortcomings thus preclude the direct employment of the VDE in the present analysis which draws on detailed and frequency-based valency descriptions for larger sets of semantically related verbs than that available in the VDE.

At the same time, research in Valency Grammar has also contributed important theoretical insights for the present analysis, particularly Faulhaber's (2011) demonstration of the unpredictable relation between verb meaning and valency (i.e. constructional) distribution and Herbst's (2014) comparison of the "valency constructions" of Valency Grammar and Goldberg's (1995, 2006) ASCs.

3.3.2 Faulhaber (2011) and the idiosyncratic nature of verb valency

Faulhaber (2011) determines the extent to which semantically related verbs differ in their argument realization properties, thus offering an important empirical test of the longstanding assumption of a (more or less) direct relationship between verb meaning and syntax characteristic of the approaches discussed in Chapter 2. Faulhaber observes that, while most research recognizes that there might be exceptions in the exact syntactic distribution of semantically related verbs, such exceptions are often viewed as minimal or insignificant and thus not fully appreciated in verb valency research (Levin 1993: 13; Levin and Rapaport Hovav 2005: 15).[56]

Analyzing 87 lexical units from 22 groups of semantically related verbs, Faulhaber seeks to identify "syntactic gaps": valency patterns which occur with some but not all verbs of a given semantic class. She documents the valency behavior of verbs using VDE data, native speaker consultations, and examples found on the internet. When the data reveal even a single instance of a verb occurring in a given valency construction, Faulhaber includes it as a possible construction for the verb in question, regardless of its frequency.[57] Table 3.6 below shows the results of Faulhaber's investigation of how a given argument/role, namely TOPIC, is realized across individual members of four "verb groups" (narrowly-defined semantic verb classes). The data shows that individual verbs do not have the same syntactic

Table 3.6 Variability of the participant TOPIC (cf. Faulhaber 2011: 166)

verb groups	**+ [about_X]**	**+ [on_X]**	**+ [upon_X]**	**+ [of_X]**	**+ [over_X]**
'quarrel'	*quarrel* *argue* *bicker* *dispute*	*quarrel* *argue*			*quarrel* *argue* *bicker* *dispute*
'remember'	*remember* *reminisce* *recall* *bear in mind*				*reminisce*
'think'	*consider* *think* *reflect* *ponder*	*(consider)* *think* *reflect* *ponder*	*think* *reflect* *ponder* *contemplate*	*(consider)* *think*	*(consider)* *ponder*
'teach'	*teach* *instruct* *educate*	*instruct* *educate*			

56. These views and their motivations were discussed in Chapter 2. Dixon (1991: 6), for instance, states that "once a learner knows the meaning and grammatical behavior of a new word he can infer its likely grammatical possibilities".

57. This methodology thus further supports Faulhaber's claim that verb valency behavior is not predictable. That is, many constructions identified for a verb seem to be very infrequent and/or judged as infelicitous by most native speakers. If such examples were excluded from her analysis, an even greater number of "syntactic gaps" would be identified. While her methodology is certainly non-problematic given the purpose of the study, the analyses in the following chapters provide a more accurate view of the precise distribution of verbs and valency constructions and address the relative frequency of verb-construction combinations.

possibilities for expressing the TOPIC role. For instance, while all four of Faulhaber's 'quarrel' verbs may realize the TOPIC in *about* or *over* PPs, only *quarrel* and *argue* may realize it in an *on* PP.

Faulhaber's (2011) findings are particularly striking for those who assume the predictability of a verb's valency from its meaning. She shows that, while the set of possible valency constructions for a verb class is clearly determined by the meanings of those verbs, the precise distribution of individual verbs within such classes differs greatly. While 68% of the verb-construction combinations were consistent within the classes, Faulhaber's analysis of the 32% of unexpected syntactic gaps demonstrates the unpredictability of verb valency: For each syntactic gap (e.g. when a verb does not occur in a construction that is found with other verbs of the class), she determines whether the gap results from detailed aspects of the verb's meaning, specifically its participant roles and aspectual characteristics. She concludes that 55% of the syntactic gaps cannot be predicted based on any semantic properties of the verb in question. These findings underscore the idiosyncratic nature of verb valency behavior and further emphasize the need for bottom-up item-specific analyses, a converging finding of both Valency Grammar and Construction Grammar (Boas 2003; Croft 2003; Iwata 2008).

Given Faulhaber's (2011) empirical demonstration of the idiosyncratic nature of verb valency, the present analysis (particularly in Chapter 5) builds on her findings and integrates them with existing views of verb meaning and argument realization. For one, I seek to reconcile Faulhaber's findings with the prominent view of grammatical uniformity within verb classes by positing generalizations at different levels of granularity, and I address the role of frequency in verb valency more systematically by specifying the frequency with which a given verb occurs in specific valency constructions. In addition to recognizing these nuanced differences within verb classes, I also demonstrate the syntactic relevance of semantic verb classes by showing the drastic differences in the set of valency constructions across distinct verb classes. As such, my analysis brings together both the broad generalizations and item-specific idiosyncrasies identified in verb class and verb valency research.

3.3.3 Valency constructions and argument structure constructions

In his comprehensive comparison of Valency Grammar and Goldberg's (1995, 2006) Cognitive Construction Grammar, Herbst (2014) offers a novel solution to the problems associated with Goldberg's ASCs and the Semantic Coherence

Principle.[58] Both theories investigate how linguistic structures open up spaces for other structures and determine both their form and their semantic interpretation. Valency Grammar, despite its focus on verb-specific valency constructions, recognizes the existence of more abstract argument structure constructions, as seen for instance in the VDE's varying notation of subjects in active vs. passive constructions. Concurrently, recent developments in Construction Grammar (e.g. Croft 2003; Iwata 2008; Boas 2008b) have emphasized the importance of detailed verb-specific analyses of constructional (i.e. valency) behavior.

At the same time, the perspective that each theory takes to the relation between lexis and grammar are quite different. With respect to the slots opened up by linguistic structures, Valency Grammar views verbs as the prime valency carrier within sentences, whereas Construction Grammar's ASCs include slots not just for arguments but also for verbs themselves. These two perspectives, however, can serve complementary purposes: Valency Grammar provides detailed verb-specific valency descriptions and the more abstract ASCs of Construction Grammar capture generalizations over this data.[59] As such, the approaches differ primarily with respect to the level of abstraction with which they account for valency.

Herbst's (2014) detailed discussion of the concepts analyzed in the two frameworks demonstrates their compatibility. Specifically, Herbst relates Goldberg's ASCs to item-specific valency constructions in Valency Grammar. As with all constructions, *valency constructions* consist of a form side, represented by valency patterns, and a meaning side, represented by participant patterns. *Valency patterns* "represent clusters of complements in terms of phrases" (Herbst 2014: 180) and are thus purely formal descriptions of argument configurations.[60] (3.26) shows the valency construction which characterizes the form side of not only traditional ditransitive constructions as in *Pat gave Sam a book*, but also predicative constructions as in *Pat called Sam a liar*.

(3.26) [SCU: NP] _VHC_{act}__[PCU1: NP]__[PCU2:NP][61]

58. For comparisons of Valency Grammar and Frame Semantics, see Fillmore (2009) and Dux (2016: 126–127).

59. Of course, the broad scope of Construction Grammar goes well beyond the analysis of verbs, (argument structure) constructions, and their combination, as described in the previous section (see also Fillmore et al. 2012).

60. In Pattern Grammar, as developed by Francis, Hunston, and Manning (1996), the *grammar pattern* corresponds closely to the valency pattern of Valency Grammar.

61. In Valency Grammar terminology, SCU stands for Subject Complement Unit, PCU stands for Predicate Complement Unit, and VHC stands for Verbal Head Complex. See Herbst et al.

Participant patterns represent the meaning side of valency constructions in terms of constellations of participants or semantic roles.[62] The sentences in (3.27), despite having the same formal valency pattern, involve distinct sets of participants and thus represent distinct participant patterns.

(3.27) a. Pat gave Sam a book.
'AGENT' – V – 'BENEFICIARY/RECIPIENT' – 'ÆFFECTED'
b. Pat called Sam a liar.
'AGENT' – V – 'ÆFFECTED' – 'PREDICATIVE'

Because valency constructions are pairings of valency patterns with participant patterns, the above sentences exhibit different valency constructions despite their formal similarity: the formal argument slots in the valency pattern are associated with different participant roles for each verb, as shown in (3.28).

(3.28) a. [SCU: NP 'AGENT'] _give_ [PCU1: NP 'BENREC'] _
[PCU2: NP 'ÆFFECTED']
b. [SCU: NP 'AGENT'] _call_ [PCU1: NP 'ÆFFECTED'] _
[PCU2: NP 'PREDICATIVE']

Similarly, a single participant pattern may be given different formal realizations. For instance, the participant pattern in (3.27a) is not limited to the ditransitive pattern (3.28a), but may also occur in a prepositional pattern, as in (3.29). Thus, a single participant pattern may combine with different valency patterns, and vice versa, resulting in different valency constructions.

(3.29) Pat gave a book to Sam.

ASCs differ from valency constructions in several ways,. Most noticeably, valency constructions are item-specific while ASCs are broader generalizations. As such, the verb slots of ASCs are not specified, while those of valency constructions include a specific verb. The argument roles associated with ASCs are also more abstractly defined than the verb-specific roles of participant patterns (and valency constructions). As a result, the meaning attributed to ASCs is broader and more abstract than that of valency constructions.

(2004) for more details on these concepts. A simpler representation of this valency pattern would read [NP V NP NP].

62. Herbst (2014: 181) is non-committal as to the exact degree of specificity of participant roles but mentions that "[a]lthough […] the roles identified at this level are less specific than the verb-specific roles of the "SENDER"-type and to be seen more on a par with Fillmore's (1968) case roles, this does not mean that all verb-specific roles can be subsumed under such general roles".

Herbst goes on to describe how verb-specific valency constructions can be generalized over to capture the same phenomena as Goldberg's ASCs, albeit from a different perspective. Specifically, valency constructions such as that in (3.26) above can be viewed as specific instances of *general valency constructions* (Herbst 2014: 182), which pair a valency pattern with a participant pattern but leave the verb slot unspecified, as in (3.30).

(3.30) [SCU: NP 'AGENT']__verb$_{act}$__[PCU1: NP 'BENREC']__
[PCU2: NP 'ÆFFECTED']

By leaving the filled verb slot of the (non-general) valency construction unspecified, generalized valency constructions can be formulated at a more abstract level, similar to ASCs, thus facilitating broader analyses – notably the identification of sets of verbs that may appear in a given valency pattern – than the item-specific descriptions of earlier research in Valency Grammar.

One interesting difference between valency constructions and ASCs pertains to the representation of syntactic form in the two approaches. Herbst (2014: 183f.) points out that valency patterns (the form side of valency constructions) use strictly formal phrase type categories (e.g. NP, VP, AP), whereas the form side of Goldberg's ASCs uses functional categories (e.g. Subject, Object, Oblique).[63] An analysis of this difference leads to an important discussion of the point at which subtle formal differences require one to posit a new construction. A functional definition of a construction's form allows one to generalize over patterns which realize the same participant/role in different phrase types. For instance, both the final NP of (3.31a) and the AP of (3.31b) instantiate the same 'PREDICATIVE' role, despite their formal difference.

(3.31) a. She considered him a fool.
b. She considered him crazy. (cf. Herbst 2014: 184)

In this case, a functional characterization of this syntactic slot as PRED, which can be instantiated by either NPs or APs, does not obscure the similarity between the semantic interpretations of different formal categories. Herbst argues that cases such as those in (3.31) can be captured by positing *allostructions* – sub-constructions with slightly different formal realizations of a participant pattern – rather than positing abstract and arbitrary categories such as PRED.[64] As such, the pat-

63. Herbst (2014: 186) notes that the valency descriptions in FrameNet are formal as in Valency Grammar, and that they also capture instances in which a single role (i.e. Frame Element) can be realized in different phrase types.

64. The concept of allostructions was formulated by Cappelle (2006) in his study of English particle verbs. It has more recently been applied by Perek (2015) to alternation variants (cf.

terns in (3.31) can be captured as two allostructions of one valency construction in which the 'PREDICATIVE' role may be realized as either AP or NP. Herbst (2014: 186–187) shows that multiple possibilities for the formal realizations of participants can easily be represented in the construction. For example, the various realizations of the theme (i.e. message) shown in (3.32) are captured by listing numerous phrase types in the form (Syn) side of the theme role in the construction's representation (Figure 3.10).

(3.32) a. You never told me *that*!
b. Now let me tell you *all the news*!
c. Tell them *I don't want to be disturbed*.
d. When did you tell him *that you were pregnant*?
e. He's telling us *how he spent last night here, on the car-park, in his van*.

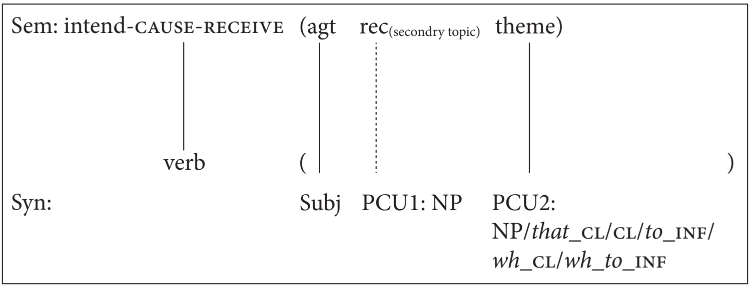

Figure 3.10 Ditransitive Construction with valency specifications (Herbst 2014: 187)

Along similar lines, Herbst (2014: 190) introduces the concept of a *constructeme*, which describes "[t]he constellation of a participant pattern [...] and all the valency constructions that can be seen as reali[z]ations of this participant pattern". Thus, the ditransitive in (3.27a) and prepositional variant in (3.29) are instances of two allostructions of the constructeme involving the Giver, Theme, and Recipient roles of *give*. Similarly (3.32a)–(3.32e) all represent constructemes of the Ditransitive Construction.[65] This view of a construction is thus much more detailed and fine-grained than the abstract ASCs of Goldberg (1995, 2006) discussed in the previous section. Among other things, it accounts for subtle phrase type differ-

Levin 1995; Section 2.4). In Section 4.4, I compare the various applications of allostructions in the CxG literature and discuss their relevance and relation to the present analysis.

65. Herbst (2014) also discusses several cases which make it challenging to determine whether different valency constructions should be grouped together or not. When two distinct valency patterns exhibit different semantics, then two separate constructions are posited. However, in some cases formal differences are due to more general principles such as information structure or pragmatic constraints.

ences in certain constructional slots and thereby captures relations among syntactically distinct configurations instantiating the same semantic roles.

A further contribution of Valency Grammar principles to generalizations made in Construction Grammar involves the fusion of verb-specific valency constructions with generalized ASCs. As discussed above, Goldberg's (2006: 40) Semantic Coherence Principle does not prevent the generation of ungrammatical verb-construction combinations whose prevalence is demonstrated by Faulhaber (2011), such as that in (3.33).

(3.33) *I explained/said him something.

Specifically, the participant roles of *explain* and *say* (i.e. Speaker, Message, and Recipient), match up with the argument roles of the Ditransitive ASC (i.e. Agent, Theme, and Recipient), but the Semantic Coherence Principle cannot account for the infelicity of these verbs in the ditransitive ASC.

Herbst (2011, 2014: 191) proposes the Valency Realization Principle to prevent the overgeneration of Goldberg's Semantic Coherence Principle.

> **Valency Realisation Principle**: if a valency construction of a verb is fused with an argument structure construction and all of its participant roles are construed as argument roles, then the formal reali[z]ation of the argument structure construction (SYN) must coincide with the valency pattern of the valency construction. (Herbst 2014: 191)

Specifically, each verb is associated with a specific set of participant roles and a list of grammatically acceptable valency patterns. The Valency Realization Principle states that the verb may appear in a given ASC in one of two cases: the first captures default cases in which the (verb-specific) valency pattern corresponding to the ASC is in the list of grammatically acceptable patterns for the verb. The second possibility is that the set of arguments associated with the ASC does not correspond to the participant roles associated with the verb. Sentences such as (3.33) violate the Valency Realization Principle because the formal realization of the recipient role in the ASC (i.e. dative/first object) does not coincide with the formal realization of valency constructions associated with *explain* and *say*. The valency patterns of the valency constructions associated with these verbs instead specify that the recipient can only be expressed in a *to* PP.

While the Valency Realization Principle prevents the generation of utterances in (3.33), it nevertheless allows for creative and novel verb-ASC combinations, as in (3.34).

(3.34) Pat sneezed it off the table.

Specifically, (3.34) does not violate the principle because there is no valency construction of *sneeze* that could be seen as fusing with the caused-motion (argument structure) construction. Neither is *sneeze* associated with participant roles (e.g. Theme and Goal) that fill argument slots of the ASC. As such, the Valency Realization Principle is a welcome addition to the principles of verb-construction fusion which combines the item-specific analyses of Valency Grammar with abstract generalizations of ASCs.

In sum, this discussion has demonstrated how a combination of Valency Grammar and Construction Grammar can lead to a more complete picture of the relation between verbs and constructions. Herbst (2014: 195–196) points out that this strain of valency research represents a break from traditional Dependency Grammar (Tesnière 1959) in that it recognizes that item-specific valency is not the only factor in argument structure, but also that abstract ASCs exist independently of valency and that the interaction of valency and constructions determines clause structure. Further, the item-specific analyses of verbal valency provide the core data for positing abstract ASCs, which are generalizations over verb-specific valency constructions.

3.4 Conclusion

In this chapter, I have described the theories of Frame Semantics, Construction Grammar, and Valency Grammar, focusing on their approaches to verb classification and argument realization. I also demonstrated how these usage-based and cognitivist approaches overcome the issues of the approaches discussed in Chapter 2. Specifically, they are situated within broader frameworks that seek a comprehensive, empirically-based, and cognitively-grounded account of all aspects of language. While earlier approaches work from the top down, drawing on little empirical data and seeking wide-ranging generalizations which are often based on unfounded pre-theoretical assumptions, the approaches discussed here recognize the prevalence of idiosyncrasies and item-specificity in language use and result in generalizations which may be less sweeping but are grounded in empirical reality, primarily via natural (corpus) data. Each of the approaches discussed here offers important methods and theoretical constructs that allow for a clearer picture of verb classes, including comparative analyses of verbs within classes, of distinct verb classes, and of verb classes across languages. Despite these advantages and a widespread recognition of the compatibility of these approaches, the field has yet to combine systematically the methods of Frame Semantics, Construction Grammar, and Valency Grammar in analyses of verb classification and argument realization. To conclude, I briefly summarize the strengths, weaknesses, and points of compatibility among these frameworks and point out how they are applied in the analyses described in the following chapters.

Frame Semantics and the FrameNet project provide relatively fine-grained word (and verb) classes based on intuitive and empirically-based semantic frames, which are defined primarily by Frame Elements (FEs). As such, verbs evoking the same FrameNet frame all share the same set of FEs and relations between these roles, ensuring a high degree of semantic uniformity within the class, thereby overcoming many of the issues identified for Levin (1993; Section 2.4.). FrameNet classes thus provide a useful starting point for the verb class analyses conducted in the following chapters. FrameNet practice also provides a systematic methodology for documenting valency behavior, specifically by annotating the phrase type and grammatical function of (Core) FEs in naturally occurring corpus sentences, and the present analyses employ a very similar methodology for documenting verbal valency behavior. A further advantage of Frame Semantics and FrameNet is that both entire frames and individual FEs of different frames are related to one another in a hierarchical structure using a rich set of frame-to-frame and FE-to-FE relations.

Despite its strong emphasis on rich semantic descriptions, verbs within the same fine-grained FrameNet frame also exhibit nuanced differences that are not always accounted for in the FrameNet database. At best, individual LUs are associated with a brief prose definition that only sometimes mentions relevant semantic components. In this study, I provide more detailed semantic analyses than those of FrameNet, explicitly showing how individual verbs perspectivize a frame in unique ways and how these varying construals influence syntactic behavior. A further shortcoming of a purely frame-semantic approach is that syntactic and valency behavior takes a back seat to semantic description. As such, Frame Semantics does not make any explicit claims about how verbs in a given frame behave syntactically. While the FrameNet database documents valency behavior for most LUs using corpus data, the amount of data annotated is too sparse to make solid claims about how FEs are realized. To address this, the analyses described below draw on a larger amount of corpus data than FrameNet and thus provide a more accurate picture of the valency behavior of both individual verbs and verb classes, in order to test empirically the syntactic similarity of verb classes and facilitate generalizations connecting verb meaning to valency.

Section 3.2 discussed (Cognitive) Construction Grammar (CxG) and the analytical tools it provides for analyzing the syntax-semantics interface. A major insight in CxG research is that not only lexical items, but also grammatical structures contribute to the semantics of utterances. This has led to the identification of high-level, abstract argument structure constructions (ASCs), such as the Resultative or Caused Motion Constructions which are necessary to account for uses of verbs in novel valency patterns, such as the popular *sneeze the napkin off the table* example. The usage-based approach characterizing CxG emphasizes that more abstract structures, such as ASCs, are abstractions over multiple instances of specific exemplars found in actual language use. Other usage-based concepts crucial to CxG analyses are the importance of frequency information and the hierarchical network organization of linguistic structures. Frequency plays a role in the present analysis, as I show how frequently individual verbs and verb classes appear in individual valency patterns, thus identifying tendencies for the syntactic behavior of verbs with a given meaning.

At the same time, recent work in CxG and Valency Grammar has exposed some issues with Goldberg's (1995, 2006) formulation of the theory. Specifically, Goldberg's Semantic Coherence Principle and Correspondence Principle have been shown to generate verb-construction combinations that are not empirically attested. This has prompted scholars (Croft 2003; Iwata 2008; Boas 2012; Faulhaber 2011, among others) to analyze more closely the relation between verbs (with similar meanings) and abstract constructions. My project enhances this strand of research by showing that closely related verbs vary significantly in their constructional distribution, despite being associated with a small set of possible constructions in a given language. I capture this tension between predictable and idiosyncratic valency behavior by more explicitly formalizing the relationship between Goldberg's principles and the Valency Realization Principle, which Herbst (2014) proposes to prevent this over-generation. This study also further advances CxG formulations of constructional networks by showing how verb classes and the constructions in which they occur can be viewed in terms of hierarchical networks, thus building on related work in CxG that focuses on hierarchies for abstract ASCs and more general phrase structure constructions.

Finally, the presentation of Valency Grammar in Section 3.3 highlighted the theory's emphasis on item-specific information, specifically its detailed, empirically-based descriptions of the full range of valency behavior for individual verbs. The descriptive focus of Valency Grammar has led its proponents (Faulhaber 2011; Herbst 2014, among others) to argue against the hypothesis that verbs with shared meanings also exhibit shared syntax (i.e. valency behavior). The current project shares this appreciation for item-specificity, and it draws on detailed corpus-based analyses of individual verbs' meanings and valency behavior, in order to provide a more empirically founded perspective on verb classes and on the more abstract ASCs of CxG.

In sum, the theoretical constructs and empirical methods of these highly compatible approaches are extremely promising for future research on argument generalization and the syntax-semantics interface more generally. The following chapters demonstrate how they can be combined to provide a novel, comprehensive, and empirically-grounded view of verb classification and how these methods can be reproduced in future studies for a wide range of verb classes and related phenomena.

CHAPTER 4

English Change verbs

4.1 Introduction

In this chapter, I draw on data from English Change verbs and employ insights from the usage-based and cognitively oriented theories discussed in the previous chapter to demonstrate a novel approach to verb classes that accounts for similarities and differences in the meanings and valency behavior of individual verbs.[1] I begin with a simple, theory-neutral description of the verbs' meanings and valency behavior to assess their degree of semantic and syntactic similarity (Sections 4.2 and 4.3). In the (Sections 4.4 and 4.5), I describe how verb classes and lexical entries for individual verbs must be formulated in order to capture both the shared and idiosyncratic properties of Change verbs identified in the descriptive analysis, along with a detailed theoretical discussion of valency constructions, their organization, and their relation to the meaning of verbs and verb classes. Finally, I assess the predictive power of the proposed approach by testing how well it captures the meaning and valency behavior of an additional Change verb (Section 4.6).

The verbs in the primary analysis include *alter, change, modify, transform,* and *turn*, and a secondary analysis of the verb *metamorphose*. These "Change verbs" are likely candidates for a verb class, not only based on intuitive recognition of their similarity but also because most of them are classified together in both Levin (1993) and FrameNet.[2] They are semantically similar in that they describe situations in which an entity changes from one state or category to another, either on its own or due to the action of some agent or to some circumstance. They are syntactically similar in that they (largely) occur in the same set of grammatical contexts (i.e. constructions), as pointed out in the previous chapters.

1. I use the term *Change verb(s)* to refer to this class rather than the label *Turn verbs* used by Levin (1993: 177) or the more complex frames defined in FrameNet, for both the sake of simplicity and to avoid any theoretical presumptions.

2. As discussed in Chapter 2, FrameNet lists these verbs in two frames, `Cause_change` and `Undergo_change`, to capture their (in)ability to occur in both transitive and intransitive contexts. I eschew this distinction for the time being and compare my approach with FrameNet in Section 4.3.4 below.

At the same time, the verbs are not entirely interchangeable in all semantic and grammatical contexts. One intuitively recognizable semantic difference among these verbs, for instance, is that verbs such as *alter* and *modify* describe subtler or less significant changes than *transform* or *metamorphose*. One apparent syntactic difference (of several) is that *turn* but not the other verbs occurs frequently in resultative constructions (e.g. *his face turned red*). However, as demonstrated above, even the most detailed verb classification resources fail to show precisely what features are shared among the verbs and to what degree: Levin (1993) offers practically no empirical data on the precise distribution of these verbs across the alternation variants used to characterize them nor on potential semantic differences between the verbs. FrameNet goes a small step further than Levin (1993) by providing corpus-based valency descriptions for each verb, but these are quite limited and do not provide precise information regarding which syntactic contexts are most frequent or rare for a given verbs. Further, FrameNet's minimal verb-specific semantic definitions do not address relations among verbs within the frame.

Given these shortcomings, a much more detailed documentation of the verbs' semantic and syntactic properties is required before we may formulate verb classes and lexical entries that capture the full (at least a fuller) range of data surrounding the relation between verb classes and argument realization. As noted in the previous chapter, recent studies (e.g. Croft 2003; Boas 2006, 2008b, 2010c, 2011b; Iwata 2006; Herbst 2010; Faulhaber 2011) have emphasized the importance of first conducting bottom-up, item-specific analyses before attempting to formulate broad-ranging generalizations (i.e. "linking rules" or potential "linguistic universals"). Sections 4.2 and 4.3 thus provide the important low-level analyses of the verbs' semantics and syntax, respectively, in order to establish empirical accuracy, while Section 4.4 identifies generalizations among verbs within the Change verb class. While those generalizations are fairly modest, capturing similarities among a fine-grained, semantically-defined verb class, it may serve as the basis for identifying broader generalizations regarding the syntax-semantics interface in English, which can in turn be compared across other languages to identify potential "universals" or, at least, systematic cross-linguistic tendencies. Section 4.5 then describes a method for formulating verbal lexical entries that capture both the properties they share with other members of the class and the idiosyncratic properties that set them apart.

Before beginning the discussion, I briefly introduce some relevant terminology for the analysis. To begin, I introduce the semantic roles (i.e. Frame Elements, FEs) associated with Change verbs employed in the analysis. The fairy tale example, repeated in (4.1), includes the full set of roles analyzed here.

(4.1) The witch changed the man from a prince into a frog.

The entity that undergoes change is *the man*, which usually appears as the subject of intransitive sentences and as the object of transitive sentences such as (4.1), is labeled Undergo_change with the abbreviation "U". The subject, *the witch*, brings about the change and is labeled Cause_change and abbreviated "C". The initial state of the Undergo_change argument – *from a prince* in (4.1) – is the Original_state argument and abbreviated as "O". The final state of the Undergo_change argument – *into a frog* – is labeled Final_state and abbreviated as "F". The role labels and abbreviations are listed and exemplified in Table 4.1.

Table 4.1 Frame Elements (FEs) and labels for Change verbs

FE name	Abbreviation	Example (relevant FE in bold)
Cause_change	C	**The witch** changed the man from a prince into a frog.
Undergo_change	U	The witch changed **the man** from a prince into a frog.
Original_state	O	The witch changed the man **from a prince** into a frog.
Final_state	F	The witch changed the man from a prince **into a frog**.

I refer to these roles as ***Frame Elements*** (FEs) in the discussion, though they differ from the Frame Elements employed in FrameNet.[3] Further, the O and F arguments are referred to collectively as ***State arguments/FEs***. The FE names have no theoretical significance and are simply shorthand labels; I have sought to name them as generally and informatively as possible while also using single-letter abbreviations that do not conflict with other abbreviations (e.g. Original_state is perhaps less appropriate than Initial_state but the abbreviation "I" can also refer to "intransitive").

I also use the term ***argument*** in a general sense to refer to any constituent occurring in a sentence and not in the traditional sense to distinguish verb-dependent complements (for which I use the term *FE*) from adverbial modifiers. Arguments are characterized semantically (e.g. the Undergo_change argument), formally (e.g. the prepositional argument), or both. This use of *argument* offers a useful label for any constituents cooccurring with a (Change) verb, and the previous chapter further described problems with a strict view of the argument-adjunct/complement-modifier distinction (cf. Herbst 2014). In Section 4.3, I discuss further terminology used to describe the verbs' valency behavior.

3. These FEs defined here differ from the much richer set of FEs employed in FrameNet's `Cause_change` and `Undergo_change` frames; for instance, in that my Original_state corresponds to two roles in FrameNet: INITIAL_VALUE and INITIAL_ATTRIBUTE. Dux (2016: 85–87, 176–184) provides a detailed discussion justifying this simpler set of roles, particularly the lack of empirically valid methods for assigning the proper fine-grained FrameNet FEs to a given argument, especially when arguments are not overtly expressed within a sentence.

Other FE-like (non-adverbial) argument types occur with Change verbs, such as those which specify an attribute of C that changes (*change in appearance*) or the general direction of a change (*change for the better*). These arguments are discussed briefly in Section 4.4.2 below (and in more detail in Dux 2016: 462–474), but not treated in this analysis due primarily to reasons of space. While their omission is certainly undesirable from an empirical standpoint, these arguments are much less frequent than the four FEs defined here, and the present analysis relying on a smaller set of FEs nonetheless provides sufficient insight into the nature of verb classes.

4.2 Semantics of English Change Verbs

4.2.1 Method

The first step in the analysis of these verbs is to gain a general understanding of their meanings and possible differences in meanings between related verbs. I consult and compare various traditional dictionaries' definitions of the analyzed verbs, as these are readily available and provide enough information on verb meanings for the present analysis.[4] The analysis allows for the identification of the meaning shared among all verbs in the class. This ***shared meaning*** is only briefly discussed in this section, while Section 4.4 elaborates on the shared meaning of Change verbs and how it distinguishes Change verbs from other (related) verb classes.

I also identify ***(additional) meaning components (MCs)*** of individual verbs: semantic features that are not shared by all verbs of a class but further specify the shared meaning of the class for certain (sets of) verbs within the class. To arrive at meaning components, I extract and summarize from full dictionary definitions any semantic features that pertain to relevant senses of the verb (excluding non-Change senses such as 'rotate' for *turn* or 'replace' with *change*)[5] and further

4. For English, I use the *Collins-Times English Dictionary and Thesaurus*, 2nd Edition (CT), the *American Heritage Dictionary of the English Languages*, 5th Edition (AH), and the online version of the *Merriam-Webster Dictionary* (MW; http://www.merriam-webster.com; accessed on 9 June 2014). Multiple dictionaries are consulted to overcome potential oversights in individual dictionaries, as they do not always arrive at the same definitions and sense distinctions (Fillmore and Atkins 2000; Atkins 2002).

5. In addition to non-Change senses, dictionaries often list domain-specific or collocation-specific interpretations of Change verbs, such as the senses of *transform* in the fields mathematics and biology found in part (2) and (3) of the MW definition in Table 4.2, respectively. These are not listed as additional meaning components nor treated in detail here, given that they are relatively infrequent in the analyzed corpus data and that they do not (appear to) have a strong influence on valency behavior.

specify the shared meaning. To demonstrate, Table 4.2 shows the full definition of the English Change verb *transform*.

Table 4.2 Full dictionary definitions for *transform*

MW	AH	CT
: to change (something) completely and usually in a good way *transitive verb* **1 a:** to change in composition or structure **b :** to change the outward form or appearance of **c :** to change in character or condition : convert **2 :** to subject to mathematical transformation **3 :** to cause (a cell) to undergo genetic transformation *intransitive verb* : to become transformed: change	*tr.* 1. To change markedly the appearance or form of: [example]. 2. To change the nature, function, or condition of; convert: [example]. See Synonyms at **convert**. 3. *Mathematics* To subject to a transformation. 4. *Electricity* To subject to the action of a transformer. 5. *Genetics* To subject (a cell) to transformation. *intr.* To undergo a transformation.	*vb* 1 to alter or be altered in form, function, etc. 2 (*tr*) to convert (one form of energy) to another form. 3 (*tr*) *Maths.* to change the form of (an equation, etc.) by a mathematical transformation. 4 (*tr*) to change (an alternating current or voltage) using a transformer.

Based on the full definitions for *transform*, two additional MCs can be identified which set it apart from the shared meaning of Change verbs: the first specifying that the change is drastic in some way and the second that it is (optionally) associated with changes that are deemed positive.[6] Figure 4.1 summarizes the meaning components for *transform*, including the shared Change meaning.

Transform
–Change verb
–drastic changes
–changes to improve (optional)

Figure 4.1 (Additional) meaning components for *transform*

6. The first MC ('drastic') is identified in the introductory definition of MW ("completely") and definition (1) of AH ("markedly"). The second MC ('positive') is only found in the introductory definition of MW ("usually in a good way"), suggesting that this MC may not characterize all uses of *transform*. Given that individual dictionaries characterize the same meaning component in different ways (e.g. *completely* vs. *markedly*), the MC labels used here may differ from those in the dictionaries for clarity and brevity.

The meaning analysis allows for the identification of ***semantic subclasses***, which contain sets of verbs within a class that share one or more additional MCs. For instance, a semantic subclass consisting of *transform* and *metamorphose* (and potentially other verbs) captures a semantic property of these verbs, namely that they refer to drastic changes, which is not shared by all members of the class. As shown below, semantic subclasses also aid in the identification of fine-grained grammatically relevant meaning components that relate verb meaning to syntactic behavior.

The semantic analysis employed here helps to overcome the lack of verb-specific semantic information found in FrameNet and Levin (1993), as it accounts for similarities and differences among individual members of a given class.

4.2.2 Meaning components of English Change verbs

In this section, I first briefly describe the results of the dictionary analysis, before discussing the additional MCs and their application to individual verbs in more detail.

General verbs: Change, turn

The verbs *change* and *turn* are the most general of the analyzed Change verbs and exhibit no additional MCs that suggest any differences from the shared meaning of the class. Almost all of the definitions for *change* include language such as "*make different*", "*cause to be different*", or "*become different*", with the first two referring to transitive and the third referring to intransitive uses. These definitions of *change* represent attempts to avoid circularity by breaking down the meaning of change using simpler (or at least different) words.[7] These 'decomposed' definitions typically do not occur with the other analyzed Change verbs (apart from *turn*), which instead simply employ the verb *change*. That other Change verbs are defined using the verb *change*, often with additional adverbial phrases further specifying *change*, is evidence for the status of *change* as the most general and prototypical Change verb. Further evidence for this is seen in the wide range of argument types and situation types employed in its dictionary examples.

Turn also exhibits no additional MCs modifying the shared meaning of the class, and its definitions employ other Change verbs, primarily *change* but also

7. Such simple definitions may be compared to the analyses of projectionist and event-structural approaches (e.g. Pinker 1989; Rappaport Hovav and Levin 1998; Levin and Rappaport Hovav 2005; cf. Section 2.3) and seen as defining the basic "event structure" of Change verbs. Specifically, this decomposed meaning corresponds closely to the roots defined by Rappaport Hovav and Levin (1998) for 'internally caused accomplishment' or 'externally caused accomplishment' for intransitive and transitive uses, respectively.

alter and *transform*. Examples in the definitions also suggest that its meaning is highly general, as they describe a wide range of distinct change scenarios involving arguments of all ontological types. *Turn* is also unique among Change verbs in its extreme polysemy, as it is used to describe numerous scenarios unrelated to Change (e.g., rotational movement, betraying) and many of these senses are idiomatically associated with conventionalized verb-object collocations (e.g., *turn a profit*). Despite its general Change meaning, *turn* is less representative of the Change verb class than *change*, given its extreme polysemy and use in contexts distinct from the Change verbs analyzed here.

Verbs with additional MCs*:: Alter, modify, transform*

The other three verbs analyzed exhibit additional MCs that further specify or restrict the shared meaning of Change verbs. *Alter* is associated with a MC that I refer to as "subtle change"; this MC restricts the verbs' meaning to changes that are subtler, non-categorical, or less significant. It is evidenced in definitions which further specify the class's shared meaning (e.g. *change, make/become different*) with additional phrases such as *in some respect* (CT) or *without changing into something else* (MW). *Alter* is not associated with any other MCs.[8]

Modify shares with *alter* the "subtle change" MC, but the dictionary definitions suggest that the change signified by *Modify* is often carried out with a specific purpose in mind, particularly to make something more suitable, palatable, or appropriate. I refer to this as the "purposive change" MC, and it is evidenced by phrases such as *often to give a new orientation, serve a new end* (MW), *to make less extreme, severe, or strong* (AH) and *to make less extreme or uncompromising* (CT). Thus, modify has the MCs "subtle change" and "purposive change". [9]

One additional MC of *transform* associates it with changes that are drastic, categorical, or significant, which I refer to as the "drastic change" MC and contrast with the "subtle change" MC of *alter* and *modify*.[10] This MC is evidenced by

8. Most definitions also note that *alter* has a specific sense referring to changes in clothing with the purpose of making the clothing fit better. However, this is not a strong restriction on the verb, as it may be used for a wide range of other change types. In fact, only one of the 79 analyzed corpus examples of *alter* exhibited this "alter garment" reading. The low frequency of this special sense demonstrates that *alter* can describe changes to many other entity types, in addition to clothing.

9. *Modify* is also associated with the domain-specific sense used in grammar and linguistics, such as when an adjective 'modifies' a noun. However, only one of the 95 analyzed examples involves this special sub-sense of *modify*.

10. *Transform* also has domain-specific senses, particularly those related to the fields of electricity, mathematics, linguistics, and biology.

definitions qualifying the general verb *change* with adverbials such as *completely* or *markedly* and by the examples included in the definitions (*trees into ghosts; heat into mechanical energy*). Finally, *transform* also exhibits a MC not found with any other Change verbs, namely a "positive change" MC which specifies that it may be used to describe changes that are deemed positive. This MC seems to apply only optionally to *transform*, as it is only noted in one of the three dictionaries and qualified by the adverb usually (*"usually in a good way"*, MW).[11] Of course, the other Change verbs may in some contexts refer to changes that are deemed positive (e.g. *change for the better*), but they do not appear to bear this MC inherently.

4.2.3 Summary of English Change verb meanings

Table 4.3 summarizes the semantic analysis of English Change verbs, listing the meaning components (both shared meaning and additional MCs) in the left column and specifying to which verb(s) the MC applies with a "+" in the relevant cell.

Table 4.3 Summary of meaning components of English Change verbs

Component	Alter	Change	Modify	Transform	Turn
"Change" shared meaning	+	+	+	+	+
Subtle Change	+		+		
Drastic Change				+	
Purposive Change			+		
Positive Change				+	

The first component is the shared meaning of the Change verb class, as described above, and naturally applies to all of the verbs under analysis.

The next two rows represent the "subtle change" and "drastic change" MCs, the former applying to *alter* and *modify* and the latter to *transform*.[12] While these meaning components (and their application to specific verbs) are intuitively understandable, it is not always possible to determine empirically whether a Change

11. Furthermore, this "positive change" MC (and other MCs of verbs) may also apply to other words morphologically derived from the verbs bearing them. In fact, a cursory search of SentiWordNet (Baccianella et al. 2010) – a so-called Polarity Dictionary, which assigns scores to (sets of synonymous) words based on features such as positivity or negativity – does not reveal any positive (or negative) scores for any of its seven entries for the verb *transform*, but assigns a slightly positive score for the only entry of the adjective *transformed*.

12. While Table 4.3 separates the drastic/subtle distinction into two separate meaning components, it is equally acceptable to include it as a single component and have the individual verbs specify its relative value, i.e. drastic for *transform* and subtle for *alter* and *modify*.

event is subtle or drastic.[13] For one, while certain Change events can easily be classified as drastic (e.g. when the human prince turns into a frog) or subtle (e.g. when leaves change from green to yellow), many – if not most – sentences with Change verbs are less easily classified. This is particularly true when sentences do not overtly express all FEs of Change verbs (and most sentences do not), in which case assigning the subtle/drastic distinction relies on information provided in the surrounding discourse or through pre-existing knowledge between interlocutors. For instance, given a sentence expressing only an (even richly described) Undergo_change FE, such as *The city's appearance has changed*, one cannot determine how drastically it has changed: if a few new buildings have been built, one would likely label it a subtle change, but if significant urban decay has occurred and previously popular downtown areas now consist of abandoned and eroded buildings, it would be labeled a drastic change. However, given the nature of corpus data and of natural discourse, such specifics are not readily available. Furthermore, even if all FEs are specified in a given utterance and all features of the described Change event are known, judgments of the event as drastic or subtle may differ due to individual speakers having different opinions and background experiences.

Given these problems, the present analysis does not seek to classify (the changes described by) individual examples according to this distinction.[14] At the same time, assigning the "subtle change" and "drastic change" MCs to these Change verbs is unproblematic for the given analysis: all native speakers (and I have asked many) agree that *transform* is intuitively associated with more drastic changes than *modify* and *alter*.

The next meaning component, "purposive change", applies only to *modify*. It is characterized both in general terms without specifying the type of purpose (MW: *"to make […] changes in often to give a new orientation to or to serve a new*

13. The subtle/drastic distinction may relate to the rich FE distinctions found in FrameNet, e.g. between attributes changing in value and entities changing in category. However, their relation to the subtle/drastic change meaning components must be tested in future work, once the issues surrounding empirical tests for the FrameNet FEs are resolved (cf. Section 3.1.; Dux 2016: 85–87, 176–184).

14. Dux (2016: 198–200) suggests some tests for determining whether a given Change verb has these MCs, including documenting the types of U arguments or adverbial phrases they occur with, analyzing specific corpus examples, and testing their ability to describe clearly drastic or subtle changes. For instance, the "subtle change" MC of *alter* may be evidenced by its frequency with adverbs such as *radically* or *significantly*, which may potentially serve to nullify this MC (and would not be needed if *alter* did not have the MC). Also, the "drastic change" MC of *transform* can potentially be seen in the following examples: […] *when he transformed the mask from a protest of youth into a gentle romantic whimsy*. (COCA); *the hippo regius labyrinth transforms the motif from a visual game to something more like a physical event*. (COCA).

end") but also more specifically stating that the purpose is "to make [something] less extreme, severe, or strong" (AH). The purposive meaning component of *modify* is also evidenced by corpus examples which explicitly mention the purpose of the modification.

(4.2) I took an 8 × 10 sheet film holder, and modified it to accept 6 1/2 × 8 ½ […] plates. (COCA)[15]

(4.3) Recent work aims to modify existing instrumentation so that logs are either more amenable to various kinds of analysis […]

In the following, it will be shown how the "purposive change" MC is reflected in the valency behavior of *modify* thus setting it apart both semantically and syntactically from other Change verbs without this MC.

The final meaning component, "positive change", was identified only for *transform*, namely in the MW reading "to change (something) completely and usually in a good way". As noted above, this MC does not necessarily characterize all changes described with *transform*. While the precise interpretation of this MC is unclear (e.g. whether the positive judgment comes from the speaker alone or is more objectively viewed as positive), the positive nature of changes described by *transform* can be identified in certain example, as in (4.4)–(4.5) below.

(4.4) Here are ways they transformed those challenges into opportunities.

(4.5) Venice transformed from a city only the elite could visit to a much more accessible destination […].

The "purposive change" MC of *transform* is also potentially grammatically relevant in that it determines some aspects of its valency behavior, as described in more detail later in this chapter.

The semantic subclasses of English Change verbs arising from this analysis are given in Table 4.4.

Table 4.4 Semantic subclasses of English Change verbs

Shared (Additional) MC	**Verbs**
"subtle change"	*alter, modify*
"drastic change"	*transform, (metamorphose)*

The first semantic subclass includes *alter* and *modify* which share the "subtle change" MC. A second subclass of "drastic change" verbs includes not only

15. Unless otherwise noted, all English examples come from the *Corpus of Contemporary American English* (COCA; Davies 2008–).

transform, but also the (yet unanalyzed) verb *metamorphose*. In Section 4.6, I offer a separate analysis of *metamorphose* to test the applicability of the approach to verb classes and entries proposed below. No semantic subclasses are posited for the remaining MCs ("purposive change" and "positive change"), as they each apply to only one verb of the class.

In sum, this analysis reveals that while the members of the Change verb class all share a meaning of '(cause to) become different', as exemplified by its central verb *change*, individual verbs vary in their additional meaning component (as well as their collocational properties and domain-specific senses). In fact, no two verbs have the exact same set of additional meaning components; while *turn* and *change* are both general, they differ in their collocational behavior and, as shown below, in their valency behavior. This observation supports the long-standing belief in lexical semantics that true synonymy does not exist (Quine 1951; Cruse 1986: 270).

The present approach also improves on existing verb classification resources, such as FrameNet and Levin (1993), in which semantic differences among individual verbs are treated unsystematically (as in FrameNet)[16] or ignored altogether (as in Levin 1993).[17] While such fine-grained semantic descriptions may appear to be superfluous (e.g. in that they are not grammatically relevant), close analysis of the

16. For instance, the FrameNet entry for *transform* in the `Undergo_change` frame lists as its meaning: *to undergo an alteration*. This definition is not only circular (i.e. by employing the nominal near-synonym *alteration*), but it also does not mention the two additional MCs of *transform* identified here.

17. An anonymous reviewer suggests that meaning components may, in some cases, be viewed as frames in their own right, which are Used (in FrameNet terminology) by the verb or verb class bearing them. The Uses relation in FrameNet captures situations in which "a particular frame makes reference in a very general kind of way to the structure of a more abstract, schematic frame" and is employed "almost exclusively for cases in which a part of the scene evoked by the child refers to the parent frame" (Ruppenhofer et al. 2010). For certain MCs identified here, it may indeed be possible to view the MC as a frame being used by the verb bearing it. For instance shoplift (cf. Section 5.2) can be viewed as Using the `Shopping` frame. Other times, a Uses relation may only apply to some instances (i.e., senses) of the verb – as with *alter*, which may be viewed as Using the `Text` frame or one of the various clothing-related frames in the 'change text' and 'alter clothing' contexts, respectively. A similar case applies for the "purposive change" sense of *modify* and the `Purpose` frame. However, more abstract MCs, such as "subtle change" vs. "drastic change" MCs of Change verbs and the "planned" vs. "sudden/spontaneous" MCs found with Theft verbs in the following chapter (as well as MCs specifying whether the theme/object is abstract vs. concrete) are less clearly captured with the Using relation, as it is difficult to identify frames that clearly characterize these MCs (and be viewed as being Used by the verbs bearing them). Of course, a more nuanced definition of the Uses relation or the development of a new relation in FrameNet may better capture the relation between MCs and verbs in a systematic manner using frame-semantic terminology.

detailed semantics and syntax such verb classes may reveal that such fine-grained meaning components influence argument realization patterns and thus enable a more comprehensive understanding of the relation between verb meaning and valency behavior, as shown in the following sections.

4.3 Valency of English Change verbs

Having established the shared meaning and additional MCs characterizing English Change verbs, I now determine their valency behavior and assess the degree of syntactic uniformity among verbs in the class.

4.3.1 Data, methodology, and terminology

The valency analysis draws on the *Corpus of Contemporary American English* (COCA; http://corpus.byu.edu/coca; Davies 2008–).[18] I first searched COCA for all verbal instances of each Change verb, using the lemmatizing and part-of-speech search functions (e.g. "[change].[v*]") and extracted examples corpus using the "Random Sample" function, which facilitates the balanced and representative extraction of data. 1,000 examples were extracted for *change* and *turn*, and 500 each for *alter, modify,* and *transform*, because *change* and *turn* are highly polysemous and thus return many examples irrelevant for the present analysis.

After extracting the full list of hits from COCA, I filtered out undesired examples as I analyzed the data. Examples were excluded if they exhibited non-Change senses of the verbs. Such cases were relatively frequent for *turn* and *change*, but less frequent for the other analyzed verbs. I also excluded sentences exhibiting passive or imperative constructions and those with adjectival or gerundial uses of the verb.[19] I included examples with interrogative and infinitival uses of the verb (e.g. with modals or semi-modals such as *hope to*) or relative clauses containing the verb, as long as the relations between individual arguments could clearly be deduced.

From the filtered data, I analyzed between 79 and 134 valid sentences per verb. I analyzed fewer examples for *alter* and *modify* than for the other verbs because

18. At the time of the analysis, COCA contained over 450 million words, including 20 million words for each year from 1990 to 2011. It has since grown to over 560 million words (as of July 2019). The corpus includes over 160,000 texts equally divided among five genres (spoken, fiction, popular magazines, newspapers, and academic journals).

19. Although these data are interesting, they interact closely with other construction types (e.g. clause formation for passive, NP modification for relative clause) and thus may distract from the present focus on valency constructions and argument realization among verb classes.

the smaller amount of data (79 and 95, respectively) exhibited very uniform valency distribution. After filtering the data as described in the following paragraphs, a total of 549 examples of English Change verbs were analyzed, as summarized in Table 4.5.[20]

Table 4.5 Number of COCA corpus examples analyzed

Verb	# of examples
alter	79
change	134
modify	95
transform	109
turn	132
Total	**549**

The number of examples analyzed here strikes a balance between the most prominent verb classification resources – FrameNet entries rarely include more than 20 examples and Levin (1993) includes no empirical data – and corpus linguistics research that subject massive datasets to automated analysis which focus on aspects of valency behavior that are much more specific and predetermined than in the present analysis (Lapata 1999; Gries and Stefanowitsch 2004).[21] This amount of data also avoids the problem of lexicographically-oriented resources, such as the *Valency Dictionary of English* (Herbst et al. 2004), which document all possible argument realization patterns that may occur with a given verb, even if they are extremely infrequent (cf. Section 3.3). By analyzing approximately 100 examples per verb, one can gain a good general picture of a verb's valency behavior, identify which patterns are most frequent and which are rare, and assess the syntactic similarity of verbs within a proposed class. This amount of data has been successfully employed in other comparative analyses of verbs within a semantic class (e.g. the contributions in Engelberg et al. 2015).

Of course, the valency data arrived at in the analysis may not precisely reflect the verbs' complete valency behavior for various reasons. For one, this is simply not

20. The results presented below include only one example per verb-construction combination for the sake of brevity. The full data for the analysis is available in the Supplementary Materials.

21. Ideally, one would be able to optimize the corpus search to automatically extract all constructions in the entire corpus that each verb appears in (and how frequently). However, automatic methods are complicated by the high degree of polysemy of English verbs, which leads to inaccurate parsing and annotation (e.g. the *from* phrase interpreted as Original_state in *She changed the man from Austin into a frog*) or the extraction of irrelevant verb senses (e.g. *turn* as rotational movement).

enough data to make broad generalizations. Furthermore, as with any linguistic data, there will be a high degree of inter-speaker and dialectal variation and the exact results may differ for individual speakers, and even examples attested in the corpus may be viewed as infelicitous to some speakers. Nevertheless, this small-scale manual analysis will at least give a good general picture of the range of constructions available to individual verbs and verb classes, but it will not be substantial for claims about the exact frequency and number of verb-construction combinations.

For each example, I document the grammatical function (GF) of each instantiated FE and – for oblique arguments (typically O and F) – any relevant preposition or other grammatical morphemes introducing the FE. For the sake of clarity, I do not focus on differences in the phrase type of a given GF-FE pairing (e.g. between nominal and clausal subjects) in the primary analyses and represent the attested GF-FE pairings in a simplified format. However, in the more detailed discussion of Change verbs' valency behavior (Section 4.4.3) and in the comparison between Change and Theft verbs (Chapter 5), I address the range of phrase types available to a given GF-FE pairing and their theoretical relevance. I refer to these argument realization patterns as ***valency constructions*** or ***VCs***. VCs may be understood as verb-specific valency constructions (in the sense of Herbst 2010, 2014) but also as verb-class-specific valency constructions, because a strict distinction between these two construction types is not necessary for the present analyses of sets of verbs which are all associated with the same set of FEs.[22]

To demonstrate, Table 4.6 shows how VCs can be documented, drawing again on the fairy tale example. The top row lists the FE, the next row ("GF + morph.") shows the categories used in the primary analyses, the third row lists the simple (abstract) grammatical function of the argument, and the final row shows the default phrase type of the argument, i.e. the phrase type most frequently exhibited for a given GF-FE pairing.

Table 4.6 Documentation of valency constructions

	The witch	*changed*	*the man*	*from a prince*	*into a frog*
FE	C	verb	U	I	F
GF + morph.	Sbj		Obj	from PP	into PP
GF	SUBJ		OBJ	OBL	OBL
default PT	NP	V	NP	N	N

22. Dux (2016: 154–157) discusses in more detail the relation of the VCs employed here to the valency constructions used in Valency Grammar (Herbst 2014), the argument structure constructions of Goldberg (1995, 2006), and other formulations of "constructions" such as those of Boas (2003) and Croft (2003).

The C (*the witch*) is a NP subject, the U (*the man*) is a NP direct object, the O (*from a prince*) occurs in an oblique PP headed by *from*, and the F (*into a frog*) in an oblique PP headed by *into*. The primary format for representing VCs is given in in (4.6a), which is in fact a simplified representation of the more fully spelled-out VC in (4.6b).

(4.6) a. [C _ U from O into F] (VC, simplified)
b. [C.NP.Sbj _ U.NP.Obj + O.PPfrom.Obl + F.PPinto.Obl] (VC, fully specified)

The full format representation documents all three of the categories of the VC (FE, GF, and PT). The abbreviated VC format lists only the FE labels, their relative ordering, and any relevant grammatical morphemes that introduce the FEs. The underscore represents the slot for the verb, and the FE to its left and right represent the subject and direct object, respectively. No phrase type specification is given in the abbreviated format, but each FE is associated with a default realization, as specified below when the VCs of English Change verbs are introduced.

The abbreviated VC format is used not only for clarity and brevity in presenting the valency data, but also serves to abstract away from subtle differences in the formal (phrase type) realization of a given FE. For instance, the subject C argument is typically instantiated by a NP, but may also appear (with much less frequency) in other formal phrase types, such as a gerundial VP (e.g. *Chanting a spell changed the man*) or a *that* clause (e.g. *That she said a spell changed him*). Such phenomena have been discussed as instances of "allostructions" by Cappelle (2006), Herbst (2014), and Perek (2015), among others. While these phrase type differences do not appear to be highly relevant for distinguishing Change verbs from one another, they show theoretical relevance in contrasting the Change verb class from other related classes, as discussed in Section 4.4.3 below and in the following chapters.

By documenting the VCs of all analyzed corpus sentences for a given verb, we gain a picture of the verb's ***valency distribution***: the specific set of VCs in which the verb occurs (based on the analyzed corpus) and the verb's relative frequency in each of these VCs. While the valency distribution of a verb offers a precise description of the verb's distribution across VCs, a verb's ***valency description*** provides a simpler prose description summarizing the valency distribution. The valency description offers generalizations based on ***VC features***, which are syntactic features that characterize sets of VCs, such as transitivity, the occurrence of oblique arguments (for State FEs), and others, as discussed below. More specifically, the valency distribution of a Change verb lists the precise frequency with which it occurs in each individual VC, while the valency description states generalizations over the detailed valency distribution drawing on VC features (e.g. "Verb X occurs almost exclusively in intransitive VCs and rarely in transitive VCs"). I use the term ***valency feature*** (of a verb) to describe its behavior with respect to a given VC feature characterizing sets of VCs associated with a given verb class, such as transitivity. The term ***valency behavior*** is used in a general sense.

4.3.2 English Change VCs: Overview

Table 4.7 introduces and exemplifies the set of VCs attested in the corpus analysis. The middle two columns show the VC's representation in the abbreviated format (second column) and the full format (third column; excluding the GF label). The subject and object arguments (C and/or U) have the default realization of a noun phrase (NP), and the F and O arguments in prepositional phrases have default realization of nouns. The fourth VC includes the labels "F.CP" (abbreviated) and "F.toCP" (full); in these VCs, the F is realized either in a purposive infinitival verb phrase headed by *to* or a subordinate clause headed by *so that*. In the resultative VCs (#12 and #13), the resultative phrase realizing the F argument has a default realization as an adjective (Adj). In presenting the findings of the valency analysis, I use the simplified formats unless otherwise noted.

Table 4.7 Valency constructions of English Change verbs

#	VC (abbrev.)	VC (Full: default PT, no GF)	Example
1	C _ U	[C.NP _ U.NP]	She changed him.
2	C _ U into F	[C.NP _ U.NP into F.NP]	She changed him into a frog.
3	C _ U to F	[C.NP _ U.NP to F.NP]	She turned him to stone.
4	C _ U F.CP	[C.NP _ U.NP F.toCP]	She changed him to look like a frog.
5	C _ U from O into F	[C.NP _ U.NP from O.NP into F.NP]	She changed him from a person into a frog.
6	C _ U from O to F	[C.NP _ U.NP from O.NP to F.NP]	She changed him from a prince to a frog.
7	U _	[U.NP _]	He changed.
8	U _ into F	[U.NP _ into F.NP]	He changed into a frog.
9	U _ to F	[U.NP _ to F.NP]	He changed to stone.
10	U _ from O into F	[U.NP _ from O.NP into F.NP]	He changed from a prince into a frog.
11	U _ from O to F	[U.NP _ from O.NP to F.NP]	He changed from a prince to a frog.
12	C _ U F.result	[C.NP _ U.NP F.AdjP]	She turned him green.
13	U _ F.result	[U.NP _ F.AdjP]	He turned green.

The VCs for English Change verbs here are assigned arbitrary number labels, given in the left-hand column in Table 4.7. These VCs can also be categorized according to their VC features, capturing similarities in the number and types of arguments they include and in the formal realization of such arguments. One distinction among VC features pertains to the VC's transitivity (or the causative-inchoative distinction), splitting VCs with the transitive VC feature from those with the intransitive VC feature. Further, VCs differ in whether they realize no State arguments, only the F, or both the O and F arguments. Among VCs that realize the F argument, six different VC features are posited. The first two capture *into* PP and *to* PP realizations of F separately, and the third conflates these two categories, capturing VCs in which F is realized in either an *into* or a *to* PP. VCs realizing (O and) F arguments in PPs referred to collectively as "Prepositional State VCs". Separate features are posited for VCs expressing F in a purposive clause (either an infinitival *to* clause or subordinate clause headed by *so that*) and those expressing F as a resultative phrase. Table 4.8 lists each VC parameter, the various VC features available for each parameter, and the (arbitrary) number labels for the VCs associated with each feature.

Table 4.8 Categories of VCs according to valency features

VC Parameter	VC Feature	Valency Constructions
Transitivity	Transitive/Causative	1–6, 12
	Intransitive/Inchoative	7–11, 13
State realization	No states	1, 7
	Only F	2–4, 8–9, 12–13
	Both O and F	5–6, 10–11
F realization	intoPP	2, 5, 8, 10
	toPP	3, 6, 9, 11
	Prepositional F	2–3, 5–6, 8–11
	Purposive/Clausal F	4
	Resultative	12–13
F and O realization	Prepositional States	3–6, 8–11

The VC parameters and their features serve two purposes. A practical purpose is that they facilitate the formulation of valency descriptions, as they allow for more general statements abstracting over specific VCs and referring to classes of VCs (e.g. "frequent in transitive VCs"). VC features are also theoretically relevant (as will be shown in Section 4.4.3 below) as they aid in identifying interrelations among individual VCs associated with a given verb class, thus enabling the identification of inheritance relations among VCs and of their relation to verb (class) meaning.

Based on the valency analysis, it is possible to formulate ***syntactic subclasses***, which capture similarities in the valency behavior of sub-sets of verbs within a class that set them apart from other verbs (for instance, to capture that certain Change verbs are much more frequent in intransitive VCs than transitive VCs when compared with other Change verbs). A comparison of syntactic subclasses and the semantic subclasses identified in the semantic analysis allows for the identification of fine-grained ***grammatically relevant meaning components***, i.e. additional meaning components that influence a verb's valency behavior, as described in more detail inSection 4.5.4 below.

4.3.3 Results of corpus analysis

I now present the results of the corpus analysis. For each verb, I first present tables documenting its valency distribution and then provide a valency description based on its precise distribution. In the valency distribution tables, the left-most column shows the VC's number as given in Table 4.7 above. The second column shows the number of examples which exhibit that VC, while the third column shows the frequency (in percentages) of that VC among all examples analyzed for the verb. The fourth column gives the VC representation in abbreviated format, and the right-most column includes one actual example of the VC from the COCA corpus. After presenting the results for each verb, I summarize the findings of the analysis by assessing the verbs' similarity with respect to valency behavior and identify syntactic subclasses of English Change verbs. I then discuss the implications of the present analysis and its advantages over the approaches discussed in the previous chapters.

Alter

Table 4.9 summarizes the valency behavior of *alter*.

Table 4.9 Valency distribution of *alter*

#	Freq.	%[a]	VC[b]	Example[c]
1	71	90%	[C _ U]	Again I say, you could ALTER **your mission**.
4	2	3%	[C _ U F.CP]	Program […] urges teachers of newly immigrated students to ALTER **this activity** as necessary *to fit their students' language fluency and education levels*
7	6	8%	[U _]	**Our tastes, abilities, and needs** all ALTER with time.

a. Because I rounded the percentages of examples exhibiting a given VC to the nearest whole number, the full percentages do not always add up to exactly 100%.
b. The VCs attested for each verb are listed in arbitrary order based on their assigned number in Table 4.7 above. For *trans*form, an additional column is included to show the frequency of VCs in which U is a reflexive object.
c. FEs are annotated in the examples as follows: C is underlined, U is in bold font, F is in italics, and O is marked with dotted underlines. The target verb is in capital letters.

The corpus analysis for *alter* suggests that this verb shows a strong preference for transitive/causative patterns over intransitive/inchoative patterns (92.5% transitive to 7.5% intransitive). It also reveals that *alter* has a very strong tendency to appear in valency constructions without State arguments, as the corpus analysis revealed no VCs with prepositional state arguments.[23] However, two examples included purposive clauses that describe the Final State of the change in more general terms.

Change
Table 4.10 summarizes the valency distribution of the 134 sentences analyzed for *change*.

Table 4.10 Valency distribution of *change*

#	Freq.	%	VC	Example
1	74	55%	[C _ U]	Barbed wire would CHANGE **everything**, […]
3	1	1%	[C _ U to F]	Should Canada CHANGE **its clocks** *to the American standard*?
6	2	1%	[C _ U from O to F]	He […] CHANGED **the sport** from shamateur *to professional*.
7	56	42%	[U _]	[…] **the plans** have CHANGED […]
8	1	1%	[U _ into F]	At six, **it** CHANGED *into "One Man's Family"*.

The data for *change* show that it has a rather different valency distribution than that of *alter*, discussed above. For one, *change* shows no strong preference for transitive or intransitive VCs, as 57% of the examples are transitive and 43% are intransitive. Similar to *alter, change* strongly prefers VCs that do not include State arguments. The corpus data for *change* did include four examples with such VC, but these comprise only 3% of the total examples.[24] The few State arguments found in the *change* data are realized in formally diverse ways; for instance, F arguments involve both adjectival and nominal states and are introduced by both *to* PPs and *into* PPs.

23. Although none of the analyzed active examples include any state arguments, one of the unanalyzed passive sentences extracted from COCA realizes the F argument in an *into* PP, demonstrating that such realizations are infrequent but not entirely infelicitous with *alter*: *[…] she could swallow a magic potion and be altered into a different person with a different life.*

24. In fact, the difference between four such VCs with *change* and no such VCs with *alter* is statistically insignificant, according to a Fisher's exact test. I thank an anonymous reviewer for pointing this out.

Transform

Table 4.11 summarizes the valency distribution of *transform*.

Table 4.11 Valency distribution of *transform*

VC	Freq.	%	Pattern	Example
1	52	48%	[C_U]	The energy boom of the 1970s TRANSFORMED **the North Slope landscape**.
2	38	35%	[C _ U into F]	Here are ways they TRANSFORMED **those challenges** *into opportunities*.
4	1	1%	[C _ U F.CP]	special cells [...] have [...] TRANSFORMED **themselves** within the pigs' hearts *to form new, healthy tissue*
5	7	6%	[C _ U from O into F]	[...] when he TRANSFORMED **the mask** from a protest of youth *into a gentle romantic whimsy*.
6	2	2%	[C _ U from O to F]	The Hippo Regius labyrinth TRANSFORMS **the motif** from a visual game *to something more like a physical event*.
7	3	3%	[U _]	**The landscape** TRANSFORMED.
8	5	5%	[U _ into F]	[...] as if **it** had TRANSFORMED *into a huge bug*.
10	1	1%	[U _ from O to F]	**Venice** TRANSFORMED from a city only the elite could visit *to a much more accessible destination* [...]
*	11	10%	[C _ U.rflxv + ...]	[...]in two weeks you can TRANSFORM **yourself** physically.

The bottom row of the table shows the frequency of reflexive direct object U arguments with *transform*.

Transform has a strong tendency to appear in transitive/causative VCs, as nearly 92% of the analyzed sentences are transitive. It also appears to be equally frequent in VCs with and without States, as 50% of the analyzed examples realize no States and 50% realize States.

Transform differs from the other analyzed change verbs in that it is highly frequent in VCs with (both a F and) an O argument. Such VCs occur 10 times in 109 examples (> 9%) of *transform*, but only seven times total among the 440 examples analyzed for the other four Change verbs. This aspect of its valency behavior may possibly relate the "drastic change" meaning component of transform, as the combination of O and F arguments typically implies a fairly drastic change from one state or category to another, and such arguments are not found with verbs exhibiting the “subtle change” meaning component (*alter* and *modify*).[25]

25. I test this hypothesis in Section 4.6 through a comparison with *metamorphose*.

Transform is also unique among English Change verbs in that several attestations include reflexive object pronouns (e.g. *itself, herself*) referring back to the subject U argument.[26] While COCA includes examples of reflexive objects with other Change verbs, none of the analyzed examples for other English Change verbs show reflexive objects, suggesting that this high frequency of reflexive objects is unique to *transform*. Given that *transform* is the only analyzed verb with the "positive change" and "drastic change" meaning components, there is reason to believe that the high frequency of reflexives may be triggered by one of these meaning components.

Turn

Table 4.12 summarizes the valency distribution of *turn* in 132 examples.

Table 4.12 Valency distribution of *turn*

#	Freq.	%	VC	Example
2	50	38%	[C _ U into F]	The incarcerated have a nasty habit of TURNING **everything** *into a weapon*, including traditional toothbrushes.
3	3	2%	[C _ U to F]	[…] that I had to TURN **that shirt** *to rags*.
4	1	1%	[C _ U from O into F]	[…] and TURNED **it** from a sluggish, neglected enterprise *into a fairly thriving one*.
8	32	24%	[U _ into F]	[…] and now **this** is TURNING *into a disaster*
9	7	5%	[U _ to F]	[…] **the lush opium of the island** slowly TURNED *to powder*, […]
11	4	3%	[U _ from O to F]	[…] **the warm moist air from the conditioned interior** will […] TURN from water vapor *to water* […]
12	4	3%	[C _ U F.result]	The prospect of sharp cuts in 2011 have TURNED **the economists** *downright gloomy*.
13	31	23%	[U _ F.result]	**A mild January** had TURNED *venomous*.

Turn behaves somewhat differently than other English Change verbs. For one, it exhibits the greatest diversity of VCs among the verbs, occurring in eight different VC types. It is also the only Change verb that requires the overt expression of the F argument, as all attested VCs with *turn* include this argument. (This finding is

26. The data include 11 instances of reflexive objects, comprising slightly over 10% of all patterns. Six of these are found in the simple transitive VC (#1), as shown at the bottom of Table 4.11. Two other instances of reflexive U objects are found with the transitive plus F as *into* PP (#2) (*the parasites transform themselves into tiny creatures called merozoites […]*), two occur with the transitive plus O as *from* PP and F as *into* PP (#5) (*When Daisy transformed herself from a so-so librarian into a seductress […]*), and one occurs with the purposive *to* clausal F argument (#4).

likely related to the polysemous nature of *turn*, as its occurrence with VC types without resultative arguments or *to*/*into* PPs yield different non-Change readings of the verb.) Furthermore, it is the only Change verb that is used in resultative VCs in which the F argument appears as a bare adjective (in most cases) without a preceding preposition.[27] Resultative VCs comprise roughly 27% of all analyzed examples, and 42% of intransitive examples.

More generally, the data show that *turn*, like *change*, shows no particular preference for transitive or intransitive VCs, as 55% of the examples are intransitive and 45% are transitive. Aside from its infelicity with purposive clause realizations of F, *turn* is compatible with all other realizations of the F argument, as it is realized with similar frequency in *into* PPs and resultative phrases and regularly (but less frequently) in *to* PPs.

Modify

Table 4.13 summarizes the valency behavior of *modify* in 95 examples.

Table 4.13 Valency distribution of *modify*

#	Freq.	%	VC	Example
1	78	82%	[C _ U]	[…] Armstrong could MODIFY **the trio of drugs used in a standard testes chemo treatment**.
4	17	18%	[C _ U F.CP]	I took an 8 × 10 sheet film holder, and MODIFIED it *to accept 6 1/2 × 8 1/2, traditional full sized plates*.

The data show that *modify* exhibits a strong preference for transitive over intransitive VCs, as no intransitive VCs were attested in the data.[28] *Modify* also seems to be

27. In this respect, *turn* behaves similar to the verb *make*, which may also express Change semantics in certain constructional contexts, including resultative VCs (*She made Pat angry*), and requires overt expression of the F argument (*She made Pat into a frog* ~ **She made Pat*). However, *turn* differs from *make* in that it may be used in both transitive and intransitive resultative VCs, while *make* only allows transitive resultative VCs (**Pat made angry*).

28. While native speaker intuitions suggest that *modify* is ungrammatical in intransitive patterns, a detailed corpus search reveals that it may be used in such patterns, as in the COCA sentences below. Nonetheless, such examples are extremely infrequent, as only two clear intransitive uses were found in COCA search results for all non-past forms of *modify* (i.e. *modify, modifies, modifying*, but not *modified* which returns many passive uses) followed by *to* or by *into*. Intransitive uses of *modify* also seem to rely on contextual information from the surrounding sentences for proper interpretation. The two examples are given below, along with the preceding sentence:

a. *The Experimenter learns from failures as well as successes. He **modifies** **to** test pre-existing theories, sometimes repurposing what is known about the world into new understandings.* (COCA) highly averse to VCs with prepositional F arguments. However, *modify* shows the highest frequency of clausal F arguments. Given this distribution, *modify* is very similar to *alter*, whose examples included a low frequency of intransitive VCs and no VCs with prepositional F arguments.

4.3.4 Summary of corpus valency analysis

4.3.4.1 *General summary of valency behavior tendencies*

To conclude this section, I summarize and compare the valency behavior of English Change verbs and then discuss the implications of the analysis for other approaches to verb classification and argument realization. Table 4.14 summarizes the results of the preceding valency analysis: the two left columns list the VC's number and abbreviated representation, and the remaining columns show the percentage of examples exhibiting that VC for each verb. For instance, 90% of the *alter* examples exhibit the simple transitive VC [C _ U] (#1), while only 1% of them exhibit the transitive VC with F in a *to* PP [C _ U to F] (#3).

Table 4.14 Distribution of corpus examples for each verb across VCs

#	VC	*Alter*	*Change*	*Modify*	*Transform*	*Turn*
1	C _ U	90%	55%	82%	48%	
2	C _ U into F				35%	38%
3	C _ U to F	1%	1%			2%
4	C _ U F.CP	1%		17%	1%	
5	C _ U from O into F				5%	1%
6	C _ U from O to F		1%		4%	
7	U _	8%	42%		3%	
8	U _ into F		1%		5%	24%
9	U _ to F					5%
10	U _ from O into F					
11	U _ from O to F				1%	3%
12	C _ U F.result					3%
13	U _ F.result					23%

Again, it should be emphasized that the figures here are not comprehensive accounts of the individual verbs' valency distributions, but rather shed light on the relative frequencies with which individual verbs of a given verb class occur in the

b. *Diagramming sentences […] might make us conclude that these words are adjectives. While they do* ***modify to*** *some degree, they can not fully perform nor act like adjectives […]* (COCA) individual VCs associated with that class, as found in a random selection of corpus examples.[29] Thus, the presentation here does not imply, for instance, that *change* never occurs in VC #2, as such examples can be readily found in numerous corpora. In fact, it is likely that the total number of instances (i.e. raw frequency) of *change* occurring in VC #2 may outnumber instances of *transform* in this VC. However, the data here suggest that when a verb (such as *change*) is used, it is much less likely to occur in a given VC (such as VC #2) than in other VCs, whereas when a different verb (such as *transform*) is used, that verb is much more likely to occur in that VC.

Nevertheless, these data clearly show that individual verbs in the Change verb class do not exhibit uniform valency behavior. For one, there are no VCs that occur with every one of the five verbs analyzed. The most frequent VC across all verbs is the simple transitive VC [C _ U] (#1), which appears with all verbs except *turn*. However, the frequency of this VC differs across the four other Change verbs analyzed: it is highly frequent with *alter* and *modify* (90% and 82% of their analyzed examples, respectively), but less frequent with *change* and *transform* (55% and 48%, respectively). There are also several patterns that appear with only one verb (e.g. #9, #12, #13 with *turn*) or with only two of the five analyzed verbs (e.g. #5 with *change* and *transform*, and #11 with *transform* and *turn*).

Despite this drastic variation in the precise valency distribution of English Change verbs, some generalizations can be made that capture similarities across sub-sets of Change verbs. Table 4.15 summarizes how individual Change verbs behave with respect to the VC features that capture similarities across individual VCs. The left-hand column lists (classes of) relevant VC features and the middle column lists the behavior of verbs with respect to these features. For instance, the final row in the first category ("Transitivity") shows that *change* and *turn* appear with (nearly) equal frequency in transitive and intransitive VCs. The last row in the table captures the relative frequency of *transform* with reflexive objects referring to the subject U, which does not clearly relate to the VC features proposed above but nonetheless sets transform apart from other Change verbs. When the right-hand column includes multiple verbs, these verbs form a syntactic subclass, defined above as a subset of verbs within a class that exhibit similar valency behavior.

The first major valency feature which distinguishes individual Change verbs is transitivity. *Alter, modify,* and *transform* each show strong preferences for transitive VCs. 100% of the analyzed *modify* examples exhibit transitive VCs, and intuition suggests that this verb is not felicitous in intransitive VCs (but see fn. 28 above). The valency distribution of *alter* and *transform* also exhibits an overwhelming

29. A statistical clustering of verbs based on their distribution across individual VCs is presented at the end of Section 4.5.

Table 4.15 Tendencies for valency behavior of English Change verbs (syntactic subclasses)

VC feature	Valency feature	Verbs (syntactic subclass)
Transitivity	(nearly) exclusively Transitive	*modify*
	strong preference for Transitive (> 90%)	*alter, transform*
	no preference (40–60% in Trans. and Intr.)	*change, turn*
States (O and F)	requires States	*turn*
	infrequent/incompatible with prepositional States	*alter, change, modify*
	equally frequent with or without States	*transform*
	frequent O arguments	*transform*
F realization	occurs in resultative patterns	*turn*
	frequent with purposive clause States	*modify*
Other	frequent with reflexive object	*transform*

frequency (but not exclusivity) of transitive over intransitive VCs, as 92% of the analyzed examples for both verbs exhibit transitive VCs. *Change* and *turn*, on the other hand, occur with similar frequency in both transitive and intransitive VCs. *Change* examples showed a slight tendency towards transitive VCs (57%) over intransitive VCs (43%), whereas *turn* is the only analyzed verb with a higher frequency of intransitive VCs (56%) than transitive VCs (44%).

Individual Change verbs also differ with respect to the overt expression and the specific realization of State FEs. The data showed that *turn* requires the overt realization of F, as 100% of its analyzed examples include this argument. The specific formal realization of F with the verb *turn*, however, is highly diverse: it is realized within *to* and *into* PPs and in resultative constructions (as either a noun or adjective). *Transform* is the only analyzed verb that occurs equally frequently in VCs with and without prepositional F arguments (each type comprising 50% of the analyzed examples). F arguments with *transform* are also highly diverse in their formal realization, as all F realizations (aside from resultative realizations) are attested. *Transform* also exhibits a relatively high frequency in VCs which include O (and F) arguments: 10 such VCs were found for *transform* while only seven were found with the other four verbs.

In contrast, *alter change,* and *modify*, exhibit a strong aversion to VCs with prepositional F realizations. For *alter* and *modify*, no analyzed examples include VCs with F realized in a PP.[30] *Change* does occur in VCs with prepositional F arguments, but at a very low rate – as only 4 of the 132 analyzed examples (< 3%)

30. While such arguments appear intuitively to be unlikely to occur with these verbs, some examples are indeed attested in the COCA corpus, as in: *[…] I used the pencils to* ***alter*** *the*

exhibit VCs with such arguments – so it is not significantly different to *modify* and *alter* in this respect.

Turn and *modify* also exhibit notable behavior with respect to the specific realization of F. As noted above, *turn* is the only verb that occurs in resultative constructions, which comprise roughly 27% of its analyzed examples. *Modify* exhibits a relatively high frequency of VCs realizing F in a purposive clause headed by *to* or *so (that)*, in which the resulting state of the change is specified using a verb phrase. Purposive F realizations occurred in 17 of the 95 (18%) *modify* examples, but only three other times in the data (twice with *alter* and once with *transform*).

Finally, *transform* sets itself apart from the other verbs due to its relatively high frequency (over 10%) in which the U argument is a reflexive pronoun. While reflexive objects are subject to more general syntactic processes (e.g. anaphora) and can thus theoretically appear with any transitive verb, their frequency with *transform* and their absence in the corpus data for all other Change verbs is indeed noteworthy.

4.3.4.2 *Implications of valency analysis*

Before moving on to the theoretical treatment of the above data, I briefly discuss how the present approach to valency analysis improves on the existing approaches discussed in the previous chapter. Levin's (1993) classes are characterized according to sets of VCs (i.e. alternation variants) with the implication that individual verbs of a given class are felicitous in each construction, as her approach is guided by the assumption of a close correspondence between verb meaning and argument realization. However, this assumption has been shown to be incorrect, which largely results from Levin's use of intuition rather than empirical corpus data. Even Levin herself notes that many constructions used to define her *Turn* class (which corresponds to the Change verbs analyzed here) occur with only "some verbs" or "most verbs" of the class (see Section 2.4), but provides no information as to precisely which verbs do or do not occur in each construction. The present analysis allows us not only to provide this missing information (e.g. that *modify* does not occur in intransitive constructions) – but also allows for statements of a verb's relative frequency in constructions associated with a class.

By not incorporating corpus data, Levin's approach cannot provide frequency information that is central to capturing a verb's valency behavior. Levin does not mention that individual verbs of a class appear with (sometimes very) different frequencies in specific constructions used to characterize the class, a fact made apparent in the present analysis. For instance, although the corpus data reveal one

mouth ***into*** *a soft, reassuring smile.*; *Morrison later* ***modified*** *that two-person rowboat* ***into*** *a solo design […].*

intransitive use of *alter*, these are extremely infrequent compared with transitive uses. Further, both *alter* and *change* (as well as *modify*) are much more frequent in constructions without oblique arguments (i.e. PPs expressing the O or F) than in those with such arguments.

While FrameNet improves on Levin (1993) by providing valency reports based on the annotation of corpus data (and avoiding the assumption that meaning determines argument realization), its valency data is too sparse and its annotation practices exhibit many inconsistencies (see Dux 2011, 2016: 85–87, 176–184, and Section 3.1 above) that are overcome by the present approach. For example, FrameNet includes only 21 annotated corpus examples in the entry for *alter* in the `Undergo_change` frame. (*Alter* is not listed as a LU of the `Cause_change` frame.) Based on these annotations, FrameNet identifies 20 different constructions ("Valence Patterns") for *alter*.[31] However, 19 of these Valence Patterns are associated with only one corpus example and the remaining one only with two examples. As such, FrameNet also provides no insight as to which of the nearly 20 constructions *alter* is most likely to occur with, whereas the present analysis offers this relevant information for *alter*.[32]

Another advantage of the present approach involves the "splitting" approach to polysemy taken by FrameNet, whereby separate lexical units (LUs) are posited for different senses of a given lexeme. Recall that FrameNet's `Cause_change` frame describes Change scenarios with a causing agent (reflected syntactically in causative-transitive constructions) and its `Undergo_change` frame captures Change scenarios with no cause (as seen in inchoative-intransitive constructions). Both

31. This number is significantly higher than the four VCs attested with *alter* in the present analysis, for one because FrameNet includes construction types (e.g. passives, imperatives) that are not documented here, and secondly, because FrameNet annotates non-core FEs and null-instantiated FEs. The current methodology, however, can easily be scaled up to provide a full-scale analysis of all construction types, including passives, imperatives, and those involving null-instantiation.

32. An anonymous reviewer points out that the choice of corpus may give rise to the difference in number and type of VCs identified in my analysis of the COCA corpus and those found in FrameNet, which draws primarily from the British National Corpus (BNC). Specifically, the COCA corpus comprised over 450 million words at time of analysis and is thus much larger than the 100-million-word BNC. Different types and distributions of VCs may also arise from differences between American English (COCA) and British English (BNC), as well as from differences in the balance of words across genres and (spoken vs. written) registers in the two corpora (see https://corpus.byu.edu/coca/compare-bnc.asp). At the same time, I believe the FrameNet database still does not seem to exhaust all VCs found with each verb, even using the (smaller) BNC corpus, as certain verb-VC combinations can be found in BNC that are not documented by FrameNet. This again may result from the workflow and methodology used to achieve the wide coverage offered by FrameNet.

alter and *change* are listed as lexical units (LUs) evoking the `Cause_change` frame, but only *change* is listed as a LU of the `Undergo_change` frame. Such a classification exhibits two problems. First, the COCA data show that *alter* may in fact appear in intransitive patterns that characterize the `Undergo_change` frame, but these uses are much less frequent than transitive `Cause_change` uses.[33] While this problem could easily be resolved by adding *alter* to the list of LUs for the `Undergo_change` frame, a second problem is that FrameNet's lack of frequency information (for the argument realization behavior of lexemes with LUs in closely related frames) does not allow for an explicit account of the large discrepancy between *alter*, which is extremely infrequent in intransitive VCs, and *change*, which occurs with equal frequency in both transitive and intransitive VCs. Ideally, FrameNet could be modified to specify that LUs evoking related frames (e.g. by the Causative-Inchoative inheritance link) may be more central to one of these frames than the other.[34]

Finally, the present approach also improves on the valency descriptions of the *Valency Dictionary of English* (VDE; Herbst et al. 2004) in various ways.[35] One obvious advantage is that the VDE is entirely item-specific and precludes the analysis of verb classes: the only Change verbs it documents are *change* and *turn*, but no mention is made regarding the semantic and syntactic similarities among these verbs (or other Change verbs). With respect to its treatment of *change*, the VDE identifies a total of 12 VCs for *change*, while the present corpus analysis revealed only five VCs (a figure that would be higher if the present analysis included passive, imperative, and other non-canonical sentence types, as noted for *alter* above). This discrepancy arises from differences in the methodologies of the two approaches: the VDE seeks out specific VCs to identify all possible VCs for a given verb, while the approach taken here analyzes a set of randomly selected corpus examples and documents the VCs occurring in the corpus sample and their relative frequency. Of course, as more examples for *change* are analyzed (than the 134 examples here), it is almost certain that other VCs will be found. However, it seems

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33. In fact, the annotated sentences for *alter* in the `Cause_change` frame include (at least) one instance of an inchoative use, which must have been overlooked by the FrameNet annotators: *Jamaicans are aware that [$_{Attribute}$circumstances] can suddenly ALTER^{Target} [$_{Degree}$dramatically]* (FrameNet).

34. That certain Change verbs appear much more frequently in either transitive or intransitive VCs while still being acceptable in either VC type suggests that there is a prototypical use of these verbs. This prototypicality could be captured in terms of Prototype Theory (Rosch 1973, 1978). or Idealized Cognitive Models (Lakoff 1987).

35. The present discussion does not address issues with the VDE's semantic characterization of verbs and arguments or its lack of an account for similarities among related verbs and classes, but see Section 3.3 and Fillmore (2009).

linguistically relevant that certain VC types occur only rarely or not at all in a large set of analyzed data (e.g. those with State arguments). The VDE's presentation of valency properties, however, suggests that *change* is equally frequent in both of these VC types, which is inaccurate and would be misleading for language learners (for whom the VDE was developed).[36] In sum, while the VDE offers a broader picture of what VCs are potentially possible for a given verb, the present corpus-based frequency analysis provides a more accurate picture of what VCs are the most common or expected for the verb.

In sum, the present analysis demonstrates that despite the coarse-grained similarity of Change verbs, as seen in their potential to occur in a delimited set of VCs, each verb has a unique distribution across these VCs and often appear to be strongly attracted to certain (sets of) VCs, despite their ability to be used – with much less frequency – in the others. This approach also allows us to identify the specific valency features with which individual verbs of a given class vary: for Change verbs, these include transitive vs. intransitive VCs, and VCs with vs. without State arguments. This frequency information is an empirical reality (and also relevant for language learners who wish to sound like native speakers) that is not accounted for in Levin (1993), FrameNet, or the VDE.

4.4 The English Change frame-constructional verb class

4.4.1 Approach

The detailed semantic and syntactic analyses of individual Change verbs above provide the rich item-specific empirical data called for in recent usage-based and constructional research (e.g. Croft 2003; Boas 2006, 2008b, 2010c, 2011b; Iwata 2006; Herbst 2010; Faulhaber 2011). Based on these data, it is now possible to work from the bottom up and identify generalizations over these individual verbs to formulate verb classes which (potentially) predict the relationship between verb meaning and syntax, a goal characteristic of the traditional top-down approaches discussed in Chapter 2. In this section, I demonstrate on the basis of English Change verbs how verb classes and verbal lexical entries must be formulated which are empirically accurate and verifiable and adequately capture both shared and idiosyncratic/verb-specific behavior with respect to meaning and argument realization. I begin by defining the semantics of the English Change verb class

36. The introduction to VDE states that, where relevant, valency patterns are categorized according to their frequency. However, the VDE does not include any such frequency information for its *change* entry.

(Section 4.4.2) I then discuss the theoretical status of the valency constructions in which Change verbs appear, focusing on the fne-grained semantics of these constructions, their hierarchical organization in a constructional network, and their relation to constructions associated with other verb classes (Section 4.4.3). In Section 4.5, I describe how lexical entries for individual verbs can be formulated to capture both verb-specific and verb-class-specific behavior and formulate such entries for the analyzed Change verbs (Section 4.5.2) and discuss finer-grained subclasses within the Change verb class (Section 4.5.4).

As a general overview, the central construct in the present approach is that of a ***(multi-grained) verb entry (MGVE)***, which specifies both semantic and syntactic properties of individual verbs at various levels of granularity. The highest level of these entries (in the present analysis) includes a specification of the verb's *(frame-constructional) verb class* which captures the similarities among individual verbs in a given class (at a granularity level similar to the classes found in Levin 1993 or FrameNet). However, as no verbs in the above analysis exhibited identical semantic or valency behavior, the MGVE must also include lower-level, verb-specific information to capture the unique nature of each verb. At an intermediate level, I propose *(syntactic-semantic) subclasses* that capture lower-level similarities among subsets of verbs within the class.

The contents of and relations between the (frame-constructional) verb class, MGVE and subclasses are represented in Figure 4.2. The arrow in the right-hand column denotes a continuum between low-level verb-specific information at the bottom end of the spectrum and broader generalizations over verb classes at the top end.

At the most general level, the ***(frame-constructional) verb class (FCVC)*** captures shared properties of all verbs of the class, specifying at a coarse-grained level the class's *shared meaning* and its ***constructional range***: the full set of VCs which may occur with (one or more verbs in) the class.[37] As implied in the term, the FCVC's meaning is defined in terms of semantic frames and the Frame Elements (FEs) that characterize them, and the FCVC's syntax is defined in terms of the valency constructions used to express the class's frame semantics. By specifying a verb's FCVC, the MGVE provides a general picture of the verb's meaning and the types of VCs it may potentially appear in. This information is inherited by

37. In the remainder of this chapter, I primarily use the term "FCVC" but also the more general term "(verb) class". In the following chapters, I primarily use the term "(verb) class", which is to be understood under the definition of FCVC formulated here. The term "(semantic) frame" is also occasionally used to refer to the semantics of the FCVC.

Frame-constructional Verb Class (FCVC): Generalizations over all verbs in class	**Semantics:** ***shared meaning***: meaning shared by all verbs in class, defined with reference to FEs and including notes on how class differs from related classes **Syntax**: ***constructional range:*** all VCs identified in corpus analysis	Verb-Class-Level Generalizations
Syntactic-semantic Subclass: Generalizations over subset of verbs in class	**Semantics**: additional meaning component shared by two or more verbs **Syntax**: similar distribution across and frequency in VCs	
Multi-grained Verb Entry (MGVE): Idiosyncratic information for individual verbs	**Semantics:** ***additional meaning components*** specifying the construal of or restrictions on the FCVC's shared meaning **Syntax:** ***valency distribution:*** exact set of VCs identified in corpus analysis and relative frequency with each VC **Pragmatic and other usage information**: verb-specific properties not directly related to valency or frame-semantics (not treated in detail here)	Verb-Specific Idiosyncrasies

Figure 4.2 Contents and level of granularity of FCVCs, subclasses, and MGVEs

individual verbs within the class, which specify more detailed aspects of the shared meaning and constructional range.[38]

Multi-grained verb entries (MGVEs) further provide verb-specific information that sets individual verbs within the FCVC apart from one another. This level of the entries includes not only a semantic and syntactic characterization of the verb's idiosyncrasies – based on the findings of the above analyses – but also specifies properties of the verb that are not directly related to its (frame) semantics or valency behavior, including pragmatic properties, which are beyond the scope of the present analysis and thus only cursorily treated here. The verb-specific portions of the MGVE are discussed in detail in Section 4.5 below.

Finally, at an intermediate level between general FCVCs and idiosyncratic MGVEs are (syntactic-semantic) subclasses of verbs. I postulate subclasses when

38. The FCVC can be understood in terms of a construction 'type' in Sign-based Construction Grammar (SBCG; Sag 2012: 76f.) as it delimits the number and types of features that specific constructions (i.e. individual verbs) exhibit. In SBCG, the use of 'types' rules out irrelevant features (e.g. case for verbs, finiteness for nouns). Applying this notion to verb classes and valency behavior, by saying that a verb is a member of the Change FCVC, analyses may rule out semantic questions that are only appropriate for verbs of other FCVCs (e.g. such as 'what type of transfer: intended or actual' which is only valid for transfer verbs but not Change verbs) and syntactic questions about the verb's occurrence in VCs that are not part of the relevant FCVC (e.g. 'does it occur in VCs with expletive subjects' which applies to other classes but not Change verbs).

groups of two or more verbs exhibit significant similarities in both the semantic and syntactic portions their MGVEs. Specifically, members of a subclass must share at least one additional meaning component and at least one valency feature. The shared meaning component(s) among subclasses can be viewed as a grammatically relevant meaning component to the extent that the shared valency behavior of verbs in a subclass can be connected to their shared meaning component(s).

4.4.2 The semantics of the English Change FCVC

The semantic side of the Change FCVC, shown in Figure 4.3, captures the shared meaning of Change verbs. It includes a brief prose description of the types of situations/events they describe, identifies the semantic roles (Frame Elements) defining the verbs' meaning as well as their interrelations, and states explicitly how

Semantics of the English Change FCVC

Shared meaning
These verbs describe situations in which an entity (U) undergoes a change from one state (O) to another state (F). The change may be brought about by some agent or cause (C).

Core FEs
C = Cause_change = agent or cause which brings about the change
U = Undergo_change = entity which undergoes the change
O = Original_state = state of the entity before the change
F = Final_state = state of the entity after the change

Peripheral FEs
–evaluative direction of change (e.g. *for the better*)
–concomitant change (e.g. *with the passing of time/of a law*)
–changed attribute (e.g. *in appearance*)
–general direction of the change (e.g. *for the better*)
–degree of the change (e.g. *beyond recognition*)
–new property or ability resulting from the change (e.g. *so that* …)
–a related entity which changes in correlation with the U argument (e.g. *according to X*)
–an external or indirect cause of the change (e.g. *with the arrival of X*)
–an entity that embodies the change (e.g. *in her work*)

Meaning components
"drastic change", "subtle change", "purposive change", "positive change"
–These MCs generally apply to the entire Change event and not to specific FEs of the frame.

Relation to other FCVCs
–General and vague compared to more specific classes of "change-of-state" verbs
–"Change-of-state" senses arise when Change verbs are used in specific contexts.

Figure 4.3 Semantics of the English Change FCVC these verbs differ from potentially related semantic verb classes. To this point, the most accurate and detailed semantic description of this class is found in the set of FrameNet frames including Change verbs. However, as discussed in Section 3.1, the FrameNet frame definitions do not explicitly capture aspects of Change verbs that are central to their distinction from other classes. (Additionally, the centrality of the semantic frame in FrameNet's methodology leads to an inadequate treatment of individual verbs and subtler semantic differences across them; these are accounted for in the formulation of verb-specific MGVEs below.) This characterization of the Change FCVC's meaning thus builds on FrameNet's frame definition's by including this information and makes explicit how the class differs from related classes. The individual categories in Figure 4.3 are now discussed in more detail.

Shared meaning

Change verbs share the semantic property of referring to events in which some entity undergoes a change from one state to another state. In some cases, an agent or cause which brings about this change is also expressed. This meaning characterizes all uses of (i.e. is inherited by all) verbs in the Change FCVC. The (core) Frame Elements of this class are the agent or cause that brings about the change, the entity undergoing the change, the initial state of the changed entity, and the final state of the entity after it has changed.

Peripheral FEs

In addition to the (core) FEs described above, some Change verbs occasionally occur with additional arguments that do not have adverbial meanings (describing the time, place, manner, etc. as with traditional 'adjuncts' or 'modifiers') but pertain closely to the Change event described by the verb. Such arguments include, but are not limited to, those which refer to the general direction of the change (e.g. *for the better*), the degree of the change (e.g. *beyond recognition*), a related entity which changes in correlation with the U argument (e.g. *according to X*), an external or indirect cause of the change (e.g. *with the arrival of X*), an entity that embodies the change (e.g. *in his work, he changes something*), or the new abilities or properties of the changed entity (e.g. *so drastically that …*). The present analysis does not offer a detailed discussion of the meanings and distribution of these peripheral FEs, but Dux (2016: 462–474) describes in some detail how such FEs appeared in the corpus data.

Additional meaning components

The additional meaning components of Change verbs include "drastic change", "subtle change", "purposive change", and "positive change". The specific contributions of these meaning components are discussed in Section 4.2 above. A noteworthy property of these meaning components is that they do not clearly apply to specific FEs of the class but instead characterize the Change event as a whole, particularly the interrelations between the U, F, and O FEs. This property of Change meaning components will be made apparent in the following chapter when Change verbs are compared with Theft verbs.

Relation to other FCVCs: General meaning of the Change FCVC

Two other characteristics of Change verbs, namely their semantic flexibility and their vagueness, sets them apart from semantically similar FCVCs. The Change verbs discussed here may be used to describe a nearly infinite variety of change events, as demonstrated in the invented examples in (4.7).

(4.7) a. *The witch changed the man from a prince into a frog.*
b. *The cool weather changed the leaves from green to gold.*
c. *The sculptor's fine craft changed the lump of clay into a beautiful statue.*
d. *Learning German changed how I think about language.*

The general semantics of Change verbs can be identified in the variety of semantic (and formal) instantiations of each of the class's FEs. The change undergone by the U argument can be characterized by the relation between the O and F arguments, which allow interpretations of a wide variety of changes, including a complete change in the category of U (4.7a) or a much less significant change in of one of its attributes (4.7b). In yet other cases, such as those involving mass or multiplex themes, the U argument does not change its category or any specific attribute but is given a different shape or form (4.7c).

The C argument can also vary greatly, including but not limited to intentional human agents (4.7a), circumstances (4.7b), abstract mental properties (4.7c), and (physical or) mental activities (4.7d). Further, the U argument may be interpreted as not only undergoing a change (as in the above examples), but also (directly or indirectly) causing the change, particularly in intransitive uses, as with *He worked really hard and changed his life*, in which case the subject (*He*) can be viewed as both bringing about and undergoing the change.

Change verbs are also highly frequent in contexts where the end result (F) of the change is not made explicit. In many cases, rich contextual and situational knowledge – not always available in corpus data – is required to determine precisely what type of change is denoted, both with respect to the resulting state and to the specific attribute (if any) of then U is changed.

Relation to other FCVCs: Change FCVC vs. "change-of-state" verbs/FCVCs
The general semantics of the Change verbs discussed here sets them apart from the much broader class of change-of-state verbs (e.g. verbs of increasing, improving, decomposing, building; cf. Levin 1993: 240f.; Rappaport Hovav and Levin 2002; Osswald and Van Valin 2014). Change verbs are vague with respect to the exact type of change they describe and are highly flexible with respect to the semantic type and formal realization of FEs. In contrast, change-of-state verbs refer to specific types of changes (i.e. specific Final_state interpretations) and are more or less restricted to specific semantic types for the FEs relating to those of the Change FCVC.

For instance, a prototypical change-of-state verb, namely *break*, encodes that the change results in the loss of internal structure of its U-like argument (transitive object, intransitive subject). As such, the U-like argument occurring with *break* is largely restricted to physical entities that have internal structure. Similarly, *break* may occur with a F-like argument denoting the result state of the broken entity and instantiated e.g. in *to* or *into* PP, but this argument is restricted to a very small and specific set of noun types, such as *into pieces* or *to shreds*. In (likely the majority of) cases in which no F-like argument is present, the resulting state of the broken entity is clearly understood (namely as "broken"), which is not the case for the general Change verbs. Further, the C-like argument of *break* (i.e. the transitive subject that causes the breaking) is somewhat flexible, as it may be either an intentional agent or a circumstance/state of affairs (e.g. *strong winds*). However, this argument must be interpreted as possible of causing something to break and as such, it would plausibly exhibit a narrower range of semantic types (e.g. fewer abstract arguments) and formal realizations (e.g. fewer gerundial or clausal realizations) than are found with the C of Change verbs. (Of course, this hypothesis must be tested in future work.)

In contrast, when one *changes, modifies,* or *transforms* something, then it is not specified whether that thing is broken, shortened, colored, burned, or has undergone any other type of change. The FCVC thus specifies that all Change verbs refer to situations in which an entity changes from one state to another, potentially due to some cause, and that they are vague with respect to the specific type of change that is undergone.[39]

39. Osswald and Van Valin (2014) propose that the `Cause_change` and `Undergo_change` frames should be mothers in inheritance relations to frames including more specific change-of-state verbs.

Relation to other FCVCs: Change-of-state interpretations for Change verbs in specific contexts
In some contexts, the general Change verbs analyzed here do in fact have more specific interpretations similar to those of change-of-state verbs. These interpretations often occur in certain fixed phrases or collocations, as with *alter clothing, modify a noun* (in linguistics terminology), or *transform a current* (in the field of electronics) in which a specific type of change (and specific types of FEs) is interpreted. In other cases, specific change interpretations are coerced due to a specific argument in a specific context. For instance, the sentence *The wine turned* forces an interpretation that the wine has become spoiled. In a slightly different case, while the simple sentence *Pat changed* allows for a wide variety of interpretations, additional contextual cues lead to a specific interpretation in which the changed entity is the clothing that the subject is wearing, as with *Pat changed before leaving for the party*. In these cases, it is perhaps most accurate to posit additional lexical units in separate frames for these uses, namely an entry for *turn* in the `Rotting` frame or for *alter* in frames that capture refitting or repairing events. A detailed investigation of such collocations and domain-specific uses is not undertaken here. However, future research should analyze the relative frequency of such uses, their historical development from a usage-based perspective, and the influence of such uses on the verbs' argument realization behavior.

4.4.3 The syntax of the English Change FCVC

4.4.3.1 *"Constructional range" of the English Change FCVC*
While the above discussion defined the meaning of the Change FCVC, I now describe the syntactic side of the FCVC. The frame semantics defined above can be expressed grammatically using a set of valency constructions (VCs), which describe a given Change scenario with more or less specificity. I refer to the full set of VCs capable of occurring with any verb in the class (as identified in the corpus analysis) as the FCVC's *constructional range*, shown in Table 4.16 below (repeated from Table 4.7 above). The constructional range represents the syntactic (i.e. argument realization, valency) characterization of the FCVC. However, it differs in nature from the FCVC's semantic characterization: while the shared meaning is inherited by all Change verbs and characterizes all of their uses, the constructional range lists the VCs that can potentially, but do not necessarily, occur with a given Change verb. Therefore, one must specify for each verb (in its MGVE) its actual distribution across the VCs in the constructional range.

The remainder of this section discusses theoretical aspects of the (Change) constructional range, particularly regarding the network structure capturing

Table 4.16 Constructional range of the English Change FCVC

#	VC (simplified)	VC (Full w/ default realization)	Example
1	C _ U	[C.NP _ U.NP]	She changed him.
2	C _ U into F	[C.NP _ U.NP into F.NP]	She changed him into a frog.
3	C _ U to F	[C.NP _ U.NP to F.NP]	She turned him to stone.
4	C _ U F.CP	[C.NP _ U.NP F.toCP]	She changed him to look like a frog.
5	C _ U from O into F	[C.NP _ U.NP from O.NP into F.NP]	She changed him from a person into a frog.
6	C _ U from O to F	[C.NP _ U.NP from O.NP to F.NP]	She changed him from a prince to a frog.
7	U _	[U.NP _]	He changed.
8	U _ into F	[U.NP _ into F.NP]	He changed into a frog.
9	U _ to F	[U.NP _ to F.NP]	He changed to stone.
10	U _ from O into F	[U.NP _ from O.NP into F.NP]	He changed from a prince into a frog.
11	U _ from O to F	[U.NP _ from O.NP to F.NP]	He changed from a prince to a frog.
12	C _ U F.result	[C.NP _ U.NP F.AdjP]	She turned him green.
13	U _ F.result	[U.NP _ F.AdjP]	He turned green.

interrelations between the VCs and how the constructional range relates to the meaning of all Change verbs and of individual Change verbs.

4.4.3.2 *Network structure of the (Change) constructional range*

The term "constructional range" is motivated by the relations between a given constructional range and the entire inventory of constructions and by the relations among individual VCs comprising a given constructional range. English, like any language, has an extremely high number of (valency) constructions, and verbs of a given class only select a subset of all possible VCs. The individual VCs in the constructional range are not selected randomly or haphazardly from the full set of VCs, but they are connected to one another both formally and semantically and can be viewed as forming a structured network that corresponds neatly to the semantics of the verbs (or FCVC) with which it occurs.

A total of 13 VCs comprise the constructional range of the Change FCVC.[40] As mentioned above, the individual VCs can be organized into various classes

40. A more comprehensive corpus analysis would likely reveal a wider set of VCs (though such VCs are likely to be highly infrequent as they do not in the present analysis of over 500 corpus

based on VC features that define (classes of) VCs. Such classes are useful for neatly summarizing the valency behavior of individual verbs and capturing interrelations among individual VCs. classes of VCs in the Change constructional range are summarized in Table 4.17 (adapted from Table 4.8 above).

Table 4.17 Categories of VCs according to valency features

VC parameter	VC feature	Valency constructions
Transitivity	Transitive/Causative	1–6, 12
	Intransitive/Inchoative	7–11, 13
State realization	No states	1, 7
	Only F	2–4, 8–9, 12–13
	Both O and F	5–6, 10–11
F realization	intoPP	3, 5, 8, 10
	toPP	4, 6, 9, 11
	to/so (that) CP	4
	Resultative	12–13

The first major distinction is that between transitive VCs and intransitive VCs. The second distinction separates VCs with no state arguments, VCs with only the F argument, and VCs with both O and F arguments. The final parameter distinguishes VCs based on the actual realization of the F argument, including classes for *into* prepositional F, *to* prepositional F, purposive clause F, and resultative F.

The identification of VC features and corresponding VC classes demonstrates that VCs used with Change verbs are not haphazardly chosen from the full set of VCs available to (English) verbs, but rather that they can be systematically organized. For instance, all the transitive VCs are related and all the intransitive VCs are related. At the same time, VCs realizing a Final_state in a *to* PP are related, irrespective of their transitivity, and thereby differ from other VCs with the same transitivity type but without the same F realization type. As such, it is possible to formulate structured (inheritance) networks to capture the relations between English Change VCs, as discussed in much previous research in Construction Grammar (Section 3.2). The proposed network structure relating the English Change VCs is shown in Figure 4.4.

The top level of this network includes the simple transitive and intransitive VCs without any state arguments. These are the most basic VCs, as they include no F (or O) argument and thus do not specify what kind of change is undergone.

sentences). In fact, in Section 4.6 below, an analysis of metamorphose reveals some new VCs which can be added to this preliminary formulation of the constructional range.

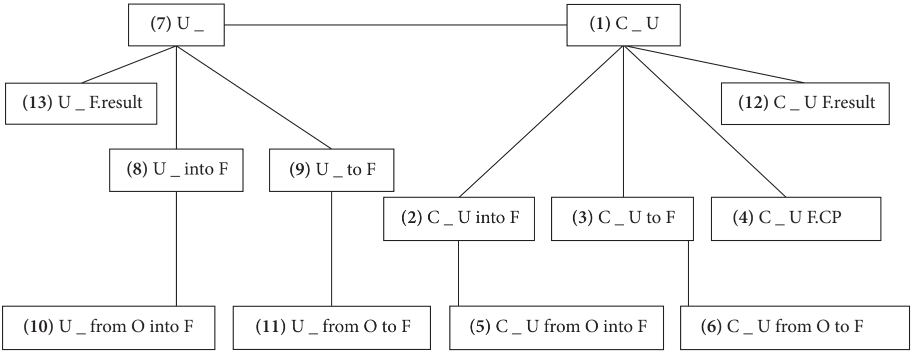


Figure 4.4 Network of Valency Constructions for English Change verbs

Following principles in usage-based and constructional approaches to syntax, I do not posit that one of the constructions is more basic than the other or that one is derived (i.e. through transformations) from the other. Depending on which criteria are used, it is possible to claim that each construction is more basic than the other. A strictly formal argument suggests that the intransitive construction is more basic, since it involves only two constituents (subject and verb) while the transitive VC requires an additional object. However, a usage-based argument suggests that the transitive VC is more basic, because the simple transitive VC is significantly more frequent than the simple intransitive VC across English Change verbs (with only *turn* appearing more frequently in intransitive patterns). Furthermore, the semantic difference between the two VCs (i.e. which role is instantiated as subject) suggests that the VCs are of different semantic types, as I will demonstrate in Chapter 6 by comparing the intransitive VCs of Change verbs against Theft verbs. I therefore treat the two constructions as equally basic constructions and graphically represent them at the same level of the constructional hierarchy.[41]

The next level contains VCs #2–4, #8–9, and #12–13, which inherit from the simple (in)transitive VCs at the top level and build on these formally, in that they include the F argument, and semantically, in that they specify the final state of U after the change. Six of the seven VCs at this level are intransitive-transitive pairs which realize F in formally distinct ways: prepositional F with *into* (#2, #8), prepositional F with *to* (#3, #9), and resultative F (#12, #13). The seventh VC (#4) at this level expresses the F in a purposive clause (headed by *so (that)* or *to*) and occurs only with transitive uses (in the analyzed data). Finally at the lowest level of the hierarchy are the four VCs which even further specify the change by

41. The hierarchy can thus be viewed as having three dimensions, with the third dimension separating transitive and intransitive uses, in addition to the vertical dimension capturing the number of arguments and the horizontal dimension capturing different formal realizations of the arguments.

overtly realizing the original state (O) of the U argument. The formal realization of this argument is a *from* PP. These constructions inherit from the transitive and intransitive VCs with *into* and *to* PPs, resulting in four distinct VCs. No lower-level VCs inherit from the VCs expressing F in a resultative phrase (#12–13) or purposive clause (#4).

While the above organization is the most explicit way to present the network of VCs available to Change verbs, there is a fair amount of redundancy. For instance, the VCs with prepositional F arguments must be listed twice, once each for transitive and intransitive patterns. Similarly, the bottom-level VCs with *from* O must be listed four times, once for intransitive with *into* F, once for intransitive with *to* F, etc. However, these VCs at the lowest level of the network are all very similar as they only add a single *from* PP to the higher-level constructions. It is thus possible to reduce the above figure to avoid redundancy by capturing the commonalities between the individual VCs, as shown in Figure 4.5.

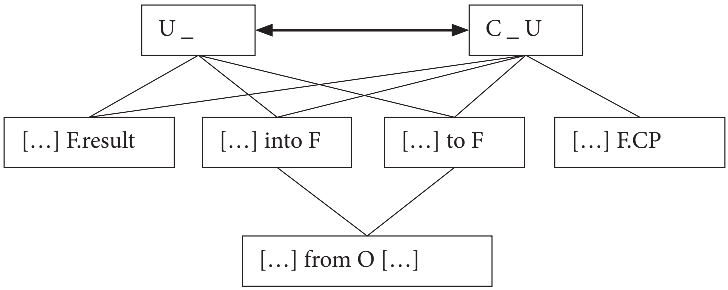


Figure 4.5 Non-redundant network of English Change VCs

At the top level, again, are the simple transitive [C _ U] and simple intransitive [U _] patterns. These are linked by a causative-inchoative inheritance link, represented by the bold arrow. The VC types at the second level all inherit information from the simple VCs at the top level, as represented by the lines connecting the individual boxes.[42] The inherited information (i.e. inherited portions of the lower-level VCs) is represented with […]; that is, the basic top-level VCs [C _ U] and [U _] fill in the unspecified […] shown in the nodes of the second-level VC types. The resultative F, *to F*, and *into* F VC types (the three left-most boxes on the second level) have two lines going up, one each to the basic transitive and intransitive VCs to capture that they occur in both variants, while the right-most purposive clause F VC type only has a line connecting it to the basic transitive VC, as no intransitive variants were attested in the corpus. Finally, the lowest-level of the non-redundant VC network in

42. It appears that the vertical inheritance relations connecting, e.g. the simple intransitive VC [U _] to the intransitive with *to* PP VC [U _ to F], correspond to the sub-part link described by Goldberg (1995: 78–79).

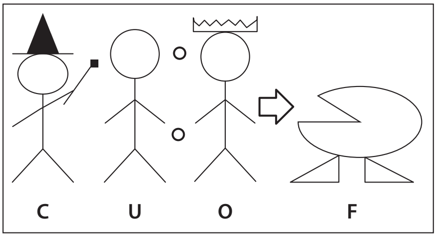
Figure 4.5 requires only a single node to capture the VCs that inherit from the second-level (transitive and intransitive) VC types realizing the F in *into* and *to* PPs, and adds to these an additional O argument in a *from* PP. Because the *from* O argument appears after the arguments in the basic (in)transitive VCs and before the *(in)to* F PP, the […] representing inherited information is written to both the left and the right of the *from* O phrase that further specifies the higher-level inherited features.

The non-redundant representation of the network of VCs for English Change verbs captures the VC features that distinguish and relate the individual VCs more neatly and simply than the fully spelled out network in Figure 4.4 above: only four nodes (i.e. VC types) are needed to represent seven specific VCs in the more explicit representation in Figure 4.4, and only a single node is needed to capture four specific VCs in Figure 4.4. These two representations of inheritance relations among the VCs of the English Change FCVC correspond to the distinction between full entry and impoverished entry representations of constructions, as discussed in Section 3.2.

4.4.3.3 *The meanings of valency constructions and the constructional range*

As a part of linguistic structure and knowledge, the constructional range should also be viewed as a type of linguistic construction with a meaning side in addition to its formal properties. In particular, its meaning corresponds closely to the shared meaning of the Change FCVC described above. For one, there is an obvious correspondence between the FEs defining the FCVC's semantics and those characterizing the VCs of its constructional range: all the VCs include (a subset of) the four core FEs in the shared semantics of the FCVC. Another aspect of Change verbs' meanings – particularly their vagueness and ability to describe changes at varying levels of specificity – is reflected in the constructional range. The VCs in the lower levels of the constructional range network reflect increasing degrees of specificity of the change scenario described, in that they overtly express the Final_state of the change (at the second level) or both the Original_state and the Final_state (at the bottom level). The horizontal dimension of the network also represents increasing specificity, as the transitive VCs on the right-hand side overtly express a Cause_change argument while the intransitive VCs on the left do not specify the cause of the change.

The levels of ambiguity and specificity can be represented in the constructional network by associating each VC with a semantic representation based on the meaning of the Change FCVC. Figure 4.6 shows a graphic representation of the fully specified VCs that overtly express all four Change FEs, namely [C _ U from O into F] and [C _ U from O to F]; these are found at the bottom right of the constructional network in Figure 4.4 above. (The representation here includes pictures based on our fairy tale example, but the pictures are merely shorthand labels for the infinite types of actual entities that can instantiate FEs of Change verbs.)

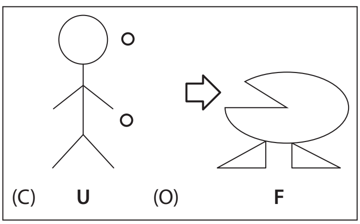


The witch changed the man from a prince (in)to a frog.

Figure 4.6 Meaning representation of VC #5 [C _ U from O into F] and #6 [C _ U from O to F]

Each figure within the representation is marked with the letter of the corresponding FE below it. The left half of the representation (to the left of the colon-type dots) represents the causation of the change event, with the left-most figure representing the C (*the witch*) and the second figure representing the U (*the man*). The two portions to the right of the colon-type dots represent the change undergone, with the third figure representing the O (*a prince*) and the right-most figure representing the F (*a frog*).

Figure 4.7 below shows a representation of the two intransitive VCs which only overtly express the U (as subject) and the F (in a PP), namely VC #8 [U _ into F] and #9 [U _ to F].

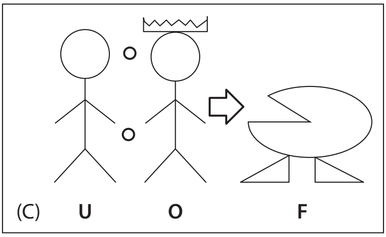


The man changed (in)to a frog.

Figure 4.7 Meaning representation of VC #8 [U _ into F] and #9 [U _ to F]

In contrast to the representation above for the more explicit Change scenario described by VCs in which all four FEs overtly expressed, the representation for these VCs include no pictures for the C or O arguments. Instead, it only includes the U argument and the F argument, while the FE labels for the unexpressed FEs (C and O) are given in parentheses (though they could be omitted altogether).

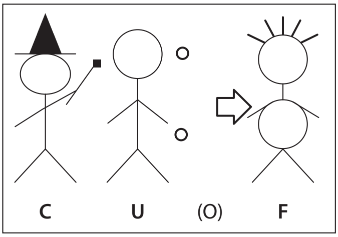
The U argument's picture could potentially follow the colon in the above figure, but it seems more suitable in this position, because in VCs #10 and #11 the U argument cooccurs with an O argument. The semantic representation of these VCs is given in Figure 4.8.



The man changed from a prince (in)to a frog.

Figure 4.8 Meaning representation of VC #10 [U _ from O into F] and #11 [U _ from O to F]

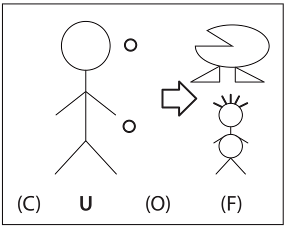
While the above representations account for prepositional realizations of F, a slightly different representation may be used to capture VCs with resultative clause F realizations and for VCs with no overt expression of F (or O). In the former case, the VC with the result-clause F realization, [C _ U F.CP] can be represented as in Figure 4.9.



The witch changed the man {to look/so that he looked} very different.

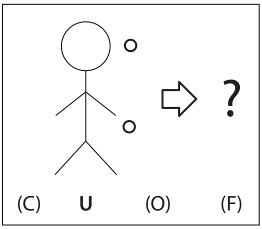
Figure 4.9 Meaning representation of VC #4 [C _ U F. CP]

The simple transitive VC (#1) and simple intransitive VC (#7) do not overtly express the F argument and thus allow for various interpretations of the resulting state of U after undergoing the change. The vagueness of such VCs can be represented in different ways, with either multiple pictures for possible F interpretations – as in Figure 4.10a or simply a question mark to represent the unknown nature of the result/final state of the change – as in Figure 4.10b. The figures below provide semantic representations only of the simple intransitive VC (#7), and the simple transitive VC (#1) would differ in that the C figure would be included to the left of the U.



The man changed.

a.



The man changed.

b.

Figure 4.10 Meaning representation of VC #7 [U _]

The semantic representations of Change VCs can be integrated into the network structure of the constructional range (Figure 4.4) as demonstrated in Figure 4.11 below. This figure only includes some VC representations for ease of viewing. Note how the VCs lower and farther right in the network include fuller pictures to capture the increasingly explicit and specific description of change events associated with VCs that overtly expressed a higher number of FEs.

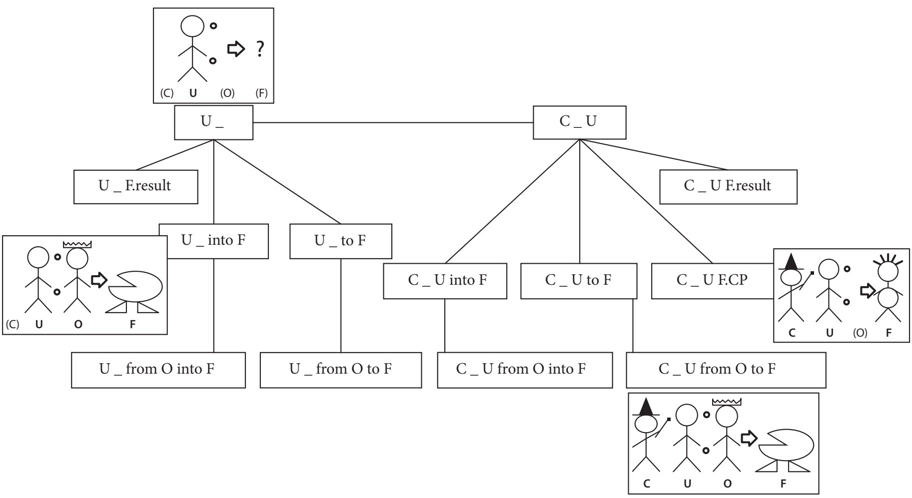


Figure 4.11 Change VC meanings in the constructional range

4.4.3.4 *Verb meanings and their distribution across the constructional range*

This integrated representation of the constructional range network and VC meanings also elucidates the relation between the meaning of individual verbs and their occurrence in certain (types of) VCs within the network. Here, I only briefly describe this relation with respect to the verbs *modify* and *transform*, as these verbs most clearly exemplify this relationship. *Modify* is associated with the meaning components "subtle change" and "purposive change" and was found in the valency analysis to occur exclusively in the simple transitive VC (#1, [C _ U]) and in the transitive VC with clausal F (#4, [C _ U F.CP]).

Figure 4.12 below demonstrates on the basis of *modify* how individual verbs' valency behavior can be represented using the constructional range network described above. Figure 4.12 includes the network of the constructional range of English Change at the top and a node signifying the verb *modify* at the bottom. The arrows going up from the *modify* node represent occurrences of the verb in individual VCs. The solid arrow represents a high frequency of cooccurrence (over 60% of analyzed examples) between a verb and VC: here, between the verb *modify* and the simple transitive VC (#1), which comprises 82% of its examples.[43] The dashed arrow represents a less strong frequency of cooccurrence between *modify* and VC #4, as these cooccurred at a rate of 12% in the corpus analysis.

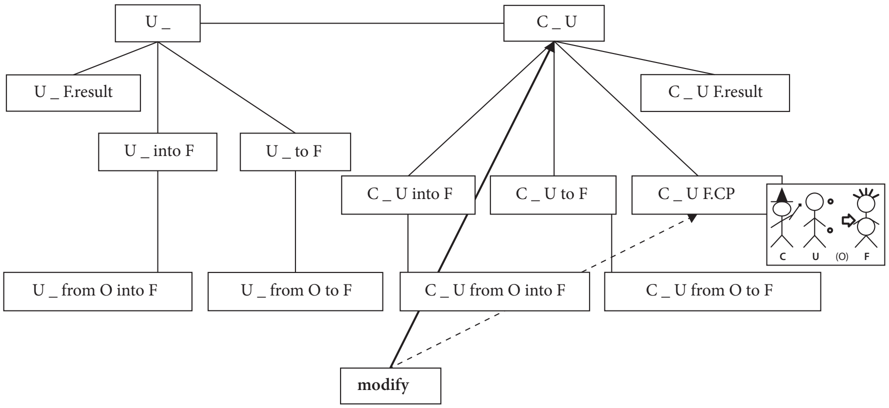


Figure 4.12 Distribution of *modify* in the constructional range of the Change FCVC

The low frequency of *modify* in VCs with prepositional F realizations follows from the verb's "subtle change" meaning component, because such VCs are used to describe change events in which the F becomes something different, as characteristic

43. Dux (2016: 250–262) further develops this representation (but without the images representing VC meaning) and demonstrates it on a wider range of English Change verbs. His approach assigns a specific range of cooccurrence frequency for each type of line to make more explicit the frequency with which a verb occurs in a given VC.

of "drastic" changes. In other words, if something is modified, it does not become something different, so it makes little sense to use VCs with *into* F or *to* F. (The same is true for *alter* which shares this meaning component.) Further, the "purposive change" meaning component of *modify* likely explains its relatively high frequency in the VC with the clausal F realization (#4), as this clause expresses the purpose of the change and/or what F does or is able to do after undergoing the change. This meaning component may also influence the (near) exclusive occurrence of *modify* in transitive VCs with a C argument, which modifies something for a given purpose.[44]

To contrast the valency (and meaning) of *modify* with that of *transform*, Figure 4.13 below shows the distribution of *transform* across the constructional range network. *Transform* was found to occur with higher frequency in transitive than intransitive VCs, and with relatively high frequency in VCs which overtly express (O and) F arguments. The former aspect of its valency behavior can be seen in that most of the lines – including solid lines representing higher frequency – point to the right side of the network, where transitive VCs are placed. The latter aspect of its behavior is seen in that several lines connect the verb to VCs in the middle vertical level of the network (i.e. VCs with overt F expression) and in the lowest vertical level (i.e. VCs expressing both O and F).

This is not unexpected given that *transform* is associated with the "drastic change" additional meaning component: specifically, if a change is drastic then the U argument is more likely to become something different due to the change, and a speaker is thus more likely to state explicitly what this entity becomes after the change and what it was prior to the change.

The above figures and discussion serve primarily to show how verb meanings and valency behavior interact with the range of VCs used to express a given semantic frame.[45] It appears that *modify* and *transform* are especially suitable for

44. An anonymous reviewer points out that the subject of *modify* appears to be closer to an 'Agent' than to the more general 'Cause' associated with other Change verbs, given its "purposive change" meaning component and its inability to occur in intransitive VCs (a feature shared by other causative verbs with a necessarily human subject). However, several examples of *modify* include non-sentient subjects. Thus, while the subject of modify may in fact more frequently be a human/sentient 'Agent' rather than 'Cause', specifying this as a rule in the verb's lexical entry would require exceptions be made for examples with non-sentient subjects, such as the following sentences found in COCA: *[…] a change in the timing of the sensitive period relative to JH secretion would also modify the critical threshold body size.*; *These variables together modify attitudes toward counseling.*

45. The approach can also be used to represent the connection between a grammatically relevant meaning component and the associated valency behavior shared by a (semantic-syntactic) subclass of verbs (cf. Dux 2016: 260–262).

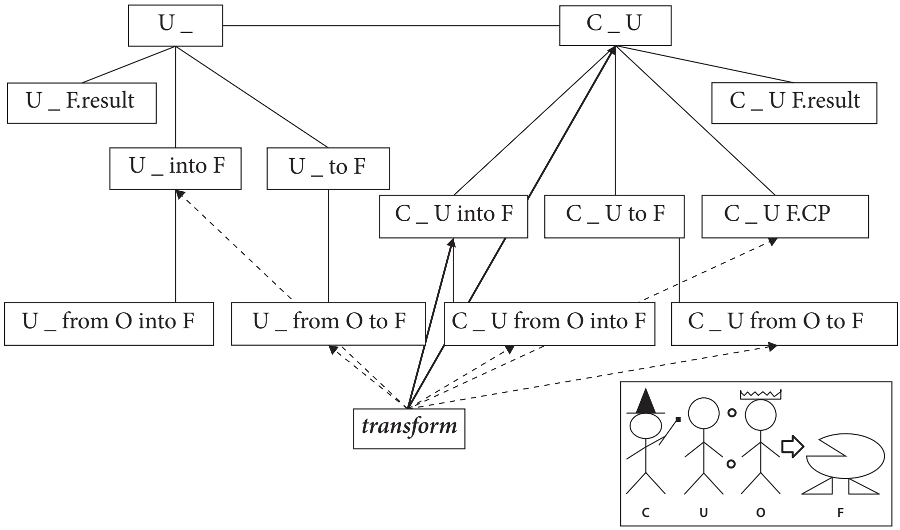


Figure 4.13 Distribution of *transform* in the constructional range of the Change FCVC

such representations, but it is not always the case that a verb's meaning (components) can be clearly connected to specific nodes or areas in a constructional range network. Future work must assess whether this method can be applied to other verbs and classes, not only in English but across multiple languages.

4.4.3.5 *Phrase-Types, allostructions, and the general semantics of change verbs*

While the preceding discussion offered a detailed account of the meaning of the constructional range and its individual VCs, and of the relation of verb valency to these meanings, I now briefly address formal properties of the Change VCs, their role in distinguishing the Change FCVC from other verb classes, and their theoretical status as "allostructions". When the Change VCs were first introduced in Section 4.3 above, the FEs occurring in each VC were associated with a default phrase type realization (e.g. NP for subject C or U and for object U; AdjP for resultative F). However, the corpus analysis revealed several instances in which FEs occur in non-default phrase type. Such deviations are amply discussed in Dux 2016 (469–474), so I here offer a simple snapshot of the degrees of phrase type differences, focusing on various realizations of prepositional F arguments and of the simple transitive VC, and then discuss how these data relate to previous accounts of allostructions.

The corpus data included some examples in which the prepositional F argument (in an *into* or a *to* PP) exhibited a non-default phrase type realization. The most frequent non-nominal realization of prepositional F is as an adjective, as shown in (4.8). Two other realizations of prepositional F reflect clause-like elements, with the first realizing F as a *wh*-clause (4.9) and the second as a direct quote (4.10).[46] The fourth non-default realization of prepositional F maintains the default noun phrase type but includes multiple PPs referring to multiple changes to the U entity, as in (4.11).

(4.8) **F as adjective within (in)to PP**
He […] changed the sport from shamateur *to professional*.
[C.NP.Subj + verb + U.NP.Obj + O.fromPPadj.Obl + F.toPPadj.Obl]

(4.9) **F as wh-CP within *(in)to* PP**
[…] you don't want to have anything turn *into where NASCAR does have to police things*
[U.whCP.Obj + verb + F.into-whCP.Obl]

(4.10) **F as Direct Quote within (*in)to* PP**
when cocktail-party chatter turned *to "Why haven't you ever married?"*
[U.whCP.Obj + verb + F.intoCP.Obl]

(4.11) **Multiple prepositional F arguments describing multiple changes**
The wheel turns girl *to woman to widow to girl*.
[C.NP.Sbj + verb + U.NP.Obj + F.toPP.Obl + F.toPP.Obl + F.toPP.Obl]

Formal phrase type variation can also be viewed from the perspective of the entire VC rather than within a specific FE (across multiple VCs). For example, the simple transitive VC (#1) was simplified to [C _ U] above and associated with a default realization in which both subject C and object U are NPs, as shown in the top row of Table 4.18 below.

Table 4.18 Specific realizations of simple transitive VC #1 [C _ U]

PT of C	PT of U	Example
NP	NP	*Barbed wire* would change everything,
VPing	NP	Did *growing the Ted Ray mustache* change your life?
for-to-CP	NP	[…] *for such a lease not to be taken* would significantly alter the balance […]
NP	RflxvNP	[…] you can transform *yourself* physically.
NP	whCP	[…] she refused to change *how she worked.*

46. This use of *turn* may potentially be interpreted as evoking a different frame than the Change frame(s) under analysis, i.e. a 'Direct Focus' frame (as in *turn one's attention to something*) or a 'Stages of Discussion' frame (as in *turn to the next item on the agenda*). However, in this context the verb turn can be replaced with *change* so it was included in the analysis. These uses of *turn* seem to demonstrate a borderline between two of the main senses of (the highly polysemous) *turn*, namely between changing and (the new perspective gained through) physical turning.

The corpus analysis, however, revealed at least four variations on the default type, i.e. in which either the C or U was not realized as a NP. These are given in the remaining rows of Table 4.18 and include cases in which subject C appears as a gerundial VP (VPing) or as an infinitival clause of the type *for N to V*, and cases in which the U argument appears as a reflexive pronoun (RflxvNP) or or as a *wh*-clause. Based on these examples alone, the simplified VC employed in the preceding analysis (VC #1 [C _ U]) corresponds to at least five VCs with phrase-type specifications. This number would likely increase greatly if more corpus data were to be analyzed, because other non-default phrase types are plausible (e.g., *that* clauses) and combinations of non-default C and non-default U can potentially be combined (e.g. *Learning changed how I live*).[47]

As such, the simpler set of VCs employed in the preceding sections (without detailed phrase type specification) are actually abstractions over sets of more specific constructions that differ only slightly, particularly with respect to the exact phrase types that instantiate the listed FEs. The use of these simpler VCs, in my view, is not problematic for a comparison focusing on verbs evoking the same semantic frame (in this case, the Change frame), because subtle phrase type differences do not significantly affect the VCs' construal of the Change frame per se but only of the participants (FEs) of specific Change scenarios.[48]

However, phrase type information appears useful in distinguishing classes of verbs from one another. The keen linguist will likely have observed the striking similarity between the VCs occurring with Change verbs (i.e. the constructional range of the Change FCVC) and those found with two other large classes of verbs, namely motion (or change-of-location) verbs such as *drive* or *walk* and change-of-state verbs such as *break* or *grow*. However, VCs used with motion verbs are much less flexible with respect to the formal realization of their arguments. For instance, motion verbs cannot occur with *wh*- clause subjects and occur only in very limited contexts with verb gerund subjects, as shown in (4.12).[49]

47. For a description of formal phrase type variation for other Change FEs and a wider range of Change VCs, see Dux (2016: 469–474).

48. Of course, the preceding investigation of Change verb valency would be more accurate and fine-grained if VCs specifying precise phrase types were employed. However, comparing the individual verbs' valency behavior according to the simplified VCs (without phrase type specifications) revealed significant verb-specific variation, such that using the richer VC types would have significantly increased the number of VCs proposed and decreased the clarity of the verb-to-verb valency comparison.

49. The close relation between the change-of-state and change-of-location domains is well-documented and cross-linguistically attested (cf. Goldberg 1995: 81–87).

(4.12) a. Pat drove the car.
b. *What Pat did drove the car.
c. *That Pat steered drove the car.
d. *Turning the wheel drove the car.
e. ?? Stepping on the gas drove the car.

Change-of-state verbs are also less flexible than Change verbs in the formal realization of arguments. However, they appear to be somewhat more flexible than motion verbs, in that specific types of actions realized as gerundial or clausal subject (or object) arguments may be permissible, as long as the actions correspond to the verb's meaning. This is shown in (4.13) which provides a crude assessment (based on invented examples) of the formal variation in the agent/subject argument of the change-of-state verb *break*.

(4.13) a. Pat broke the vase.
b. Pat dropping it on the floor broke the vase
c. ?Dropping it on the floor broke the vase.
d. ?What Pat did broke the vase.
e. *That Pat dropped it broke the vase.

In contrast, the semantically general Change verbs investigated here are not associated with specific types of changes, and their associated participants (FEs) are not limited to certain types of entities (i.e. they can be abstract, animate, states-of-affairs, etc.). As such, the arguments occurring with (general) Change verbs exhibit corresponding syntactic flexibility.

Phenomena similar to the phrase type variation of Change FEs have been increasingly discussed, particularly in the framework of Construction Grammar under the rubric of "allostructions" (see Section 3.2). Cappelle (2006) coined the term in his analysis of English particle verbs to account for the formal difference between constructions realizing the particle directly after the verb (before the direct object) and those with the particle separated from the verb by the direct object. In this context, Cappelle argues that there is no semantic difference between the two allostructions and they are sub-constructions (or "constructemes") of a more general, underspecified verb-particle construction. In a similar fashion, Perek (2015: Chapter 6) uses the term allostruction to distinguish construction pairs akin to the alternation variants of Levin (1993). Perek posits two allostructions for the dative alternation to distinguish those with dative recipients from those with prepositional recipients, as well as two for the locative alternation to distinguish location-as-object (*load wagon with hay*) and theme-as-object (*load hay onto wagon*) variants. He argues that the dative allostructions exhibit no difference in semantics (but rather in pragmatics and information structure) while the locative allostructions exhibit a subtle and abstract semantic difference.

As noted in Section 3.3, Herbst (2014) posits yet another type of allostruction, one which is more similar in nature to the phrase type variation in VCs discussed here. In contrasting the Argument Structure Constructions (ASCs) of Goldberg (1995, 2006) and the valency constructions of Valency Grammar (particularly the VDE; Herbst et al. 2004), Herbst points out that the form side of ASCs are defined according to abstract grammatical features (e.g. subject, oblique) rather than more concrete formal features (i.e. phrase types such as NP or Adj) used to define the formal side of "valency patterns" in Valency Grammar. He demonstrates that the ASC approach cannot adequately account for semantic differences between sentences with identical constellations of grammatical functions. For instance, the sentences in (4.14) exhibit allostructions, in that they include the same verb and participants/semantic roles (and thus evoke the same semantic frame) but differ in the formal realization of one participant, namely the "Predicative" role, which is a noun in (4.14a) but an adjective in (4.14b). Herbst contrasts such allostructions from sentence pairs such as that in (4.15), which exhibit the same grammatical and formal structure, but differ in their (frame) semantics.

(4.14) a. *She considered him a fool.*
b. *She considered him crazy.*

(4.15) a. *She considered him a dog.*
b. *She gave him a dog.*

From the allostruction perspective, only (4.15a) can be reformulated using a wider range of phrase types to realize the "Predicative" role (of a semantic frame such as Considering), whereas (4.15b) does not readily allow for other formal realizations of the final (nominal) argument as it evokes the Giving frame whose "Theme" argument is semantically restricted to things that can be given, thus precluding the occurrence of adjectival arguments such as those found with *consider*. These phenomena largely parallel the present findings, in which VCs occurring with Change verbs (i.e. evoking the Change frame) appear similar to VCs occurring with change-of-state verbs and motion verbs when one defines VCs only according to grammatical categories, but reveal systematic and semantically motivated differences when one takes into account formal (phrase type) variation among VCs.

The various perspectives on allostructions, as well as the phrase type variation in Change VCs described above, suggest that there are different categories of allostructions, arising from whether the individual variants (i.e. "constructemes") differ with respect to grammatical functions (GF), formal phrase types (PT), word order (WO), and/or semantic interpretation (Mng). The different formulations of allostructions are contrasted in Table 4.19. The English particle verb allostructions of Cappelle (2006) differ only in the relative ordering of elements with the same form (in this case, the exact same word) and grammatical functions with no semantic difference. The allostructions described by Perek (2015), which underlie Levin's (1993) alternation variants, have different formal realizations and may or may not differ semantically, depending on the specific higher-level construction (e.g. dative vs. locative). Finally, the valency patterns of Valency Grammar, as well as the phrase type variations in the present analysis's VCs, exhibit the same constellations of grammatical functions and semantic roles (i.e. FEs) but vary in their formal realization. When analyzing verbs within a given (semantic) class, these types of allostructions do not differ semantically with respect to the general frame semantics of the construction (i.e. the scenario defined by the interrelations among participants/arguments) but they differ with respect to the semantic type of the individual participants. However, in cross-class analyses of a given constellation of grammatical functions, semantic differences can be seen in the range of formal realizations possible for each argument, as with the difference between the formally restricted Motion VCs and the more flexible Change VCs.

Table 4.19 Various interpretations of "allostructions"

<table>
<tr><th></th><th>GF</th><th>PT</th><th>WO</th><th>Mng</th></tr>
<tr><td>Particle Verbs (Cappelle 2006)</td><td>same</td><td>same</td><td>different</td><td>Same</td></tr>
<tr><td>Variants of Locative and Dative Alternation (Perek 2015)</td><td>different</td><td>different</td><td>different</td><td>Depends on construction:
–Different meaning for locative constructions
–Same meaning for dative constructions</td></tr>
<tr><td>Valency Patterns (Herbst 2014)</td><td rowspan="2">same</td><td rowspan="2">different</td><td rowspan="2">same</td><td rowspan="2">Within Class:
Same with respect to general frame semantics
Different with respect to individual arguments
Cross-class analysis:
Verbs of different (semantic) classes exhibit different range of possible PTs, depending on (semantic) types of arguments.</td></tr>
<tr><td>Present Analysis (e.g. Change vs. Motion VCs)</td></tr>
</table>

In summary, this comparison of the various formulations of allostructions in the CxG literature reveals that constructions can be deemed similar or different based on a range of formal, grammatical, and semantic parameters, and the specific parameters and degrees of similarity depend on the type of phenomena and level of granularity of a given analysis.

4.4.3.6 *Summary*

The preceding discussion of the syntax of the English Change FCVC, or its constructional range, advances previous work on verb (class) syntax in that it accounts for the full range of valency behavior of a verb class and its individual members through empirical corpus analysis. For one, it overcomes the problems with the list of alternation variants used to define Levin's (1993) verb classes (see Section 2.4), namely that her alternation variants are presented in pairs (on the unfounded assumption that one variant is more basic than the other), that the alternations are selected unsystematically, and that claims about verbs' behavior with respect to alternations are not based on empirical data. While FrameNet's syntactic data relies on annotated corpus data, valency is presented only on a LU-specific (i.e. verb-specific) basis, thus precluding a syntactic description of entire frames (i.e. verb classes) and comparisons of valency behavior among semantically related verbs (see Section 3.1). Not only does the present approach rely on corpus data and investigate valency from both a verb-specific and class-specific perspective, but it explicitly shows how the VCs comprising a class's constructional range relate to one another to form a network-like structure, as well as how the entire constructional range and its individual VCs relate to the (frame) semantics defining the class and to the meanings and valency behavior of individual verbs.

With respect to the question regarding the syntactic uniformity of verbs within a class, two conclusions can be drawn depending on one's perspective. The syntactic analysis in Section 4.3 showed that all instances of Change verbs occur in a limited set of VCs available in the (English) language, specifically the 13 VCs comprising the class's constructional range. As such, it appears that generalizations regarding the syntactic (valency) behavior of verb classes are extremely useful in predicting a verb's valency behavior based on its FCVC membership, specifically in that any verb evoking a given semantic frame will occur in a given set of VCs. As such, the positing of a constructional range for the FCVC's aligns well with traditional approaches assuming syntactic uniformity within verb classes (i.e., those discussed in Chapter 2), and it calls into question recent research emphasizing the unpredictive nature of verb classes, particularly as demonstrated by Faulhaber (2011). These generalizations of a class's syntactic behavior can also be integrated into FrameNet, which currently does not make any claims about the (potential) argument realization patterns for LUs of a given frame. Specifically, each FrameNet frame could include a list (such as that in Table 4.16 above) of the VCs that are attested for any verb in the frame. This is currently done for individual LUs in FrameNet (albeit in a rather convoluted and inconsistent manner), but not for the entire range of (verbal) LUs for a given frame.

However, when one compares the specific valency distribution of individual Change verbs, a different picture emerges. Specifically, the corpus analysis described in Section 4.3 revealed that the individual verbs vary significantly with respect to the exact number and types of VCs (within the constructional range) in which they occur and to their frequency with each of these VCs. This idiosyncratic behavior is well documented in research on Construction Grammar (Boas 2003, 2008a) and to a greater extent in Valency Grammar (Herbst et al. 2004; Welke 2011; Faulhaber 2011). To account for these empirical findings of idiosyncrasy in valency behavior for individual verbs in a verb class, the FCVC must be complemented with item-specific entries that specify for each verb their distribution across the delimited set of VCs in the constructional range. Such entries are formulated for each analyzed verb in the following section.

4.5 Multi-grained verb entries and (syntactic-semantic) subclasses

4.5.1 Contents of multi-grained verb entries

While the FCVC described above accounts for semantic and valency properties that are shared among verbs of a given class, this section introduces *multi-grained verb entries* (MGVEs).

As the name suggests, MGVEs are entries that include information at varying levels of granularity, ranging from the properties shared among all members of the FCVC (as described above) to idiosyncratic, verb-specific properties that do not lend themselves to broader generalizations (as found e.g. by Faulhaber 2011). Furthermore, the MGVE includes both syntactic and semantic information (as well as a place for other types of information, such as collocational and pragmatic features, which are not discussed in detail here). Table 4.20 outlines the various information types of the MGVE and their respective levels of granularity.

The first portion of the MGVE lists the FCVC to which the verb belongs. Here, each verb is associated with the Change FCVC, which captures that individual Change verbs inherit the shared meaning of the FCVC (Figure 4.3) and their argument realization is delimited by the set of VCs defined in the FCVC's constructional range (Table 4.16). It should be noted that this highest level information corresponds to the level of analysis undertaken here but can be scaled up to larger verb classes; future analyses may reveal that coarser-grained classes of verbs (e.g. change-of-state verbs, Transfer verbs, Communication verbs) may be useful in predicting verb (class) behavior and exploring the syntax-semantics interface.

The second portion of the MGVE states the (syntactic-semantic) subclass of the verb, described above as sets of two or more verbs within a FCVC which share both (at least) one additional meaning component and (at least) one valency feature. Subclasses thus capture very fine-grained grammatically relevant meaning

Table 4.20 Types of information in multi-grained verb entries (MGVEs)

MGVE category	Granularity level	Information
FCVC	Class-specific	–shared meaning of FCVC –constructional range of FCVC
Subclass	Subclass-specific	–additional grammatically relevant meaning component –valency behavior determined by grammatically relevant meaning component
Additional semantics	Verb-specific	additional meaning components (not captured by subclass)
Additional syntax	Verb-specific	valency distribution (not captured by subclass)
Other	Verb-specific	additional pragmatic, collocational, and usage-based properties

components and also serve to reduce redundancies in the verb-specific portion of the MGVE. Not all verbs include subclass specifications. Subclasses are discussed at the end of this section, after such shared meaning and valency properties are identified in the preliminary MGVEs.

The remaining portions of the MGVE capture idiosyncratic, verb-specific properties that are not accounted for in its "FCVC" or "Subclass" specifications. "Additional Semantics" specifies the exact construal of and/or restrictions on the shared meaning inherited from the FCVC as accounted for by the additional meaning components identified in the dictionary-based analysis of Section 4.2. "Additional Syntax" specifies the verb's precise valency distribution (based on the corpus analysis in Section 4.3) and offers a brief prose valency description. This category thus captures verb-specific aspects of valency behavior, specifying exactly which (types of) VCs the verb can occur in and which VCs are most frequent for the verb (assuming that the analyzed corpus data reflect normal usage). The "Additional Syntax" category also lists any other syntactic features that set apart individual verbs that are not clearly captured in terms of VCs (e.g. that *transform* is relatively frequent with reflexive object U arguments). The "Other" category specifies other information necessary for proper use of the verb in question but not directly related to its frame semantics or argument realization behavior, including statistically relevant collocations (e.g. *alter clothing*), domain-specific uses (e.g. *modify* in linguistics), and other pragmatic features (e.g. formality, genre-specificity) that set apart individual verbs of a class.[50] This portion is only cursorily presented below

50. Some of these features could also be listed in the "Additional Meaning" category, but I have chosen to reserve this category for (additional) meaning components relating directly to shared meaning of the FCVC, rather than more pragmatic or convention-based features.

but not addressed in detail, despite its importance in formulating entries that capture a verb's full range of behavior.

4.5.2 MGVEs for English Change verbs

I now formulate MGVEs for the analyzed verbs. These preliminary formulations of the MGVE do not include subclass specifications, as those are identified based on shared features across individual verbs' MGVEs. As shown below, adding a subclass specification reduces the amount of verb-specific information in the verbs' MGVEs (specifically in its "Additional Semantics" and "Additional Syntax" categories).

Alter: The MGVE for *alter* is presented in Table 4.21.

Table 4.21 MGVE for *alter*

Verb	***Alter***
FCVC	CHANGE
Subclass	see below
Add'l Sem.	–refers to changes that are subtle, minor, non-categorical
Add'l Synt.	Appears in: 90% #1 [C _ U] 8% #7 [U _] 3% #4 [C _ U F.CP] → Strong preference for transitive VCs → Rarely (if at all) appears with prepositional state arguments
Other	(a) Special senses include that of tailoring, or changing the size or fit of clothing articles, and, less frequently, that of changing one's gender. (b) *Alter* may appear with adverbs such as *drastically* or *dramatically*, in which case it is refers to changes that are more substantial than prototypical "subtle" changes.

As mentioned above, the FCVC level specifies that *alter* inherits information from the Change FCVC. That is, its uses adhere semantically to the shared meaning of the Change FCVC (Figure 4.3), and its valency behavior is delimited by the constructional range of the Change FCVC (Table 4.16). The subclass category is left unspecified at present but discussed in more detail below. The "Additional Meaning" category specifies that *alter* bears the "subtle change" (additional) meaning component. The "Additional Syntax" category states that *alter* appears most frequently in the simple transitive VC [C _ U] (#1) and less frequently in #7 [U _] and #4 [C _ U F.CP]. It also summarizes this behavior by stating that it is much more frequent in transitive than intransitive VCs and that it rarely occurs in VCs with prepositional state arguments. The “Other” category states that it is a slightly formal verb and lists domain-specific senses.

Modify: Table 4.22 shows the MGVE for *modify*.

Table 4.22 MGVE for *modify*

Verb	***Modify***
FCVC	CHANGE
Subclass	see below
Add’l Sem.	–refers to changes that are subtle, minor, non-categorical –refers to changes undertaken for a specific purpose, such as to improve something or make it more acceptable, less extreme, etc.
Add’l Synt.	Appears in: 82% #1 [C _ U] 18% #4 [C _ U F.CP] → Only appears in transitive VCs → Infelicitous in VCs with prepositional F arguments → Frequent in VCs expressing result of change (F) in a purposive clause headed by *so, so that,* or *to* (most frequent among all Change verbs in this VC)
Other	(a) Special sense includes grammatical changes, as in adjectives modifying nouns.

The first category of *modify*’s MGVE states that it is a member of the Change FCVC (this is the case with all verbs discussed here and will no longer be mentioned in the text). Again, the subclass specification of *modify* is discussed in the following sub-section. The “Additional Meaning” category specifies that *modify* has the “subtle change” and “purposive change” MCs. The “Additional Syntax” category, in addition to listing the precise valency distribution, states that *modify* exclusively occurs in transitive VCs, it rarely occurs in VCs with prepositional F arguments, and it is relatively frequent in VCs with dependent clauses headed by *so (that)* or *to* that express the result of the change. Finally, the “Other” category specifies that *modify* has a domain-specific sense in the field of linguistics in which it refers to grammatical modifications.

Transform: Table 4.23 below shows the MGVE for *transform*. The “Subclass” category for *transform* is left unspecified here, but a potential subclass of “Drastic Change” verbs will be tested in the following sub-section. The “Additional Meaning” category specifies that *transform* refers to “drastic changes” and “positive changes”. The “Additional Syntax” category states the valency distribution of *transform* and summarizes its valency behavior, namely that it has a strong preference for transitive over intransitive VCs and that it occurs relatively frequently with reflexive objects and in VCs with both O and F arguments. Finally, the “Other”

Table 4.23 MGVE for *transform*

Verb	*Transform*
FCVC	CHANGE
Subclass	see below
Add'l Sem.	–refers to drastic (or categorical) changes –refers to changes deemed positive in some way (optional)
Add'l Synt.	Appears in: 48% #1 [C _ U] 35% #2 [C _ U into F] 5% #5 [C _ U from O into F] 5% #8 [U _ into F] 4% #6 [C _ U from O to F] 3% #7 [U _] 1% #4 [C _ U F.CP] 1% #11 [U _ from O to F] → Strong preference for transitive VCs (91% transitive, 9% intransitive) → Most frequent among English Change verbs with reflexive object (10%) → Most frequent among English Change verbs in VCs realizing both O and F (10%)
Other	(a) Special senses include changes in the fields of electricity, mathematics, linguistics, and biology.

category mentions domain-specific senses of *transform* in the fields of electricity, mathematics, biology, and linguistics.

Change: The MGVE for *change* is given in Table 4.24. Unlike the above MGVEs, the subclass category of *change*'s MGVE reads "*none*", which means that Change is not associated with any syntactic-semantic subclasses. (A justification of this is given below.) The "Additional Meaning" category also reads "*none*", as *change* was found to exhibit no MCs that further specify the shred meaning identified for the Change FCVC. The "Additional Syntax" category again lists the valency distribution of *change* and notes that it has a strong preference to occur in patterns that do not include State arguments (including prepositional and clausal F types) and that it is equally frequent in transitive and intransitive VCs. Finally, the "Other" category lists several, though certainly not all, collocations and domain-specific senses of *change*. [51]

51. In certain contexts, collocations, and morphological forms (e.g. *a-changing;* adjectival *changed* as in '*a changed man*') the verb *change* (and likely other Change verbs) may be associated with more drastic or subtle changes, as well as with more specific meaning components that cannot be attributed to all uses of the verb.

Table 4.24 MGVE for *change*

Verb	*Change*
FCVC	CHANGE
Subclass	none
Add'l Sem.	none
Add'l Synt.	Appears in: 55% #1 [C _ U] 42% #7 [U _] 2% #6 [C _ U from O to F] 1% #3 [C _ U to F] 1% #8 [U _ into F] → Strong preference (> 90%) for VCs without State arguments → Equally frequent in transitive and intransitive VCs
Other	(a) *Change* is associated with many collocations and scene-specific senses, e.g., leaves (color), moon (cycle), voice (tone, e.g. lowering), seasons, mind.[a] (b) *Change* also evokes several other semantic frames, particularly those of Exchanging and Replacing: *change clothes, bed, diapers, means of transportation, change sides, gears*, etc.

a. Many of these collocations do not clearly exhibit Change semantics, but rather evoke frames such as Replacing or Exchanging. For instance, when one changes their clothes, the original clothes do not undergo a change, but are replaced by a new set of clothes. Similarly, when one changes sides (of an argument, team, etc.), the sides do not change but one changes their membership from one side to the other. As such, it is unclear to what degree these collocations should be included in the entry for *change* in this specific frame, rather than listing them in entries for other lexical units (i.e. senses) of the lexeme *change*. The same holds for *turn*.

Turn: The MGVE for *turn* is shown in Table 4.25 below. The MGVE for *turn*, like that of *change*, specifies it is not in a subclass and does not exhibit additional meaning components. The "Additional Syntax" category specifies that *turn* occurs exclusively in patterns which realize the F argument in either a PP or as a resultative phrase. Furthermore, it states that *turn* is the only English Change verb that appears in resultative VCs. Specifically, *turn* appears in the resultative constructions. Finally, the "Other" category notes that *turn* has several specific senses and collocations, listing several of these. It also mentions that *turn* is highly polysemous and notes some of its most frequently occurring non-Change senses.

Table 4.25 MGVE for *turn*

Verb	***Turn***
FCVC	CHANGE
Subclass	none
Add'l Sem.	none
Add'l Synt.	Appears in: 38% #2 [C _ U into F] 24% #8 [U _ into F] 23% #13 [U _ F.result] 5% #9 [U _ to F] 3% #11 [U _ from O to F] 3% #12 [C _ U F.result] 2% #3 [C _ U to F] 1% #5 [C _ U from O into F] → Exclusively in VCs with F realized in PP or resultative phrase → Only English Change verb to appear in resultative VCs
Other	(a) Many frequent collocations and scene-specific senses in Change sense, e.g. turn [number] (age), food spoiling (intransitive), leaf color (intransitive), face color, etc. (b) Highly polysemous, with many non-Change senses, e.g. rotational motion, seek advice.

4.5.3 Implications of the MGVE approach

The precise verb-specific information listed by the MGVE captures the results of item-specific analyses provided by Valency Grammar, as opposed to the broader generalizations sought by generative and projectionist work on the syntax-semantics interface (e.g. Pinker 1989; Jackendoff 1990; Rappaport Hovav and Levin 1998). MGVEs are also an attempt to state more systematically the information in the LU-specific lexical entries in FrameNet. Currently, FrameNet entries are associated with only an informal prose definition and a limited set of corpus sentences documenting valency behavior. As opposed to FrameNet lexical entries, the MGVE specifies any additional meaning components systematically with reference to the semantic frame and summarizes each verb's valency behavior with reference to its frequency in each type of VC. The combination of FCVCs and MGVE also roughly corresponds to Croft's (2003) distinction between verb-specific constructions, verb-class-specific constructions, and more general argument structure constructions.[52]

52. The current analysis, however, differs from Croft (2003), as his work primarily analyzed the ditransitive construction and its various interpretations across verbs of relatively distinct

4.5.4 Syntactic-semantic subclasses and refining MGVEs

Having defined MGVEs for each of the verbs under analysis, I now identify (syntactic-semantic) subclasses among subsets of the analyzed verbs, as well as grammatically relevant meaning components that influence valency behavior. As mentioned above, subclasses are posited when groups of verbs in the same FCVC share one or more additional meaning component(s) and exhibit significant similarities in their valency behavior.[53]

The analyses above suggest that the "subtle change" meaning component may be grammatically relevant and the basis for a subclass. The meaning analysis in Section 4.2 revealed that both *alter* and *modify* bear the "subtle change" meaning component. While the shared meaning component alone does not justify the formulation of a subclass, correspondences in valency behavior suggest that these two verbs form a coherent subclass of English Change verbs. Specifically, both verbs appear almost exclusively in transitive VCs. 73 of the 79 (> 92%) *alter* examples exhibit transitive VCs, while all 95 of the *modify* examples are transitive. Furthermore, both verbs seem to be infelicitous in VCs with prepositional state arguments: none of the analyzed examples of either verb appear with such arguments.

These correspondences allow us to posit a subclass of Subtle Change verbs, as defined in Table 4.26. Subclasses may also be represented as constructions with entries defining both the meaning ("Semantics") and formal/valency properties ("Syntax") of the subclass. In the entry for the Subtle Change subclass, the top row (labeled "Verbs") lists the verbs within the subclass, namely *alter* and *modify*.[54] The next row describes the "Semantics" of the subclass, specifying that these verbs refer to subtle and/or non-categorical changes. The final row describes the "Syntax" of the subclass, i.e. the valency features shared by its member verbs.

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semantic frames. In contrast, I analyze the full range of VCs that occur across a single, relatively semantically homogeneous class of verbs.

53. Ideally, future work should seek independent verification of the proposed subclasses (as well as the classes themselves, individual meaning components, etc.). For instance, one could conduct an experiment in which native speakers sort verbs according to their perceived similarity. If non-linguist language users come up with similar groupings as the sub-classes posited here (on the basis of corpus analysis and linguistic-theoretical concepts), this would provide evidence for the cognitive reality of such classes.

54. The Subtle Change subclass may also contain other Change verbs not analyzed here, e.g. *adjust, amend,* or *emend.*

Table 4.26 Subtle Change verb subclass

Subclass	**Subtle change**
Verbs	*alter, modify*
Semantics	Refer to subtle and non-categorical changes
Syntax	Most frequent in: #1 [C _ U] May also appear in: #4 [C _ U F.CP] Not felicitous in patterns with prepositional or resultative state arguments

Integrating the Subtle Change subclass specification into the (preliminary) MGVEs for *alter* and *modify* allows for a simplification of their MGVEs, as it is no longer necessary to list the properties associated with the subclass separately in the verb-specific "Additional Meaning" and "Additional Syntax" categories. Tables 4.27 and 4.28 show the revised MGVEs for *alter* and *modify*, respectively, which now include the subclass specification and do not list the subclass's features at the verb-specific level.

The revised MGVE for *alter* now requires no verb-specific information in the "Additional Meaning" category, and its "Additional Syntax" category notes only that it may appear (with low frequency) in the simple intransitive VC [U _] (#7), while the rest of the verb-specific information in its preliminary MGVE (Table 4.21 above) is efficiently captured by the specification of the verb's FCVC (CHANGE) and subclass membership (Subtle Change).

Table 4.27 Revised MGVE for *alter* with subclass specification

Verb	***Alter***
FCVC	CHANGE
Subclass	Subtle Change
Additional Meaning	none
Additional Syntax	May appear in: #7 [U _] (with low frequency)
Other	[see Table 4.21 above]

Table 4.28 Revised MGVE for *modify* with subclass specification

Verb	***Modify***
FCVC	CHANGE
Subclass	Subtle Change
Additional Meaning	–change in order to improve, make more acceptable, less extreme –change for a specific purpose
Additional Syntax	Relatively frequent in: #4 [C _ U F.CP]
Other	[see Table 4.22 above]

The MGVE for *modify* includes slightly more verb-specific information than that of *alter*. Its "Additional Semantics" category no longer lists the "subtle change" meaning component but retains the "purposive change" meaning component, as this is not associated with a subclass. Its "Additional Syntax" category must still specify that *modify* appears relatively frequently with purposive clauses headed by *so (that)* or *to* expressing the purpose or result of the change. Such minor differences among verbs of the same (sub-)class are expected. They are captured in the "Additional Semantics" and "Additional Syntax" portions of the verbs' lexical entries, and they further support the notion that no verbs are synonymous or, in other terms, that every verb forms its own class (Hasegawa et al. 2011: 107).

While explanations of correspondences between verb meaning and argument structure are not always feasible or necessary, it is worth noting the logic behind the correlation of the "subtle change" meaning component and the lack of prepositional state arguments. Specifically, if something undergoes a subtle change, it usually does not become something different. As such, it would be unusual to say that something changed "into something else", when only a single part, characteristic, or attribute of that thing has changed. The correlation between the subtle change meaning component and the aversion to intransitive patterns, on the other hand, lacks such a clear "explanation" (i.e. things may undergo subtle changes of their own accord without a causing agent, so it seems plausible that agent-less utterances would be just as frequent as those without C).

Given the existence of a Subtle Change subclass, it is worth considering whether a corresponding Drastic Change subclass also exists. While *transform* is the only verb analyzed thus far with the "drastic change" meaning component, the verb *metamorphose* is also a potential candidate for membership in this subclass as it is also associated with drastic, complete, or radical changes. In the following section, I present a corpus analysis of *metamorphose* in order to determine whether its valency behavior is similar enough to that of *transform*, in which case there is evidence for a subclass of Drastic Change verbs.

For the present, I introduce a proposal for the Drastic Change subclass whose syntactic side reflects the valency behavior discussed above for *transform*. Table 4.29 defines the characteristics of the potential Drastic Change subclass, which will be refined as needed, or entirely rejected, based on the analysis of *metamorphose* undertaken in the following section.

With respect to the other analyzed verbs, *change* and *turn*, one may wish to posit a subclass which includes these two verbs on the basis of their shared meaning: both verbs are general in that they have no additional MCs and can refer to virtually any type of change. However, the syntactic data does not allow for the positing of a General Change subclass, as these verbs exhibit dramatic differences in their valency behavior. For one, *change* rarely appears in VCs with F arguments,

Table 4.29 (Potential) Drastic Change verb subclass

Subclass	**Drastic Change**
Verbs	*transform*, (*metamorphose*?)
Semantics	Refer to drastic, complete changes
Syntax	–Strong preference for transitive VCs –Relatively high frequency with reflexive objects –Relatively high frequency in VCs with both O and F arguments

while every analyzed *turn* example expresses this argument. Furthermore, *turn* is quite frequent in resultative VCs, while no such VCs were attested for *change*. These verbs' entries are thus not associated with any subclass. To capture the fact that both verbs are general, I simply list "n/a" in the "Additional Semantics" category of their MGVEs. The "Additional Syntax" categories for both verbs' MGVEs correspondingly require more specifications than those for the verbs included in subclasses.

The subclasses proposed here can also be subject to a cluster analysis, such as that visualized in Figure 4.14.[55] This clustering is based on each verb's participation in individual VCs (rather than sets of VCs according to their VC features), yet it supports the statistical basis of the proposed sub-classes.

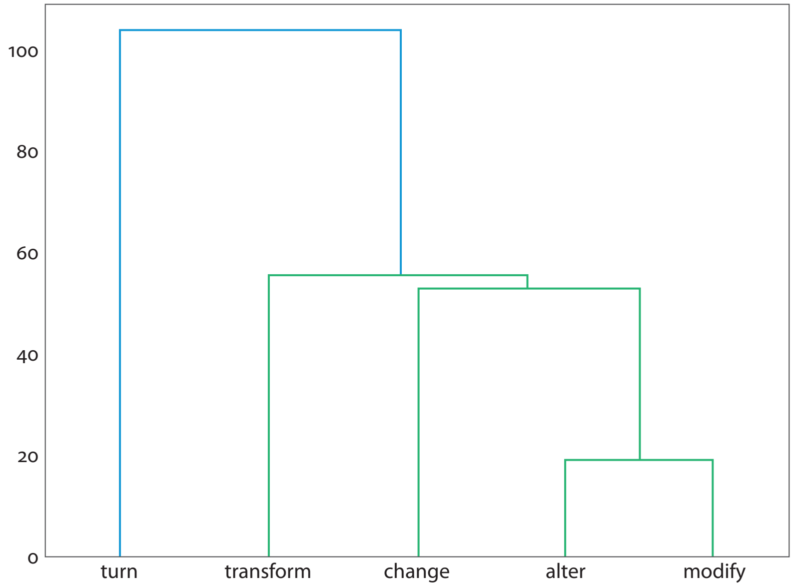

Figure 4.14 Clustering of English Change verbs according to distribution across individual VCs

55. I thank Josef Ruppenhofer for providing the clustering image, which was made using AgglomerativeClustering from the sklearn python package.

Specific features captured by the clustering include the close relation between the "subtle change" verbs *alter* and *modify*, the positioning of *transform* to the left of *change*, and the distance of *turn* from the other Change verbs (due to its occurrence in resultative VC types). Of course, a clustering based on VC features rather than individual VCs would yield a slightly different image (perhaps even more clearly supporting the sub-classes identified here), but the present clustering should amply demonstrate the empirical support for the syntactic relevance of the proposed sub-classes.

4.6 Testing the FCVC approach and a "Drastic Change" subclass

4.6.1 Can FCVCs predict argument realization?

The discussion up to this point has demonstrated the unique relationship between verb classes and valency behavior, which involves both generalizations that capture shared properties of one verb class in comparison with others, as well as idiosyncrasies in the finer-grained semantic and valency properties of individual verbs within the class. The Change FCVC accounts for the shared properties of the Change verbs analyzed above, while the (verb-specific portions of) MGVEs accurately account for the full range of individual verbs' (idiosyncratic) behavior, and (syntactic-semantic) subclasses capture low-level generalizations among subsets of verbs in the class.

The approach outlined above implies that the construct of the FCVC (and the subclass) have some predictive power in determining the valency behavior of a verb based on its meaning, or vice versa. That is, once it is known that a (novel) verb exhibits the semantics of a given FCVC (i.e. evokes a certain semantic frame), then the constructional range of the FCVC (as formulated on the basis of previously analyzed verbs with similar semantics) can be used to predict the range of VCs the novel verb appears in. At a finer-grained level, if this verb also includes an additional meaning component identified to be grammatically relevant for previously analyzed verbs in the class, then even more aspects of its valency behavior may be predicted. At the same time, the MGVEs described above (and the findings e.g. of Faulhaber 2011) show that it is rarely possible (if at all) to predict the full range of valency behavior on the basis of meaning components alone.

This section thus assesses the degree to which the FCVC approach is predictive of a verb's meaning and valency behavior. As a test case, I use the verb *metamorphose*, which is included in Levin's (1993) *Turn* class but not yet documented (as a LU of any semantic frame) in FrameNet, though its meaning corresponds closely to the frame definitions of the `Cause_change` and/or `Undergo_change` frame(s).

After informally analyzing its semantics based on internet-accessible dictionaries, I present the results of a corpus analysis of 206 examples from COCA, in order to determine the extent to which the valency behavior of this 'novel verb' corresponds to the behavior of the previously analyzed near-synonyms. After establishing the degree to which the valency behavior of *metamorphose* aligns with the constructional range of the Change FCVC defined above, I then determine whether *metamorphose* can be included in the proposed Drastic Change subclass by comparing its valency distribution with that of *transform*.

4.6.2 Meaning and valency behavior of *metamorphose*

The meaning of *metamorphose* is documented based on the dictionary definitions in Table 4.30 below, whose bottom row lists the relevant additional MCs extracted from the full definitions. The definitions first show that *metamorphose* belongs in the Change FCVC, as each of the definitions use the more general verb *change* (which was shown above to represent the shared meaning of the Change FCVC). Further specifications in the definitions show that *metamorphose* has the "drastic change" meaning component, expressed variably as "into a wholly different form" (AH), "into something completely different" (CC), and "change strikingly" (MW), among others.[56] Furthermore, both AH and MW relate *metamorphose* to another Change verb, *transform*, which also exhibits the "drastic change" meaning component. Apart from this meaning component, CC mentions that the changing entity "develop[s]" before or while undergoing the change, and MW mentions an optional meaning component (marked with the phrase "especially") that the change is caused "by supernatural means".[57]

The valency distribution of *metamorphose* was assessed based on 206 examples from COCA and is summarized in Table 4.31. The data show several interesting trends for the valency behavior of *metamorphose*. With respect to transitivity, *metamorphose* shows an extremely strong tendency to appear in intransitive VCs rather than transitive VCs, as nearly 98% (201 of 205) of the analyzed examples exhibit intransitive VCs. It is also much more frequent in VCs with state argu-

56. The dictionary versions and abbreviations are noted in Section 4.2 above. As the online-accessible version of the Collins-Times dictionary (labeled CT above) only include the technical sense of *metamorphose* ('undergo metamorphosis'), I extracted the definition here from the online version of the Collins Cobuild English Learner's Dictionary (CC; Sinclair 1987; http://www.collinsdictionary.com/dictionary/english-cobuild-learners; accessed 11 August 2015). Technical senses of *metamorphose* (e.g. in biology and geography) are omitted from the presentation here.

57. I do not discuss these two potential meaning components any further, as the present goal is to test the Change FCVC and the Drastic Change subclass.

Table 4.30 Meaning components for *metamorphose*

AH	CC	MW
v.tr. 1. To change into a wholly different form or appearance; transform […] v.intr. 1. To be changed or transformed: […]	To metamorphose or be metamorphosed means to develop and change into something completely different	transitive verb 1a : to change into a different physical form especially by supernatural means b : to change strikingly the appearance or character of : transform […] intransitive verb […] 2 : to become transformed
– into a wholly different form	– to develop – into something completely different	– into a different physical form – esp. by supernatural means – strikingly

Table 4.31 Valency distribution of *metamorphose*

#	Frq.	%	VC	Example
1	2	1%	[C _ U]	No wonder the vampires refuse to metamorphose those with children.
2	3	1%	[C _ U into F]	One kit, for example, metamorphoses a Datsun 240 into a Ferrari 250 GTO Le Mans race car.
7	28	14%	[U _]	But nearly all of our emotional landscapes had dramatically metamorphosed.
8	145	70%	[U _ into F]	Mary now metamorphoses into Rose […]
9	8	4%	[U _ to F]	[…] how he metamorphosed from a high-school dropout to a multimillion-dollar music mogul […]
10	6	3%	[U _ from O into F]	Laura Nyro was a recluse who had metamorphosed from a sultry teen-ager into a plump earth mother […]
11	10	5%	[U _ from O to F]	Deadwood had metamorphosed from a gold rush camp to a mining city.
??	1	1%	[U _ F.CP]	Each larva attaches and metamorphoses to form a polyp […]
??	1	1%	[U _ as F]	Betty B's Bomber Bar bombed, the building metamorphosed as the Tupimamba Tropical […].
??	1	1%	[U _ through F]	[…] like dolphins and wheels that metamorphosed through fifteen patterns.
??	1	1%	[U _ from O F.CP]	It could just metamorphose from bankruptcy and potential civil war to surpass elder sister Russia in reform […].

The "??" label in the first column indicates that this VC was not found in the primary analysis of English Change verbs in Section 4.3.

ments than most English Change verbs, specifically with prepositional state arguments: 85% of the analyzed examples include states (176 of 206), and all but two of these realize the F argument in a PP (rather than as a purposive clause). In these respects, *metamorphose* behaves most similar to *turn* among the five verbs analyzed, as *turn* was the only verb found to occur more frequently in intransitive VCs (56%) than transitive VCs (44%), and to occur more frequently with state arguments (100%) than without (0%). *Metamorphose*, while similar to *turn*, displays a much higher frequency of intransitive VCs, but a slightly lower frequency of (prepositional) state FEs than *turn*.

4.6.3 Assessing the accuracy (predictive power) of the Change FCVC

Turning now to the question of how well the constructional range of the Change FCVC accounts for the valency behavior of *metamorphose*, the data show that 202 of the 206 examples for *metamorphose* were already included in the constructional range of the Change FCVC defined in Table 4.16 above (the first seven VCs listed in the *metamorphose* table). The bottom four rows of Table 4.31 list four examples exhibiting VCs not identified for other Change verbs (and not included in the Change constructional range). One of the four novel VCs identified for *metamorphose* is an intransitive VC with a purposive clausal F introduced by *to*: [U _ F.CP]. This VC is easily integrated into the constructional, because a similar transitive VC [C _ U F.CP] (#4) was documented in the main corpus analysis and differs only with respect to transitivity. When this VC is added to the constructional range of the Change FCVC, only three of the 206 examples of *metamorphose* are not accounted for by the FCVC approach's association of verb classes with a constructional range. The test thus shows that over 98% of the analyzed *metamorphose* examples are predictable by the FCVC, demonstrating the strong predictive power of this approach for predicting the valency behavior of novel verbs.

I now briefly discuss the three examples that are not predictable from the Change FCVC's constructional range, listed in the bottom three rows of Table 4.31.[58] The first of these is an intransitive VC in which an *as* PP introduces the Final_state argument. The use of this preposition to introduce the F argument seems rather peculiar and is only attested once in over 200 examples of *metamorphose*. This use of a novel argument structure pattern may result from creative language use, potentially motivated by the unique change described (i.e. a build-

58. While these three previously unattested VCs could potentially be added to the constructional range given in Table 4.16, these VCs are highly infrequent and it is unclear whether they occur with any other Change verbs aside from *metamorphose*.

ing changing from one type of establishment to another).[59] The next previously unattested VC (second-to-last row of Table 4.31) introduces a unique type of F argument (*fifteen patterns*) in a PP headed by *through.* While this PP type is unique in the data set, its use is understandable as the F argument can be viewed as collectively referring to multiple (final) states, in which case *through* is an appropriate preposition, particularly if the various F states are arranged in an ordered sequence. The final previously unattested VC, shown in the last row of Table 4.31, involves an intransitive pattern in which the O is expressed in a *from* PP and the F is described in a purposive clause headed by *to*. While both of these argument realization types (*from* O and *to* F.CP) are amply attested as individual arguments in the corpus, the combination of only these two arguments is rather unexpected. It was previously noted that the O argument may only be expressed when the F argument is also expressed in a PP headed by *to* or *into*, in conformance with the prepositional realization of O. Indeed, every instance of O in the main corpus was accompanied by a prepositional F. This example is thus unique, as O is realized as a noun phrase within a PP, whereas F is in a purposive clause. It may be the case that this configuration is licensed because the purposive F clause begins with the preposition *to*, which also introduces normal prepositional F arguments.

These data show that the inclusion of FCVC information in verbal lexical entries is a powerful strategy for predicting the range of valency constructions a verb may appear in. Specifically, over 98% of the examples for *metamorphose* were predictable from the valency behavior of other verbs in the Change class. The three examples with unexpected or divergent valency constructions each comprise less than 0.5% of the analyzed examples of *metamorphose* and likely reflect the creativity of language use. For one, *metamorphose* is a highly infrequent verb and thus less entrenched in uses with a more restricted set of VCs. Given the nature of large natural language corpus data, it is also not unusual to encounter unexpected data such as these; as a larger number of examples are analyzed (about twice as many examples were analyzed for *metamorphose* than for the other five verbs), the analyses will inevitably reveal new VCs that may or may not correspond to more well-attested constructions for a given verb class.

However, despite the FCVC's ability to predict the general types of valency constructions a novel verb will appear in, the data for *metamorphose* demonstrate that the exact distribution of a novel verb across VCs is highly unpredictable. Specifically, *metamorphose* exhibits several valency features, such as its high frequency in intransitive VCs and in VCs with prepositional State arguments, that are not clearly predictable from its meaning. These findings underscore the importance

59. The novel argument structure could also result from a performance error, but this seems unlikely due to the fluency of the sentence.

of not only capturing generalities among verb classes by means of the FCVC, but also accounting for verb-specific information by means of MGVEs that accurately capture idiosyncratic and unpredictable information.

4.6.4 A "Drastic Change" subclass?

I now turn to the comparison of *metamorphose* with *transform* in order to determine whether a potential Drastic Change subclass specification could be included in the verbs' MGVEs in order to predict some aspects of their valency behavior on the basis of the "drastic change" meaning component. Table 4.29 above shows that *transform* exhibits three valency properties distinguishing it from other Change verbs, which may be related to this meaning component. These are (a) a strong preference for transitive VCs, (b) relatively high frequency (~10%) with reflexive objects, and (c) relatively high frequency (~10%) with VCs including both O and F arguments. If any of these valency properties are also exhibited by *metamorphose*, which also has the "drastic change" meaning component, then these properties are likely related to the meaning component and can be included in the entry for the Drastic Change subclass and thus decrease the amount of idiosyncratic information in the two verbs' MGVEs.

With respect to the first property of transitivity, *metamorphose* differs significantly from *transform*. Specifically, over 97% of the corpus examples for *metamorphose* involved intransitive VCs, whereas only 8% of the *transform* examples were intransitive. Therefore, it can be concluded that the "drastic change" meaning component does not influence a Change verb's behavior with respect to transitivity. As for the second possible valency property, relatively high frequency with reflexive objects, only one example of *metamorphose* includes a reflexive object, comprising less than 0.5% of all analyzed examples, suggesting that this valency property is also not related to the "drastic change" meaning component.[60] A third potential valency property of a Drastic Change subclass is a relatively high frequency in VCs that include O arguments (in addition to F arguments). A total of 17 of the 206 examples of *metamorphose*, or 8%, included O arguments. This figure is close to that for *transform* with 9% of its VCs including O arguments. In comparison with other Change verbs, *turn* is the next most frequent in such VCs, yet these comprise only 4 of 132 (~3%) of the *turn* examples. It is thus likely that the "drastic change" meaning component influences a verb's valency behavior, namely effecting a higher frequency in VCs which include O arguments than Change verbs without this meaning component. The Drastic Change subclass from Table 4.29 above must

60. The frequency of reflexive objects with *transform* may thus be associated with its "positive change" meaning component.

therefore be reformulated by listing only one (not three) valency features in the "Syntax" category, as shown in Table 4.32.

Table 4.32 Revised Drastic Change verb subclass

Subclass	**Drastic Change**
Verbs	*transform, metamorphose*
Semantics	Refer to drastic, complete, and/or categorical changes
Syntax	Relatively high frequency (~10%) in VCs with both O and F (in PPs)

The MGVEs for *metamorphose* and *transform* can then be revised by including the Drastic Change subclass specification in their respective Subclass categories and then omitting the features in Table 4.32 from the verb-specific "Additional Semantics" and "Additional Syntax" categories in these verbs' MGVEs. I forego this reformulation here, but refer the reader to Section 4.5.4, where the MGVES of *alter* and *modify* were simplified through application of the "Subtle Change" subclass specification.

In sum, the test case of *metamorphose* suggests that the FCVC can predict a large portion of the valency behavior of novel verbs at a general level. Specifically, almost all (98%) of the examples of *metamorphose* exhibited VCs that were already observed for other verbs in the Change frame. Most of the examples that had not been attested exhibited novel constellations of arguments that could be generated on the basis of the previously attested VCs. Very few (only two of 206 examples for *metamorphose*) VCs were completely unexpected based on data from previously analyzed Change verbs. At the same time, however, the exact distribution of novel verbs across VCs cannot be readily predicted on the basis of FCVCs or subclasses. The data for *metamorphose* showed that it was unlike other Change verbs in exhibiting an overwhelming preference for intransitive over transitive VCs and a strong preference for VCs including State arguments, and none of these features could be predicted on the basis of verbal semantics alone. In fact, the subclass formulated on the basis of the "drastic change" meaning component shared by *transform* and *metamorphose* could only account for one aspect of the verbs' valency behavior (i.e. a relatively high frequency of O arguments) which nonetheless only accounts for about 10% of the analyzed examples for either verb. Thus, while the FCVC helps to delimit the set of potential VCs a novel verb may occur in, this secondary analysis suggests that it is much less likely to determine the precise distribution of such verbs across the set of VCs, thereby calling into question the assumption of a strict predictive relation between verb meaning and argument realization.

4.7 Conclusion

In this chapter, the class of English Change verbs was investigated to shed light on the nature of verb classes and formulate theoretical constructs to capture verbs with shared semantic and syntactic properties. The first part of the chapter assessed the degree of semantic and syntactic among members of fine-grained verb classes from a theory-neutral perspective.

The semantic analysis in Section 4.2 revealed that meanings of Change verbs are largely uniform with only minor differences influencing the types of changes each verb may describe. The analysis revealed a three-way classification of English Change verb meanings between "subtle change" verbs *alter* and *modify*, "drastic change" verbs *metamorphose* and *transform*, and general change verbs *change* and *turn*. Beyond these major semantic distinctions, the corpus and dictionary analyses revealed only two other meaning components that set apart a given verb within these subclasses – the "positive change" meaning component of *transform* and the "purposive change" meaning component of *modify* – both of which only apply to some uses of these verbs and do not affect the verbs' semantics as significantly as the "drastic change" or "subtle change" meaning components.

The corpus-based syntactic analysis of the verbs' valency behavior, described in Section 4.3, revealed a wider range of variation than the semantic analysis. Namely, individual verbs differ with respect to the precise set of valency constructions (VCs) in which they appear and to their frequency in each VC (see Table 4.14 in Section 4.3). Specifically, although *alter* and *modify* exhibit fairly similar valency behavior, each of the other verbs differed significantly in their valency distribution. From the perspective of the present analysis, which was limited to a comparison of semantically related verbs, these data seem to corroborate recent research in usage-based linguistics (particularly those of Faulhaber 2011; cf. Section 3.3) suggesting that a large portion of verb valency behavior is not predictable from verb meaning. However, if one takes a broader perspective by comparing Change verbs against verbs of other classes, the analysis actually reveals a fairly high degree of syntactic uniformity among Change verbs, as these consistently occur in a limited range of (around 13) VCs that are distinct from those occurring with semantically unrelated verbs.

Sections 4.4 and 4.5 discussed a novel approach to capture the shared and idiosyncratic behavior of the Change verb class, which employs principles of cognitive and usage-based frameworks to offer a more comprehensive and unified account of verb classes than those discussed in the preceding chapters. The shared behavior of the verbs is captured by means of a frame-constructional verb class (FCVC). Following a central tenet of Construction Grammar, the FCVC – as with all linguistic structures – is formalized as a construction, i.e. a pairing of meaning and form. The semantics of the FCVC, shown Figure 4.3 above, is defined according to principles of Frame Semantics, namely by associating verbs with the semantic frame they evoke, which is characterized according to its central participants (i.e. Frame Elements) and their interrelations. The present account, however, improves on FrameNet classes through a more explicit account of meaning components distinguishing individual verbs' meanings, of peripheral or non-core Frame Elements that are not central to the semantic frame but nonetheless pertain to the Change scenario, and of the relation between the defined class and other, closely related classes (in this case the more specific classes of change-of-state verbs). The syntax of the FCVC is characterized by the constructional range. Simply put, the constructional range is the list of VCs in which verbs of the class may occur. However, a close investigation of the constructional range allows for a more detailed view of the interrelations among individual VCs comprising it and of the relation between these syntactic structures and the meaning associated with the broader semantic frame and with individual verbs evoking the frame. As such, the constructional range offers more structure than Levin's (1993) haphazardly chosen alternation lists and it improves on FrameNet's verb-specific valency reports by associating semantic frames with sets of constructions.

Section 4.5 then discussed the formulation of verbal lexical entries that capture both the shared properties of the class, as defined by the FCVC, and the idiosyncratic behavior setting apart individual verbs or subsets of verbs within the class. At the highest level, these multi-grained verb entries simply associate the verb with the FCVC, thus capturing the similarity of all verbs in the class. At the lowest level, however, the finer-grained properties setting apart individual verbs is captured by specifying restrictions in the FCVC's semantics and syntax, i.e. by stating whether a verb is semantically restricted in that it only refers to certain types of events encoded by the semantic frame and/or syntactically restricted in that it only occurs in a limited set of VCs within the broader constructional range. At an intermediate level of analysis, I proposed subclasses, such as the "Subtle Change" subclass containing *alter* and *modify*, which capture low-level generalizations among sub-sets of verbs in a class and can thus be seen as finer-grained verb classes than those posited by Levin (1993) or FrameNet. Finally, in Section 4.6, another Change verb, *metamorphose*, was investigated to assess the predictive power of the FCVC approach. The analysis showed that a verb's semantic class membership is largely predictive of the range of VCs in which it may appear, but it cannot accurately predict the exact set of VCs or its relative frequency across VCs.

In the following chapter, I report on a similar analysis of Theft verbs, which differ from Change verbs not only in the type of scenario they describe but also in the relative richness of their meaning, or their level of "verb descriptivity" in the terms of Snell-Hornby (1983), in order to determine whether the findings for

Change verbs may relate to the relatively vague and non-specific nature of their meaning. In Chapter 6, I determine whether German Change verbs also exhibit the features identified for English Change verbs identified here and develop methods for establishing (translation) equivalency among verb meanings and VCs across languages, as well as assessing the relevance of a verb's (or class's) relative level of descriptivity for contrastive analysis.

CHAPTER 5

Comparing Theft verbs to Change verbs

5.1 Introduction

5.1.1 Overview

This chapter reports on an investigation of Theft verbs such as *steal, swipe, embezzle,* and *pilfer*. The present analysis of a verb class with very different semantics from the Change verbs discussed in the previous chapter serves two purposes. First, it enables us to determine the extent to which the findings for Change verbs also apply to the semantically distinct class of Theft verbs, particularly regarding the syntactic and semantic uniformity of near-synonymous verbs. Secondly, the comparison of these two classes brings to light interesting differences in the nature and number of meaning components and valency constructions associated with distinct verb classes. This analysis not only fills a gap in linguistic (particularly Construction Grammar) research, as few existing studies systematically compare the frame semantics and valency behavior of semantically diverse verb classes,[1] but it also takes a broader, cross-domain perspective on questions surrounding the predictability of verb meaning and argument realization.

The specific research questions guiding the present analysis are the following:

- To what extent do verb classes of different semantic domains and levels of semantic richness differ with respect to their semantic and syntactic behavior?
- Do the constructs of (frame-constructional) verb classes and (multi-grained) verb entries, as developed for Change verbs in the preceding chapter, also capture behavior of the semantically distinct class of Theft verbs?

The comparison of Change and Theft verbs is partially guided by the findings of Snell-Hornby (1983) and Boas (2008b), who find correlations between a verb's descriptivity level (i.e. its semantic richness) and its contextual and constructional

1. While there are several resources which investigate numerous verb classes (e.g. Levin 1993, FrameNet), I am not aware of any studies that compare verb classes of different domains against one another. A Google Scholar search (on February 3, 2016) for "comparing verb classes" or "differences across verb classes" did not reveal any relevant sources but returns more general theoretical research on verb classes (e.g. Levin 1993) and studies from other fields, primarily computational linguistics or child language acquisition.

flexibility. This study scales up on those analyses, which focus on individual verbs within a given semantic class, by comparing two classes of verbs which differ greatly with respect to their level of descriptivity. Before discussing the construct of verb descriptivity and its application to Change and Theft verbs in more detail, I first describe how Theft verbs are classified in Levin (1993) and FrameNet. This section concludes with a discussion of the method and an outline of the cross-class comparison.

5.1.2 Theft verbs in Levin (1993) and FrameNet

The Theft verbs analyzed in this chapter are included in Levin's (1993: 128–129) class of *Steal* verbs along with numerous other verbs.[2] Interestingly, these verbs are not characterized according to alternations in which they participate, but ones in which they do not participate.[3] As noted in Section 2.4 for Levin's *Turn* class, her *Steal* class is also given a rather brief and vague semantic description, namely that "[t]hese verbs primarily describe the removal of something from someone's possession" (1993: 129).

Drawing on data from FrameNet and native speaker consultations, Dux (2011) points out several issues with Levin's treatment of Theft verbs. For one, the verbs within the class are semantically quite heterogeneous, including not only verbs intuitively associated with wrongful taking, but also more general taking verbs such as *capture, take*, and *withdraw*. Another issue Dux (2011) observes with Levin's classification is that her class does not include verbs such as *borrow, transport*, or *save*, which exhibit the same alternating behavior Levin ascribes to *Steal*

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2. The following verbs are included among Levin's (1993: 128) *Steal* verbs: *abduct, cadge, capture, confiscate, cop, emancipate, embezzle, exorcise, extort, extract, filch, flog, grab, impound, kidnap, liberate, lift, nab, pilfer, pinch, pirate, plagiarize, purloin, recover, redeem, reclaim, regain, repossess, rescue, retrieve, rustle, seize, smuggle, snatch, sneak, sponge, steal, swipe, take, thieve, wangle, weasel, winkle, withdraw, wrest.*

3. The basic pattern of Levin's *Steal* verbs and the alternations which characterize them are:

Basic Pattern:	The thief stole the painting from the museum.	
Locative:	The thief stole the painting from the museum.	
	*The thief stole the museum of the painting.	
Benefactive:	The thief stole the painting for Mr. Smith.	
	*The thief stole Mr. Smith the painting.	
Conative:	The thief stole the painting from the museum.	
	*The thief stole at the painting.	
Causative:	The thief stole the painting from the museum.	
	*The painting stole from the museum.	(Levin 1993: 129)

verbs but not the semantic properties she attributes to such verbs. The verbs in her class are also syntactically heterogeneous, as a careful analysis reveals differences in the verbs' behavior with not only with respect to the alternation variants used to define the class, but also in other constructions not used in Levin's classification. In Section 2.4, I identified many of these same issues in Levin's characterization of Change verbs and argued against an alternation-based approach to verb classification based on these findings.

FrameNet's `Theft` frame offers a semantically richer and more homogeneous classification of `Theft` verbs than Levin (1993).[4] The definition of the `Theft` frame is given in (5.1) and the Frame Element descriptions are given in Figure 5.1.[5]

(5.1) These are words describing situations in which a PERPETRATOR takes GOODS from a VICTIM or a SOURCE. The MEANS by which this is accomplished may also be expressed. (Ruppenhofer et al. 2010)

GOODS [Goods]
Goods is anything (including labor, time, or legal rights) that can be taken away.
PERPETRATOR [Perp]
Semantic Type: Sentient
Perpetrator is the person (or other agent) that takes the goods away.
SOURCE [Src]
Semantic Type: Source
Source is the initial location of the goods, before they change location.
VICTIM [Vict]
Victim is the person (or other sentient being or group) that owns the goods before they are taken away by the perpetrator.

Figure 5.1 Frame Element descriptions for the `Theft` frame (Ruppenhofer et al. 2010)

Although the `Theft` Frame Description does not directly mention concepts central to Theft events (e.g. that the GOODS do not belong to PERPETRATOR, and that the PERPETRATOR acts illegally), these concepts can be arrived at through the

4. Recall that FrameNet frame titles are in Courier_new font and FrameNet FE names are in small caps. I do not use these fonts when I refer to the present analysis of Theft verbs and constructions.

5. FrameNet identifies the following lexical units that evoke the Theft frame (with the letter after each lexical unit referring to its part of speech and the verbal lexical units marked in bold): **abstract.v, cop.v**, cutpurse.n, **embezzle.v**, embezzlement.n, embezzler.n, **filch.v**, **flog.v**, heist.n, kleptomaniac.n, larceny.n, **lift.v**, light-fingered.a, **misappropriate.v**, misappropriation.n, **nick.v**, peculation.n, pickpocket.n, **pickpocket.v**, **pilfer.v**, pilferage.n, pilferer.n, pilfering.n, **pinch.v, purloin.v, rustle.v**, **shoplift.v,** shoplifter.n, shoplifting.n, snatch.n, **snatch.v**, snatcher.n, **snitch.v, steal.v**, stealer.n, stealing.n, stolen.a, **swipe.v,** theft.n, thief.n, **thieve.v**, thieving.a, thieving.n.

Frame Element Descriptions and through Inheritance relations.[6] Specifically, the `Theft` frame inherits semantics from both the `Taking` and the `Committing_crime` frames, thus capturing the fact that Theft scenarios involve an illegal or wrongful act of taking. While the (non-illegal) `Taking` frame includes an AGENT FE which takes a THEME from a SOURCE, the `Theft` frame includes a PERPETRATOR FE which takes some GOODS from a SOURCE or a VICTIM. The VICTIM FE refers to the animate entity that originally possesses the GOODS, while the SOURCE FE refers to the original (inanimate) location of the GOODS.

While the distinction between SOURCE and VICTIM is clear in most cases, as in (5.2a–b), in some cases this participant can be interpreted as either a SOURCE or a VICTIM, particularly with institutions such as banks, stores, or businesses, as in (5.2c).[7]

(5.2) a. *Pat stole it from the table.*
b. *Pat stole it from the man.*
c. *Pat stole it from Wal-Mart.*

In (5.2c), the prepositional argument, *Wal-Mart*, can be viewed as both a SOURCE, as the physical store is the original location of the GOODS, and VICTIM, as the (abstract) company is the original owner of the GOODS and loses possession of them. Given this ambiguity, the present analysis initially employs a fifth FE, namely "Source/Victim (S/V)" for such argument types.[8] However, in comparing the valency of Change and Theft verbs in Section 5.3.2 below, I discuss an alternative approach employing a single FE and its implications for formulating and enumerating valency constructions. The full set of FEs for Theft verbs employed in the present analysis are listed in Table 5.1.

6. Closely related to Theft verbs are verbs such as *rob* and *mug*, which also refer to illegal taking scenarios but differ in their perspective of these events. Specifically, these verbs entail that the theft involve some aggression and a close interaction between the perpetrator and the victim. This meaning component has a syntactic repercussion in that the victim rather than the goods is realized as direct object. Such verbs are placed in a separate class from the Theft verbs in both Levin (1993: 128, *Cheat* verbs) and FrameNet (the `Robbery` frame, which is in a Perspective_on relationship to the `Theft` frame). Here, I only focus on Theft verbs. Section 3.2 offers a detailed discussion of Goldberg's (1995: 45–48) analysis of these two verb types and their related constructions.

7. The relation between SOURCE and VICTIM is captured in FrameNet by means of a "core set", in which two FEs express different sub-types of a broader semantic role and are typically not able to cooccur (e.g. **He stole it from the woman off the table*).

8. The Source FE, Victim FE, and Source/Victim FE are collectively referred to as *Source/Victim-type FEs* or *Source/Victim-type arguments*.

Table 5.1 FEs of Theft verbs

FE name	FE abbrev.	Example
Perpetrator	P	***The thief*** *stole a book.*
Goods	G	*The thief stole* ***a book.***
Source	S	*The thief stole it* ***from the table.***
Victim	V	*The thief stole it* ***from the woman****.*
Source/Victim	S/V	*The thief stole it* ***from Wal-Mart.***

While the FrameNet `Theft` frame provides a much more semantically uniform classification of Theft verbs than Levin's (1993) *Steal* class, neither approach identifies semantic and syntactic differences among individual Theft verbs. Compare for instance the meanings of *embezzle* and *snatch*. Although both LUs evoke (and are listed as LUs of) the `Theft` frame, they cannot be used to describe the same range of theft events: *embezzle* refers to rather serious offenses in which the Perpetrator takes abstract financial Goods from a person or commercial entity that has entrusted the Perpetrator with the Goods, whereas *snatch* typically refers to less serious Theft events involving concrete Goods and human Victims. Syntactically, these verbs differ in that *embezzle* but not *snatch* can appear without the Goods argument (*She embezzled/*snatched from her employer*), whereas *snatch* but not *embezzle* may realize locational sources in *off (of)* PPs (*She snatched/*embezzled it off of the table*).

Below, I investigate further semantic and syntactic differences among individual Theft verbs not only to determine whether this verb class exhibits similar in-class differences as those identified for Change verbs, but also to investigate whether and to what degree the descriptivity level of a verb class influences the semantic and syntactic characterization of the whole class and its individual verbs.

5.1.3 Verb descriptivity of Change and Theft verbs

One reason to suspect that the Change and Theft verb classes may behave differently relates to the notion of verb descriptivity. Snell-Hornby (1983) coined the term in her comparative analysis of German and English "descriptive verbs", or verbs that not only denote an event (e.g. of moving, giving, or speaking) but also describe how (e.g. the manner or means in which) the event is carried out. Simply put, a verb has a low descriptivity level when it simply refers to the event, as with *move, give,* or *speak*, while it has a higher level of descriptivity when it includes further specifications on the event, as with *crawl, meander,* or *sprint* (when compared with low-descriptivity *move* or *walk*). Among verbs referring to taking events, for instance, *take* has low descriptivity because it does not specify the event any further, whereas *shoplift* has high descriptivity because it contains additional meaning components such as "illegal taking" (i.e. "stealing"), "take from a store", "pretend to be a customer", and so forth. Snell-Hornby (1983: 25f.) refers to the basic meaning of a descriptive verb as the Act Nucleus and the additional meaning components as Modificants (e.g. for *shoplift* the Act Nucleus is "take" and the Modificants are "from a store", etc.).[9]

With respect to verb descriptivity's influence on how verbs are used, Snell-Hornby (1983: 34–35) claims that verbs with more descriptive meanings have a much narrower *range of application* than non-descriptive verbs, where range of application refers to the number and types of scenarios to which they may refer. Drawing on two verbs with the same Act Nucleus, namely "produce sound", Snell-Hornby points out that *shout* may be used in more contexts , and thus has a higher range of application, than *grovel*. This is because *shout* only specifies that the sound is loud, whereas *grovel* specifies not only that the sound is obedient in some way, but also that it has a negative connotation and involves two participants in which the speaker groveling is subservient to the addressee. While Snell-Hornby's characterization of a verb's range of application applies merely to the (semantic) range of scenarios the verb may refer to, Boas (2008b) investigates the syntactic consequences of verb descriptivity (see also Sections 3.2 and 6.1). Specifically, Boas (2008b) notes that, among verbs evoking the `Self_motion` frame, those with higher descriptivity (e.g. *crawl, wander, stagger*) occur in a narrower range of argument structure constructions than low-descriptivity verbs (e.g. *walk, run*), as seen for instance in their occurrence in the resultative construction (*Pat walked/?jogged/*crawled/*staggered Sam off the sidewalk*). It is possible to draw a connection between Boas's findings on descriptive verbs' constructional behavior and Snell-Hornby's construct of range of application, especially given the understanding that constructions have meaning. Specifically, different constructions are used to describe different types of scenarios, and if high-descriptivity verbs apply to a narrower range of scenarios, then we may expect them to appear in a narrower range of constructions as well.

The present analysis aims to scale up Boas's and Snell-Hornby's fine-grained analyses of verbs of varying descriptivity levels within a single class to a comparison of two verb classes of varying descriptivity levels.[10] In Chapter 4, the

9. Comparing Snell-Hornby's terminology to the present analysis (as with the Change verb meanings discussed in Section 4.2), her Act Nucleus corresponds to the "shared meaning" of a (frame-constructional) verb class and her Modificants correspond to the "(additional) meaning components" further specifying the shared meaning.

10. An anonymous reviewer observes that a comparison of Change and Theft verbs is conceptually fraught, as the two classes do not stand in a hyponymy relation and that a comparison of verbs within each class would be more meaningful. An in-class comparison of individual verbs meaning of the Change frame and the verbs evoking it was found to be highly general, describing scenarios in which some entity (of virtually any ontological type) undergoes a change (in virtually any of its attributes or features), which may be brought about by some other entity (again, of virtually any ontological type). In contrast, Theft verbs have much more detailed meanings, and their use is restricted to a more clearly defined range of scenarios and participants: a sentient agent takes something which does not belong to them from an animate victim or an inanimate location, with associations that the agent acts illegally and/or secretively (see Section 5.2.1 below).

The intuitively apparent difference in semantic richness (i.e. descriptivity) between the classes can also be established by looking at their relation to other verbs and verb classes. The semantic analysis of Change verbs in Chapter 4 showed that the meaning of Change verbs could not easily be rephrased using a verb from a semantically more general class (*change* was defined as 'make/become different' and other Change verbs were defined using *change*). It also revealed that (classes of) verbs, particularly change-of-state verbs entail and further specify the meaning associated with the Change verb class. In contrast, even the most general Theft verb, *steal*, can be paraphrased by further specifying the meaning of another verb (e.g. take/get/obtain illegally), whereas no verb class can be viewed as entailing the shared meaning of Theft verbs. As such, it is apparent that Change verbs have very low descriptivity, while Theft verbs are highly descriptive.[11]

5.1.4 Outline of chapter

In Section 5.2, I compare the (additional) meaning components characterizing individual verbs of Theft and Change verbs. Section 5.3 describes the comparison of valency constructions (VCs) across the two classes, drawing on a corpus analysis of five English Theft verbs. In comparing the number of VCs for each class, I also address methodological issues surrounding the granularity level of

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is indeed fruitful and has been carried out by several scholars mentioned above, including for the Theft verbs (Dux 2011) and Change verbs (Dux 2016) discussed here. The objection to a comparison of unrelated classes, however, is unfounded: for one, the varying levels of descriptivity across Theft and Change verbs is supported by various criteria, including intuition, number of meaning components, external lexicographic resources, and the relation of these classes to other classes in the same domain. Further, the comparison of classes in distinct domains does not preclude their comparison against other classes in the same domain (e.g. Theft vs. Taking verbs; Change vs. 'change-of-state' verbs), and such comparisons are in fact argued for as a necessary continuation of the present comparative analyses.

11. Dux (2016: 357–358) further establishes the descriptivity levels of Change and Theft verbs based on the hierarchical structures of WordNet (Miller 1995; Fellbaum 1998) and FrameNet.

Frame Elements and the enumeration of VCs, and I investigate differences in the interpretation of specific VCs and VC features when they occur with verbs of the distinct classes. These analyses allow the aforementioned hypotheses surrounding verb descriptivity and syntactic flexibility to be tested. To conclude this chapter, Section 5.4 applies the frame-constructional approach to verb classes and entries (developed for Change verbs above) to capture generalizations and idiosyncrasies among Theft verbs.[12] In the following chapter, I return to the comparison of Theft and Change verbs and discuss further differences arising when such cross-class comparisons are applied to different languages.

5.2 Comparing the meanings of English Theft and Change Verbs

5.2.1 The meanings of English Theft verbs

For the English analysis, I focus on the verbs *embezzle, pilfer, shoplift, snatch* and *steal*.[13] Although all verbs share the meaning described in (5.1) above, namely that a Perpetrator takes some Goods (wrongfully) from a Source or a Victim, each verb is associated with additional meaning components (MCs) that further specify or constrain the range of Theft scenarios they can describe. Table 5.2 summarizes the MCs identified for each verb and specifies which of the Theft FEs the MC applies to.[14]

Steal: *Steal* is the most general of the Theft verbs and is not clearly associated with any MCs that set it apart from the shared Theft semantics given in (5.1) above. Its dictionary definitions and their corresponding examples contain a very wide range of semantic types for the Goods FE (e.g. *car, liberty, ball, election*) and of adverbial phrases describing potential manners in which the Theft is carried out (e.g., *secretly/surreptitiously, artfully, by trickery, by skill, by force, by unjust means*). The

12. Given this chapter's focus on comparing Change and Theft verbs, I do not define the Theft FCVC in detail as with Change verbs in the previous chapter. I also neither provide detailed MGVEs for (all) Theft verbs nor address grammatically relevant meaning components and subclasses for Theft verbs.

13. These verbs were selected because they exhibit a diverse range of MCs and correspondingly diverse perspectives on the shared Theft semantics. In future work, these verbs can be compared against other Theft verbs to identify grammatically relevant meaning components and subclasses, as shown for Change verbs in the previous chapter.

14. I only present the results of the semantic analysis and do not describe the methodology in detail, given that this chapter focuses on the Change-Theft comparison and that the precise methodology for identifying MCs was demonstrated in Section 4.2.

Table 5.2 Meaning components for English Theft verbs

Verb	Meaning components
steal	n/a
embezzle	**Goods**: (abstract) money or property
	Source/Victim: belongs to an organization or business
	Perpetrator: entrusted with Goods
	Manner: fraudulently
	Purpose: for one's own / personal use
pilfer	**Goods**: in small amounts
	Goods: small items
	Goods: low value
	Manner: stealthily
	Iteration: often again and again
shoplift	**Goods**: displayed goods / merchandise
	Source: a shop or store
	Perpetrator: (pretends to be) a customer
snatch	**Manner**: quickly or with a sudden movement
	Manner: (using force)[a]
	Manner: (unexpectedly, abruptly, etc.)

a. The final two components for *snatch* were extracted from entries that use *take* rather than *steal* as the base verb (modified by adverbials), but nonetheless characterize Theft senses of *snatch*. Non-Theft senses of *snatch* (e.g. rapid, non-wrongful Taking) were excluded from the dictionary analysis, as were any metaphorical uses such as *snatch some sleep* or *snatch a glance*.

generality of *steal* compared to other Theft verbs is further evidenced in that almost all definitions of the other analyzed Theft verbs include the verb *steal* (along with further specifications).

Embezzle: The dictionary entries for *embezzle* include many highly specific adverbial phrases that describe closely interrelated features of the type of Theft event it refers to. Summarizing over the individual dictionary entries, the MCs of *embezzle* specify that the Goods are money or some other abstract financial assets (often belonging to an institution rather than an individual), that the Goods are entrusted to the Perpetrator, and that the Perpetrator uses the Goods for their own personal use.

Pilfer: The definitions for *pilfer* show that it refers to Theft scenarios in which the stolen Goods are small, in small amounts, and/or of low value. It also has two optional MCs (which need not apply to all uses of the verb): the first stating that the Perpetrator acts stealthily and the second noting that the pilfering is done repeatedly (as seen in the adverbial *again and again*; this MC seems to apply particularly to intransitive uses of *pilfer*).

Shoplift: Like *embezzle, shoplift* also has a very rich meaning that is documented in various, interrelated adverbial phrases. Specifically, *shoplift* applies to Theft events in which (someone pretending to be) a customer takes concrete goods on display from a store, shop, or other business, without paying for them. As such, *shoplift* is similar to *embezzle* in that it refers to a very specific type of stealing event.

Snatch: The verb *snatch* is somewhat different than the others discussed thus far, as its definitions refer more frequently to its use as a Taking verb without reference to the illegality/wrongfulness associated with Theft verbs.[15] However, the information provided in non-Theft definitions of *snatch* also apply to its use as a Theft verb (as confirmed through native speaker consultation). Specifically, Theft events described with *snatch* are carried out with speed or quickness, as identified by adverbs in its definitions such as *suddenly, eagerly, hurriedly*, or *with a sudden movement*, among others. Further, one of the definitions specifies that it is often done *by using force*. Given these meaning components, it appears that *snatch* is primarily a verb of taking or grasping but can also be used to describe acts of theft, particularly those involving suddenness or a use of force.

5.2.2 Comparison of English Theft and Change meanings

Having described the meanings of the five Theft verbs under analysis, I now compare the MCs associated with Theft verbs and those of Change verbs. Three interesting differences arise from this comparison. For one, Theft verbs are characterized by a much richer and more numerous set of MCs, leading to an increased diversity of individual verb meanings. Secondly, many of the Theft MCs can be connected to a specific FE – including the peripheral/non-core "Manner" FE – of the Theft frame, whereas the MCs of Change verbs were found to characterize the Change event as a whole rather than constraining or specifying individual participants. Finally, the two classes exhibit interesting differences in terms of how MCs apply to (i.e. restrict or constrain) individual and subsets of verbs across the two classes. Each of these differences is discussed in more detail in the following.

15. In the syntactic analysis, it is not always easy to distinguish whether *snatch* is used to describe a theft or a simple act of taking. I have relied primarily on intuition to distinguish these two interpretations and excluded any examples that could not clearly be seen as describing a (wrongful) Theft scenario.

The Change meaning analysis in Section 4.2 revealed around four MCs that further specify the shared Change semantics of the verb class. The major semantic division among individual Change verbs splits those with the "subtle change" MC (*alter, modify*), those with the "drastic change" MC (*transform, metamorphose*), and general Change verbs with neither of these MCs (*change, turn*). Two other MCs were identified, but each only applied to one verb, namely the "positive change" MC of *transform* and the "purposive change" MC of *modify*.

In contrast, Theft verbs are associated with a much wider range of MCs, including highly complex sets of interrelated MCs.[16] Some verbs specify, with more or less leniency, that the theft involves "concrete goods" (*pilfer, snatch, shoplift*) or "abstract goods" (*embezzle*), or that it involves "low-value goods" (*pilfer, snatch*) or "high-value goods" (*embezzle*), and some verbs specify even more detail about the Goods, such as "goods on display in store" (*shoplift*) or "financial assets" (*embezzle*).[17] Some Theft verbs specify in more or less detail the precise Source or Victim of the Goods, such as the "store as source" meaning component for *shoplift* or the "pocket or purse as source" for *pickpocket*. Other MCs refer to the manner in which the theft is carried out, with adverbial MCs such as "quickly" or "violently" for *snatch*, "repeatedly" for *pilfer*, or "while pretending to be a customer" for *shoplift* (though the latter of these may pertain more closely to the Perpetrator FE). Finally, other MCs specify certain relations between individual aspects or participants (FEs) of the theft scenario, such as the "goods entrusted to perpetrator by victim" MC for *embezzle* or the "perpetrator has easy access to goods" MC for *pilfer* (identified in a secondary analysis and through native speaker consultations). While one could potentially identify numerous other MCs among Theft verbs, this survey alone reveals 14 distinct MCs that further elaborate the shared meaning of the Theft frame. In contrast, the Change meaning analysis only revealed four to six MCs: "subtle change", "drastic change", "positive change" and "purposive change" (which is closely related to "change to improve" and "change to make less extreme").[18]

16. This discussion also mentions Theft verbs that are not part of the core analysis here, but whose meanings can be easily verified through consultation of native speakers and/or dictionary definitions.

17. The verb *rustle* also has a very specific type of Goods, namely cattle or other livestock.

18. Of course, to fully verify this claim, one must investigate all meaning components of every Change and Theft verb. While further analysis may lead to a different number of MCs identified – for instance the addition of the religion-based MCs of *transubstantiate* – it seems unlikely that the MCs of all Change verbs would outnumber those of Theft. For instance, several Theft verbs were excluded from the analysis (e.g. *rustle*), and the semantically rich verbs discussed here could be associated with even more MCs: *shoplift* for instance requires that the Goods belong to the store (and not a person in the store) and that the theft occurs while the store is open.

Not only do the two classes differ with respect to the number of MCs, but also with respect to the overall richness and general nature of these MCs. Specifically, most of the MCs for Change verbs are fairly abstract, vague, and open to subjective interpretation. For instance, one may imagine a nearly infinite range of change scenarios that are compatible with a "subtle change" MC, such as a leaf changing color, a text being slightly reworded, or a person changing their clothing style. The same can be said for the "drastic change" MC and the "change for a purpose/ to improve" MC(s) as a vast array of change scenarios may be viewed as drastic or as having a specific purpose. Furthermore, individual speakers may differ in their interpretation of a specific change scenario as being subtle or drastic, or purposive or non-purposive.[19]

On the other hand, the MCs for Theft verbs are much clearer and more empirically testable. For instance, except on extremely rare occasions, speakers agree on whether an entity falls in the category of "concrete goods" or "abstract goods", and the same is also generally true (though likely with somewhat higher inter-speaker variation) for the "high-value goods" or "low-value goods" MCs. Furthermore, of all the possible theft scenarios, speakers will have a very clear understanding of which scenarios can be described by a given verb (e.g. *shoplift, snatch, embezzle*) and which cannot.

Another noteworthy difference across the classes is that many of the Theft MCs apply to specific FEs of the Theft frame (e.g. small goods for *pilfer*; store as location for *shoplift*), including peripheral/non-core FEs such as the means or manner in which the theft takes place (e.g. suddenly for *pilfer*). This stands in contrast to the MCs for Change verbs, which primarily characterize the event as a whole and cannot clearly be attributed to specific participants of the event. For instance, the "drastic change" MC seems to affect all of the core Change FEs: the cause/agent (if there is one) likely exerts more effort in bringing about the change, the undergoer/theme changes more drastically, and the original and final states of the theme are less closely related to one another.

A further difference between Change and Theft verbs pertains to the distribution of MCs across individual verbs. The six Change verbs discussed in Chapter 4 allowed for a fairly clear separation into semantic subclasses, with the prominent MCs "subtle change", "drastic change", and "general change" verbs forming three fairly uniform verb groups with only minimal semantic differences within the subclasses (e.g. the "purposive change" MC setting *modify* apart from *alter*). In contrast, the five Theft verbs defined above each showed very distinct meanings , precluding the formulation of clear semantic subclasses (at least among these five

19. See also the discussion in Section 3.1 of why the FrameNet distinction between certain FEs such as ATTRIBUTE and CATEGORY are difficult to test empirically.

verbs). While the general verb *steal* is interchangeable with the other four verbs, those verbs refer to quite different types of Theft events, and if semantic subclasses were to be formed (e.g. upon analysis of further Theft verbs such as *swipe* and *snitch*, which seem to share MCs with the analyzed *snatch*), they would be much more numerous and many would contain only one or two verbs.

The distribution of MCs can also be viewed according to the relation between MCs of a verb and the range of scenarios the verb may describe – or their range of application in Snell-Hornby's (1983) terminology.[20] The Change analysis showed that while very specific change scenarios (e.g. *alter clothes*) are consistently expressed by a specific verb, the verb may express countless other change scenarios (e.g. *alter one's opinion, alter a machine*). Conversely, a single change event may often be expressed with multiple Change verbs: a witch may change, turn, or transform a prince into a frog; and the weather may alter, modify, or change the color of leaves. In contrast, certain Theft verbs, particularly extremely high-descriptivity verbs such as *embezzle* and *shoplift*, refer only to very specific theft scenarios and cannot be used for other Theft events that differ from that scenario (**She embezzled the TV from Wal-Mart*; **She shoplifted my wallet from my room*).

This cross-class comparison of MCs raises an interesting observation that should be discussed before moving on. Although no MCs (clearly) apply to verbs of both the Theft and Change classes, it is not difficult to find MCs that apply to verbs of semantically distinct classes.[21] Such MCs include those involving loudness – which applies to *shout* (speak loudly), *chomp* (eat loudly), *rumble* (of a vehicle) – or speed, which applies to *run* (walk fast), *cram* (study fast), and *slam* (drink fast, esp. an alcoholic beverage). Some MC types may also define entire verb classes as well as individual verbs of other classes: for instance, the 'illegality' meaning distinguishes Theft verbs from Taking verbs, but is also found with individual verbs of other frames, such as *murder* (kill illegally), *trespass* (enter area illegally), and *hack* (change computer program illegally). Other candidates for MCs occurring across classes include those relating to sneakiness, abstractness (of agents or themes), carelessness, and others. The question also arises whether such MCs reveal any syntactic effects that are shared by semantically distinct verbs bearing them. One MC that appears to be syntactically relevant across domains is the 'negatively affect a person' meaning, and the corresponding realization of the affected person in an *on* PP, as is found with *cheat on, tattle on,* or *give up on*. A detailed investigation of

20. This view corresponds to the notions of semasiology (i.e. the range of events a given verb can express) and onomasiology (i.e. the range of verbs that can be used to express a given event), as discussed in Section 2.1.

21. I thank an anonymous reviewer for their insightful comments motivating the discussion in this paragraph.

such MCs is unfortunately not possible here, but future research should be conducted to identify which (types of) MCs occur across verb classes and domains, and the extent to which such MCs are grammatically relevant.

In sum, the comparison of meanings across Theft and Change verbs reveals that the MCs of Change verbs are fewer in number and more abstract and general in nature than those of Theft verbs. Furthermore, such a comparison allows not only for an identification of how many MCs characterize verbs of a given class, but it also sheds light into how MCs themselves differ in their nature, in their distribution across verbs (of a class), and in the degree to which they restrict the uses of the verbs bearing them.[22]

5.2.3 Verb descriptivity, frequency, and concreteness

Before moving on with the syntactic analysis, the construct of verb descriptivity as employed here can be clarified by discussing its relation to verb frequency and to psycholinguistic measures of concreteness and imageability.

Verb descriptivity appears to correlate with frequency, albeit with some caveats. Resuming the cross-class comparison, Change verbs appear to occur much more frequently than Theft verbs based on COCA data.[23] The verb *change* occurs 175,680 times in the corpus, whereas *steal* (the most frequent Theft verb) occurs 31,196 times. Further, the frequency of *steal* and eight other Theft verbs amounts to no more than 39,470, less than 25% of the overall frequency of the single verb *change*. In fact, the total frequency of the four Change verbs *alter, change, modify,* and *transform* amounts to 223,106, putting Theft verbs at under 18% the frequency of Change verbs. (*Turn* is excluded from this figure due to its rampant polysemy, but it occurs 308,586 times, and if Change senses account for 25% of its uses – for just over 77,000 instances – the sum frequency of five change verbs amounts to over 300,000.) This discrepancy, combined with the above claim for the low descriptivity of Change verbs, thus suggests a clear negative correlation between descriptivity and frequency. These figures, of course, then prompt the question of the relation between descriptivity, frequency, and real-world scenarios: Change scenarios presumably occur much more frequently than Theft scenarios, so it is natural that Change verbs occur at such a drastically higher frequency than Theft verbs.

22. Dux (2016: 369–376) proposes a categorization of meaning components to capture differences in their semantic richness, in their varying application to verbs (or classes), and in whether they pertain to specific Frame Elements or particular uses of a given verb.

23. The data presented here was accessed from COCA on 6 July 2019. Although it is difficult to clearly establish the exact frequency of each class, given the polysemous nature of (particularly the Change) verbs, such detailed analysis is not required to demonstrate this discrepancy.

Turning to the relative frequency of individual verbs within classes, the most general verbs of each class are again the most frequent. Among Change verbs, *change* is three to four times more frequent than the three higher-descriptivity Change verbs combined (*modify, alter, transform*), with the most frequent of these being *transform* with 22,693 occurrences. (*Turn* also appears to be much more frequent than the descriptive Change verbs, based on the estimate of its Change uses noted in the previous paragraph.) Among Theft verbs, *steal* is far and away the most frequent. All other Theft verbs occur less than 400 times, except for *snatch* (5,331 occurrences) and *swipe* (1,695 occurrences), whose frequency can be attributed to their non-Change senses (described below).

These data strongly suggest a correlation between descriptivity and frequency within a verb class, namely that the least descriptive (i.e. most general) verb(s) within a given class are significantly more frequent than verbs with additional MCs. However, a comparison of non-general verbs (bearing at least one additional MC) within a class reveals that higher descriptivity (i.e. more meaning components) does not directly correlate with frequency. For example, among descriptive Theft verbs (aside from *swipe* and *snatch*), the most frequent are *embezzle* (364 occurrences), *pilfer* (292), and *shoplift* (238) – while the other three occur 161 times or less (*filch* = 161, *misappropriate* = 126, and *purloin* = 67). *Shoplift* and *embezzle* (and its near-synonym *misappropriate*) are the most descriptive of the Theft verbs here, so their higher frequency relative to the others belies a direct correlation between descriptivity and frequency among descriptive verbs. Two factors may account for this data. For one, highly descriptive verbs may be more frequent than somewhat descriptive verbs that are informal and/or register-specific (e.g., *filch, purloin*), because the former's meanings are motivated by the frequent occurrence of such highly specific scenarios occur (e.g. shoplifting, embezzling as opposed to more general theft scenarios) which prompts speakers to use them more frequently. Another factor may arise from a 'division of labor' among descriptive verbs with very similar (sets of) meaning components.[24] For instance, *filch* may be highly infrequent because it is highly informal and also competes with other "hand-motion" Theft verbs such as *swipe* and *snatch*. This can also be seen in the Change frame, where the combined frequency of near-synonymous *alter* and *modify* is nearly equal to that of *transform*, which has the same level of descriptivity but does not compete with a near synonym (aside from *metamorphose* which is rather formal and technical).

24. Similarly, *embezzle* and *misappropriate* are near-synonymous, so the frequency difference cannot clearly be due to differences in descriptivity level. Instead, the lower frequency of the latter may be due to a higher level of formality and association with technical ('legalese') register, so speakers in non-technical domains would more frequently use the more general *embezzle*.

Having assessed the relation between verb descriptivity and frequency, I now briefly compare the construct of descriptivity with similar concepts from the fields of psycholinguistics and language acquisition, including "Concreteness" and "Imageability". Concreteness pertains to the degree to which a word's meaning can be understood via sensory experience (touch, sight, sound, smell). A concrete word is opposed to an abstract word, whose meaning can only be characterized linguistically, i.e. by using other words (cf. Brysbaert et al. 2014). Similarly, imageability refers to "the degree of effort involved in generating a mental image of something" (Scott et al. 2019). These constructs thus differ from verb descriptivity, in that a verb may have a more descriptive meaning (i.e. more meaning components) even if its meaning does not pertain to sensory experience or lend itself to a mental image. To demonstrate, *embezzle* (and *misappropriate*) have more and richer MCs than *steal* and are thus of higher descriptivity, yet the MCs defining them (i.e. the abstract Goods and distance between Perpetrator and Victim) specify that the theft event is less concrete and thus less easily 'imageable' than those expressed with *steal*. As such, these high-descriptivity verbs receive lower concreteness and imageability ratings than low-descriptivity *steal*, thus demonstrating the difference between these ratings and verb descriptivity.[25] However, it should be noted that concreteness and imageability may be useful in differentiating verb classes (rather than individual verbs). For instance, the concreteness ratings for Theft verbs appear to be (on average) higher than those for Change verbs, thus suggesting that higher-descriptivity verb classes (e.g. Theft) are more concrete and imageable than low-descriptivity classes (e.g. Change).[26]

5.3 Comparing English Theft and Change valency constructions and their features

As discussed in Section 5.1.3 above, previous studies of verb descriptivity (Snell-Hornby 1983; Boas 2008b) give reason to assume that Theft verbs are associated with a more restricted range of valency constructions (VCs; cf. Section 4.3) than

25. *Steal* has a concreteness rating of 3.84 in Brysbaert et al. (2014), which is much higher than the concreteness ratings for *embezzle* (2.69) and *misappropriate* (1.85). A similar discrepancy is found in the imageability ratings assigned by the Glasgow Norms (Scott et al. 2019) to *steal* (4.546) and *embezzle* (3.031) (no score was provided for *misappropriate*).

26. The concreteness ratings in Brysbaert et al. (2014) for Theft verbs (excluding *embezzle* and *misappropriate*) are between 3.19 and 3.86, and thus much higher than those for Change verbs, which range from 2.41 to 3.44 (or only to 3.07, as *turn* has a score of 3.44 but this score may apply to or include non-Change senses of *turn*).

Change verbs due to their higher degree of descriptivity. This section therefore presents the results of a corpus analysis of VCs occurring with Theft verbs. The analysis allows for both a general comparison of the number and types of VCs across the classes and for the identification of specific differences among individual VCs and features of VCs.

5.3.1 Valency constructions of English Theft verbs

The valency behavior of English Theft verbs is assessed using data from the *Corpus of Contemporary American English* (COCA; Davies 2008–). I documented the VC of 58 to 110 examples for each of the five verbs *embezzle, pilfer, shoplift, snatch,* and *steal*. The exact number of examples analyzed for each verb is provided in Table 5.3.[27]

Table 5.3 Number of corpus examples analyzed for English Theft verbs

Verb	**# analyzed**
embezzle	103
pilfer	58
shoplift	64
snatch	86
steal	110
Total	**421**

The methodology for documenting valency behavior is described and demonstrated in Section 4.3. As a brief review, VCs are documented by identifying the phrase type and grammatical function of each core FE. Table 5.4 shows how the mapping of grammatical functions (GF), phrase types (PT), and Frame Elements (FE) is documented based on a prototypical (invented) Theft sentence.

Table 5.4 Documentation of VCs based on mapping of GF, PT, and FE

Example	*Pat*	*stole*	*money*	*from Sam.*
FE	Perpetrator	verb	Goods	Victim
GF	Sbj		Obj	Obl
PT	NP		NP	fromPP

27. Because this chapter's focus is on comparing the general valency behavior of the entire verb classes, I draw on fewer corpus examples than in the preceding chapter and do not discuss the valency distribution of Theft verbs in detail. The Supplementary Materials include the analyzed sentences and their valency constructions.

In Table 5.4, *Pat* instantiates the Perpetrator FE and is syntactically a subject noun phrase, *money* instantiates the Goods FE and is a nominal object, and *from Sam* instantiates the Victim FE and is an oblique PP headed by *from*. The VC exhibited by the sentence is given in full format in (5.3a) and simplified format in (5.3b).[28]

(5.3) a. [P.NP.Sbj + verb + G.NP.Obj + V.fromPP.Obl]
b. [P _ G from V]

The full list of VCs with simple invented examples demonstrating them is provided in Table 5.5. Intransitive VCs are listed before transitive VCs, and VCs realizing oblique Source, Victim, and Source/Victim FEs are listed in that respective order. The end of the table (#14–#17) lists VCs that are infrequent and seem unusual for Theft verbs in some way.[29]

As discussed in the previous chapter, this list of VCs can be viewed as the "constructional range" of the Theft frame-constructional verb class. Given the present chapter's focus on broader differences in the meaning and syntax of Theft and Change verbs, I briefly discuss the features of Theft VCs but forego a detailed discussion of the constructional range (e.g. the interrelations among individual VCs and the constructional range's network structure) but refer the reader to Section 4.3.2 for a such a discussion for Change verbs.

As with the VCs characterizing the Change verb class, Theft VCs can also be categorized according to valency features. The first major distinction among the VCs is between intransitive VCs (#1–#5 and #17 in Table 5.5), which realize only a subject Perpetrator, and transitive VCs (#6–#16). In most cases, transitive VCs additionally realize the Goods FE as direct object (#6–#14), but in rare cases the Source FE (#15) or Source/Victim FE (#16) may appear as the direct object.

Another distinction separates VCs with no oblique (prepositional) arguments (#1, #6, #15–#16) from VCs that realize an oblique argument (#2–5, #7–14, #17). VCs that include oblique arguments can be further classified according to which

28. Simplified VC formats are employed in the remainder of this chapter, unless otherwise noted. The distinction between simplified and full VC formats and theoretical implications thereof are discussed in Sections 4.3 and 4.4, respectively. In the present analysis, I do not posit separate VCs for cases in which one FE occurs within the phrase instantiating another FE, typically as a possessor using a possessive form (*He stole her goods/the woman's goods*) or an *of* PP (*He stole the goods of the woman*). I discuss the implications of this choice later in this section.

29. Examples from the COCA corpus instantiating these VCs include the following:

(#15) *[…] now that they can stay with me […], pilfer the garbage dumps, collect bottles, […]*
(#16) *Someone is attempting to pilfer this company!*
(#17) *And not five minutes after their son died, they were pilfering through things (their son) owned.*

Table 5.5 VCs of English Theft verbs ("Constructional Range of the Theft FCVC")

VC #	Valency construction	Example
1	P _	*Pat stole.*
2	P _ from S	*Pat stole from the house.*
3	P _ at S	*Pat stole at the house.*
4	P _ from V	*Pat stole from Sam*
5	P _ from S/V	*Pat stole from Wal-Mart.*
6	P _ G	*Pat stole the jewelry.*
7	P _ G from S	*Pat stole jewelry from Sam.*
8	P _ G at S	*Pat stole jewelry at the house.*
9	P _ G off (of) S	*Pat stole off (of) the table.*
10	P _ G out of S	*Pat stole out of the box.*
11	P _ G from V	*Pat stole jewelry from Sam.*
12	P _ G away from V	*Pat stole jewelry away from Sam.*
13	P _ G off (of) V	*Pat stole jewelry off (of) Sam.*[a]
14	P _ G from S/V	*Pat stole jewelry from Wal-Mart.*
15	P _ S	*Pat pilfered the store.*
16	P _ S/V	*Pat pilfered the company.*
17	P _ through G	*Pat stole through the jewelry.*

a. VC #13 was not attested in the main dataset, but examples can be readily found in corpus data, such as the following sentences found in COCA: *Lou* ***snatched*** *the rifle* ***off me*** *[…]*; *Hayes* ***snatches*** *the gun* ***off him*** *[…]*. This VC can also be used in intransitive contexts*: That's not the point, but she has* ***stolen off of me*** *before*.

FE instantiates the oblique, setting apart those with prepositional Source (#2, #3, #7–10), Victim (#4, #11–13) and Source/Victim (#5, #14) arguments.

A further distinction among VCs involving oblique/prepositional arguments can be made regarding the specific preposition used to introduce the FEs: the Source FE can be realized in a *from* PP (#2, #7), an *at* PP (#3, #8), an *off (of)* PP (#9), or an *out of* PP (#10). The Victim FE is most typically realized in a *from* PP (#4, #11) but may, with certain Theft verbs, also appear in *away from* PPs (#12) or *off (of)* PPs (#13). Oblique Source/Victim arguments are consistently realized in a *from* PP (#5, #14). [30]

30. An anonymous reviewer argues that separate VCs should not be posited for distinct prepositions (i.e. that constructions employing *from, (off [of],* and *out of)* should be categorized as a single VC). While such an approach may make sense at a higher level of abstraction, it does not align with the detailed, bottom-up analysis undertaken here. For one, the VCs exhibit semantic differences, as different types of Source/Victim nouns occur with the different prepositions, and

The three final VCs in Table 5.5 above are highly infrequent and were found only with the corpus data of *pilfer*. These include a transitive VC realizing the Source as direct object (#15) and a transitive VC realizing the Source/Victim as direct object (#16). These constructions are identical to those observed for Robbery verbs such as *rob* and *mug*.[31] *Pilfer* was also found in an intransitive VC in which the Goods is realized in a *through* PP (#17).[32]

It should be noted that the VCs proposed here are characterized using the three specific FEs capturing differences between the Source, Victim, and Source/Victim FEs. On this approach, multiple VCs are proposed for a single syntactic configuration (of phrase type and grammatical function). For instance, while VCs #2, #4, and #5 all have the same syntactic form of [N _ from N], three separate VCs are posited based on differences in the semantic type of the entity (e.g. location, animate entity, abstract entity such as a business, respectively). While these different role types could be viewed as instances of a single role, as they all express the original location or possessor of the stolen goods, the semantic differences between the roles influences their syntactic properties with respect to other valency features. For instance, Source FEs can be expressed with (at least) three different prepositions (*from, off (of), out of*), Victim FEs are normally expressed in *from* PPs but may also be expressed in *off (of)* PPs in certain contexts, and Source/Victim FEs may only be expressed in *from* PPs. I thus follow suggestions from recent work in Valency Grammar (esp. Faulhaber 2011) which emphasizes the importance of distinguishing valency patterns (her terminology) with respect to fine-grained semantic role distinctions, and I posit different VCs for the each of the three role types. However, this methodology has implications for establishing the precise number of VCs available to Theft verbs, as described presently.

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the distribution of each VC (preposition type) may reflect differences in verb meanings. The present approach also facilitates a fair comparison across the classes, as distinct Change VCs are also posited on the basis of distinct prepositions *(to, into)* introducing the F argument. However, it should be noted that the prepositional phrase variants with *of* (e.g. *off X* and *off of X*) are grouped into a single VC, because they do not (appear to) exhibit any semantic difference but seem to relate more to prosody or formality.

31. Robbery verbs are discussed in Section 3.1.2; see also Goldberg (1995: 45–48) and Dux (2018).

32. This VC is likely only possible with specific Theft scenarios, such as those in which a perpetrator may choose from multiple items to steal.

5.3.2 Comparing English Theft and Change VCs and issues in delimiting VCs

Having established the range of VCs for English Theft verbs and discussed various properties thereof, I now compare these against the VCs associated with Change verbs. I first discuss the overall number of VCs for each class and the difficulties in establishing this number precisely, and then I address how specific VCs and the syntactic properties defining them reveal interesting differences when they occur with verbs of the two different classes. To aid the reader, the VCs identified for Change verbs in the previous chapter are repeated in Table 5.10.

Table 5.6 Valency constructions of English Change verbs (cf. Table 4.16)

VC #	VC	Example
1	C _ U	*Pat changed Sam.*
2	C _ U into F	*Pat changed Sam into a frog.*
3	C _ U to F	*Pat turned Sam to stone.*
4	C _ U F.CP	*Pat changed it to do something different.*
5	C _ U from O into F	*Pat changed Sam from a person into a frog.*
6	C _ U from O to F	*Pat changed Sam from a prince to a frog.*
7	U _	*Sam changed.*
8	U _ into F	*Sam changed into a frog.*
9	U _ to F	*Sam turned to stone.*
10	U _ from O into F	*Sam turned from a prince into a frog.*
11	U _ from O to F	*Sam turned from a prince to a frog.*
12	C _ U F.result	*Pat turned Sam blue.*
13	U _ F.result	*Sam turned blue.*

The first observation arising from a comparison of Theft and Change VCs is that only two syntactic patterns appear with both verb classes.[33] These are the simple intransitive construction with form [N V] (labeled #1 for Theft, #7 for Change) and the simple transitive construction with form [N V N] (#6 for Theft, #1 for Change). These are likely the most common active constructions in English, as they occur with virtually every intransitive and transitive verb, respectively. Apart from these two constructions, no other VCs are syntactically identical across the classes.

33. I use the terms (*syntactic*) *pattern* or or *construction* to describe constellations of phrase types and grammatical functions independent of the FEs/semantic roles they instantiate. These constructs serve to compare syntactic features of semantically distinct classes and thus differ from *valency constructions*, which include specifications of the (FEs defining a) verb class.

This vast discrepancy suggests that a verb's semantic class is in fact syntactically relevant. That is, while the previous chapter emphasized that verbs within a given class exhibit significant differences in valency distribution, this comparison of the VCs associated with two semantically distinct classes highlights the syntactic uniformity of semantically similar verbs. That members of verb classes can be seen as exhibiting both uniformity or diversity, depending on whether they are compared against one another or against other classes, further emphasizes the need for analyses at varying levels of granularity (see Croft 2003; Boas 2011b; Herbst 2014; cf. Sections 3.2–3.3), such as those demonstrated in the previous chapter.

Delimiting VCs

While it is plain to see that the syntactic forms of Change and Theft VCs are very different, comparing the number of VCs for the two verb classes is complicated by various factors. The analysis above identified 17 distinct VCs for English Theft verbs, whereas the Change analysis revealed 13 distinct VCs. Thus, at first glance it appears that Theft has a wider range of VCs than Change. However, a direct comparison of this type is not so straightforward. Three issues complicate establishing the precise number of VCs for each class: the delimitation of closely related FEs, variations in phrase-type realizations of a single argument, and the status and nature of infrequently occurring VCs. I address each of these issues below, before assessing which class exhibits greater options for argument realization.

The first issue relates to the degree to which FEs are characterized according to semantic features (e.g. semantic role (sub-)types) or syntactic features. As noted above, several Theft VCs exhibit the same syntactic form but differ only with respect to the semantic type of arguments. For instance, the transitive + *from* [N V N from N] pattern and the intransitive + *from* [N V from N] pattern each correspond to three different Theft VCs, depending on whether the *from* PP argument realizes the Source, Victim, or Source/Victim role. If one were to conflate such VCs (or the FEs characterizing them), the number of VCs for Theft verbs would be lowered from the 17 proposed above to 11, a lower figure than the 13 VCs posited for Change verbs. Table 5.7 shows the constructional range of Theft verbs when the three Source/Victim-type FEs are conflated to a single FE (labeled O as shorthand for "Original_Location").

This conflated view of Theft's constructional range is more comparable to that proposed for Change verbs in the previous chapter. Recall that the Change verb analysis eschews the rich and complex FE distinctions posited by FrameNet (see Sections 3.1 and 4.1). The two FrameNet FEs corresponding to transitive subjects of Change verbs – separating animate AGENT and inanimate CAUSE FEs – were conflated into a single coarser-grained Cause_change FE in my analysis. I also conflated FrameNet's distinction between ENTITY FEs (which undergo categorical

Table 5.7 VCs of Theft verbs with three Source/Victim-type FEs conflated to one FE

VC	Example
P _	Pat stole.
P _ from O	Pat stole from the house.
P _ at O	Pat stole at the house.
P _ G	Pat stole the jewelry.
P _ G from O	Pat stole jewelry from Sam.
P _ G at O	Pat stole jewelry at the house.
P _ G off (of) O	Pat stole off (of) the table.
P _ G out of O	Pat stole out of the box.
P _ G away from O	Pat stole jewelry away from Sam.
P _ S	Pat pilfered the store.
P _ through O	Pat stole through the jewelry.

changes) and ATTRIBUTE FEs (which change only with respect to some value) into a single coarser-grained Undergo_change FE. If one were to posit distinct VCs for each of these FE pairs (as was done with the Source/Victim-type roles of Theft in Table 5.5), then the number of intransitive Change VCs would double (requiring separate VCs for ENTITY and ATTRIBUTE subjects) and the number of transitive Change VCs would quadruple (to account for FrameNet's AGENT and CAUSE FEs). This multiplication of Change VCs would further increase when FrameNet's finer-grained distinctions among my Original_state and Final_state FEs (i.e. four FrameNet FEs: INITIAL_VALUE, FINAL_VALUE, INITIAL_CATEGORY and FINAL_CATEGORY). As such, by looking only at the syntactic form of VCs, the number identified for Theft would decrease slightly to 11 VCs; conversely, by positing separate FEs for sets of related participants, the number of VCs for Change would increase exponentially.

The second issue surrounding the enumeration of VCs for a given class relates to the different phrase types that may realize a given FE in a given VC. As discussed in Section 4.3 in the context of "allostructions", the arguments of a given Change VC have "default" realization types (e.g. NP for subjects and objects, N for arguments within PPs) but may also appear in "non-default" realizations in which the phrase type is different, as in *Learning German changed how I think* or *He changed from sad to happy*. The list of 13 Change VCs in Table 5.6 does not include separate VCs for each possible non-default realization (because accounting for this would have greatly increased the number of VCs and consequently decreased the clarity of the analysis), but the number of VCs for the Change frame would be exponentially larger if separate VCs were posited for each distinct realization type. For example, rather than positing a single simple transitive VC (i.e. [Cause_change + verb + Undergo_change]) and stating that Cause_change has a default realization of NP, one would posit at least five separate VCs to account for phrase-type differences in the Cause_change subject (noun, gerundial verb, *that* clause, *to* infinitival clause, *for-to* clause). These five VC types would be further multiplied for potential phrase-type differences in the Undergo_change object. Further additional VCs would need to be posited for adjectives occurring in PPs, nouns as resultative phrases, and so forth, thus resulting in a list of Change VCs numbering well above 100.

With the Theft class, however, non-default realizations are extremely rare, and each argument is almost always a NP or a noun within a PP.[34] However, the VC list of Theft verbs shown in Table 5.5 above would increase slightly, if one were to posit separate VCs to capture cases in which multiple FEs are expressed within a given constituent. Specifically, the Source/Victim-type FEs and the Goods FE can cooccur in a single constituent by means of various possessive constructions (e.g. possessive pronouns, genitive *-'s*, and *of* PPs). Possible combinations include the Victim possessing the Goods (5.4a), the Victim possessing the Source (5.4b), the Source/Victim possessing the Goods (5.4c), and the Source/Victim possessing the Source (5.4d).

(5.4) a. Pat stole *Sam's wallet / the wallet of Sam*.
b. Pat stole money *from Sam's wallet*.
c. Pat stole *the company's money / the money of the company*.
d. Pat stole money from *the company's account*.

However, apart from these possible additions to the VC list of Theft verbs, I did not identify any other candidates for additional VCs based on phrase type distinctions or possessive incorporation.[35] Thus, by splitting the proposed VCs into separate VCs based on such features, the number of VCs for the Theft frame would only increase slightly (by four, or by six if one distinguishes the genitive *-'s* and the *of*

34. The difference in the number of phrase types that can realize arguments of Change and Theft is likely related to how changes can be caused and undergone by virtually anything (even abstracta), and states can be realized in very different ways. In contrast, Theft events almost always involve (primarily concrete) entities. This observation is interesting because the phrase-type changes appear at first glance to follow from non-semantic, grammatical principles (e.g. construing a verb phrase as a noun), but this comparison shows that the semantic aspects of a frame/verb class determine this behavior.

35. Interestingly, Source FEs cannot be expressed as a possessor of the Goods thus providing a further syntactic distinction between Source and Source/Victim FEs, which may be realized as such: *Pat stole the store's profits.* vs. **Pat stole the table's wallet.*

PP possessive forms). This increase is drastically lower than that described for Change verbs above.

To demonstrate that Change VCs are more formally diverse than Theft verbs with respect to the phrase types in which arguments are realized, Table 5.8 shows how many VCs could be posited based on the simple transitive construction (consisting of only the subject, verb, and direct object) for each class when phrase-type differences are accounted for, with the relevantly changed argument marked in bold. The VC labels show the arguments' FE label and phrase type (but not the grammatical function specifications, e.g. subject, object). For the Theft verbs, I listed various possessive constructions (e.g. *my wallet; the wallet of the woman*; with the possessor phrase underlined) as different variants of the simple transitive construction.

Table 5.8 Phrase type realizations of simple transitive VCs for Change and Theft

Change VCs	**Examples**	**Theft VCs**	**Examples**
[C.NP _ U.NP]	***It*** *changed everything.*	[P.NP _ G.NP]	*He stole it.*
[C.VPing _ U.NP]	***Doing it*** *changes everything.*	[P.NP _ V.poss-pron G.NP]	*He stole* ***<u>my</u> wallet****.*
[C.toVP _ U.NP]	***To do it*** *changes everything.*	[P.NP _ V.NPgen G.NP]	*He stole* ***<u>Pat's</u> wallet****.*
[C.for-toVP _ U.NP]	***For him to do it*** *changes everything.*	[P.NP _ G.NP V.ofPP]	*He stole* ***the wallet <u>of Pat</u>.***
[C.thatCP _ U.NP]	***That he did it*** *changes everything.*	[P.NP _ G.whCP]	*He stole* ***what I had.***
[C.whCP _ U.NP]	***What you did*** *changes everything.*		
[C.NP _ U.whCP]	***It*** *changes* ***how I think.***		
[C.VPing _ U.whCP]	***Doing it*** *changes* ***how I think.***		
[C.toVP _ U.whCP]	***To do it*** *changes* ***how I think.***		
[C.for-toVP _ U.NP]	***For him to do it*** *changes* ***how I think.***		
[C.thatCP _ U.NP]	***That he did it*** *changes* ***how I think.***		
[C.whCP _ U.NP]	***What you did*** *changes* ***how I think.***		

The table demonstrates that, for a single construction, Change verbs allow a much wider range of phrase type realizations of both the subject and object than Theft verbs. Specifically, given the wide variety of phrase types that may instantiate the C and U arguments of Change verbs, the single simple transitive construction can be seen as a generalization over (at least) 12 different specific constructions. For Theft, however, the subject P argument may only be realized as a NP, and the (generalized) object G argument may appear in four different specific phrase-type forms.[36] As such, the Theft simple transitive construction is a generalization over five specific constructions. So here again, as with the delineation of related fine-grained FEs, changing the method for enumerating VCs by positing different VCs for different phrase type realizations would lead to a highly significant increase in Change VCs and only a minimal increase in Theft VCs. This finding further supports the conclusion that Change verbs are more flexible than Theft verbs with respect to valency behavior. [37]

A final factor that complicates the enumeration of VCs for a given verb class relates to the frequency of VCs. Specifically, the VCs listed above include every distinct VC attested in the corpus data regardless of its frequency. However, the data clearly show certain VCs of a given class are highly infrequent relative to others. 10 of the 17 Theft VCs occurred only four or fewer times in the 421 analyzed

36. Such possessor relations could also be identified for Change verbs if one were to employ the rich set of FEs posited by FrameNet. Specifically, in a sentence such as *He changed his appearance*, the entire object noun phrase instantiates an ATTRIBUTE FE and the possessive pronoun instantiates the ENTITY FE. Here again, an equal treatment of the two frames would lead to a much wider range of VCs for the Change verbs than Theft.

37. From a theoretical perspective, this phenomenon would be of little interest for proponents of (generalized) role-based approaches (cf. Section 2.2), in which the variation in formal realization of a given argument would be attributed to the (generalized) role of the argument. For instance, the syntactically flexible C of Change is an instance of the "Cause" semantic role, whereas the P of Theft is an "Agent" role which exhibits a narrower range of formal realization types. On this view, there would be no need to specify this variation as a property of specific verb classes aside from labeling their arguments with semantic roles. While this approach may help to broadly define the difference between Theft and Change arguments, it would require a theory of generalized semantic roles, which not only contradicts the integrative, non-modular view espoused in constructional approaches but was also demonstrated in Section 2.2 to not adequately account for the types of data discussed in this study. Two issues specific to this case also apply to the role-based approach: simplifying the difference in subject types to that between Agent and Cause would preclude an account of instances in which the arguments are syntactically and/or semantically similar across the two classes (e.g. in which the C of Change is a NP and/or "Agent") and it would preclude the investigation of subtler differences in a given role type within a verb class or across classes of a given domain (cf. the comparison of Change verbs proper with more specific change-of-state verbs in Section 4.4.2.). It should also be noted that the present approach does not posit separate VCs for the argument-internal variation; they are only mentioned in the present discussion to further demonstrate the subtler nuances across these two verb classes. I thank an anonymous reviewer for bringing this to my attention.

examples.[38] If such VCs were removed from the analysis due to their low relative frequency, a mere seven distinct VCs for the Theft frame would remain. If we also eschew the semantic distinctions between the Source/Victim-type FEs, as described above, only four formally distinct VCs would remain for the Theft class: [N V], [N V from N], [N V N], and [N V N from N].

The Change VCs would also decrease if one were to remove VCs that are highly infrequent. Of the 13 VCs listed in Table 5.6, six of them occurred fewer than seven times in the 549 analyzed English Change examples.[39] The remaining seven VCs, however, were each formally distinct, so Change is associated with seven frequently occurring and formally distinct VCs, as opposed to four for the Theft verbs. Furthermore, based solely on my native speaker intuitions, several of the infrequent VCs of Theft do indeed sound somewhat odd (e.g. *He pilfered the garbage dump; He pilfered through the jewelry*). In contrast, the infrequent Change VCs sound quite natural and their infrequency was not intuitively expected, e.g. *She turned him to stone* (2 occurrences in corpus), *She changed him from a prince into a frog* (6 occurrences), *He turned to stone* (5 occurrences), *He changed from a prince into a frog* (0 occurrences). In sum, Theft events are frequently expressed in only four distinct syntactic configurations and infrequent VCs are highly marked, while Change events are frequently expressed in seven distinct VCs and the infrequent VCs appear natural and unmarked. Here again, the data suggest that Change verbs exhibit a wider range of valency behavior than Theft verbs.[40]

In summary, several complications arise in determining precisely the number of VCs available to a given verb class. While a cursory look at the VCs for each class suggests that Theft verbs appear in a wider range of VCs than Change verbs, a closer investigation of methodological issues surrounding the definitions and granularity levels of VCs reveals quite the opposite. In discussing methods for adjusting the number of VCs for a verb class based on the treatment of semantically related FEs, of variation in a given FE's formal realization, and of infrequent VCs,

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38. VC #15 (in Table 5.5) occurred four times in the corpus analysis. VCs #3, #9, #10, and #12 each occurred three times. #16 occurred twice. VCs #5, #8, and #17 each occurred only once. VC #13 was not identified at all in the main corpus analysis, but only through a manual search of COCA.

39. The data included six instances of VC #5, five instances each of #6 and #9, four instances of #11, two instances of #3, and zero instances of #10 (the last of which being identified through a manual search of COCA).

40. Recall that the analysis of *metamorphose* in Section 4.6 revealed three additional VC types that were not identified in the main corpus analysis and thus not included in the initial formulation of the Change constructional range, shown in Table 5.6 above. These additional VCs provide even further evidence that Change is associated with a broader range of VCs than Theft.

it was found that the number of Change VCs would increase drastically while that of Theft VCs would either increase only slightly or decrease. These findings thus demonstrate that Change verbs have a much wider range of options for argument realization than Theft verbs, thereby corroborating Boas's (2008b) observations that high verb descriptivity corresponds to narrow constructional distribution and showing that it applies not only to distinct verbs within a given class, but also to distinct classes of verbs.

5.3.3 Frame-sensitive syntactic features

Having discussed in general the number and nature of Change and Theft VCs, I now address some interesting differences among formally related (or identical) syntactic features that likely result from their cooccurrence with verbs of different semantic frames. I first discuss differences in the semantics of intransitive constructions, relating these differences to which aspects of the semantic frame the construction profiles across classes. I then discuss the number and types of prepositions that introduce FEs of the two frames, focusing on the *from* PP which occurs with both verb classes. Finally, I discuss differences in the interpretation of purposive subordinate clauses and their implications for identifying and positing valency constructions.

Among the numerous Change and Theft VCs, only two syntactic configurations characterize VCs of both classes: the simple transitive [N V N] and simple intransitive [N V] constructions.[41] The interpretation of the transitive construction is relatively comparable across the two verb classes: that is, its interpretation can be described at a coarse-grained level such that it accurately describes the interpretation of the construction when it appears with verbs of either class. Specifically, the construction [N_1 V N_2] can be interpreted as: N_1 acts on N_2 in the way described by the verb, and N_2 changes as a result of the action. For Change verbs, N_1 changes N_2 and N_2 becomes different. For Theft verbs, N_1 takes/steals N_2 and N_2 changes with respect to its possessor: it is now possessed by N_1 (the Perpetrator) rather than the Victim.

In contrast, the intransitive construction does not allow for a (useful) uniform semantic characterization that accounts for its cooccurrence with both Change and Theft verbs. Instead, its interpretation can only be accounted for with reference to a frame-semantic verb class and its associated constructional range. The subject of intransitive Change VCs (*Pat changes*) becomes different in some way and does not (necessarily) have an agentive interpretation, as is also the case with

41. For more on different types of transitivity constructions, see Comrie (1978), Dixon (1979, 1994), and Croft (2001: Chapter 4).

the large class of change-of-state verbs such as *break, grow,* or *redden*.[42] In contrast, the subject of intransitive Theft VCs (*Pat steals*) does not become different but instead maintains the agentive interpretation it has in transitive contexts.[43] Here, it is difficult to posit a definition that accounts for the interpretation of the intransitive construction across both verb classes, even using highly abstract characterizations such as "N does something", "something happens to N", or any others. This demonstrates that a single syntactic configuration may render very different interpretations when it combines with verbs evoking different semantic frames. The interpretation of the intransitive also requires comparison with other constructions associated with a given verb class. That is, the transitive object of Change verbs (the Undergo_change FE) corresponds to the subject of the intransitive construction, whereas the subject (Perpetrator) remains consistent across transitive and intransitive uses of Theft verbs.

Semantically, the intransitive Change and intransitive Theft VCs can be characterized according to which aspects/portions of the semantic frame they highlight. (5.5) below shows the frame-based definitions (including FEs) for the two classes, with bold font marking the portion of the frame profiled by the intransitive construction, square brackets marking the portions of the frame that are not expressible using the intransitive construction, and italic font marking the portions that are compatible with the intransitive construction in that they may appear as additional oblique arguments (e.g. *He stole from me; She changed into a frog*).

(5.5) a. **Perpetrator takes** [Goods] *from Victim or Source*
b. [Cause_change acts such that] **Undergo_change changes** *from Original_state to Final_state*

The semantic relation between the Theft intransitive VC and the Theft frame is represented in (5.5a). This VC focuses on the Perpetrator carrying out the taking/stealing act, as it is realized as subject. The Goods are semantically out of focus in this VC and are not formally realized, while the original Source or Victim of the frame may potentially combine with the intransitive VC. In contrast, the Change intransitive VC focuses on the Undergo_change participant undergoing the

42. Of course, the intransitive subjects of change verbs may have an 'intentional' interpretation in some contexts, particularly when the subject is human or otherwise sentient subjects (e.g. *I want to change*). However, these represent only a small proportion of the myriad contexts for Change verbs.

43. Depending on the extra-linguistic and linguistic context (especially with respect to tense-aspect-modality features), intransitive VCs with Theft verbs may involve a habitual interpretation (*He always steals*) or describe a specific event without mentioning what the Goods are (*He stole because he was broke*).

change, while the transitive subject Cause_change argument is out of focus, and the Original_state and Final_state may combine with the simple intransitive VC. These data show that the different semantic interpretations that arise when highly abstract argument structure constructions (such as the simple (in)transitive construction) occur with verbs of different semantic classes can readily be accounted for with reference to the verb's semantic frame.[44]

The second comparison pertains to the types of prepositions used to introduce oblique arguments across the two classes. While the Change verbs had a limited set of PPs to introduce O (*from*) or F (*in, into*), the PPs for introducing the Victim and Source FEs of the Theft class exhibit wider variation. Specifically, the Source/Victim-type FEs can variably be expressed using *from, away from, off (of), out of*, or (at least in one case) *through* PPs. This wider variety of prepositions for Theft FEs may be due to the "spatial" semantics of Theft, whereby stolen Goods not only change possession but, in many cases, also their location. That is, Goods can be stolen *from* or *off of* tables; *from* or *out of* bags; etc. In contrast, the State FEs (O and F) of Change refer to abstract states and categories which are less likely to be associated with locations and are thus expressed with a much narrower range of prepositions that fulfill more generic "grammatical" purposes.

The *from* PP cooccurs with verbs of both classes, introducing the Original_state of Change and the Victim/Source-type FEs of Theft. The question thus arises regarding the semantic similarity of these FEs and of *from* when used across classes. At a highly abstract level, the *from* PP can be viewed as similar across the classes, in that it expresses a property which another FE previously exhibited but no longer exhibits after the event (i.e. Victim possessing Goods, Undergo_change exhibiting Original_state). However, the property in question differs drastically across the two classes. For Theft verbs, the property expressed by the *from* PP is the original possessor (Victim) or location (Source) of the Goods FE, with the Goods no longer being possessed by or located at the entity expressed in the *from* PP. In contrast, the property expressed by *from* PPs with Change verbs is semantically much more general, referring to the category or a value of one of the attributes of the Undergo_change FE.

The *from* PP also differ across the two classes with respect to its cooccurrence with other arguments/FEs. Specifically, the Original_state argument introduced by

44. While similar phenomena surrounding constructional polysemy have been discussed by Goldberg (1995) and treated using Frame Semantics by Boas (2008a, 2011a) and Dux (2018) (see Section 3.2), the field has yet to systematically compare such basic constructions across more distinct verb classes/semantic frames and address their varying interpretation using frame and FE definitions. The method above of situating the construction's interpretation into a frame definition must be further developed and tested on other constructions and verb classes but may prove useful in both defining constructions and classifying semantic frames.

from can only occur when both the Undergo_change and the Final_state are also expressed, whereas the Victim/Source-type FEs introduced by *from* typically only need the subject Perpetrator FE to be expressed (though in some cases no other FE need be expressed, as with passive and infinitival uses).[45] Thus, while the *from* PP exhibits similar semantics across the classes at a very abstract level, its specific interpretation and relation to other arguments/roles differs drastically across the two classes. As with the above discussion of (in)transitive construction(s), this comparison shows that the interpretation of a given syntactic structure (i.e. *from* PP) depends on the meaning of the verb it occurs with, thus further emphasizing the need for a frame-semantic approach to verb classes.

A final syntactic feature exhibiting interpretational differences across Change and Theft verbs are purposive subordinate clauses. Purposive clauses, such as those introduced by phrases such as *(in order) to* or *so (that)* are generally viewed as 'adjuncts' that can cooccur with virtually any verb and have a consistent interpretation across contexts and verb classes.[46] However, a comparison of such clauses when used with Change and Theft verbs reveals interesting differences in their interpretation. Consider the two sentences in (5.6) and their typical interpretation (following the arrow), which each include a purposive clause and differ only with respect to the verb.

(5.6) a. They modified the crops to grow. → The crops grow.[47]
b. They stole the crops to grow. → They grow.

With the Change verb in (5.6a), the purposive clause applies to the object of the sentence, specifying that the crops grow as a result of the change.[48] In contrast,

45. The following sentences identified in COCA include only the *from* PP argument (expressing Source or Victim) and no other FEs: *Stealing from robots was easy pickings, the kind of pickings Gil liked best.*; *The Corporation will not be stolen from.*; *You're the one afraid of being stolen from.*

46. See also Jackendoff (1990: 183–184) and Croft et al. (2001: 588) for discussions of purposive clauses and a Purposive semantic role.

47. (5.6a) is adapted from the following sentence in COCA: *they genetically modify their crops to grow in warmer, colder, wetter or drier climates*. In (5.6b), the subject would most logically refer to a group of animals living in the wild (e.g. deer eating crops from nearby farms). However, the different interpretations can be found across various contexts, e.g. *Pat {altered/stole} the shirt to look better*.

48. In some cases, the purposive clauses occurring with Change verbs have the more general interpretation referring to the purpose or motivation of the subject Cause_change argument, as in the invented example: *She changed her work ethic to get a raise*. Here, the work ethic does not get a raise, but the subject *she* does. It seems plausible that such readings are more frequent with *change* than with other Change verbs, particularly *modify* (which bears the "purposive change" MC).

the purposive clause with the Theft verb (5.6b) applies to the subject, specifying that the subject *they* will grow as a result of stealing the crops (e.g. when they eat the stolen crops).

In the Change analysis, I posited a separate VC for sentences with a purposive clause expressing how the Final_state FE behaves differently after the change event. I argued that these constructions have VC status, as they express a core FE of the frame (the Final_state) and characterize the Change event as such (rather than situating it in time or place or describing the manner of the agent, as is typical for adverbial "adjuncts", i.e. non-core FEs). In contrast, I did not posit additional VCs for Theft sentences including purposive clauses, as these do not characterize the Theft event per se, but serve an adverbial function, specifying the purpose or motivation of the subject Perpetrator argument. The clause thus expresses a semantic feature that is independent of the types of events captured by the Theft verb in the main clause. As Reason and Purpose FEs are not core FEs of the Theft frame, their cooccurrence with the core FEs does not require additional VCs to be posited. This comparison of purposive clause interpretation across two verb classes again demonstrates that formally identical syntactic categories exhibit different semantics when combined with verbs evoking different semantic frames. To conclude this brief discussion, the cross-class comparison of syntactic features emphasizes that a verb's frame-semantic class membership influences the distribution and interpretation of certain syntactic structures that are traditionally viewed as being isolated from verb meaning.

5.4 Variation among Theft verbs and the need for multi-grained verb entries

While the preceding sections emphasized the differences between Change and Theft verbs with respect to their meanings and valency constructions, the two classes also exhibit an important similarity that likely characterizes all verb classes. Specifically, Theft verbs share a great deal of semantic and syntactic properties, but they also differ from one another with respect to their specific meanings and precise valency distributions. The meaning differences among Theft verbs were discussed in Section 5.2 above, and Table 5.9 presents the results of the corpus-based valency analysis of English Theft verbs, conducted following the methodology employed for Change verbs and discussed in detail in Section 4.3. Table 5.9 shows the frequency with which each verb appears in each VC.[49]

49. I forego a detailed discussion of the valency behavior of English Theft verbs and only present the results of the valency distribution analysis to demonstrate the verbs' syntactic diversity.

Table 5.9 Valency distribution of English Theft verbs

		Embezzle **(103)**	***Pilfer*** **(58)**	***Shoplift*** **(64)**	***Snatch*** **(76)**	***Steal*** **(110)**
1	P _	7%	9%	61%		7%
2	P _ from S	1%	5%	3%		2%
3	P _ at S	1%		3%		
4	P _ from V	3%	4%			2%
5	P _ from S/V	1%				
6	P _ G	50%	50%	22%	39%	73%
7	P _ G from S	11%	16%	9%	30%	6%
8	P _ G at S			2%		
9	P _ G off S				3%	1%
10	P _ G out of S				4%	
11	P _ G from V	5%			20%	8%
12	P _ G away from V				4%	
13	P _ G off (of) V					
14	P _ G from S/V	22%	2%			1%
15	P _ S		10%			
16	P _ S/V		4%			
17	P _ through G		2%			

The data show that Theft verbs differ (sometimes drastically) in the frequency with which they occur in each of the VCs. The syntactic diversity of Theft verbs, however, seems to be less striking than that of Change verbs. While a more comprehensive analysis is necessary to arrive at conclusive results, here I point to a few observations in comparing the valency distributions of Theft and Change verbs. For one, none of the Change VCs was found to occur with all five of the analyzed verbs. In contrast, two Theft VCs occur with all of the verbs: the simple transitive VC (#6) and transitive with *from* Source VC (#7). Two others VCs occur with four of the five verbs: the simple intransitive (#1) and intransitive with *from* Source VCs (#2). These four VCs account for at least 68% of the examples for each of the five verbs, whereas all nine of the Theft VCs that occur with only one or two verbs (#3, #5, #8–10, #12, #15–17) are extremely infrequent for each verb and in the corpus overall. These findings, along with the findings discussed in the previous

The number in parentheses after the verb at the top of the table refers to the number of examples analyzed. Here again, the low number of examples certainly does not represent a comprehensive and accurate account of the verbs' valency distribution but suffices to give a picture of the diversity in the verbs' valency behavior (see Section 4.3).

section, further support the claim that Theft verbs appear in a narrower range of VCs than Change verbs.

Nevertheless, a comprehensive and empirically accurate account of Theft verbs should capture the precise behavior of individual verbs as well as the shared behavior of all verbs in the class. As laid out in Section 4.5 for Change verbs, I propose that the frame-constructional verb class (FCVC) captures the shared behavior and that multi-grained verb entries (MGVEs) capture the verb-specific behavior. As this approach was demonstrated in detail in the previous chapter, here I only discuss the MGVE of the verb *shoplift*, shown in Table 5.10, to demonstrate that the approach not only accurately accounts for Change verbs but also for Theft verbs (and by extension to virtually any properly defined verb class).

Table 5.10 Multi-grained verb entry for *shoplift*

Verb	***shoplift***
FCVC	Theft
Subclass	n/a
Additional Semantics	Goods: concrete Perpetrator: human, (pretends to be customer) Source: a store or shop, typically on display Victim: rarely expressed (indirectly the owner of the store)
Additional Syntax	Distribution: #1 (61%), #6 (22%), #7 (9%), #2 (3%), #3 (3%), #8 (2%) – highly frequent in intransitive VCs – occurs only with Source FE and not the Victim or Source/Victim FE
Other	– Often has an interpretation of being a habitual activity of a person, especially in simple intransitive (#1) VCs.

The first part of *shoplift*'s MGVE states that it is a member of the Theft FCVC, thus associating it with the Theft frame semantics and FEs (defined in Section 5.1.2) and with the potential to occur in the Theft constructional range, i.e. the list of VCs in Table 5.5 above. The FCVC specification captures the behavior shared by all Theft verbs, while additional specifications are required to capture how *shoplift* differs from other Theft verbs. The next level of the MGVE should show the verb's "Subclass", if it is associated with one, but is left "n/a" for the present discussion.[50]

50. Subclasses of Theft verbs are not discussed here, as this part of the approach was demonstrated in detail for Change verbs above. However, Dux's (2011, 2016: Chapter 7, 2018) treatment of Theft verbs discusses potential subclasses such as "hand-motion Theft verbs" (*swipe, snatch*) which do not occur in intransitive uses and "source-specified Theft verbs" (*pickpocket, shoplift*) which can be used in progressive and intransitive contexts (e.g., go shoplifting) with a habitual interpretation.

The final three portions of the MGVE capture verb-specific properties of *shoplift*. The "Additional Semantics" category describes the meaning of *shoplift*, particularly with reference to the Theft FEs. Specifically, it states that the Goods are concrete items, the Perpetrator is a human that is (pretending to be) a customer at a store, the Source is a store or shop (more specifically a shelf, rack, or other display area in a store), and the Victim is indirectly the store owner but rarely expressed in utterances with *shoplift*. The "Additional Syntax" category specifies the verb's valency distribution, or the frequency with which it occurs in each of the Theft VCs (based on the corpus analysis). Specifically, it states that 61% of the corpus examples for *shoplift* exhibit VC #1 (the simple intransitive VC as in *He shoplifts*), 22% of its examples exhibit VC #6 (*He shoplifts goods*), and so forth. The "Additional Syntax" category also summarizes the precise valency distribution more generally, for instance stating that *shoplift* is highly frequent in intransitive VCs and that it does not occur in VCs including the Victim or Source/Victim FEs (with the understanding that shops occurring in sentences with shoplift are categorized as a locational Source rather than Victim or Source/Victim). The "Other" category lists additional verb-specific properties that do not clearly fall into the "Additional Syntax" or "Additional Semantics" categories, including pragmatic, collocational, interpretational, or other properties. Here, the "Other" category only notes that *shoplift* often has an interpretation of being a habitual activity of a person, especially in simple intransitive (#1) VCs.

This MGVE thus captures a great deal of the semantic and valency behavior of the verb *shoplift*. It offers both a coarser-grained description of the verb's meaning and syntactic potential, which captures the shared properties characterizing the Theft FCVC, as well as verb-specific information necessary for the proper use and understanding of the verb. As such, the FCVC/MGVE approach offers richer semantic descriptions and more systematic and accurate syntactic descriptions for individual verbs and verb classes than that provided in existing classifications such as Levin (1993) and FrameNet.

5.5 Conclusion

In this chapter, I compared the semantics and valency behavior of English Theft verbs against the previous chapter's analyses of Change verbs. The motivation for this comparison came from research on verb descriptivity, specifically Snell-Hornby's (1983) observation that high-descriptivity verbs apply to a narrower range of contexts than low-descriptivity ones, and Boas's (2008b) study demonstrating that high-descriptivity verbs occur in a narrower range of valency constructions than low-descriptivity ones. While those studies focused on verbs of varying descriptivity levels within a single verb class (or semantic frame), this chapter aimed to establish similar findings across entire verb classes of different descriptivity levels. After demonstrating the low descriptivity of Change verbs relative to Theft verbs, I hypothesized that Theft verbs would exhibit (a) richer and more numerous meaning components and (b) a narrower range of valency constructions than Change verbs.

The semantic analysis of Theft verbs discussed in Section 5.2 showed support for the first hypothesis, as Theft verbs exhibit a much wider range of meaning components than those found with Change verbs in the previous chapter. Furthermore, the meaning components of Theft verbs are much richer and more specific and exhibit a wider distribution across individual verbs than was the case for Change verbs. I also showed that the nature of meaning components differs across the two classes, as those of Change verbs typically characterize the entire Change event as a whole, while many of the Theft verbs' meaning components apply to specific FEs or circumstances of the Theft event.

The comparison of valency constructions in which Theft and Change verbs appear (Section 5.3) confirmed the second hypothesis, namely that high-descriptivity Theft verbs are syntactically less flexible than low-descriptivity Change verbs. I first showed that the VCs differ drastically across the classes, with only two constructions (likely the most prevalent constructions in the English language) occurring in both classes. This finding emphasizes the predictive relation between verb semantics (i.e. semantic classes) and argument realization behavior. The comparisons in Section 5.3.2 led to the conclusion that Change verbs exhibit a much more diverse range of options for argument realization than Theft verbs, thus corroborating at a broader verb-class level the results of Boas's (2008b) comparison of Motion verbs, which showed that highly descriptive verbs appear in fewer constructions than low-descriptivity verbs. To arrive at this conclusion, I addressed some methodological issues surrounding the identification and enumeration of VCs, specifically involving semantically related FE types (i.e. core sets in FrameNet terminology), different phrase type realizations of a given FE in a given VC, and the relation between frequent and infrequent VCs. In each case, it was found that applying a different method to the VC analysis would increase the number of Change VCs at a significantly higher rate than Theft VCs. To conclude the comparison of valency behavior among the two verb classes, I showed that certain "purely syntactic" features and phenomena traditionally viewed as independent of verb meaning actually exhibit interesting semantic differences that likely relate to the frame semantics of the verb they occur with.

Despite the drastic differences observed for Change and Theft verbs, each of the classes exhibited both uniformity across verbs in the class that can be captured at the verb class level and idiosyncratic behavior among individual verbs. In

Section 5.4, I applied the approach (developed for Change verbs in Chapter 4) for formulating (frame-constructional) verb classes and (multi-grained) verb entries to the class of Theft verbs, and I showed how this approach accurately captures verbal semantics and syntax at various levels of granularity, as argued for in earlier work in Construction Grammar (Croft 2003; Boas 2003, 2008b; 2011a; Iwata 2008, Stefanowitsch 2011). This section thus demonstrated that the approach is not restricted to a specific type of verb class but can be employed to verbs of any semantic domain.

In sum, while the verb-class-specific analysis of Change verbs in Chapter 4 emphasized the syntactic and semantic differences among semantically related verbs, the cross-class comparison in this chapter revealed that many of the semantic and syntactic features that characterize Change verbs are virtually incomparable to those of Theft verbs, thus highlighting the uniform and predictive nature of verb classes. While the differences between the classes obviously relate to the differences in events described by the two classes (Change vs. Theft events), the comparison also suggests that these differences may relate to the more general (i.e. non-verb-class-specific) construct of verb descriptivity. Of course, a comparison of only two verb classes is not sufficient to establish verb descriptivity as a predictor of the nature of verb meaning and valency, but the present methods and findings should inform future research on a wider range of verb classes and languages to determine the precise relation between verb descriptivity and valency. This comparison also raised more general questions that should be taken into account in future research on the syntax-semantics interface, particularly regarding how semantic roles and grammatical constructions can or should be identified and formalized and how a verb's semantic frame (i.e. its class membership) determines the interpretation of formally identical syntactic contexts and categories.

CHAPTER 6

A contrastive perspective

German Change and Theft Verbs

In this chapter, I discuss the meanings and valency behavior of German Change and Theft verbs and compare them with the findings on English verbs in the previous chapters. The German analysis serves two major purposes: First, it provides a broader data set to assess the cross-linguistic validity of verb classes and to test whether the formalization of frame-constructional verb classes and multi-grained verb entries developed in Chapter 5 also applies to German. Secondly, it reveals specific differences and similarities in the meaning and valency behavior of Change and Theft verbs across German and English.

Section 6.1 briefly reviews contrastive and German-based research on verb valency, meaning, and classification and lays out the major research questions and methods employed in the analyses. The majority of this chapter is dedicated to German Change verbs and their comparison against the English-based findings of Chapter 4, addressing questions surrounding the equivalency of Change verb meanings, valency constructions, and subclasses (Section 6.2). In Section 6.3, an analysis of German Theft verbs is compared against the preceding chapter's investigations to shed light on how verb (class) descriptivity influences the cross-linguistic compatibility of verb meaning and argument realization.

6.1 Background and outline of the contrastive change verb analysis

In order to motivate the following analyses and situate the methodology I employ, this section briefly describes relevant contrastive and German-specific research on verb classification and argument realization, focusing on research employing principles of Frame Semantics and Construction Grammar.[1] The section concludes with an overview of the research questions and methods guiding the contrastive analyses of Change verbs.

1. Contrastive studies on Theft verbs are reviewed briefly at the start of Section 6.3. The literature review in this chapter complements those in Chapters 2 and 3, which focus on English-specific and/or language-independent research.

6.1.1 Previous contrastive research on verb meaning

I begin by discussing existing contrastive research on verb meaning. A recently blossoming branch of research applies principles of Frame Semantics to German and other languages. The success of the Berkeley FrameNet project has led to the development of similar resources for other languages, including French, Hebrew, Japanese, and Spanish (summarized in Boas 2009b, 2010a). Along similar lines, the large-scale SALSA project (Burchardt et al. 2006, 2009) sought to test whether the FrameNet frame definitions developed from English data can be directly applied to German data by seeking to annotate German corpus data using only the English-based frames and Frame Elements of FrameNet. The project found that the majority of the German data can be described using FrameNet frames, but that some problems arise due to general structural differences between the languages (e.g. dative case in German) and differences in lexicalization patterns. For instance, one observed frame-semantic difference across the two languages involves the German verb *fahren*, which can be used both in the sense of 'drive a car' and 'ride a car'. English does not have any verbs that are ambiguous between these senses (unless the proper context coerces such readings) and thus only requires two fairly specific frames, i.e. `Drive_vehicle` and `Ride_in_vehicle`. However, a description of the German lexicon requires a more general `Travel_by_vehicle` frame that overarches the frames required by English.

A related branch of research investigates pedagogical and lexicographic applications of Frame Semantics. Atzler (2011) discusses how German-English "translation equivalents" exhibit cultural and pragmatic differences, focusing on the culturally complex `Personal Relationship` frame and how these translation difficulties lead to problems in cross-cultural interactions but are rarely discussed in pedagogical materials. In reaction to Atzler's (2011) study, researchers developed the German Frame-based Online Lexicon (G-FOL; Boas and Dux 2013; Boas et al. 2016; http://coerll.utexas.edu/frames). The G-FOL draws on principles of Frame Semantics and FrameNet to provide rich lexical descriptions combining syntactic and semantic/pragmatic information for lexical items and to point out problematic areas in translation.[2]

In addition to these larger frame-semantic projects, several smaller-scale studies apply frame-semantic principles to compare specific groups of English verbs (or lexical items in general) to those in other languages, such as Boas (2001) for Motion

2. Another lexicographic project, the Kicktionary (Schmidt 2008, 2009, www.kicktionary.de), provides an online-accessible FrameNet of soccer terminology in English, German, and French. This project compares individual lexical items of different languages in a very specific and rigidly defined semantic domain and relies on news reports and sport announcer transcripts that are clearly parallel, as they describe the same game being played.

verbs in English and German, Boas (2002) for Communication verbs in German and English, Ohara (2009) for the concept of 'risk' in English and Japanese, and Bertoldi et al. (2010) for verbs of judgment and assessing in English and Portuguese. These studies apply close analyses of verbal semantics and valency behavior to investigate polysemy and translation equivalency. Their findings underscore the important role of the grammatical context in determining what frame a polysemous verb evokes, concluding that verbs cannot be translated as independent entities, but only within the context of the (valency) construction(s) in which they appear.

A major finding shared by all of these works is that similar lexical items in different languages may display semantic and syntactic differences. These often subtle, yet communicatively relevant differences are not captured in most approaches, be they theoretical, pedagogical, or lexicographic. While these studies suggest that Frame Semantics is useful for contrastive semantic analyses at a medium- or coarse-grained level, subtle differences in individual verbs evoking the same frame across languages require more verb-specific information than that provided in FrameNet frame descriptions. Specifically, verbs of a given FrameNet frame frequently differ in their detailed semantic properties and constructional distribution, so cross-linguistic comparisons must rely on data beyond what is offered by FrameNet.

These recent findings correspond closely to the conclusions drawn by Snell-Hornby (1983) in her highly detailed comparative analysis of German and English verb meanings (introduced in Section 5.1). In developing the notion of verb descriptivity, Snell-Hornby demonstrates that "translation equivalents" often share the same Act Nucleus (i.e. general or "shared meaning") but differ with respect to the Modificants that further specify the Act Nucleus (i.e. "additional meaning components"). Snell-Hornby's account can be reformulated in frame-semantic terms as follows: verbs of a given class in two languages will share the same general frame semantics, but the individual verbal lexical units will differ in how they construe or profile certain more detailed aspects of the semantic frame. In other words, semantic frames may serve as a tertium comparationis, as they are language-independent and potentially universal (provided that a language's culture has the concept corresponding to the given frame) and we may thus compare individual LUs in different languages against the backdrop of a single semantic frame (see the contributions in Boas 2009a and 2010a, especially Boas 2010b). While the studies described here investigate the meanings of verbs with relatively rich semantic content, the present analysis of Change verbs investigates translation equivalency in a verb class with much less detailed semantic content. In Section 6.4, the findings of the Change verb analysis are compared with a similar contrastive analysis of the semantically rich class of Theft verbs to determine more systematically how verbs of different descriptivity levels (i.e. richness of meaning) behave across languages.

6.1.2 Previous contrastive research on verb valency and constructions

While the studies described above focus primarily on verb meaning, I now discuss existing contrastive research on verbal syntax (i.e. constructions, argument realization, valency) and its relation to meaning, focusing on studies using principles of Construction Grammar and Frame Semantics. The comprehensive, cognitivist philosophy behind Construction Grammar has led scholars to rethink the status of language universals and how they are to be identified through contrastive analysis. In his formulation of Contrastive Construction Grammar, Boas's (2010b) demonstrates how frame-semantic analyses of verbs and constructions allows for cross-linguistic comparisons that can be applied intuitively and empirically, are tied directly to (verb) meaning, and do not rely on abstract theoretical categories based primarily on the analysis of English grammar.[3] In particular, Boas points out that semantic frames and the Frame Elements (FEs) that define them are not language-dependent, but rather characterizations of real-world situations and can thus be objectively compared without reference to (language-specific) linguistic structures. As such, "it is in principle possible to map the same frame-semantic meaning to different forms across languages" (Boas 2010b: 11). Contrastive frame-semantic analyses can determine the extent to which languages are similar in the syntactic expression and semantic interpretation of frames and their associated FEs. For instance, a brief comparison of how the combination of the DONOR, THEME, and RECIPIENT FEs of the `Giving` frame are realized in German and English, as in (6.1)–(6.2), reveals a systematic difference in transfer constructions across the languages.

(6.1) a. He gave her a book.
b. He gave a book to her.

(6.2) a. Er gab ihr ein Buch.
b. *Er gab ein Buch an sie.

In particular, while English allows the RECIPIENT to be realized as either a first object in a double object construction or as a *to* PP, German only allows the dative construction. Furthermore, the RECIPIENT is marked with dative case in German, whereas in English there is no explicit morphological marking to distinguish dative and accusative nouns. By analyzing sentences in this way, it is possible to determine the range of syntactic patterns (i.e. constructions) associated with individual LUs

3. Dux (2016: 275–279) describes Boas's (2010b) Contrastive Construction Grammar in more detail and contrasts his approach with the related Radical Construction Grammar developed by Croft (2001), noting that the latter is more relevant and applicable to broader typological studies of more numerous and less closely related languages.

and with semantic frames in general. This method for mapping semantics, in the form of frames and FEs, and syntax, in the form of phrase types and grammatical functions, allows one to identify similar classes of verbs in different languages and determine the range of syntactic patterns they may appear in. These classes then serve as a basis for comparison and facilitate the identification of cross-linguistic variability in the syntactic expression of a given function (or semantic domain).

This type of (frame-)constructional approach has been successfully applied to contrastive analyses of specific constructions, such as the applicative in German and English (Michaelis and Ruppenhofer 2001), the resultative in English and German (Boas 2003: Chapter 8), the locative alternation in English and Japanese (Iwata 2008), and transfer constructions such as the dative and secundative (DeClerck et al. 2012). (See also the contributions in Fried and Östman (2004)). In each of these cases, the data reveal that constructions which appear to be formally similar, exhibit (sometimes significant) differences in their semantic interpretation and distribution across verb classes.

In recent years, researchers who do not explicitly identify with the Construction Grammar community also employ methods characteristic of this framework in contrastive analyses of verbal valency.[4] Most notably, a recent publication by the Institut für Deutsche Sprache (Institute for German Language; Engelberg et al. 2015) includes several interesting studies on the relation between lexical-item-specific valency and more general abstract argument structure constructions across languages. For instance, Meliss (2015) contrasts the syntactic distribution of "Smelling" verbs in German and Spanish, Winkler (2015) compares the material/product alternation in German and English, and Fernández Méndez (2015) investigates how the concept of 'kidnapping/abducting' (Ger. *entführen*) is expressed in German and Spanish. The general consensus arising from these independent analyses is that, even though a semantically and syntactically related construction may exist in different languages, rigorous empirical analysis often reveals that

4. The theoretical connections between Valency Grammar and Construction Grammar are discussed in Section 3.3 (cf. Herbst 2010; Herbst et al. 2014). Another work of interest is the *Valenzwörterbuch deutscher Verben* (VALBU; Schumacher et al. 2004), the German equivalent of the Valency Dictionary of English (VDE, Herbst et al. 2004) described in Section 3.3. The VALBU contains entries for 638 German verbs with detailed information on their meanings and valency properties as well as notes on their morphology, phraseology, pragmatics and other properties. The VALBU is not used in the present analysis, as it is associated with many of the same issues as noted for the VDE, including a limited number of verbs covered, an unclear method for separating verb senses and their related participants, and a lack of frequency information. (See also Dux 2016: 288–289.)

the distribution of verbs (or verb classes) and constructions may differ greatly across the languages.[5]

These contrastive analyses show that, while constructions (at various levels of abstraction) with similar forms and meanings can be identified across languages, close analyses of their distribution across verbs (and verb classes) reveal interesting cross-linguistic differences. In the contrastive analyses in this chapter, I draw on these studies by investigating the similarities and differences in valency constructions in which Change and Theft verbs appear across German and English. At the same time, I compare the constructions from a rather different perspective than the aforementioned studies. While those focus on very general constructions and investigate their distribution across verbs of a wide variety of semantic classes, the present analysis addresses the full range of constructions occurring with a semantically defined verb class. As such, this type of analysis enables me to investigate how the two languages differ in the inventory of constructions they offer their speakers to express a given situation.

Before moving on, I briefly discuss previous research investigating the cross-linguistic applicability of grammatically relevant meaning components: aspects of meaning that directly influence a verb's syntactic behavior. The most prevalent type of research in this respect focuses on rather coarse-grained meaning components such as event structure (Croft 2012) or manner vs. result verbs (Levin 2015). These studies generally take such meaning components to be grammatically relevant in English and test whether they influence verbs of (often many) other languages in similar ways, with the goal of establishing them as universally grammatically relevant. Levin (2015), for instance, shows that the manner/result distinction cross-cuts the lexicon of various languages and has similar repercussions across languages (e.g. manner verbs are more flexible with respect to how they realize the affected theme). In contrast to these highly general meaning components, other research has investigated the contribution of rich fine-grained meaning components in small sets of verbs across languages, showing that not only highly abstract meaning components, but also very detailed aspects of verb meaning, influence grammatical behavior cross-linguistically, thus explaining some grammatical differences in purported translation equivalents (see Ohara 2010; Fernández Méndez 2015). However, these studies of rich, verb-class-specific meaning and their impact on verb classes are few in number and lack a systematic methodology which

5. A related branch of cross-linguistic research on the syntax of verb classes focuses on applying Levin's (1993) alternation-based verb classification method to German (Frense and Bennett 1996; Schulte im Walde 2000, 2003, 2009). These researchers also arrive at the conclusion that while alternations (and their individual variants) are similar across the languages, distributional and semantic differences are prevalent.

can be reproduced for other verb classes and languages. In Section 6.2.5, I develop such theoretical and methodological tools on the basis of a comparison of German and English Change verbs.

Although the German-specific and contrastive research discussed above are situated in different theoretical frameworks, there are several converging results from all studies that motivate the methodology of the contrastive analysis. For one, cross-linguistic comparisons of verb valency cannot be done directly given the unique syntactic repertoire of each language but must be mediated through language-independent formulations of meaning, specifically through semantic frames. Studies following such a methodology have repeatedly found that, while language pairs often have verbs and constructions that appear similar on the surface, detailed corpus-based analysis often reveals important differences in the distribution of verbs across constructions, and vice versa. In the following, I preview the contrastive analysis of Change verbs and constructions and discuss the hypotheses and methodology in the context of the preceding literature review.

6.1.3 Overview of contrastive Change verb analyses

The first major contrastive analysis in this chapter focuses on German Change verbs, specifically *abändern* ('change/alter/modify'), *ändern* ('change/alter/modify'), *verändern* ('change/alter/modify'), *verwandeln* ('change/transform'), and *wandeln* ('change/transform').[6] The major goal of the analysis is to compare them against their English counterparts (discussed in Chapter 4) with respect to their meanings, the valency constructions in which they appear, and the meaning components found to be grammatically relevant for English Change verbs. Similar comparisons are conducted for German Theft verbs in Section 6.3, but in much less detail, as that analysis focuses on the role of verb (class) descriptivity in contrastive analysis. Here, I provide a brief overview of the Change verb analysis and situate its major research questions and hypotheses in the context of the previous research described above.

In Section 6.2.1, I analyze the meanings of the five German Change verbs listed above, through dictionary definitions and (to a lesser extent) corpus data, in order to determine the degree of cross-linguistic similarity of (a) the general

6. The English glosses provided in this chapter are not to be taken as true translation equivalents but are included for clarity's sake. The verbs under analysis were selected because they are among the most frequently occurring German Change verbs (compared to e.g. *abwandeln, umändern*) and appear to be less restricted to specific domains than other German Change verbs (e.g. *transformieren* and *modifizieren*). Of course, an analysis of more (or ideally the full range of) German Change verbs is certainly desirable but must be put off for future research.

frame semantics shared by all Change verbs, (b) the additional meaning components that further specify the general frame semantics, and (c) the combinations of additional meaning components for individual verbs. As discussed above, numerous studies have shown the value of semantic frames as a tertium comparationis for the contrastive analysis of verb meanings, because meaning defined in terms of real-world situations (frames) and the involved participants (Frame Elements) is not dependent on a given language's grammatical structures but does allow for the identification of potentially universal aspects of meaning (see Boas 2010a, 2010b). Based on the research cited above, verbs of a given semantic class in two languages will share the same general frame semantics, but the individual LUs will differ in their precise construal of or perspective on the semantic frame. The previous chapter showed that English Change verbs share the same general frame semantics and corresponding FEs (see Section 4.2), but individual verbs may exhibit additional meaning components, the most prominent of which are components restricting verbs to either subtle (*alter, modify*) or drastic (*transform, metamorphose*) changes. Other additional meaning components each only apply to a single verb; these components refer to purposive changes (*modify*), changes to make things more acceptable/less extreme (*modify*), and changes that are deemed positive (*transform*). We may thus expect that German Change verbs also exhibit similar general frame semantics as English, but differ with respect to the types and combinations of additional meaning components.

The second step in the contrastive analysis, described in Sections 6.2.2 through 6.2.4, is a comparison of (valency) constructions across German and English. The methodology I employ follows Boas's (2010a) suggestions for a Contrastive Construction Grammar. Here again, the role of Frame Semantics as a tertium comparationis is important. Specifically, Boas (2010a) argues that constructions may be deemed similar across languages if they are used to evoke the same semantic frame and they involve the same number and types of Frame Elements in comparable formal realizations. As noted above, this method has been applied to cross-linguistic comparisons of the abstract argument structure constructions similar to those identified by Goldberg (1995, 2006), such as the applicative in German and English (Michaelis and Ruppenhofer 2001), the resultative in English and German (Boas 2003: Chapter 8), or the locative alternation in English and Japanese (Iwata 2008), in each case revealing both idiosyncratic and systematic differences and similarities across languages. However, those studies focus primarily on individual, highly abstract constructions across numerous verb classes, making it difficult to establish translational equivalents for verb-class specific valency constructions (VCs). The analysis here, in contrast, seeks to overcome this issue by assessing the full range of valency constructions used to express a given semantic frame, thus allowing for a clearer assessment of cross-linguistic similarity in constructions and the features that characterize them. Specifically, the present analysis compares the valency constructions identified for German and English Change verbs in order to determine which (sets of) VCs used with German and English Change verbs can be characterized as semantically and/or formally equivalent. After establishing the constructional range of the German Change valency frame, I then establish constructional equivalents where possible. This analysis allows me to determine whether one language has a broader range of valency constructions than the other and to identify potential constructional gaps, whereby a VC of one language has no clear equivalent in the other language. I also address whether differences between VCs can be traced to more general grammatical characteristics of the language (e.g. case marking in German) or to differences in the construal and conceptualization of similar events cross-linguistically.

Finally, in Section 6.2.5, I tie together the preceding parts of the analysis to assess whether German and English Change verbs exhibit the same grammatically relevant meaning components. The research cited above suggests that fine-grained, frame-specific meaning components may account for more nuanced similarities and differences in valency behavior among near-synonyms cross-linguistically than highly abstract semantic features such as manner/result or verbal aspect. In the below analysis, I determine whether the grammatically relevant meaning components and corresponding syntactic-semantic subclasses identified for English Change verbs are also relevant for German, and if so, whether these meaning components have the same syntactic repercussions for verbs bearing them. In Section 4.5, I identified a handful of meaning components that could be traced to valency behavior. For example, the "subtle change" meaning component of *alter* and *modify* correlates with a high frequency in simple transitive VCs and strong aversion to VCs with prepositional Final_state arguments. I therefore investigate whether German verbs with similar additional components to English also have comparable valency behavior (e.g. whether German Change verbs with the "subtle change" meaning component also prefer transitive VCs without prepositional F arguments).

6.2 Change verbs in German and English

6.2.1 Meanings of German Change verbs

I begin by investigating the meanings of German Change verbs to determine whether they exhibit the same shared meaning and additional meaning components as those identified for English Change verbs. As with the English meaning analysis, I assess the German verb meanings based on their definitions in four dictionaries:

Duden Deutsches Universalwörterbuch (7th edition), *Wahrig Deutsches Wörterbuch*, the online version of the *Digitales Wörterbuch der Deutschen Sprache* (DWDS; www.dwds.de), and the bilingual German-English *Langenscheidts Grosswörterbuch Deutsch-Englisch* (1st Edition). In this discussion, I forego a presentation of full entries for each verb, but refer only to relevant portions of the definitions.

The semantic frame, or "shared meaning", of Change verbs is the same across both languages. Specifically, most of the German definitions include phrases such as *anders werden* ('become different') for reflexive uses (corresponding to English intransitive uses, see below) or *anders machen* ('make different') for transitive uses, and these phrases correspond to those used in English definitions of Change verbs, particularly the highly general *change*: 'become different' and 'make different'. The general nature of this Change meaning, relative to more specific change-of-state verbs, is seen in that many definitions list a wide range of distinct entities, attributes, characteristics, etc., that can be changed (e.g. *Form* 'form', *Aussehen* 'appearance', *Wesen* 'nature', *Verhalten* 'behavior'). That the shared meaning of the two classes (i.e. their frame semantics) is virtually identical across languages supports previous research emphasizing the cross-linguistic applicability of semantic frames (Boas 2002, 2010a, 2010b; Burchardt et al. 2006, 2009; Schmidt 2009).

I now turn to the additional meaning components (MCs) which expand on the basic Change semantics.[7] The most prominent MC characterizing German Change verbs are "subtle change" and "drastic change" *Abändern, ändern,* and *verändern* exhibit the "subtle change" meaning component specifying that they refer to minor and non-categorical changes. The verb *abändern* exhibits two further MCs: the first notes that the verb refers to changes undertaken for a purpose, namely to improve something, and the second restricts its use to changes in texts or text-like entities, particularly laws or policies. *Ändern* and *verändern*, in contrast, exhibit no further MCs, as they can refer to a wide range of Change scenarios, as evidenced both by the dictionary definitions and in the corpus data.

Verwandeln and *wandeln*, on the other hand, exhibit the "drastic change" MC specifying that they refer to drastic and/or categorical changes. No other relevant MCs were identified for either verb in the dictionary entries, and the corpus data show no clear further semantic restrictions (i.e. they are used to describe a wide range of Change scenarios).

7. This discussion only addresses semantic features of the verbs that pertain directly to the Change frame semantics and clearly influence the types of Change scenarios they describe. Non-change senses (e.g. *verwandeln* for converting a goal in the domain of sports, *wandeln* as a motion verb), collocational features (e.g. *ändern* for the alteration of clothing), and domain-specific senses (e.g. *abändern* for biological changes) are not discussed here, nor are syntactic features included in dictionary entries (e.g. separate listings of transitive and reflexive uses). However, see Dux (2016: 296–308) for a brief description of these features.

A comparison of additional MCs across the two languages reveals virtually no significant differences. In both languages, the primary MCs distinguishing individual verbs are the "subtle change" MC (*alter, modify, abändern ändern, verändern*) and "drastic change" MC (*transform, metamorphose, verwandeln, wandeln*). The "purposive change" MC of English *modify* also closely corresponds to that of German *abändern*. Another MC characterizing verbs of both languages – English *modify* and German *abändern* – specifies that the change serves a specific purpose, especially that of making something more acceptable or less extreme. As these MCs were found in Chapter 4 to be grammatically relevant for English verbs, at the end of this section I assess the German verbs' valency behaviors and compare them against other verbs with different MCs. This analysis allows me to determine whether certain MCs are grammatically relevant in both languages, which would motivate future research to determine whether they are cross-linguistically (or universally) grammatically relevant.

The only MC identified for German but not for English is the restriction of *abändern* to changes in texts or other abstract text-like entities (e.g. policies, guidelines, methods). Such changes appear to be most frequently described by the English verbs *alter* and *modify*.[8] However, these English verbs are not restricted to these types of Undergo_change arguments, whereas very few corpus examples for German *abändern* refer to changes to other types of entities.[9] Only one meaning component identified for English Change verbs did not appear in any of the definitions of German Change verbs. This is the "positive change" meaning of *transform*, which refers to changes that are deemed positive in some respect (e.g. becoming a better person). While no German verbs were explicitly associated with this meaning component, native speaker consultations suggest that *verwandeln* is the most appropriate verb for describing such situations.

Perhaps the most notable difference in the "lexical field" of German and English Change verbs is that the English lexicon includes the semantically general verbs *turn* and *change*, which are not associated with any MCs (not even the "sub-

8. Furthermore, it seems that one or the other of *alter* and *modify* may be preferred with different 'sub-types' of the abstract U arguments found with *abändern*. Specifically, *alter* appears to be more appropriate for texts and documents per se (*We altered/$^{?}$modified the text.*), whereas *modify* appears to be more appropriate for more abstract policies and methods (*We modified/$^{??}$altered our approach*). Of course, these are intuitive judgments only and must be confirmed through a corpus analysis.

9. English *alter* and German *ändern* also exhibit a specific sense referring to the alteration or refitting of clothing, but both verbs can be used for a much wider variety of Change events beyond the alteration of clothing.

tle change" or "drastic change" MCs), whereas all of the German verbs can be categorized as either drastic or subtle change verbs.[10]

This comparison also raises implications for translation as it emphasizes that one must take into account the specific change scenario in order to determine the proper translation equivalents for the General English Change verbs. For instance, changes to entities such as laws or policies are typically expressed by *abändern* in German and by either *alter* or *modify* in English, whereas changes to a person's name tend to be expressed by *ändern* in German and by *change* in English. Another difference is the MC restricting *abändern* to changes in abstract text entities; such changes may be expressed using either *modify* or *alter* in English, depending on the specific type of entity that is changed.

To summarize the comparison of the meanings of German and English Change verbs, we see that both the shared meaning and nearly all of the additional MCs are highly similar across the two languages. There is some minor variability in the precise distribution of additional meaning components of the individual LUs across the languages, but none of the verbs appear to be untranslatable, assuming that sufficient contextual knowledge is given. These findings of relatively insignificant cross-linguistic differences in the meanings of Change verbs differ from those of previous studies (Snell-Hornby 1983; Boas 2001, 2002; Ohara 2010; Bertoldi et al. 2010), which emphasize the semantic differences across languages and corresponding translation problems. Of course, those studies focus on very different semantic domains (e.g. communication, motion, risk) than the Change verbs discussed here.[11] This cross-linguistic semantic similarity may be due to the highly general nature of the Change frame/verb class, as the verbs are

10. An anonymous reviewer (and native speaker of German) feels that *ändern* could be characterized as a general Change verb and notes that its definition in Duden supports this characterization, as it includes "drastic" change verbs such as *umformen* and *wandeln* as synonyms (as well as "subtle" change verbs such as *abändern* and *modifizieren*). However, a corpus survey shows that nearly all examples of *ändern* refer to changes that do not involve drastic transformation of an entity into something else. The U arguments occurring with *ändern* are almost exclusively abstract entities – such as *Haltung* ('behavior'), *Meinung* ('opinion'), *Verhältnis* ('relation[ship]') – which may indeed be changed to very different types of behavior, etc., but cannot be changed into another thing (as further evidenced by the rarity of Final_state arguments with *ändern*). Furthermore, informal native speaker consultations show that *ändern* is infelicitous when referring to changes that are clearly drastic or categorical change (e.g. 'from a prince to a frog' or 'from lead to gold').

11. While analyzing a broader range of Change verbs or conducting deeper semantic analyses of these verbs may reveal more MCs for German Change verbs than those identified in the present analysis, the present results based on dictionary definitions, shallow semantic corpus analysis, and native speaker consultations did not reveal any further significant differences.

semantically quite general in contrast to other semantic classes (see Section 4.4.2). In Section 6.3 below, I conduct a similar German-English comparison of Theft verb meanings in English and German in order to determine whether the cross-linguistic similarity of Change verbs is also found for the semantically distinct and richer class of Theft verbs.[12]

6.2.2 Valency constructions of German Change verbs

Having discussed the meanings of German Change verbs, this section discusses the valency behavior of German Change verbs and compares them with English Change verbs. A corpus analysis was conducted to assess the valency behavior of each German Change verb, drawing on data from the *Kernkorpus 20* ('main corpus – 20th century') from the *Digitales Wörterbuch der deutschen Sprache* (DWDS; http://www.dwds.de; 'Digital Dictionary of the German Language').[13] Similar to the procedure for the English corpus analysis, examples were excluded from analysis if they exhibited a non-Change sense of a verb (e.g. 'move' for *wandeln*), if they were non-verbal uses of the lemma (e.g. adjectives), or if they appeared in special syntactic constructions which influence argument realization, such as infinitival clauses or passives. Table 6.1 shows the total number of examples analyzed for each verb.[14] The method for documenting the valency construction of each example was demonstrated in Chapter 4 and involves the identification of the phrase type and grammatical function for all FEs (C, U, O, F) occurring in the sentence.[15]

12. Another potential avenue for researching translation equivalency, which unfortunately cannot be pursued here, is the investigation – potentially using the Semantic Mirroring technique of Dyvik (2005) – of parallel corpora, such as EUROPARL. Of course, the EUROPARL corpus may not be ideal for analyses of the less frequent and colloquial verbs (particularly the more descriptive Theft verbs, e.g. *snatch, stibitzen).*

13. Because the corpus contains data from throughout the 20th century, I filtered the data to only include examples from 1970–2000 for a better synchronic fit with the English COCA corpus, which ranges from 1990–2011. Because the DWDS corpus is much smaller than COCA, I did not randomly select 500 instances per verb, but extracted every example for analysis.

14. As with the English analyses, a larger amount of data is necessary to establish the precise valency distribution of each verb. The number of examples employed here, however, appears to provide a good general picture of the full range of VCs available to German Change verbs, as well as of the relative frequency of each verb in each VC.

15. The full data used for the analysis can be found in the Supplementary Materials. For reference, the reader is reminded of the Change verb FEs and their abbreviations: C = Cause_change, U = Undergo_change, O = Original_state, F = Final_state.

Table 6.1 Number of examples extracted and analyzed

Verb	Examples analyzed
abändern[16]	22
ändern	95
verändern	77
verwandeln	114
wandeln	87
Total	**395**

Before describing the results of the valency analysis, I introduce the VCs attested in the corpus, which represent the constructional range of the German Change verb class. The corpus analysis of five German Change verbs revealed 19 VCs, presented in Table 6.2. The first column lists the number arbitrarily assigned to the VC. The second column provides the (abbreviated) form of the VC, listing only the FE abbreviations, their relative order (with nominative subjects preceding and accusative objects following the placeholder "_" for the verb), and any relevant prepositions or other words (described in more detail below). The right-most column provides a simple, invented example of the VC.

As with the English Change VCs, the German Change VCs can also be categorized according to various "valency features". The first major distinction pertains to the basic transitivity. Nearly all examples are either transitive, with C as nominative subject and U as accusative object (#2–#10), or reflexive, with C as nominative subject and a reflexive accusative object pronoun corresponding to the subject C argument (#11–#19). Only two examples exhibited an intransitive VC (#1) in which the C is the nominative subject and no U (or other argument) is present and whose interpretation is that the C argument has the inherent or habitual property of changing things. For example, one such sentence from the DWDS corpus reads *Liebe verwandelt* ('Love transforms') and means that love has the ability to change things.

The next major distinction among German Change VCs applies to those which express the F argument in addition to the U (or C and U) argument(s) and separates these according to how F is realized. Most frequent are prepositional realizations of F in either an *in* PP (#3, 7, 8, 12, 16, 17) or a *zu* PP (#4, 9, 10, 13, 18, 19). The F may also expressed in a subordinate *dass* clause that is marked with the word *so* ('so/such that') or *dahingehend* ('to the effect that') in the main clause and de-

16. Due to the low number of valid examples for *abändern* in DWDS, I also consulted the COSMAS-II DeReKo corpus to support the findings arising from the DWDS data.

Table 6.2 Valency constructions of German Change verbs (German Change constructional range)

#	VC	Example
1	C _	*Sie verwandelt.*
2	C _ U	*Sie verwandelt ihn.*
3	C _ U in F	*Sie verwandelt ihn in einen Frosch.*
4	C _ U zu F	*Sie verwandelt ihn zu einem Frosch.*
5	C _ U dahingehend/so…	*Sie verwandelt ihn so/dahingehend, dass er zum Frosch wird.*
6	C _ NEG an U	*Sie ändert nichts an ihm.*
7	C _ U aus O in F	*Sie verwandelt ihn aus einem Mann in einen Frosch.*
8	C _ U von O in F	*Sie verwandelt ihn von einem Mann in einen Frosch.*
9	C _ U aus O zu F	*Sie verwandelt ihn aus einem Mann zu einem Frosch.*
10	C _ U von O zu F	*Sie verwandelt ihn von einem Mann zu einem Frosch.*
11	U _ sich	*Er verwandelte sich.*
12	U _ sich in F	*Er verwandelte sich in einen Frosch.*
13	U _ sich zu F	*Er verwandelte sich zu einem Frosch.*
14	U _ sich dahingehend/so,…	*Er verwandelte sich so/dahingehend, dass er zum Frosch wird.*
15	NEG _ sich an U	*Nichts ändert sich an ihm.*
16	U _ sich aus O in F	*Er verwandelte sich aus einem Mann in einen Frosch.*
17	U _ sich von O in F	*Er verwandelte sich von einem Mann in einen Frosch.*
18	U _ sich aus O zu F	*Er verwandelte sich aus einem Mann zu einem Frosch.*
19	U _ sich von O zu F	*Er verwandelte sich von einem Mann zu einem Frosch.*

scribes the purpose or result of the change, rather than a simple state or category. Such "clausal F" VCs occur in both transitive (#5) and reflexive variants (#14).

The next set of VCs realize the O argument in addition to the F argument (and the basic transitivity arguments U or both C and U). In contrast to English in which O is always introduced by the same preposition (*from*), in German the O argument can be expressed in either an *aus* PP (#7, 9, 16, 18) or in a *von* PP (#8. 10, 17, 19). These prepositional O arguments can occur in both transitive and reflexive variants, and (as seen in the English data) the O argument does not appear unless the F is also expressed.

One interesting VC type, with both transitive and reflexive variants, was found only with the verb *ändern*. This VC includes a negative element or negative polarity item (e.g. *nichts, kein Wort*) as its subject (in intransitive VCs) or object (in transitive VCs), as well as an *an* PP spelling out in more detail the U argument in which no changes have taken place.[17] These VCs are #6 and #15 in Table 6.2 and demonstrated in (6.3) and (6.4) using corpus examples from the DWDS.

(6.3) **Transitive with NEG *an* U**
[C.NP.Nom + verb + NEG + U.anPP.Obl] (full VC format)
[C _ NEG an U] (simplified VC format)
[…] ein fetter Hintern und ein gelber Stock änderten nichts an dieser Tatsache.
'And even a fat behind and a yellow stick changed nothing about this fact.'
(DWDS)

(6.4) **Reflexive with NEG *an* U**
[NEG + verb + U.Refl.Acc + U.anPP.Obl] (full VC format)
[NEG _ sich an U] (simplified VC format)
An dieser Logik hat sich seit Piet Retiefs Zeiten nichts geändert. (DWDS)
'Nothing has changed (itself) about this logic since the times of Piet Retief.'

In summary, the 19 German Change VCs can be classified according to the valency features described above, namely (a) transitivity, (b) number of state arguments

Table 6.3 Classes of German Change Valency Constructions

Valency feature	**Classes**	**VCs**
Transitive/Reflexive	Intransitive	1
	Transitive	2–10
	Reflexive	11–19
State realization	No states	1, 2, 6, 11, 15
	Only F	3–5, 12–14
	Both O and F	7–10, 16–19
F realization	*in* PP	3, 7, 8, 12, 16, 17
	zu PP	4, 9, 10, 13, 18, 19
	so/dahingehend, dass	5, 14
O realization	*aus* PP	7, 9, 16, 18
	von PP	8. 10, 17, 19
Special	*NEG an U*	6, 15

17. This VC type may not relate directly to verbal valency but instead arise from quantification processes, as the phrase *nichts an der Tatsache* ('nothing about the fact') can be viewed as a single, complex NP built from constructions for noun formation. However, if such phrases (or VCs) were independent of verb valency, one would expect that these constructions would occur with relatively similar frequencies for all German Change verbs, which will be shown in the following section not to be the case.

realized, (c) specific realization of the F argument, and (d) specific realization of the O argument, along with a separate category for (e) the "NEG an U" VC occurring only with *ändern*.[18] This classification is presented in Table 6.3 and discussed in more detail in the following.

6.2.3 Comparing German and English Change valency constructions

Having established the German Change VCs and the classes thereof, I now compare them with those identified for the English data in Section 5.3. This allows me to establish which VC pairs/groups are equivalent across the languages and further enables the comparison of subclasses and grammatically relevant meaning components carried out in Section 6.2.5. To establish equivalency relations between German and English VCs, I employ the concepts of formal equivalency and semantic equivalency.

Formal equivalence holds between two (or more) VCs across languages when they involve the same number of syntactic arguments in the same phrase types and grammatical functions. Here, I assume that German nominative arguments correspond to English subjects, and German accusative arguments correspond to English direct objects.[19] Other arguments, such as prepositional objects, are deemed as formally equivalent when the grammatical lexemes introducing the phrase (i.e. prepositions or complements) exhibit significant semantic overlap across the languages, as for instance with the prepositions *from* and *von*.[20]

Semantic equivalence refers to when VCs in two languages include the same set of FEs and perspectivize them in the same way. By perspectivization, I assume that VCs perspectivize FEs by assigning them to specific grammatical functions (through word order in English and case assignment in German) or instantiating them with specific phrase types (as with the clausal F arguments, which

18. As noted in Chapter 4, organizing VCs into classes facilitates the identification of relations between individual VCs and allows for a more succinct description of the valency behavior of individual verbs. For example, rather than saying a verb consistently appears in VC #2, #3, etc. rather than #11, #12 etc., we may simply state that the verb appears in transitive VC types rather than reflexive VC types.

19. While these categories are not entirely equivalent across the two languages in all contexts, the assumption seems unproblematic for the data discussed here.

20. The question of equivalence for the German dative object does not come into play in the present analysis but can potentially be deemed formally equivalent with a range of English categories, including the first object in ditransitive constructions (*give them something*) and PPs headed by *for* or *to*. However, future work will likely reveal that the equivalencies of German dative objects depends on the (frame-semantic) class of the verb it occurs with.

perspectivize the Final_state as a new ability or characteristic of the U role after the change, and thus differ from prepositional F argument which state more directly the new category or value of the U role). As a diagnostic for semantic equivalence, semantically equivalent VCs in the two languages should express the same scenario with the same amount of specificity (e.g. without adding or omitting certain FEs).

Before directly comparing individual VCs, I first compare specific features that characterize the VCs and establish which features are equivalent, then draw on this VC feature comparison to determine the equivalency of specific VCs. To aid the reader, the list of English Change VCs and their classification according to VC features are given in Tables 6.4 and 6.5, respectively (repeated from Chapter 4).

The basic transitivity features of the VCs refer to the expression of the most prominent grammatical functions, namely (nominative) subject and (accusative) direct object, which are filled by the C and/or U FEs of Change verbs. Three transitivity types were found for the German Change verbs, namely transitive, reflexive, and the highly infrequent intransitive VC types, whereas only two types were found for English, namely transitive and intransitive.

Table 6.4 (cf. Table 4.16): Constructional range of the English Change valency frame

VC #	Pattern	Example
1	C _ U	*Pat changed Sam.*
2	C _ U into F	*Pat changed Sam into a frog.*
3	C _ U to F	*Pat turned Sam to stone.*
4	C _ U F.CP	*Pat changed it to do something different.*
5	C _ U from O into F	*Pat changed Sam from a person into a frog.*
6	C _ U from O to F	*Pat changed Sam from a prince to a frog.*
7	U _	*Sam changed.*
8	U _ into F	*Sam changed into a frog.*
9	U _ to F	*Sam turned to stone.*
10	U _ from O into F	*Sam turned from a prince into a frog.*
11	U _ from O to F	*Sam turned from a prince to a frog.*
12	C _ U F.result	*Pat turned Sam blue.*
13	U _ F.result	*Sam turned blue.*

Table 6.5 (cf. Table 4.17): Categories of English Change VCs according to valency features

VC parameter	VC feature	Valency constructions
Transitivity	Transitive/Causative	1–6, 12
	Intransitive/Inchoative	7–11, 13
State realization	No states	1, 7
	Only F	2–4, 8–9, 12–13
	both O and F	5–6, 10–11
F realization	intoPP	3, 5, 8, 10
	toPP	4, 6, 9, 11
	prepositional F	2–3, 5–6, 8–11
	Purposive/Clausal F	4
	Resultative	12–13

The transitive VC types align well across the two languages, as they each realize the C argument as (nominative) subject and the U argument as direct (accusative) object, and both render the same causative interpretation, namely that C brings about a change in U. As such, they are both formally and semantically equivalent.

The German reflexive and the English intransitive VC (type)s exhibit the same semantic interpretation, namely that of "inchoative" changes whereby only the U is perspectivized as undergoing a change, while the C argument is not overtly expressed (or only as an oblique/adverbial phrase, in which case it is not "perspectivized" by the VC) thus leaving open to interpretation what, if anything, causes the change. However, the VC (type)s are formally distinct, in that the German reflexive VCs include accusative reflexive pronouns identifying with the nominative U argument, while the English intransitive VCs have no direct object. The reflexive pronoun in the German reflexive VCs provides virtually no semantic contribution to the VC's interpretation, as it arises from more general grammatical differences between German and English, namely that inchoative scenarios are typically encoded in reflexive VC types in German but not in English. As such, the German reflexive VCs and the English intransitive VCs are semantically equivalent but not formally equivalent.[21]

Finally, the German intransitive VC type (occurring only twice in the corpus analysis) is formally equivalent to the English intransitive, as both involve only a nominative subject and no direct (accusative) object. However, the two differ

21. Of course, this equivalency pertains only to these valency construction types when they occur with Change verbs, and I do not claim that the English intransitive construction corresponds to the German reflexive construction in all contexts. This disclaimer applies to all equivalency pairs/sets proposed here for German and English Change VCs.

semantically in that the subject position is filled by the C argument in German and yields a habitual interpretation, while the subject position of the English Intransitive is filled by the U argument and has an inchoative interpretation.[22] Given these drastic semantic differences, I claim that the German intransitive VC does not have an English equivalent. The equivalency of German and English VCs according to transitivity types are summarized in Table 6.6.[23]

Table 6.6 Equivalencies in German-English VC transitivity types

Equivalency pair	Form	Formal. Equiv.	Semant. Equiv.
English Transitive German Transitive	[C.Sbj + verb + U.Obj] [C.Nom + verb + U.Acc]	Y	Y
English Intransitive German Reflexive	[U.Sbj + verb] [U.Nom + verb + U.Rflxv]	N	Y
No equivalency			
German Intransitive	[C.Nom + verb]	n/a	n/a

Turning to the comparison of VC features regarding the realization of the State FEs (F and O), both languages include VCs that realize only F, both O and F, or no State FEs. The latter case represents an obvious equivalent VC feature, establishing equivalency between German and English VCs that have no State arguments (and are equivalent in other VC features). However, for VCs expressing one or both State FEs, a more detailed comparison is necessary.

In German, the F argument can be introduced in an *in* PP, a *zu* PP, or as a subordinate *dass* clause with the word *so* or *dahingehend* serving as a "placeholder" in the

22. The habitual agentive reading of English intransitive constructions with Change verbs may be coerced given the proper context (see Boas 2011a on coercion). In fact, a Google search for "that transforms" (conducted 11 January 2016), returns (at least) two intransitive uses in which the subject corresponds to the C FE rather than the expected U FE. Both examples occur in heading titles for websites and read *A Love that Transforms* and *Teaching transforms*. It is unclear whether other Change verbs besides *transform* occur in such contexts. Native speaker intuition suggests interpretation may only be possible only for *transform* but not other English Change verbs, but a more detailed corpus analysis is required to confirm this claim. I do not address this English VC in the present analysis, but future work must determine why *transform* may have two different semantic interpretations (habitual vs. inchoative) when it appears in the same syntactic configuration (noun + verb), and how this behavior can be captured when comparing VCs across languages. In English, the interpretation of intransitive uses as habitual agentive actions (i.e. *He changes*, where *he* is interpreted as habitually causing changes) appears to be blocked, because the inchoative reading is associated with Change verbs in the English intransitive construction in the vast majority of such combinations.

23. The abbreviations used in this section are: Nom = nominative, Acc = accusative, Sbj = subject, Obj = object.

main clause. In English, F may be expressed in an *into* PP, a *to* PP, or in a purposive clause (either an infinitival *to* clause or a subordinate clause headed by *so (that)*).[24]

With respect to the prepositional realizations of F, it remains unclear whether each preposition (e.g. *into* vs. *to*; in vs. *zu*) has a different semantic contribution, i.e. is associated with a given type of F argument. While intuition suggests that, in English, *to* is closely associated with materials or qualities (e.g. *turn to stone, to powder, to rust*) while more typical (count) nouns are introduced with *into* (e.g. *She turned him into/*to a frog*), a brief comparison of the F arguments realized by each preposition (or the O argument with German *aus* and *von*) did not reveal any clear systematic differences. A more detailed and comprehensive analysis is thus required to establish whether certain semantic or ontological types of F arguments are more closely associated with a given preposition and, if so, whether these F types are the same across the two languages. At present, I therefore posit that both prepositional F argument realizations types of German (as *in* or *zu* PP) are semantically equivalent to the two of English (as *into* or *to* PP). I also propose that the two pairs of prepositions are formally equivalent, because of the large overlap in functions across them (especially in the Change contexts addressed here). Thus, the two prepositional realizations are both formally and semantically equivalent, rendering not a one-to-one but a two-to-two mapping.

The clausal F realization types of the two languages are semantically equivalent, as both express the purpose or result of the change, describing in a full clause the new properties of the Undergo_change FE (e.g. what it may now do that it could not before the change event). Formally, the realization types are similar in that they express the resulting F in a full clause that is independent of the main clause. However, the specific formal apparatus for introducing clausal F arguments differs across the languages, as German requires the placeholder *so* or *dahingehend* in the main clause to foreshadow the following *dass* clause, while this is not required for English subordinate (*so (that)*) clause realizations. Furthermore, English may also express the result in an infinitival clause (e.g. *change X to do Y*), a realization type that was not found in the German data. The relation among clausal F VC types across German and English is thus only semantic equivalency but not (complete) formal equivalency. The purposive clause VCs also differ cross-linguistically, in that the German purposive clause VCs appear in both reflexive and transitive variants, whereas the English purposive VCs were almost exclusively found in transitive rather than intransitive ones.[25]

24. Resultative phrase realizations (found only with *turn* in English) are discussed below.

25. No intransitive VCs with purposive clause F arguments were found the corpus data for the primary analysis of English Change verbs in Section 4.3. Only one intransitive VC with a purposive clause was found in the 206 examples analyzed in the test case of *metamorphose*, suggesting

With respect to the expression of O arguments, the German data showed that O may appear in an *aus* PP or in a *von* PP.[26] The English data only revealed one possible realization for O, namely as a *from* PP. The VC feature of O realization is semantically equivalent across the language, precisely because they simply express the Original_state of the change (in an oblique/prepositional phrase). Given that English *from* can be translated to German as either *aus* ('from/out of') or *von* ('from/of') not only with Change verbs but also in many other contexts, I propose that the various O realization types are formally equivalent across the languages. Thus, the English O realization type is related to the two German O realization types in a

Table 6.7 Equivalencies in German-English realizations of state arguments

Equivalency set (with VC feature specification)	**Form**	**Formally equivalent**	**Semantically equivalent**
F arguments			
English *into F*	[into F]	Y	??
English *to F*	[to F]		
German *in F*	[in F]		
German *zu F*	[zu F]		
English F.CP	[to F]	N	Y
	[so (that) F]		
German F.CP	[dahingehend…, dass F]		
	[so…, dass F]		
O arguments			
English *from O*	[from O]	Y	??
German *aus O*	[aus O]		
German *von O*	[von O]		

that such combinations (intransitive + purposive F) are indeed possible in English, but they are highly infrequent.

26. As with the prepositional F realizations, a cursory semantic analysis did not reveal any apparent semantic distinctions among the types of O entities introduced by the two prepositions. In her investigation of German equivalents of the material/product alternation constructions (Levin 1993: 55–58), Winkler (2015) discusses the prepositions used in contexts similar to those discussed here (see Section 6.3 below). She notes that arguments similar to the O of Change verbs can be expressed with *aus, von,* or *mit* PPs. She does not mention any semantic difference in the types of arguments introduced by the three prepositions, but only that *aus* is most frequent and most prototypically associated with this argument type. Future work must investigate the relation between these alternations/construction types, as well as how they may differ with respect to the prepositions they employ.

one-to-two equivalency relation. This relation is formally equivalent but only a more detailed analysis can determine whether the relation is also semantically equivalent.

The equivalencies of German and English VCs according to the realization of state arguments are summarized in Table 6.7. The "??" labels in the final columns refer to the potential, but yet unestablished, semantic differences between prepositions introducing the F or O argument.

I now turn to VC types that are highly infrequent or differ significantly across German and English with respect to formal, interpretational, or distributional properties. To begin, German *ändern* was found in VC types in which a negative word (i.e. negative polarity item) occurs in the position and form typically filled by the U argument (nominative subject in reflexive VCs, accusative object in transitive VCs) and the spelled-out U occurs in an *an* PP. Semantically, this VC renders an interpretation that the U could or should have changed (potentially in some property specified by the negative item) but did not undergo any changes. This type of VC was not found in the main corpus analysis of English Change verbs but can be identified through a manual search of larger corpora such as the Web (e.g. *This changed nothing about the situation*). These two constructions are semantically very similar, as they describe situations that highlight a change to some entity which may be expected to have occurred but did not. They are also formally quite similar, differing only in the choice of preposition to introduce the U argument. (Of course, given the polysemy of prepositions, there are several contexts in which German *an* corresponds directly to English *about*, so even in this case, formal equivalency is also possible.) Another striking cross-linguistic similarity of this VC type is also evident in that, in both languages, it seems to occur with only one member of the class of Change verbs (German *ändern*, English *change*). The overall frequency of such VCs, however, appears to be much higher in German than in English, as it was found 19 times for German *ändern* (~20% of its analyzed examples) but not at all in the analyzed English data.

The second VC type that exhibits notable differences across German and English are resultative VCs which realize the F as a bare adjective (or noun) without a preceding preposition (e.g. *She turned it red, It turned red*), which were identified only for *turn* in English. While resultative constructions exist in German (Boas 2003), they do not occur with any Change verbs "proper", but instead with the more general verbs *machen* ('make'; for transitive resultatives) or *werden* ('become'; for intransitive resultatives). Of course, when these highly general and polysemous German verbs are used in resultative constructions, they do in fact exhibit the Change semantics characterizing the Change verb class.[27] In order to

27. FrameNet also has a `Becoming` frame, which is associated with only two lexical units, the verbs *become* and *turn*. It is unclear how the `Becoming` frame differs semantically from the `Undergo_change` frame (i.e. intransitive VCs with Change verbs can be interpreted as 'becoming' scenarios even when they include prepositional F realizations: if one transforms into a frog, one

account for such data, the verbs *werden* and *machen* should also be categorized as members of the Change verb class but must also include specifications that they only occur in a highly limited range of Change VCs (specifically, one VC each).

Finally, the English verb *transform* was found to occur frequently in VCs in which the Undergo_change entity is realized as subject and expressed again as a reflexive pronoun in the object position. This valency feature cannot clearly be compared to the German VCs, as all inchoative change scenarios are expressed in reflexive constructions which are formally equivalent to those found with English *transform*. This has implications for the comparison of grammatically relevant meaning components in the following section. Specifically, in Chapter 4, I hypothesized that the frequency of *transform* in reflexive patterns relates to its meaning component specifying that it (optionally) refers to changes that are deemed positive. Ideally, one could identify German Change verbs that also appear with high relative frequency with reflexive objects and then determine whether they have the "positive change" meaning component, thus establishing "positive change" as cross-linguistically grammatically relevant. However, this comparison is impossible given that reflexive constructions are employed by default with inchoative uses of German Change and thus not (clearly) associated with any semantic feature.

Having identified equivalent features of the VCs across German and English, it is now possible to determine translation equivalents of each VC used to express Change. Table 6.8 shows how individual VCs for expressing Change events match up across the two languages. Each row of the table shows a set or pair of translation equivalents, with the German VC(s) listed in the left column and the corresponding English VC(s) on the right. The table is divided into three sections, with equivalent transitive VCs at the top, equivalent intransitive/reflexive VCs in the middle, and VCs exhibiting notable cross-linguistic differences at the bottom (with notes on the differences in the other language's cell).

Among the transitive VCs, the first equivalency pair (i.e. one-to-one equivalence) in Table 6.8 involves the simple transitive VCs of German and of English. The next set of equivalent VCs are those which are transitive and realize F in a prepositional phrase (but do not express O). The next equivalency pair captures transitive VCs which express the result or purpose of the change in a dependent clause (with slight formal differences, mentioned above). The final set of equivalent transitive VCs are those which realize both the O and F arguments in prepositional phrases. As discussed above, the VCs involving prepositional State arguments do not exhibit one-to-one mappings, because German may use two

becomes a frog). This close relation between 'becoming' and 'changing' may account for the appearance of *turn* in both resultative and non-resultative VCs and the use of German *werden* ('to become') to describe resultative change scenarios.

prepositions each to introduce O and F, while English may use two prepositions for F but only one for O.

Table 6.8 Equivalent German-English change VCs and VC groups

Equivalent Transitive VCs	
German	**English**
#2: [C _ U]	**#1:** [C _ U]
#3: [C _ U in F]	**#2:** [C _ U into F]
#4: [C _ U zu F]	**#3:** [C _ U to F]
#5: [C _ U dahingehend/so…]	**#4:** [C _ U F.CP]
#7: [C _ U aus O in F]	**#5:** [C _ U from O into F]
#8: [C _ U von O in F]	**#6:** [C _ U from O to F]
#9: [C _ U aus O zu F]	
#10: [C _ U von O zu F]	

Equivalent Reflexive/Intransitive VCs	
German	**English**
#11: [U _ sich]	**#7:** [U _]
#12: [U _ sich in F]	**#8:** [U _ into F]
#13: [U _ sich zu F]	**#9:** [U _ to F]
#16: [U _ sich aus O in F]	**#10:** [U _ from O into F]
#17: [U _ sich von O in F]	**#11:** [U _ from O to F]
#18: [U _ sich aus O zu F]	
#19: [U _ sich von O zu F]	

Non-equivalent VCs	
German	**English**
#6: [C _ Uneg an U] (*ändern*)	*infrequent, occurs only with* change
#15: [Uneg _ sich an U] (*ändern*)	*extremely infrequent, occurs only with* change
#14: [U _ sich dahingehend/so,...]	*extremely infrequent, transitive counterpart is present*
#1: [C _]	*unique interpretation, extremely infrequent, occurs only with* transform
expressed with machen	**#12:** [C _ U F.result] (*turn*)
expressed with werden	**#13:** [U _ F.result] (*turn*)
incomparable due to German requirement of reflexive argument in inchoative contexts	[C _ U.reflexive …] (*transform*)

The equivalency sets/pairs of English intransitive and German reflexive VCs, shown in the middle of Table 6.8, largely mirror those of the transitive VCs. In each of these cases, of course, formal equivalency does not hold, because the German VCs have a reflexive accusative object while the English VCs have no (direct) object. The first equivalence pair relates the German simple reflexive and English simple transitive VCs, which do not include any additional state arguments. The next equivalency set includes German reflexive and English intransitive VCs which realize the F in a prepositional phrase. As with the transitive VCs, there is a two-to-two mapping because two prepositions may realize F in both languages (with no apparent semantic difference). Among the VCs which realize both O and F in prepositional phrases, there is a two-to-four mapping: two English VCs are proposed, as the O argument only occurs in a *from* PP and can cooccur with *into* F or *to* F, while four German VCs are proposed, as the O argument can be expressed in either an *aus* PP or a *von* PP and each of these can cooccur with an *in* PP or a *zu* PP realizing the F argument.

The bottom section of Table 6.8 shows VCs that do not have clear equivalents in the other language. The first two of these are the transitive and reflexive German "NEG an U" VC, which in fact have equivalent English VCs (i.e. *Nothing changed about it; Pat changed nothing about it*), but these VCs did not occur in the English corpus analysis and appear to be highly infrequent (at least relative to other VCs). Another German VC without a clear English equivalent is the German reflexive VC with the clausal realization of F. This F realization type was not identified for intransitive VCs in the main English corpus analysis (though it occurred once in the separate analysis of 206 *metamorphose* examples), suggesting that this VC type is much rarer in English than in German. The English (transitive and intransitive) resultative VCs were found only with *turn*, but in German only occur with the highly general and polysemous verbs *machen* and *werden* in German rather than the more prototypical Change verbs discussed here. Finally, English *transform* was found to occur with notable frequency with a reflexive direct object pronoun referring back to the subject U argument: given that this feature characterizes all German reflexive VCs with the inchoative Change meaning, no German verbs can exhibit this property as a special type of argument realization.

In summary, this comparison has shown that the valency constructions found among German and English verbs are largely similar to one another. While some construction pairs can be characterized as one-to-one equivalents across the languages (e.g. the simple transitive VC), most display one-to-many or many-to-many mappings. Such mappings particularly characterize the VCs which include prepositional state arguments, because no clear semantic distinctions were identified among the different prepositional realizations within the languages and because German O arguments can be realized in two distinct PPs compared to only one in English. While some VCs for one language were not identified in the corpus analyses of Change verbs in the other language, even these VC types appear to have translation equivalents, but differ with respect to their overall frequency and distribution across verbs. As with the striking similarity of meaning components identified in the previous section, the question arises whether the similarity of VCs among these verbs may be due to the highly general nature of the Change semantics. This question is taken up in Section 6.3 below, where I discuss how the semantically richer class of Theft verbs behaves across German and English in comparison with Change.

From a theoretical perspective, this comparison showed the advantages of the Contrastive CxG methodology introduced by Boas (2010a), as it allowed a structured and empirically-based comparison of constructions that are closely semantically related in that they are used to express the same semantic frame. As such, it differs from traditional (even traditional CxG) analyses that investigate more abstractly defined argument structure constructions (Goldberg 1995, 2006) across a range of semantically diverse verbs and verb classes, such as Michaelis and Ruppenhofer (2001), Iwata (2008), and DeClerck et al. (2012). These studies showed rather drastic differences in the distribution and detailed interpretation(s) of related constructions across languages, whereas the present frame-specific analysis revealed that VCs for expressing Change across German and English are for the most part highly similar, with only minimal differences among certain constructions in their distribution and frequency. Establishing this range of constructions and their cross-linguistic equivalents opens up windows for new research, specifically focusing on how the syntactic configurations associated with Change VCs occur across other verb classes, including those closely related to Change (e.g. more specific change-of-state verbs) and those less closely related (e.g. Motion verbs; *She turned her car into the driveway*). Another avenue for future research would be to extend this comparison to other, especially less closely related languages, in order to determine whether those languages also exhibit the same classes and types of VCs to express Change events. More generally, this analysis realizes many of the suggestions arising from corpus-based contrastive research at the intersection of Construction Grammar and Valency Grammar, specifically that contrastive analyses must first be carried out in very specific contexts and that constructions should be defined at varying levels of abstraction (Iwata 2008; Boas 2011a; Herbst 2014).

6.2.4 Valency behavior of German Change verbs

Before moving on to the German-English comparison of grammatically relevant meaning components, it is necessary to assess the valency distribution of each German Change verb and compare the individual verbs' valency behavior against one another. The valency behavior of German Change verbs was established through a corpus analysis, following the same methodology discussed in Chapter 4 (and employed for English Change verbs). Below, I present the findings of the German Change valency analysis. For each verb, I present tables documenting its precise valency distribution in the analyzed corpus and provide brief prose descriptions of its valency behavior, drawing on the VC classes proposed above. I then systematically compare the verbs' distribution against each other in order to identify syntactic subclasses of German Change verbs.

Ändern

The corpus analysis of 95 examples with the verb *ändern* are presented in Table 6.9. The columns of the table list the following, from left to right: the number of examples exhibiting the VC, the percentage of analyzed examples exhibiting the VC, the VC's arbitrarily assigned numerical label (see Table 6.2), the abbreviated formalization of the VC, and one corpus example demonstrating the verb-VC combination.[28]

Table 6.9 Valency distribution of *ändern*

# of 95	Freq. (%)	VC#	VC	Example
41	**43%**	2	[C _ U]	Die Autoren […] änderten aber die Dramaturgie des Stückes, […]
13	**14%**	6	[C _ NEG an U]	Und auch ein fetter Hintern und ein gelber Stock änderten nichts an dieser Tatsache.
1	**1%**	8	[C _ U von O in F]	Ein außerordentlicher Parteitag änderte am 15.2. 1969 den Namen von SED-W in SEW
33	**35%**	11	[U _ sich]	Denn der Bezugsrahmen, in dem sich die Bedeutung des Lokalen erweisen muß, ändert sich.
1	**1%**	14	[U _ sich dahing/so,...]	[…] wird sich auch das Selbstverständnis global handlungsfähiger Aktoren dahingehend ändern können, daß sie sich zunehmend als Mitglieder einer Gemeinschaft verstehen, […]
6	**6%**	15	[NEG _ sich an U]	Der Kurs ist klar umrissen worden, und daran wird sich nichts ändern.

28. The VCs are listed in order based on the number assigned in Table 6.2. Generally, the intransitive VC is followed by transitive VCs, which are followed by reflexive VCs. Within these categories, VCs realizing no State FEs precede those realizing only F, followed by those realizing both O and F.

The data show that *ändern* exhibits a slight preference for transitive patterns (58%) over reflexive patterns (42%) but can appear felicitously in both VC types. With respect to State realization, *ändern* appears almost exclusively without prepositional State arguments. Only one such example was found in a transitive variant, and none were found in a reflexive variant. One unique property of *ändern* is its relatively high frequency in both transitive and reflexive variants of the "NEG an U" VC (#6, #15). These VCs occur at a rate of nearly 19% for *ändern* but were not identified in the corpus data of other German Change verbs.

Abändern

Abändern appears to be the least frequent verb among the five, as only 95 results were extracted from the DWDS corpus. Of these 95, only 22 were verbal uses in active sentences not involving non-canonical clause types (e.g. passive, infinitival clauses) that are not analyzed here due to methodological reasons (see Chapter 4). Despite the sparsity of this data, it is possible to identify some trends in the verb's argument realization behavior (which seem to be supported by a cursory analysis of the COSMAS-II DeReKo corpus). The results of the DWDS analysis are provided in Table 6.10 below.

Table 6.10 Valency distribution of *abändern*

# of 22	Freq. (%)	VC#	VC	Example
19	**86%**	2	[C _ U]	Das Gericht kann die Entscheidung auf den weiteren Antrag einer Partei abändern.
1	**5%**	4	[C _ U zu F]	[…] erarbeitete die CDU/CSU Reformpläne, die den Ersatz- zu einem quasi Arbeitsdienst abändern sollte.
2	**9%**	5	[C _ U dahing/so…]	[…] er wolle sie so abändern, daß sie seinen persönlichen Wünschen einen Freiraum gewährt.

The data show that all 22 of the analyzed examples for *abändern* are transitive, and 19 exhibit the simple transitive VC (#2). The transitive VC with clausal/purposive F occurred twice in the dataset, which is a small overall frequency but nonetheless comprises 9% of the (limited) examples analyzed. Thus, based on this limited analysis, *abändern* strongly prefers transitive VCs, as no reflexive VCs appeared in the corpus, and it seems averse to (though not completely incompatible with) VCs with prepositional F and O arguments.

Verändern

Table 6.11 presents the results for the 77 examples analyzed for *verändern*.

Table 6.11 Valency distribution of *verändern*

# of 77	Freq. (%)	VC	VC	Example
41	53%	2	[C _ U]	Diese Globalität verändert unser Denken.
35	45%	11	[U _ sich]	Mit diesen strukturellen Verschiebungen verändert sich der Weltbegriff.
1	1%[29]	14	[U _ sich dahing/so,...]	Vielleicht verändert sich die Pyramide so sehr, daß sie dereinst zum Würfel wird?

Verändern appears to have a rather narrow valency distribution, as it occurs with only three different VCs in the corpus sample. 41 examples exhibit the simple transitive VC (#2), 35 exhibit the simple reflexive VC (#11), and one example exhibits an intransitive pattern with a clausal F introduced by *so…, dass…* (#14). No VCs expressing State arguments were attested. These data suggest that *verändern* has no preference for either reflexive or transitive patterns, and strongly prefers VCs without State arguments.

Verwandeln

Table 6.12 presents the results of 114 analyzed examples of *verwandeln. Verwandeln* exhibits the greatest syntactic diversity of the five German Change verbs, appearing in nine different VC types.

To summarize the syntactic behavior of *verwandeln*, the data show that it no particular preference for transitive or reflexive patterns. With respect to State arguments, *verwandeln* shows a strong tendency to appear in patterns which express the F argument in a prepositional phrase, as 92 sentences (81%) include this argument while only 22 (19%) do not. Among these examples, the most frequent preposition used to introduce F is *in* with 86 attestations, while *zu* introduces F in only four examples. *Verwandeln* is also the only verb to appear in the simple intransitive VC (#1), with two such occurrences. As noted above, this VC type is rather unexpected, based on native speaker consultations and its infrequency in the corpus. It is also worth noting that both examples are from the same (religious) text and may be the product of novel, creative language use.

29. This percentages here do not equal 100% because each VC's percentage is rounded to the nearest whole number.

Table 6.12 Valency distribution of *verwandeln*

# of 114	Freq. (%)	VC #	VC	Example
2	**2%**	1	[C _]	Liebe verwandelt und heilt.
10	**9%**	2	[C _ U]	[…] die Komödianten haben ihn belehrt und verwandelt.
37	**32%**	3	[C _ U in F]	Wie verwandelt man Blei in Gold?
2	**3%**	4	[C _ U aus O zu F]	[…] daß im Atomzeitalter eine Rückkehr der Supermächte zum Kollisionskurs die menschliche Rasse zu Asche verwandeln könne.
1	**1%**	7	[C _ U aus O in F]	Die fehlerhafte Linie der Führung hat die Partei aus einer politischen Partei und einem von einer Idee durchdrungenen Bund in eine Machtorganisation verwandelt, die […]
10	**9%**	11	[U _ sich]	Während der Sommermonate des Jahres 1948 hatte sich unsere Armee verwandelt.
47	**41%**	12	[U _ sich in F]	Prag, Paris und Westberlin verwandelten sich binnen kurzem in Orte der konkreten Utopie.
3	**3%**	13	[U _ sich zu F]	Dabei verwandelt sich die religiöse Glaubensgemeinschaft […] zu einer […] Kommunikationsgemeinschaft.
1	**1%**	16	[U _ sich aus O in F]	Die Teilnehmer […] können sich aus Exemplaren einer tierischen Spezies mit angeborener artspezifischer Umwelt […] in Angehörige eines Kollektivs mit Lebenswelt verwandeln […]
1	**1%**	17	[U _ sich von O in F]	Die Augenärztin und ehemalige Hochschullehrerin hat sich […] von einer scheuen Ehefrau […] in eine selbstbewußte Hoffnungsträgerin verwandelt.

Wandeln

Table 6.13 presents the results of 87 analyzed examples of *wandeln. Wandeln* shows a preference for reflexive patterns, as they comprise 79 of the 87 examples (91%), but transitive patterns were also attested. *Wandeln* exhibits a slight preference for VCs without State arguments (F, or both O and F). VCs with State arguments comprise 24 of the 87 examples (27%). One example expresses F in a purposive clause, while 23 realize F (and O) in a PP. However, when *wandeln* does occur with F, it is realized in a *zu* PP more frequently than any other German Change verb, as 20 of the 23 (87%) VCs with F arguments employ *zu* PPs. (The verb with the second highest frequency of VCs realizing F in a *zu* PP is *verwandeln*, but these occur only five times in 114 examples, or 4%.) Finally, *wandeln* appears to be most frequent among the analyzed verbs in patterns with both the O and the F argument, as these comprise over 9% of its examples (eight of 87) but are found only once each with *ändern* and *verwandeln* among all other analyzed examples.

Table 6.13 Valency distribution of *wandeln*

# of 87	Freq. (%)	VC #	VC	Example
6	**7%**	2	[C _ U]	[…] und seine Tätigkeit im Club d'essai wandelten dann grundlegend seinen Stil […]
2	**2%**	4	[C _ U zu F]	[…] , daß er den Front National zu einer salonfähigen konservativen Partei wandeln wolle.
57	**66%**	11	[U _ sich]	Am Ende des 18. Jahrhunderts allerdings wandelte sich das Leseverhalten der ländlichen Bevölkerung.
2	**2%**	12	[U _ sich in F]	Die Gunst des Königs wandelt sich in Zorn, […]
11	**13%**	13	[U _ sich zu F]	Nach der Gründung des Staates Israel wechselte er ins sozialistische Lager und wandelte sich zum engagierten Publizisten und Schriftsteller.
1	**1%**	14	[U _ sich dahing/so,..]	[…] , sollten die Verhältnisse sich so wandeln, "daß einer Vertragspartei das Festhalten an der ursprünglichen Regelung nicht zugemutet werden kann".
1	**1%**	16	[U _ sich aus O in F]	Erst in der entwickelten KP. würde sich die Arbeit aus einer Existenznotwendigkeit in ein erstes Lebensbedürfnis wandeln.
7	**8%**	19	[U _ sich von O zu F]	Der ältere Diener […] wandelt sich vom fanatischen Eiferer zum mitleidenden Gläubigen, […]

Summary and comparison of German Change verbs' valency behavior

The verb-specific data presented above is reformulated in Table 6.14, which summarizes the precise distribution of each Change verb across each of the VCs.[30]

30. The asterisk next to VCs #9, #10, and #18 indicate that these VCs were not attested among the analyzed corpus examples, but nonetheless occur with (at least some) German Change verbs

Table 6.14 Distribution of valency constructions with German Change verbs

VC#	VC	*abändern*	*ändern*	*verändern*	*verwandeln*	*wandeln*
#1	C _				2%	
#2	C _ U	86%	43%	53%	9%	7%
#3	C _ U in F				32%	
#4	C _ U zu F	5%			3%	2%
#5	C _ U dahing/so…	9%				
#6	C _ NEG an U		14%			
#7	C _ U aus O in F				1%	
#8	C _ U von O in F		1%			
#9*	C _ U aus O zu F					
#10*	C _ U von O zu F					
#11	U _ sich		35%	45%	9%	66%
#12	U _ sich in F				41%	2%
#13	U _ sich zu F				3%	13%
#14	U _ sich dahing/so…		1%	1%		1%
#15	NEG _ sich an U		6%			
#16	U _ sich aus O in F				1%	1%
#17	U _ sich von O in F				1%	
#18*	U _ sich aus O zu F					
#19	U _ sich von O zu F					8%

From a bird's eye perspective, the table demonstrates that German Change verbs, like their English counterparts, also exhibit drastic differences in their distribution across VCs, especially when frequency is taken into account. Only one VC type, the simple transitive VC (#2) appears with all five of the analyzed verbs, but several other VCs occur with only one of the verbs under analysis (#1, #3, #6, #7, #8, #15, #17, #19) in the corpus sample. The English Change verbs discussed in Chapter 4 also exhibit significant variation in valency distributions, suggesting that the idiosyncratic nature of verb valency is not limited to English.

In order to compare the valency behavior of the individual verbs, Table 6.15 extrapolates the data from the above table to show how each verb behaves with respect to specific features and classes of VCs. The first distinction is the relative frequency of each verb in transitive vs. reflexive VCs (second column). The next column shows the verbs' distribution across VCs with vs. VCs without prepositional state arguments (including those with only F and with both O and F). The fourth

as they may be found through manual corpus searches.

column shows the frequency with which *in* vs. *zu* introduces the F argument (with the first number showing the number of examples employing that preposition and the number after the slash showing the total number of prepositional F arguments attested for that verb). The final column lists any other unique behavior observed for each verb.

Table 6.15 Major trends in valency behavior of German Change verbs

Verb	Transitive vs. Reflexive	Prepositional F vs. no prepositional F	Preposition for F realization	Other
abändern	100%–0%	5%–95%	*zu* (1/1)	Frequent (9%) with purposive clause F VCs #5 and #14
ändern	58%–42%	2%–98%	*in* (1/1)	Frequent (20%) in [NEG *an* U] VCs #6 and #15
verändern	53%–46%	0%–100%	0	
verwandeln	46%–54%	80%–20%	*in* (87/92) *zu* (5/92)	2 examples (2%) with intransitive VC #1
wandeln	9%–91%	26%–74%	*in* (3/23) *zu* (20/23)	8 examples (9%) realize O

With respect to the transitive-reflexive distinction, three types of behavior are observable. For *ändern, verändern*, and *verwandeln* there is no strong preference for transitive or reflexive VCs. *Abändern* occurs only in transitive VCs, while *wandeln* appears much more frequently in reflexive VCs than transitive VCs. Each verb shows some preference for VCs with or without prepositional (Final) State arguments. *Abändern, ändern*, and *verändern* each rarely occur in VCs with prepositional F arguments. *Wandeln* is also more frequent in VCs without prepositional F than in those with this argument, but to a lesser extent than the three verbs just mentioned; however, it is the most frequent in VCs with both O and F. *Verwandeln*, in contrast, is the only verb which appears more frequently in VCs including prepositional F arguments than those without. With respect to the specific preposition introducing the F argument, it is noteworthy that *in* is much more frequent than *zu* with *verwandeln*, but the opposite is true for *wandeln*.[31]

Other notable tendencies in the valency behavior of individual verbs include the following. *Abändern* appears most frequently in VCs in which F is expressed in a purposive clause, with such patterns comprising over 9% of the data for *abän-*

31. As noted above, a more detailed comparison of the semantic types of F arguments occurring with *zu* and those occurring with *in* may reveal a semantic distinction between *wandeln* and *verwandeln* and thereby may account for this distribution, but such a comparison must be left for future work.

dern, but not more than 1% for any of the other verbs. *Ändern* is the only verb which occurs in the “NEG *an* U” VC types and exhibits a relatively high frequency in these VCs (20%). Next, *verwandeln* was the only verb found in the uncommon intransitive patterns with a “habitual” interpretation, though these were found only two times in its 114 examples. Finally, *wandeln* shows a relatively high frequency (9%) in VCs realizing the O argument in addition to F.

Finally, Table 6.16 presents the valency data described above according to the class’s major valency features and the specific verbs exhibiting each feature. This data informs the identification of “syntactic subclasses” of German Change verbs, defined in Chapter 4 as subsets of verbs within a class that exhibit similar tendencies in their valency behavior.

Table 6.16 Classes of German Change verbs according to valency behavior

Valency feature	Category	Verbs
Transitivity	no clear tendency	*ändern, verändern, verwandeln*
	only transitive	*abändern*
	(almost) only reflexive	*wandeln*
State arguments	(almost) always no State	*abändern, ändern, verändern*
	(relatively) frequent with State	*verwandeln, wandeln*
F PP realization	none	*abändern, ändern, verändern*
	prefer *in*	*verwandeln*
	prefer *zu*	*wandeln*
Unique behaviors	frequent purposive clausal F	*abändern*
	frequent in [NEG an U] VCs	*ändern*
	occurs in intransitive VCs	*verwandeln*
	frequent in VCs realizing O	*wandeln*

While no verbs exhibit (near) identical behavior, some possible groupings may be proposed. Both *ändern* and *verändern* show no preference for transitive or reflexive VCs, and they both consistently appear in VCs without State arguments, suggesting a syntactic subclass. The only difference between these two verbs involves the frequent occurrence of *ändern* in the [NEG an U] VCs (#5, #16). *Abändern* is similar to these two verbs in that it also does not appear with prepositional F arguments. However, it differs in that it shows a strong preference for transitive over reflexive patterns and frequently occurs with clausal purposive F arguments. A possible explanation for the behavior of these verbs is a proposed connection between not realizing prepositional states (e.g. changing into something else) and the “subtle change” meaning component identified for these three verbs above.

Similar behavior was noted for the English Subtle Change verbs *alter* and *modify* in Chapter 4. With respect to the frequency of purposive F clauses with *abändern*, this may be traced to its meaning component of improving or making something more acceptable, similar to that identified for English *modify* which also appeared with purposive F clauses with relatively high frequency.

Verwandeln and *wandeln*, on the other hand, share some similarities with one another that set them apart from the three other verbs. Both verbs frequently appear with prepositional F arguments and, to varying extents, with prepositional O arguments as well. A relevant difference between the verbs is that *verwandeln* shows no preference for transitive or reflexive patterns, while *wandeln* is much more frequent with reflexive than transitive patterns. Less significantly, these verbs differ in the exact preposition which introduces the F, as *verwandeln* is much more frequent with *in* PPs while *wandeln* appears more frequently with *zu* PPs. Although they display these differences, it is possible that their shared behavior of frequently realizing prepositional states (e.g. changing into something else) is related to the "drastic change" meaning component observed for these verbs in the previous sub-section.

The valency behavior and subclasses of German Change verbs can also be represented with clustering images based on the verbs' (and subclasses') distribution across VCs. Figure 6.1 shows the hierarchical clustering of German Change verbs based on their distribution across individual VCs (without respect to VC features), parallel to the clustering of English Change verbs shown in Figure 4.14 (Section 4.5).[32] This representation demonstrates the similarity of *ändern* and *verändern* on the one hand, and *wandeln* and *verwandeln* on the other. The distant positioning of *abändern* separates it from the other German Change verbs, given its exclusive occurrence in transitive VCs and its frequent occurrence with purposival clause F arguments.

However, the clustering in Figure 6.1 fails to capture the similarity of *abändern* to the other *-ändern* verbs, namely their infrequency in VCs expressing State arguments. This similarity, however, can be captured when the verbs' distributions are clustered according to the transitive vs. reflexive VC feature, as shown in Figure 6.2. This clustering better captures the similarity of the two *-wandeln* verbs and the three *-ändern* verbs, while also still capturing the strong similarity between *verändern* and *ändern*.

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32. I thank David Hünlich for providing these clustering images, which were made using R (the dist function for calculating euclidean distances and the as.dendrogram function to convert into dendrograms).

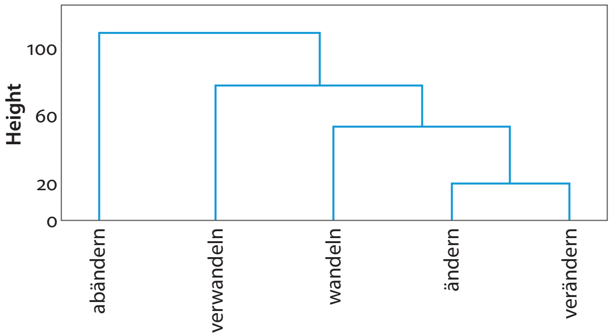

Figure 6.1 Clustering of German Change verbs according to distribution across individual VCs

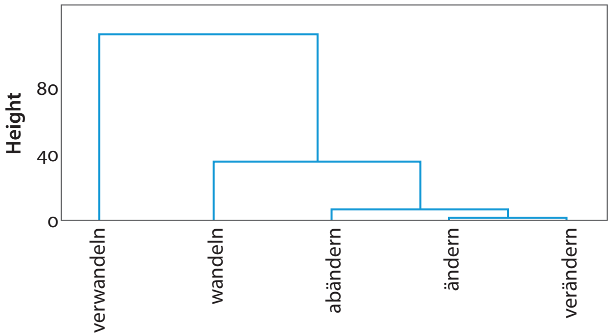

Figure 6.2 Clustering of German Change verbs according to distribution across VCs with vs. without State arguments

Of course, more sophisticated statistical tests and representations could be provided, for instance according to all the VC features identified above. However, the two clusters above correspond closely to the subclasses identified in the preceding discussion, despite their somewhat rudimentary nature.

In conclusion, this subsection has shown that while no verbs exhibited identical argument realization behavior, *ändern* and *verändern* share many similarities that suggest a syntactic subclass, particularly as they shown no preference for transitive or reflexive VCs and they almost exclusively appear in VCs without prepositional state arguments.[33] *Abändern* could also possibly be included in this subclass

33. Dux (2016: 350–352) investigates whether the verbal prefixes *ab-* and *ver-* occurring with German Change verbs influence the verb's syntactic or semantic properties. His investigation finds no clear influence from the prefixes based on the limited number of verbs analyzed and that the prefixes' influence on the root verb do not correspond to those found by Motsch (1999). He concludes that future research is necessary to establish the semantic or syntactic influence of verb prefixation among German Change verbs but suggests that prefixes may not be associated with a single meaning or syntactic impact, but they must be specified on a verb-by-verb (or due to its aversion to VCs with prepositional F arguments, but it also differs with respect to transitivity and the realization of purposive F clauses. In contrast to these verbs, *verwandeln* and *wandeln* both frequently realize prepositional F arguments, suggesting a syntactic subclass, but they differ with respect to transitivity and the choice of preposition that introduces the F argument.[34]

6.2.5 Grammatically relevant meaning components of Change verbs in German and English

Having established the valency behavior of each German Change verb, it is now possible to investigate systematically whether the grammatically relevant meaning components identified for English Change verbs have the same effect, if any, on German verbs exhibiting these (additional) meaning components (MCs). In Chapter 4, I defined a grammatically relevant meaning component (GRMC) as a MC that causes verbs that bear it to differ in valency behavior from other verbs in the class that do not bear it. There, I claimed that when two or more verbs each exhibit a GRMC, they form a (syntactic-semantic) subclass: a verb class that captures more fine-grained aspects of syntax and semantics than that of the broader verb class. The question thus arises whether these GRMCs also influence German Change verbs that bear them in similar ways as the English verbs. To test this, we must first identify German verbs with similar MCs to the English ones, establish the German verbs' valency distribution, and finally determine whether the verb(s) with the given MC exhibit(s) similar valency behavior to the English verbs with that MC. If this is the case, this MC is viewed as a *cross-linguistically grammatically relevant meaning component* (and potentially a linguistic universal to be tested on a wider range of languages).

The meaning analysis of German Change verbs described in Section 6.2.1 provides the first step of the analysis. Three MCs are relevant for the present analysis, as they characterize verb meanings in both languages and were found to influence the valency behavior of English verbs bearing them.[35] These are the "subtle

potentially a class-by-class) basis, as argued for by Lüdeling (2001) in her investigation of verb particle constructions.

34. As this chapter focuses on developing methods for contrastive verb class analysis and on comparing specific aspects of German and English Change and Theft verbs, I do not formalize the German Change (frame-constructional) verb class or the class's constructional range (and its network structure), as was done for English Change verbs in Section 4.4. However, see Dux (2016: 475–488) for more on these topics.

35. The "positive change" MC of English *transform* was not clearly identified for any of the German verbs analyzed and its potential syntactic repercussion (i.e. relatively frequent with change" MC (*alter, modify, abändern, ändern, verändern*), the "drastic change" MC (*transform, metamorphose, verwandeln, wandeln*), and the "purposive change" MC (*modify, abändern*). I discuss these MCs in turn below and draw on the above valency analysis to assess whether they are cross-linguistically grammatically relevant.

The "subtle change" MC was found to be grammatically relevant in English, in that the two verbs bearing it (*alter, modify*) appear almost exclusively in transitive VCs and in VCs without prepositional F (or O) arguments. This component applies to German *abändern, ändern,* and *verändern*, so I now discuss the behavior of each of these verbs with respect to these valency features. The VCs in the *abändern* data were all transitive VCs and only one example included a prepositional F argument; both features corresponding to the English "subtle change" verbs. *Ändern*, however, shows no preference for transitive VCs over reflexive VCs, thus differing from the English "subtle change" verbs, but it does seem highly averse to VCs with prepositional F arguments, as no such VCs were found in its 95 analyzed examples. *Verändern* is very similar to *ändern*, as it also appears equally frequent in transitive and reflexive VCs but shows a strong preference for VCs without prepositional F arguments. Given these data, it appears that the "subtle change" MC is grammatically relevant across German and English, but it does not have precisely the same effect on valency behavior. Specifically, it effects only a strong preference for VCs without prepositional F arguments in German, but not a strong preference for transitive VCs.

Moving on, the "drastic change" MC of English *transform* and *metamorphose* was found in Chapter 4 to correlate with a relatively high frequency in VCs realizing both the O and the F arguments (each in prepositional phrases). The German verbs *verwandeln* and *wandeln* also have this MC, thus raising the question whether they also exhibit this valency behavior. Of the 114 analyzed examples for *verwandeln*, only three (< 3%) included both the O and the F arguments. While this is a seemingly low frequency, it is still much higher than the German verbs without the "drastic change" MC, which rarely occur in such VCs in the corpus sample. *Wandeln*, however, does exhibit a much higher relative frequency in VCs with both O and F, which comprise over 9% of its examples (8 of 87). Thus, both German "drastic change" verbs occur more frequently in VCs realizing both F and O than verbs without this MC, though the low overall frequency of *verwandeln* in such VCs weakens the generalization. However, if one looks more generally at VCs with prepositional State arguments (i.e. with both O and F and with only F), the data show that such VCs comprise 80% of the data for *verwandeln* and 26% for *wandeln*.

reflexive objects) is also incomparable across the languages, given that reflexive VCs are always used in German to describe inchoative changes.

This is a stark contrast to the "subtle change" verbs, for which such VCs comprise a much lower percentage of the data, if they occur at all: namely 0% for *verändern*, 2% for *ändern*, and 5% (i.e. only one of 23 examples) for *abändern*. Recall from Chapter 4 that this property was not used to characterize English "drastic change" verbs because *turn* also was frequent in such VCs but bore neither the "drastic change" nor "subtle change" MC, a property which no German verbs exhibit. However, all English Subtle Change verbs rarely occurred in VCs with prepositional State FEs, thus showing a stark contrast to English Drastic Change verbs. In sum, the "drastic change" MC is also grammatically relevant in German and it influences a high relative frequency in VCs with prepositional State arguments (including only F or both O and F) and an ability to occur in VCs realizing both O and F.

Finally, both English *modify* and German *abändern* are associated with the "purposive change" MC. In Chapter 4, *modify* was found to exhibit a relatively high occurrence (18%) in VCs with purposive clause F arguments, which may potentially be related to the "purposive change" MC it bears (but no subclass could be posited as no other English verbs had this MC). The data for *abändern*, however, support this hypothesis, as VCs with purposive clause F comprise 9% of its data but at most 1% of the examples for the other German Change verbs. These correspondences between English *modify* and German *abändern* therefore suggest that the "purposive change" MC is cross-linguistically grammatically relevant and has the same effect across languages, namely a high relative frequency in VCs expressing F in a purposive clause.[36] Of course, a generalization based only on two verbs in different languages is not particularly useful, so future work would need to identify other verbs (even perhaps verbs in other classes) with a "for a purpose" MC and establish whether these also occur frequently with purposive subordinate clauses. Here, the analysis of less frequent and more domain-specific German Change verbs such as *modifizieren* or *umwandeln* (and English verbs such as *evolve* or *adapt*) may provide further support for the grammatical relevance of this MC and is thus a desideratum for future research.

The results of the comparison of grammatically relevant meaning components across German and English are summarized Table 6.17. The first column lists the MC found among verbs of both languages. The second and third columns lists the German and English verbs exhibiting this component, respectively, as well as the shared valency behavior identified for these verbs. The fourth and fifth columns list whether the meaning component is grammatically relevant across languages

36. The relation between the "purposive change" MC and the corresponding frequency in VCs with purposive clauses exhibits the "chicken and egg" problem. Specifically, one may attribute the syntactic behavior to the verb meaning or one may attribute the MC to the verbs based on their syntactic behavior. This issue is also addressed in Barðdal (2001).

(with column label "x-lg GRMC") and if it has the same effect on verb valency behavior across languages, respectively.

Table 6.17 Grammatically relevant meaning components across German and English

MC	English	German	x-lg GRMC	Same effect
subtle change	**Verbs**: *alter, modify* Valency Behavior: – strong aversion to VCs with F PP – strong preference for transitive VCs	**Verbs**: *abändern, ändern, verändern* Valency Behavior: – strong aversion to VCs with F PP	Y	N
drastic change	**Verbs**: *metamorphose, transform* Valency Behavior: – -relatively frequent in VCs with O and F	**Verbs**: *verwandeln, wandeln* Valency Behavior: – occur in VCs with O and F	Y	??
purposive change	**Verb**: *modify* **Valency Behavior:** – relatively frequent with clausal F	**Verb**: *abändern* **Valency Behavior:** – relatively frequent with clausal F	Y	Y

The table shows that the "subtle change" MC is grammatically relevant across the two languages but with a slightly different effect on valency: English "subtle change" verbs show both a strong preference for transitive VCs and strong preference for VCs without prepositional F (or O) arguments, whereas German "subtle" change verbs only exhibit the latter of these properties. The "drastic change" MC was traced to a relatively high frequency in VCs with both O and F (in prepositional realizations) among English verbs, while German "drastic change" verbs show some frequency (i.e. the potential to occur) in VCs with both O and F, but a much higher relative frequency relative to the other German Change verbs in VCs expressing any State FE in a preposition. (The final column of this row includes "??" because the effect of this MC is similar but not identical across languages.) Finally, the "purposive change" MC appears to influence a high frequency in VCs with purposive/clausal F arguments in both languages, but this applies to only one verb in each language (*modify* and *abändern*).

The comparison of grammatically relevant meaning component among German and English Change verbs was less conclusive than the prior comparisons of verb meanings and valency constructions, given the limited set of verbs and MCs to compare and the relatively small amount of corpus data to draw on. At the same time, the methodology and preliminary results of the analysis show promise for future applications and advantages over existing comparisons of grammatically relevant MCs. Specifically, traditional comparisons of grammatically relevant MCs (e.g., Croft 2012, Levin 2013) focus on meaning components – such as the result/manner distinction, causal chains, and verbal aspect – which are highly abstract and general, applying to much coarser-grained verb classes than those treated here.[37] Such meaning components are thus very difficult to compare empirically and often rely on elusive intuitive judgments.[38] As these studies compare a wide range of typologically diverse languages, they are complicated by the cross-linguistic variation in grammatical constructions (see Croft 2001), making it difficult to determine the precise effects that the MCs have on valency behavior (which was not the case here due to the close genetic relationship between German and English). The present approach differs from previous studies in that it involves clearly defined and easily measurable semantic features – defined in terms of semantic frames for verb classes and additional MCs for individual verbs – and concrete, corpus-based aspects of valency, as defined through the range of VCs associated with a class and the syntactic/valency features defining them.[39] As such, the present methodology allows claims to be made from the bottom up, specifically identifying how richly defined and intuitively identifiable aspects of meaning influence highly specific aspects of a verb's valency behavior as compared to other verbs within the same (fine-grained) semantic class.

6.2.6 Conclusion of contrastive Change verb analysis

The above comparison sheds light on parallels and differences in verb meanings, valency constructions, and grammatically relevant meaning components of Change verbs across German and English. The meaning comparison revealed strikingly few cross-linguistic differences in either the shared meaning (defined

37. See Levin and Rappaport Hovav (2005: 16–18) and Levin (2015) for a discussion of how grammatically relevant meaning components may be found among verbs of very different semantic classes, be they FrameNet classes or even the coarser-grained classes identified by Fillmore (1968).

38. See, for instance, Levin and Rappaport Hovav's (2013) discussion of the complications that arise when determining whether a verb is a result verb or a manner verb.

39. Furthermore, this fine-grained perspective also makes it clear what aspects of verb meaning and valency behavior can be compared in contrastive analyses and which cannot. For example, it was not possible to compare the relation between the "positive change" meaning for English *transform* and its relatively high frequency with reflexive objects with the German data, because all inchoative change events are expressed in VCs including reflexive objects.

in terms of semantic frames and FEs) or in the (additional) MCs setting apart individual verbs: both languages show a major distinction among "drastic change" and "subtle change" verbs, as well as a "purposive change" meaning component associated with only one (analyzed) verb in each language. Perhaps the most significant lexical difference across the languages is the existence of "general change" verbs (i.e. neither subtle nor drastic) in English but not in German. With respect to valency behavior, the valency constructions (VCs) associated with Change verbs were also found to be largely parallel across the two languages. Apart from the systematic formal difference in the expression of inchoative change events (using intransitive VCs in English and reflexive VCs in German), other differences between the VCs related primarily to their distribution or frequency. Finally, the comparison of grammatically relevant MCs (and the corresponding subclasses) in the previous section was fairly limited, given the small number of MCs, verbs bearing them, and corpus data in both languages. However, the three MCs tested in the most detail appear to be grammatically relevant in both languages, even if their grammatical effect is not identical across the languages.

In sum, the comparison of German and English Change verbs revealed surprisingly few differences in terms of either meaning or valency behavior. This situation certainly may arise from the close genetic relation between English and German, and comparisons with other, less closely-related languages is certainly necessary. However, the striking absence of prominent cross-linguistic differences may relate more generally to the nature of the class of Change verbs analyzed here. The following section therefore describes the results of a contrastive analysis of Theft verbs, which in the previous chapter were shown to be semantically much richer (or more highly descriptive) class, in order to test this hypothesis.

6.3 Theft verbs in German and English: Verb descriptivity in contrastive analysis

6.3.1 Introduction and review of contrastive research on Theft verbs

While the previous sections compared Change verbs across German and English, I now return to questions raised in Chapter 5 regarding the comparison of semantically distinct classes with an eye on how verb classes of varying levels of descriptivity differ when compared across languages. The preceding sections revealed that the highly general Change verbs exhibit few notable semantic or syntactic differences across German and English. However, the analysis of English Theft verbs in Chapter 5 demonstrated that Theft verbs are unlike Change verbs both semantically – in that they are associated with more numerous and specific (additional) meaning components – and syntactically – in that they have a much narrower range of argument realization patterns, with respect to both the number of valency constructions they occur in and the range of phrase types that may occur in these constructions. The question thus arises whether Theft verbs exhibit greater cross-linguistic differences resulting in translation gaps and problems for language learners. If this is the case, the cross-class variation in cross-linguistic equivalency may be tied to the verbs' (or verb classes') level of descriptivity.

Prior to reporting on the comparison, I briefly review relevant contrastive and German-based research on specific verb classes, particularly Theft verbs. Next, I describe the meaning (component)s of German Theft verbs and then draw on this analysis to compare the meanings of Theft verbs across English and German. I then describe the valency constructions associated with German Theft verbs and compare them with those identified for English Theft verbs.[40] The analysis draws primarily on the German verbs *stehlen* ('steal'), *klauen* ('steal/snatch'), *mopsen* ('steal/snatch'), *stibitzen* ('steal/swipe/pilfer'), *entwenden* ('steal/run off with') and *unterschlagen* ('steal/embezzle').[41] These verbs exhibit the Theft shared meaning (defined in Section 5.2) but construe the general Theft semantics in slightly different ways.

Before discussing previous research on Theft verbs, I first contrast the results of two studies (briefly mentioned in Section 6.1) that address verb classes of varying levels of descriptivity. Winkler (2015) investigates the valency behavior of verbs of creation, which occur in German equivalents of the constructions associated with the material/product alternation (*make X out of Y; make Y into X*; cf. Levin 1993: 55f.) These verbs include *machen* ('make'), *bauen* ('build'), *formen* ('form'), and *herstellen* ('produce'), each of which are semantically quite general, meaning only that "someone creates some product using some material". As such, these verbs can be viewed as having a low degree of descriptivity, like the Change verbs investigated above. In contrasting their valency behavior (specifically with respect to the material/product alternation), Winkler observes very few syntactic differences across the languages, the primary one being that German may express the material in either a *von* ('from'), *aus* ('out of'), or *mit* ('with') PP, whereas English only allows *out of* or, less frequently, *from*.

In contrast, Meliss (2015) compares the valency behavior of German and Spanish "smelling verbs" which describe situations in which "something gives off

40. Given the focus of this chapter, I do not discuss grammatically relevant meaning components or subclasses of German Theft verbs (but see Dux 2018), nor do I define the frame-constructional verb class and multi-grained verb entries.

41. As noted above, the glosses provided here should not be viewed as precise translation equivalents but only serve to give a general picture of how the German verbs' meanings relate to individual English Theft verbs.

a scent that is perceived by an animate entity" (as with English *smell, stink,* and *sniff*). Given that the meanings of these verbs involve much more specific concepts (e.g. perception/sensation, scent emission) and corresponding participants (e.g. smeller, smell, smelly thing), they are semantically richer (i.e. have higher descriptivity) than the Change or Creation verbs discussed above. Meliss's comparison revealed rather significant differences in the precise construction types available to equivalent verbs in the two languages as well as in the verbs' distribution across those constructions. Thus, a cursory comparison of these two studies suggests that verb classes of higher descriptivity (e.g. smelling verbs) exhibit more drastic cross-linguistic differences with respect to their valency behavior than verb classes of lower descriptivity (e.g. creation verbs). Based on these findings, it stands to reason that the semantically rich Theft verbs will be more syntactically diverse across German and English than the Change verbs compared in Section 6.2 above.

In fact, existing studies have documented rather significant cross-linguistic differences in the syntactic behavior of Theft verbs. Dux (2018) points to two German Theft construction types that differ greatly from English. The first is the ditransitive (a.k.a. dative object) construction, in which the Victim who loses the Goods is expressed as a dative object, as shown in (6.5).[42] In English, the first object in the English ditransitive construction is consistently interpreted as a Beneficiary of the Theft event, rather than the Victim.[43]

(6.5) Er stiehlt mir ein Buch. → He steals a book from me.
He steals me a book.

The second construction type occurring with German but not English Theft verbs is the applicative construction (or *be-* prefix construction; see Michaelis and Ruppenhofer 2001). Specifically, most German Theft verbs may be combined with the *be-* prefix, in which case the Victim (rather than the Goods) is the accusative object and the Goods may (optionally, with some verbs) be expressed as an oblique genitive object, as shown in (6.6).

(6.6) Er bestiehlt den Mann seines Geldes.
He be-steals the man (acc.) his money (gen.).

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42. While the dative object of such German constructions typically instantiates the Victim FE, it may also be interpreted as a Beneficiary in certain contexts.

43. Colleman and DeClerck (2008, 2011) investigate diachronic change of the semantics of the dative/double object construction in English and Dutch. They show that earlier stages of English did in fact allow verbs of dispossession to occur in the construction, but the (English) construction's semantics narrowed to no longer allow such verbs. Some vestiges of this usage remain in English, as in *to deny someone something.*

This construction closely resembles the valency behavior documented for English Robbery verbs (cf. Goldberg 1995: 45–50), which realize the Victim as direct object and the Goods in an *of* PP (which corresponds to German genitive case in many contexts), as in (6.7).

(6.7) He robs the man of his money.

Dux (2018) observes that the lexicogrammatical distinction in English between Theft and Robbery verbs motivates the positing of two different English verb classes. However, the German lexicon lacks this distinction, thus precluding the positing of two classes, because the German verbs' ability to appear in the applicative construction is not determined lexically but triggered morphologically by combining a Theft/Robbery verb with the *be-* prefix. That is, both *stehlen* ('steal') and *rauben* ('rob') may occur with the prefix in the applicative and without the prefix in the steal-type construction with Goods as object.

Syntactic differences among Theft verbs are not only documented across German and English, but also across other language pairs. Enghels and Wylin (2015), for instance, discuss the constructions found with French *voler* and Spanish *robar*, which are equivalents of both *rob* and *steal* in English. In reviewing the constructions found with Theft verbs in other languages, particularly Germanic languages, they identify the simple transitive construction (with Goods as direct object and Victim/Source as a PP), the ditransitive construction (with Goods as direct object and the Victim as a dative or first object), and the applicative construction (with Victim as direct object and Goods optionally expressed as an oblique phrase) which is triggered lexically in English but via the applicative (*be-* prefix) construction in German and Dutch. Drawing on translations of English *rob* and *steal* in the Harry Potter book series, they identify even more constructions for expressing Theft events. Among the various constructions discussed (including both passive and active as well as two- and three-participant constructions), Enghels and Wylin (2015) single out two language-specific constructions used to profile the victim of the Theft event, i.e. to emphasize that it is negatively affected.[44] This is expressed using the clitic doubling construction in Spanish[45] and using the pronominal fac-

44. Enghels and Wylin also emphasize that the "source" type arguments differ in their syntactic possibilities, depending on whether the entity is (construed more as) an inanimate location, a mere possessor of the goods, or a highly affected victim. These suggestions also support the separate treatment of Source, Victim, and Source/Victim FEs discussed in Section 5.3.

45. *En Jezabel le roba el marido a otra mujer.* ('In Jezebel she steals the husband from another woman.'; Enghels and Wylin 2015: 116).

titive construction in French.[46] Thus, the cross-linguistic diversity of constructions used with Theft verbs does not appear to be limited to Germanic languages, but is also documented for other, less closely related languages.[47]

In the following investigation of German Theft verbs, I briefly compare them with English Theft verbs as with the Change verbs above. The focus of this section, however, is to assess the degree of cross-linguistic similarity in the meanings and valency constructions associated with high-descriptivity Theft verbs and compare the findings against the preceding analysis of low-descriptivity Change verbs.

6.3.2 Theft verb meanings in German and English

6.3.2.1 *Meanings of German Theft verbs*

I begin by discussing the meanings of German Theft verbs in order to compare them with those of English Theft verbs and determine whether Theft verbs exhibit greater semantic diversity across languages than Change verbs.[48] The (additional) meaning components (MCs) identified for the six verbs under analysis are given in Table 6.18. The verb is in the left column and its associated MCs are in the right, along with a specification of which participant (i.e. Frame Element) of the Theft frame the MC applies to (including non-core Situation and Manner FEs, as well as a "Pragmatic" category to capture features such as formality and register).

46. *La mère de Christian, depuis qu'elle a fêté ses quatre-vingts ans, s'est fait voler deux fois son sac à main*. ('Christian's mother, since she celebrated her 80th birthday, has been robbed two times of her handbag.; Enghels and Wylin 2015: 109)

47. Enghels and Wylin point to Margetts and Austin's (2007) observation that the cross-linguistic diversity in the syntactic expression of three-participant events, such as taking and giving events, may relate to the cognitive difficulty of expressing events with more than two participants.

48. The method for documenting verb meanings is presented and demonstrated in Section 4.2. The present analysis relies on the four dictionaries employed for German Change verbs: *Duden Deutsches Universalwörterbuch* (7th edition), *Wahrig Deutsches Wörterbuch*, the online *Digitales Wörterbuch der Deutschen Sprache*, and the bilingual *Langenscheidts Grosswörterbuch Deutsch-Englisch* (1st Edition). The dictionary analysis was also supported by an analysis of, corpus data from the COSMAS-II DeReKo corpus and through native speaker consultations, as noted in the table. (See also Dux 2016: 296-306, 440-443.)

Table 6.18 Meaning components of German Theft verbs

Verb	(Additional) meaning components
stehlen	[none]
klauen	**Goods:** small things[a] **Pragmatic:** informal
mopsen	**Goods:** small things **Goods:** low value **Manner:** secretively/unnoticed **Pragmatic:** humorous*[c] **Pragmatic:** informal
stibitzen	**Perpetrator:** (frequently) animal* **Manner:** using cunning/trickery **Goods:** minor, small, low-value **Pragmatic:** humorous **Pragmatic:** informal
unterschlagen	**Goods:** (abstract) financial assets or property **Goods:** high value* **Purpose:** for own purpose **Situation:** Victim entrusts Goods to Perpetrator **Pragmatic:** formal*
entwenden	**Situation:** take advantage of opportunity **Manner:** unnoticed/easily **Manner:** secretively **Pragmatic:** formal

a. The "small things" meaning component of *klauen* appears to be an optional meaning component, as native speaker consultations and corpus data suggest that *klauen* may also be used for goods of high value, such as cars.

b. Meaning components marked with an asterisk were not directly identified through the dictionary definitions, but rather through native speaker consultations and the analysis of corpus data.

Stehlen: *Stehlen* is the most general German Theft verb, as it is not clearly related to any additional MCs and typically defined using German equivalents of *take* along with phrases denoting that the taken item does not belong to the agent, as well as adverbials with translations such as *illegally, secretively*, or *for one's own use*. These definitions correspond closely to the semantics of the Theft frame (i.e. the class's "shared meaning"), defined in Section 5.2. Further evidence for categorizing *stehlen* as a highly general Theft verb is that most definitions for other verbs include the verb *stehlen* and specify it further.

Klauen: *Klauen* is also a highly general Theft verb with an (optional) MC stating that it occurs with Goods that are small, but this MC is only a weak association at best. It appears that *klauen* differs from *stehlen* only pragmatically, in that it is informal.

Mopsen: *Mopsen* is an informal and humorous German Theft verb with various MCs that apply to the Goods FE, specifying that it be small, insignificant, and/or of low value. *Mopsen* also has an optional MC that the theft is secretive or unnoticed.

Stibitzen: *Stibitzen* is related to *mopsen*, in that both are informal and/or humorous, but it is also associated with theft events that are undertaken with cunning or trickery, typically involving Goods that are insignificant or of little value. Furthermore, the corpus data suggests that many uses of *stibitzen* involve animal Perpetrator arguments.

Unterschlagen: *Unterschlagen* is a semantically rich verb closely related to English *embezzle*: it refers to situations in which someone takes money or other financial properties, which are typically in large amounts (or of high value) and abstract (e.g. funds in a bank account). The Goods are typically entrusted to the Perpetrator (an employee, politician, or financial agent), who takes the Goods for his/her own use. It is a highly formal and/or legalistic term that is not frequent in colloquial registers.

Entwenden: *Entwenden* is a (slightly) formal Theft verb with associations that the Perpetrator takes advantage of an opportunity to steal something, and thus exerts little effort to steal the thing. Related to this, the theft is often secretive and goes unnoticed.

A comparison of the meanings of German Theft verbs against German Change verbs reveals the same differences as those identified in the English-specific comparison of the classes (Section 5.2). Specifically, while the German Change verb analysis revealed only a handful of MCs that typically apply to multiple verbs, the German Theft verbs are associated with a much wider range of MCs (including pragmatic features) which are distributed more diversely across the individual verbs. This further supports the observation that, within a given language, verbs evoking a more descriptive semantic frame exhibit greater semantic diversity amongst themselves.

6.3.2.2 *Theft verbs vs. Change verbs: A comparison of cross-linguistic semantic similarity*

The comparison of Change verbs in German and English in Section 5.2 showed that the meanings and specific MCs of Change verbs exhibited very few and minor differences across the two languages. Nearly all of the MCs identified for English Change verbs also characterized the German Change verbs, and all of the verbs could be clearly associated with translation equivalents in the other language with only minimal semantic differences.[49] As noted above, the cross-linguistic uniformity of Change verb meanings likely relates to the low descriptivity of the verb class as a whole. If so, one would expect that verb classes with higher descriptivity, such as Theft verbs, exhibit more drastic differences in verb meanings across languages.

To test this hypothesis, I now compare the meanings associated with German Theft verbs with those identified for English Theft verbs in Section 5.2. Rather than addressing the individual MCs in detail, I point out translation gaps between the languages, in which a verb of one language exhibits a set of MCs that is not identical to any verb of the other language.[50] I begin by discussing German verbs that do not have clear semantic equivalents in English.

German *klauen* is both informal and general: it may describe virtually any type of theft event but it is restricted to informal colloquial registers. While the (American) English lexicon has several informal Theft verbs (e.g. *swipe, pilfer, filch*), each of these is restricted to a specific range of theft scenarios and no verbs are both informal and semantically general (i.e. may be used to describe all types of Theft events).[51] German *entwenden* is both formal and associated with theft events in which it is easy for the Perpetrator to steal the Goods. While I am unaware of any English verbs that are strongly associated with such Theft events, English expressions that seem to best describe such scenarios (*swipe, pilfer, run off/away with*)

49. Despit the lack of general Change verbs in German, the English general Change verbs (*change, turn*) can nevertheless be mapped to a specific (set of) German subtle or drastic Change verbs when the context is given.

50. It appears that the MCs themselves are not as drastically different across the two languages as is their distribution distribution across individual Theft verbs. This is likely a result of the nature of theft events and the cultural and world knowledge surrounding them: Perpetrators typically act in a secretive or cunning manner, Goods come in varying sizes and values, and various relations between participants are characteristic of theft events (e.g. trust between Victim and Perpetrator; Perpetrator has easy access to Goods).

51. In British English, the verb *nick* is used in a similar way to German *klauen* (e.g. someone can 'nick' a car), which is not felicitous in (my variety of) American English.

are all of informal registers.[52] Another difference involves the verb *stibitzen*, which frequently occurs with animal Perpetrators. Again, no English Theft verbs seem to be strongly associated with such Theft events. Finally, German *unterschlagen* (and possibly the related verb *veruntreuen*), while closely related to English *embezzle*, refers not only to cases where an employee takes financial goods, but also where they simply 'hold them back' from the rightful owner.[53]

Conversely, several English Theft verbs also lack clear translation equivalents in German. Most notably, *shoplift* and *pickpocket* do not exist as verbs in German. Instead, these concepts are expressed in the German lexicon as nouns describing the perpetrator or the act itself: e.g. *Ladendieb* ('shoplifter'), *Ladendiebstahl* ('shoplifting'), *Taschendieb* ('[one who] pickpocket[s]'), *Taschendiebstahl* ('pickpocketing'). To express the same concept as the single English verbs, German must use more complex expressions, such as *Ladendiebstahl begehen* ('commit shoplifting') for *shoplift* or *aus Taschen stehlen* ('steal from bags/purses') for *pickpocket*.[54] Another translation gap involves the set of English "hand-motion" verbs briefly discussed in Section 5.2 (see also Dux 2011). In English, verbs with more general 'taking' meanings, especially those focusing on the motion of the taker's hand (e.g. *snatch, swipe, pinch, lift*) are used (fairly productively) to describe Theft events. The use of these verbs is typically semantically restricted to Theft events involving concrete goods that can be held in one's hand and syntactically restricted in that the Goods FE may not be omitted. However, German Taking verbs that focus on the motion of the hand (e.g. *greifen, grabschen, packen, schnappen*) are not used to describe Theft events.[55]

This cursory survey of differences in Theft verb meanings across German and English and the resulting translation gaps demonstrates that Theft verbs exhibit rather significant semantic differences across languages. While the Change verbs

52. See Glynn (2004) for a discussion of metaphorical expressions used to describe Theft events (e.g. walk off with, run away with). German also has the expression *mitgehen lassen* ('allow to go with') that also seems to emphasize the easiness of the Theft.

53. *Unterschlagen* is polysemous with a "not mention" meaning where people hold back information, with negative connotations. In fact, several native speaker informants were reluctant to categorize *unterschlagen* as a Theft verb because it seems to be more frequently associated with the wrongful withholding of information. Of 161 active sentences with *unterschlagen* analyzed from the COSMAS-II DeReKo corpus, only 41 have the Theft meaning but 120 have the "withhold information" meaning.

54. Some American English native speakers do not consider *pickpocket* a verb, but only a noun that refers to people who pick pockets.

55. These verbs are all listed as translations for both English *snatch* and English *grab* in the online bilingual dictionary dict.cc (www.dict.cc).

could all be associated with one or more equivalents in the other language with no striking semantic differences, Theft verbs are much more difficult to translate directly across the languages. The semantic differences between Theft verbs of the two languages also exhibited different natures and degrees of difference: some verbs exhibit MCs which are found in both the languages but differ in their precise distribution (e.g. *klauen* as both "general" and "informal"), some verbs exhibited MCs that were not identified for the other language (e.g. "easy to steal" for *entwenden*), some verb meanings could not be expressed with a single verb in the other language (e.g. *pickpocket, shoplift*), and the entire (productive) subclass of English "hand-motion" Theft verbs does not have equivalents in the other language. In conclusion, Theft verbs are significantly more semantically divergent across German and English than Change verbs. This result was expected based on the relative descriptivity of the two classes, as I hypothesized that high-descriptivity verbs (such as Theft verbs) would be more semantically diverse cross-linguistically than low-descriptivity verbs (such as Change verbs). In order to determine whether this cross-linguistic finding is a potential universal, similar analyses must be conducted on a wider range of verb classes and a more diverse array of languages.

6.3.3 Comparing the contrastive analyses of Theft and Change valency constructions

Having just demonstrated that Theft verbs are cross-linguistically more diverse in their meanings than Change verbs, I now turn to the contrastive analysis of Theft valency constructions (VCs) in order to determine how the verb classes differ with respect to valency behavior. I first briefly compare the number of VCs across German Theft and Change verbs and then investigate the cross-linguistic similarity of German and English Theft VCs.

6.3.3.1 *German Theft VCs vs. German Change VCs*

The VCs identified for German Theft verbs are provided in Table 6.19, which includes an arbitrary label number, the abbreviated formalization of the VC, and an invented example for each VC. [56]

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56. Other constructions were identified in the corpus that could potentially be added to this list but were excluded because they only differed from the listed VCs with respect to the realization of an argument that is not a core Frame Element. These include constructions with reflexive pronouns (e.g. *Er klaute sich ein Buch*. 'He stole himself a book') which express only the non-core Beneficiary FE, as well as those introducing source-like arguments in different PP types (e.g. *Er stiehlt Sachen auf einer Baustelle*. 'He steals things at a construction site'), which are not clearly Source FEs but appear to be peripheral (non-core) Location FEs that situate the location of the theft event.

Table 6.19 Valency constructions of German Theft verbs[a]

#1	P _ [b]	*Jan stiehlt.*
#2	P _ in S	*Jan stiehlt in Läden.*
#3	P _ von S	*Jan stiehlt von Läden.*
#4	P _ von V	*Jan stiehlt von Leuten.*
#5	P _ G	*Jan stiehlt Sachen.*
#6	P _ G von S	*Jan stiehlt Sachen von Läden.*
#7	P _ G aus S	*Jan stiehlt Sachen aus Läden.*
#8	P _ G in S	*Jan stiehlt Sachen in Läden.*
#9	P _ G von V	*Jan stiehlt Sachen von Leuten.*
#10	P _ G bei V	*Jan stiehlt Sachen bei Leuten.*
#11	P _ G von S/V	*Jan stiehlt Sachen von Geschäften.*
#12	P _ G bei S/V	*Jan stiehlt Sachen bei Geschäften.*
#13	P _ V.dat G	*Jan stiehlt dem Mann die Sachen.*
#14	P _ V.dat G aus S	*Jan stiehlt dem Mann die Sachen aus der Hand.*
#15	P _ V.dat G von S	*Jan stiehlt dem Mann die Sachen vom Tisch.*

c. Most of the VCs were identified through an analysis of data, which can be found in the Supplementary Materials. The examples were drawn from the COSMAS-II DeReKo corpus and analyzed using the method discussed and demonstrated in Chapter 4. VCs #3–4 of this table were not found in this corpus analysis but were included because they were found to be acceptable by native speaker consultants and can be identified in a more detailed search of the corpus.

a. The VCs are ordered as follows: intransitive VCs (#1–4) precede transitive ones (#4–17). VCs with oblique Source FEs (#2–3, #6–8), precede those with oblique Victim FEs (#4, #9–10), which precede those with Source/Victim FEs (#11–12). The list concludes with VCs which express the Victim as a dative object (#13–15). The P before the _ slot representing the verb specifies that the Perpetrator is a nominative subject (which need not always precede the verb in German). The G following the _ (or following the *V.dat* in #13–15) specifies that the Goods is an accusative object. The label "*V.dat*" found in VCs #13–15 signifies that the Victim appears as a dative object.

To briefly address the relative number of VCs for German Theft and Change verbs, compare the table above with the VCs identified for German Change verbs in Section 6.2, which are provided again in Table 6.20.

The German data reveal 15 Theft VCs and 19 Change VCs, suggesting that German Change verbs have a slightly wider range of valency options than German Theft verbs. This was also the initial finding in the English comparison of the classes' VCs. However, as discussed in Section 5.3.2, the number of VCs defined here does not account for three factors, each of which suggest that Change verbs have an even greater range of argument realization patterns.

For one, in formulating Theft VCs. I posit separate Theft VCs when a given syntactic configuration differed only with respect to the semantic type of the Source and Victim role types, as discussed in Section 5.3.2. For instance, VCs #3 and #4,

Table 6.20 German Change VCs (cf. Table 6.2)

VC #	VC	Example
#1	C _	*Sie verwandelt.*
#2	C _ U	*Sie verwandelt ihn.*
#3	C _ U in F	*Sie verwandelt ihn in einen Frosch.*
#4	C _ U zu F	*Sie verwandelt ihn zu einem Frosch.*
#5	C _ U dahing/so…	*Sie verwandelt ihn so/dahingehend, dass er zum Frosch wird.*
#6	C _ NEG an U	*Sie ändert nichts an ihm.*
#7	C _ U aus O in F	*Sie verwandelt ihn aus einem Mann in einen Frosch.*
#8	C _ U von O in F	*Sie verwandelt ihn von einem Mann in einen Frosch.*
#9	C _ U aus O zu F	*Sie verwandelt ihn aus einem Mann zu einem Frosch.*
#10	C _ U von O zu F	*Sie verwandelt ihn von einem Mann zu einem Frosch.*
#11	U _ sich	*Er verwandelte sich.*
#12	U _ sich in F	*Er verwandelte sich in einen Frosch.*
#13	U _ sich zu F	*Er verwandelte sich zu einem Frosch.*
#14	U _ sich dahing/so,...	*Er verwandelte sich so/dahingehend, dass er zum Frosch wird.*
#15	NEG _ sich an U	*Nichts ändert sich an ihm.*
#16	U _ sich aus O in F	*Er verwandelte sich aus einem Mann in einen Frosch.*
#17	U _ sich von O in F	*Er verwandelte sich von einem Mann in einen Frosch.*
#18	U _ sich aus O zu F	*Er verwandelte sich aus einem Mann zu einem Frosch.*
#19	U _ sich von O zu F	*Er verwandelte sich von einem Mann zu einem Frosch.*

as well as #6, #9, and #11 have the same form but differ with respect to whether the Source, Victim, or Source/Victim is expressed in the prepositional phrase. If one were to only posit one VC for such formally similar constructions, the German Theft verbs would be associated with only 11 VCs, resulting in an even smaller number of VCs relative Change verbs.[57] Furthermore, in documenting the Change

57. The list below shows the Theft VCs when those differing only with respect to the fine-grained semantics of the prepositional object are listed as only a single VC. I use the label "O" (Original Location/Owner) to describe such FE types more generally.

#1	P _
#2	P _ in S
#3/4	P _ von O
#5	P _ G
#6/9/11	P _ G von O

VCs, I conflated several FE distinctions posited by FrameNet (e.g. FrameNet posits both AGENT and CAUSE FEs for my single Cause_change FE); positing separate VCs for these FE distinctions would greatly increase the number of VCs for German change verbs and thus also the difference between the number of VCs across the classes.

Further evidence for the narrow range of valency options for German Theft verbs, as compared to Change verbs relates to the formal phrase types that can instantiate each of the FEs in a given VC. As discussed for English Change verbs (Section 4.3.3), the FEs of Change verbs exhibit several phrase type options (e.g. gerundial verb clauses, infinitival clauses, and *that* clauses, in addition to the default NP realization for the Cause_change FE), while the FEs of Theft verbs almost always appear as NPs (or NPs within PPs). This is also the case in German, as Change verbs may occur with non-nominal arguments (6.8), while Theft verbs may not (6.9).

(6.8) a. Dass wir etwas machen {verändert/ändert} etwas.
b. Etwas zu machen {verändert/ändert} etwas.

(6.9) a. *Dass wir etwas machen {stiehlt/klaut} etwas.
b. *Etwas zu machen {stiehlt/klaut} etwas.

Therefore, if one were to posit separate VCs for each different phrase type realization, each of the Change VCs would be multiplied (sometimes several times), whereas few additional Theft VCs would be required. Thus, this comparison has demonstrated that German Theft VCs appear in a narrower range of VCs than German Change VCs, providing further evidence that the correlation between high descriptivity of a verb (class) and low constructional options is not limited to English but appears to hold across languages.

6.3.3.2 *Are Theft VCs more diverse across languages than Change VCs?*

I now compare the Theft VCs across German and English in order to determine the extent to which the VCs align across the languages and, conversely, to identify constructional gaps in which one language has a construction that does not exist

#7	P _ G aus S
#8	P _ G in S
#10/12	P _ G bei O
#13	P _ V.dat G
#14	P _ V.dat G aus S
#15	P _ V.dat G von S

(or is not used with Theft verbs) in the other language. Because the comparison of Change VCs in Section 6.2.4 showed virtually no "untranslatable" VCs and only minimal differences, most of which pertain only to the distribution of verbs and VCs. Given the difference in the two classes' descriptivity levels and the corresponding discrepancies in meaning and syntax noted up to this point, there is reason to expect that the VCs of Theft verbs also exhibit greater cross-linguistic diversity than those of Change verbs. For comparison, Table 6.21 shows the abbreviated formalization and arbitrary number labels of the Theft VCs identified for each language.

Table 6.21 Theft VCs in English and German

	English Theft VCs		German Theft VCs
#1	P _	#1	P _
#2	P _ from S	#2	P _ in S
#3	P _ at S	#3	P _ von S
#4	P _ from V	#4	P _ von V
#5	P _ from S/V	#5	P _ G
#6	P _ G	#6	P _ G von S
#7	P _ G from S	#7	P _ G aus S
#8	P _ G at S	#8	P _ G in S
#9	P _ G off (of) S	#9	P _ G von V
#10	P _ G out of S	#10	P _ G bei V
#11	P _ G from V	#11	P _ G von S/V
#12	P _ G away from V	#12	P _ G bei S/V
#13	P _ G off (of) V	#13	P _ V.dat G
#14	P _ G from S/V	#14	P _ V.dat G aus S
#15	P _ S	#15	P _ V.dat G von S
#16	P _ S/V		
#17	P _ through G		

Looking only at VCs #1–14 for English and #1–12 for German, the two VC sets exhibit many similarities. They include both transitive [P _ G] and intransitive [P _] VCs, which can variably be combined with a prepositional phrase expressing a Source, Victim, or Source/Victim FE.[58] While the simple intransitive (#1 in both

58. In both languages, the transitive VCs realize the Perpetrator as (nominative) subject and the Goods as (accusative) direct object, and the intransitive VCs realize only the Perpetrator as (nominative) subject.

languages) and simple transitive (#6 English, #5 German) VCs exhibit no relevant differences, VCs involving oblique phrases differ somewhat in the types of PPs they employ. English *from* and German *von* can be used to express any of the three FEs (S, V, S/V), but the other prepositions differ slightly in their meanings and in their distribution across the FE types. In English, Source FEs can be introduced by the following prepositions: *from, at, off (of),* or *out of*; German Source FEs can be introduced by *von* ('from'), *in* ('in'), *aus* ('out (of)'), or *bei* ('at, by'). While some of these prepositions match up well across the languages (*from-von*; *at-bei*; *out of-aus*), the German equivalents of *off (of)* ('weg', 'ab', 'weg von') are typically not used with Theft verbs.

Moving on to the Victim and Source/Victim FEs, English allows these to be expressed with the prepositions *from, away from,* or, with certain verbs, *off (of)*, while German allows them to be expressed with *von* ('from') or *bei* ('at, by'). While *from* and *von* are highly equivalent in most contexts across German and English, the other PP types do not match up. Specifically, German *bei* typically has a locational ('at', 'by') or comitative ('while', 'with') reading, but none of its English counterparts can be used to introduce victims of Theft events. The English PPs *away from* (Ger. complex preposition 'weg von') and *off (of)* (Ger. verbal prefix 'ab') are not used as prepositions with Theft verbs; however, similar meanings may possibly be expressed through particle verbs such as *wegstehlen*[59] or *abklauen*.[60] While there appear to be slight mismatches across German and English VCs including oblique prepositional arguments, a more detailed comparative analysis of the meanings of these prepositions and verbal particles remains a desideratum.

Apart from the transitive and intransitive VCs with prepositional oblique arguments, there are two other significant differences in the VCs expressing Theft events across German and English. The first difference is seen in the German VCs #13–15, which express the Victim as a dative object and the Goods as direct accusative object, with the Source also optionally expressed in a *von* or *aus* PP (#14–15). These "dative victim" type of VCs are not only of interest due to their differing interpretation from similar English constructions (as discussed in Dux 2018; cf. Section 6.3.1). They also raise the question of whether they are a

59. *Eine Handtasche quasi « unter dem Hintern » der Besitzer* ***weggestohlen*** *hat ein Unbekannter in Bautzen.* ('A stranger in Bautzen **away-stole** a handbag (from) virtually under the behind of its owner.') Accessed on Feb. 12, 2016 at: http://www.bild.de/regional/leipzig/handtasche-unter-dem-hintern-weggestohlen-22056694.bild.html

60. *Das ist sein Style oder der hat ihn von anderen Tänzern* ***abgeklaut***. ('That is his style or he has **off-stole** it from other dancers.'). Accessed through a Google search on Feb. 12, 2016 at: Jaan Valsiner, Peter C. M. Molenaar, Maria C.D.P. Lyra, Nandita Chaudhary (Eds.). *Dynamic Process Methodology in the Social and Developmental Sciences* (pg. 532).

unique feature of the Theft frame or should simply be interpreted as instances of "free" (or "pertinence") dative objects, which signify the possessor of the accusative object (Welke 2009: 98f).[61] The free datives are independent of the verb (class) and instead behave more as adverbials (i.e. adjuncts, modifiers) and/or arise from constructional processes governing the noun phrase. As such, subsuming the "dative victim" under these categories would simplify the class-specific information required for Theft verbs (as the "dative victim" VCs would not need to be posited as additional VCs of the Theft verb class). However, two points of evidence suggest that the "dative victim" of Theft verbs differs from free datives. First, they instantiate a 'core' FE of the frame (i.e. an argument of the verb) and thus differ from the non-core, adverbial participants introduce by the free dative. Second, if the free dative is independent of verb (class), one would expect them to occur with similar frequency across verbs with similar meanings. Dux (2018: 395), however, finds a rather striking degree of variation in the frequency of "dative victim" constructions across German Change verbs (drawing on a random sample of 50 sentences per verb from the DeReKo corpus): over half of the *rauben* examples (54%) include a dative victim, verbs such as *klauen* and *stibitzen* exhibit such arguments at a rate of around 20%, but four other verbs (*mausen, ergaunern, unterschlagen, veruntreuen*) did not include any instances of dative victims. Of course, this variation may be due to the types of theft events described by each verb, but this again suggests that the 'dative victim' is sensitive to semantic features of the verb (class) and thus unlike free datives. Here again, however, we return to questions surrounding the argument/adjunct distinction, whose abandonment would allow the dative victim argument to be categorized in the middle of a continuum between pure adjuncts and pure arguments.

The second major difference in Theft VCs across German and English involves the English VCs #15–16. These transitive VCs express the Source and Source/Victim FEs, respectively, as direct object, rather than the expected Goods FE (e.g. They pilfered the drawer). These VC types are identified only in the data for *pilfer* and are more closely associated with Robbery verbs such as *rob* and *mug* (as described in Section 3.1.2).[62] In German, the Victim or Source/Victim FEs may only be ex-

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61. The free dative is exemplified below. I thank an anonymous (native German speaker) reviewer for this example and for prompting the discussion in this paragraph.

(1) Dein Pferd hat mir den Rasen zertrampelt.
Your horse trampled down my lawn.
(lit.) Your horse trampled down the lawn on me

62. English *pickpocket* also occurs in a VC more closely associated with Robbery verbs, in which the Victim FE is direct object. The following example is found in the COCA corpus: *Now, you pickpocketed her?*

pressed as a direct object when the Theft verb is prefixed (most frequently with *be-*, but also with *aus-*, as in *ausrauben*). The prefix morphologically marks the syntax of the applicative construction. Semantically, these prefixed verbs (as well as the applicative construction) evoke a different frame than non-prefixed Theft verbs, captured in FrameNet with the `Robbery` frame which stands in a 'Perspective_on' relation to `Theft`. The two languages thus exhibit an interesting difference in the expression of these frames: the Robbery/Theft distinction is expressed lexically in English (as each frame is associated with a distinct set of verbs), but morphologically in German (as the Robbery frame is evoked by Theft verbs with additional prefixes).[63] A further difference in the expression of Robbery is that German (prefixed) Robbery verbs only realize Victim FEs or Source/Victim FEs as direct/accusative object, whereas English Robbery verbs may also realize purely locational Source FEs (such as houses) as direct object (as well as S/V and V). Thus, the English VC #15 also appears to have no equivalent across the two languages.

To conclude this comparison, recall that the comparison of Change VCs in Section 6.2.3 showed that basically every Change VC matched up across the two languages with only minor differences in their frequency and their distribution across verbs (as well as the systematic distinction between English intransitive and German reflexive VCs). In contrast, the Theft VCs differed more significantly across the languages. For one, the relatively comparable VCs with oblique Source, Victim, and Source/Victim FEs differed slightly with respect to the prepositions that could introduce each of the FEs. Two other significant differences were identified: German Theft verbs appear in a variant of ditransitive/double-object construction, in which the Victim FE appears as a dative object, whereas similar English VCs only allow this argument to be interpreted as a Beneficiary who receives the stolen Goods. Finally, at least one English verb (*pilfer*) appeared in VCs that express the Source or Source/Victim FE as the direct object; these VC types are only permissible with German Theft verbs when they occur with the *be-* (or *aus-*) prefix in the applicative construction, and even in this case, they typically only allow Victim or Source/Victim FEs, but not Source FEs, as direct (accusative) object. In conclusion, the analysis showed Theft VCs differ more drastically across German and English than Change VCs.

63. Dux (2018) offers a more detailed comparison of these constructions and discusses their distribution across German Theft verbs.

6.4 Summary and conclusion

In this chapter, I investigated German Change verbs and Theft verbs. In the Change verb analysis (summarized in greater detail in Section 6.2.6 above), I developed methods for comparing verb meanings and valency constructions and employed these methods to establish equivalency pairs (or sets) between English and German Change verb meanings and valency constructions. The comparison revealed a high degree of cross-linguistic similarity in verb meanings and valency constructions, as nearly all of the German verbs and constructions have fairly clear translation equivalents in English. Further, the meaning components found to be grammatically relevant for English Change verbs ("drastic change", "subtle change", and "purposive change") were also shown to influence the valency behavior of German Change verbs bearing them, in most cases with similar effects on the types of valency constructions the verbs may appear in.

The analysis of German Theft verbs also addressed the equivalency of verb meanings and valency constructions across English and German, but its major goal was to determine whether a verb class's level of descriptivity influences the degree of cross-linguistic similarity of their respective verbs meaning components, and valency constructions. Drawing on previous research, I hypothesized that Theft verbs would differ more drastically across the two languages because they are of a higher descriptivity level than Change verbs. In analyzing German Theft verb meanings, I first showed that they were much richer than those of German Change verbs, as they involve meaning components that are more numerous, more detailed, and more diverse in their distribution across individual verbs. I also showed that Theft verb meanings differ more drastically across German and English than those of Change verbs, with the result that several Theft verbs could not be directly translated across the two languages. I then investigated the VCs identified for German Theft verbs, first showing that they are less numerous and diverse than those of German Change verbs, as was also found in the English class comparison in Section 5.3. I then compared the Theft VCs across German and English and demonstrated that this verb class is cross-linguistically more diverse in its syntactic behavior than Change verbs, with several VCs lacking direct equivalents in the other language. These analyses further demonstrate the drastic differences between the Change and Theft verb classes, showing that they exhibit differences not only within languages but also when subjected to contrastive analysis, thereby supporting the hypothesis that a verb class's descriptivity level of influences its degree of cross-linguistic variation.

CHAPTER 7

Conclusion

In this monograph, I investigated the nature and structure of verb classes and their ability to account for the relation between verb meaning and argument realization both within and across languages. The analysis involved a comparison of verb classes in several dimensions. Drawing primarily on verbs of Change (e.g. *alter, transform*) and Theft (e.g. *pilfer, embezzle*), I sought to account for both uniformity and idiosyncrasies in verb meaning and form, both within and across languages (German and English) and semantic domains. This study contributes to a significant body of research investigating the relation between meaning and (syntactic) form, specifically with respect to verbs and their arguments (Fillmore 1968; Levin 1993; Goldberg 1995, 2006; Croft 2012). In contrast to much existing research on argument realization which compares coarse-grained features across several verb classes, I approached the topic at a microscopic level and identified subtle differences among individual verbs of a given semantic class. This approach is motivated by recent findings in usage-based linguistics emphasizing that fine-grained bottom-up analyses are required before linguists are able to accurately account for more general or potentially universal principles of language. The results of the study contribute to broader linguistic theory by demonstrating how to account for both regularity and variation among verbs of a given class, how to compare verb classes across languages, and how the varying types and richness of verb classes' semantics influence various aspects of their behavior both within and across languages. In this conclusion, I first review the goals and findings of each chapter. I then return to the questions and goals laid out in Chapter 1 and determine how they are answered by the present analysis. Finally, I address the limitations of this study and point to avenues for future research.

7.1 Summary

After situating and motivating the study in the introductory chapter, I reviewed several existing approaches to verb classification and argument realization in Chapter 2. In Section 2.1, I introduced the main problems, goals, and assumptions of this field of study and its relation to other fields of linguistics. I then described in detail three concepts central to verb classification studies. In Section 2.2, I presented research that seeks to characterize semantic roles and predict their mapping to syntactic categories (Fillmore 1967; 1968; Dowty 1991; Van Valin and LaPolla 1997). Here, I showed that the original approach to semantic roles was flawed due to the assumption of a small (universal) list of semantic roles that can be directly mapped to grammatical functions, which precludes an adequate account of the rich variety of role types and of data in which a single verb and set of roles may be realized in multiple ways. In Section 2.3, I described event-structural approaches to argument realization which decompose verb meanings into primitive predicates that determine argument realization (Jackendoff 1990; Rappaport Hovav and Levin 1998; Croft 2012). While such approaches overcome several issues found with purely role-based approaches, they are unable to account for subtle differences in argument realization among semantically related verbs. Finally, in Section 2.4, I discussed how Levin (1993) employs argument structure alternations to classify English verbs, showing that while her classification has significantly advanced the field of verb class studies, many of her classes are problematic as they include sets of verbs which (sometimes drastically) differ in their semantic and syntactic behavior, largely due to the strict reliance on alternations as criteria for verb classification.

Chapter 3 focused on the treatment of verb meaning and argument realization in usage-based and cognitively oriented frameworks, specifically Frame Semantics (Fillmore 1982, 1985; Fillmore and Baker 2009), Construction Grammar (Goldberg 1995, 2006), and Valency Grammar (Herbst et al. 2004; Faulhaber 2011; Herbst 2014). In Section 3.1, I presented Frame Semantics and its implementation in FrameNet (Ruppenhofer et al. 2010), showing how its rich frame-semantic characterization of word (including verb) classes and semantic roles facilitates empirical investigations into the relation between verb meaning and syntactic form within and across languages and semantic domains. I also pointed out various shortcomings with the design of FrameNet, particularly noting that it does not account for fine-grained differences in verb meanings within a semantic frame nor does it provide sufficient syntactic information for individual verbs. In Section 3.2, I discussed the motivations and methods of Construction Grammar, and Goldberg's (1995, 2006) application of this approach to the study of verb meaning and syntax. Particularly relevant for the present analysis are Construction Grammar's assumption that argument structure patterns (and all aspects of language) are meaningful and its detailed investigations of constructions and their interaction with verbs and verb classes. Finally, I discussed how recent research in Valency Grammar (Welke 2011; Herbst 2014), a framework with a long-standing recognition of the item-specificity of valency phenomena, has shed light on the idiosyncratic nature of argument realization (Faulhaber 2011) and led to fruitful collaborations with researchers in Construction Grammar and related usage-based linguistic theories (Herbst et al. 2014; Engelberg et al. 2015). Despite the differing goals and methods of these three approaches, they all arrive at the conclusion that an accurate account of verb classification and argument realization must draw on detailed item-specific investigations of natural language use and posit generalizations at various levels of abstraction.

In Chapter 4, I assessed the semantics and valency behavior of English Change verbs, in order to determine the proper way to formulate verb classes and lexical entries that capture both shared and divergent behavior among semantically related verbs. After briefly introducing the verbs and clarifying some terminology in Section 4.1, I then conducted detailed semantic (Section 4.2) and valency (Section 4.3) analyses of the verbs to assess their similarity. The results of such analyses for each class (i.e. Change and Theft verbs in English and German) revealed that, while the general meaning and some valency constructions are shared among all verbs of the class, individual verbs differ (sometimes dramatically) in their additional meaning components and their precise distribution across valency constructions. In Sections 4.4 and 4.5, I demonstrated a novel approach for capturing both the shared and idiosyncratic behavior of verbs in verb classes. Specifically, I introduced the construct of a *frame-constructional verb class* to capture the semantic and syntactic properties shared by all members of a verb class, as well as *multi-grained verb entries* that capture verb-specific properties by drawing on and further specifying aspects of the frame-constructional verb class. This approach further allows the identification of even finer-grained *(syntactic-semantic) subclasses* of (typically only two or three) verbs within a class that exhibit highly specific grammatically relevant meaning components. Section 4.4 also included a detailed discussion of the valency constructions occurring with Change verbs, as well as their network organization and their relation to the Change frame semantics and to more detailed meanings of individual verbs. Section 4.6 showed that this approach is effective in determining fine-grained aspects of the valency behavior of novel (i.e. previously unanalyzed) verbs through a secondary investigation of the verb *metamorphose*.

In Chapter 5, I investigated English Theft verbs and compared them against Change verbs in order to determine how a verb class's semantic domain and descriptivity level influences the number and types of meaning components and valency constructions characterizing the class. In Section 5.1, I introduced the Theft verb class and the construct of verb descriptivity (i.e. semantic richness; Snell-Hornby 1983) and then demonstrated that Theft verbs exhibit a higher descriptivity level than Change verbs. The semantic comparison of Theft and Change verbs in Section 5.2 revealed that Theft verbs have much richer and more diverse meanings (and meaning components) than Change verbs. The valency analysis in Section 5.3 revealed that Theft verbs occur in a much smaller set of valency constructions than Change verbs. This conclusion was further supported by a closer consideration of the method used for defining valency constructions. The syntactic comparison also prompted a discussion of grammatical features whose interpretations and distributions depend on the frame-semantics (i.e. semantic class) of the verbs with which they cooccur, despite being traditionally viewed as purely syntactic phenomena. In Section 5.4, I demonstrated that, despite the drastic dissimilarity of the two classes, the approach to verb classes and lexical entries proposed based on Change verbs is also necessary for and effective in capturing Theft verbs, which also exhibited striking in-class variation in their specific meanings and valency distribution.

In Chapter 6, I compared the English-based findings of the preceding chapters against data from German Change and Theft verbs. In Section 6.1, I reviewed contrastive and German-specific studies on verb meaning, verb classification, and argument realization. The methodology employed in the comparisons builds on Boas's (2010a, b) proposals for a Contrastive Construction Grammar, which exploits the language-independent nature of semantic frames (and their associated Frame Elements) in the comparison of syntactic constructions across languages. The majority of the chapter (Section 6.2) focused on comparing the meanings, valency constructions, and grammatically relevant meaning components of Change verbs across English and German. The comparison revealed very few striking differences in Change verbs among the two languages: the meaning components were largely similar across languages resulting in few translation gaps, the valency constructions also had fairly direct equivalents across languages, and the grammatically relevant meaning components appeared to influence valency in similar ways for verbs of both languages. Section 6.3 then discussed differences between Theft and Change verbs that arise when subjected to contrastive (German-English) comparison, in order to assess whether verb descriptivity influences the cross-linguistic uniformity and translatability of verb meanings and valency constructions. The comparison showed that Theft verbs, their meanings, and their associated constructions exhibit greater differences across German and English than Change verbs. With respect to semantics, most Change verbs have semantically equivalent verbs in the other language, but many Theft verbs cannot be directly translated into the other language. Syntactically, the vast majority of valency constructions for Change verbs had a corresponding construction in the other language with highly similar formal and semantic properties, whereas several of the Theft valency constructions did not exist at all or did not occur with Theft verbs in the other language. In this analysis, I proposed that the drastic difference between Change and Theft verbs relates to their varying levels of descriptivity, a hypothesis which must be tested on more verb classes in future work.

7.2 Conclusions and implications

I now discuss the results of the analyses conducted in this monograph, focusing on the three major goals introduced in Section 1.3. The first major goal is methodological in nature and seeks to determine what concepts, data, and methodological tools are necessary for an adequate and comprehensive account of the relation between verb meaning, argument realization, and verb classification. The review of approaches in Chapters 2–3 of this work showed that numerous frameworks have been developed to describe the relation between verb meaning and form, given the many dimensions of this relationship. As such, the most useful methods and constructs depend on what aspects of the verb-construction relationship are being analyzed. As the present study focused on the degree of uniformity in the meanings and valency distribution of verbs within fine-grained verb classes, it was necessary to draw on approaches that emphasize detailed, item-specific analyses based on rich semantic criteria. Furthermore, the cross-linguistic comparisons required a semantics-based characterization of verbs and constructions, given that purely syntactic structures defined without clear semantic criteria are often incomparable across languages (Croft 2001). Furthermore, in order to capture both similarities and differences among verbs within and across verb classes, including differences in frequency distributions, a usage-based approach drawing on corpus data was deemed most useful, as it is capable to capture various types of relations across linguistic items, allow for generalizations at varying levels of granularity, and appreciate the role of type and token frequency.

The review of traditional approaches to verb classification in Chapter 2 revealed that, while those approaches offer important insights and methods for capturing the relationship between verb meaning and valency, they were each unable to account for differences among verbs within verb classes. The discussion in Chapter 3, however, demonstrated that Frame Semantics, Construction Grammar, and Valency Grammar improve on the traditional approaches by appreciating the richness of verb meanings and the importance of bottom-up analyses. At the same time, given the specific focus of these frameworks, each only addresses some aspects of verb meaning and valency. It was therefore necessary to combine insights from each of the three approaches. Specifically, Frame Semantics offers detailed and empirically grounded characterizations of word meaning and a semantic classification of the lexicon, but makes no explicit claims about how verb meaning related to argument realization. Construction Grammar investigates how grammatical constructions combine with verbs of specific semantic classes, but many studies in this field view constructions at a coarse-grained level and thus overlook subtle differences among specific verbs in a given semantic class. Valency Grammar, on the other hand, emphasizes the idiosyncratic nature of verb valency behavior and offers detailed verb-specific analyses that inform the coarser-grained constructional analyses. While Valency Grammar does not aim to identify verb classes, an integration with principles of Frame Semantics facilitates the identification of verb classes that capture similarities in both semantics and valency behavior among verb classes. As such, by applying various aspects of these three approaches to the analysis of (subtle differences in) the meanings and valency distribution of verbs within verb classes, my methodology showed how a combination of these frameworks capitalizes on the strengths and minimizes the weaknesses of each approach.

The second major goal of this monograph was to assess the degree of semantic and syntactic similarity within verb classes – specifically within fine-grained classes such as those of FrameNet or Levin (1993) – and to develop an empirically accurate and theoretically useful approach to capturing both class-level generalizations and verb-specific idiosyncrasies. The in-class analyses revealed that no two verbs in a given class were identical in both meaning and argument realization. While some sets of verbs, particularly in the (English and German) Change classes, exhibited no notable semantic differences, they were not identical in their valency behavior. These findings emphasize that true synonymy does not exist (Quine 1951) and that verb valency is not (fully) predictable from verb meaning (Faulhaber 2011), thus calling into question the existence of verb classes altogether. At the same time, however, the comparison of Change and Theft verbs in Chapter 5 and Section 6.3 demonstrated that, while semantically related verbs may not be fully identical, they exhibit significant overlap in meaning and in the set of valency constructions with which they may appear, especially when compared against other classes. These contradictory findings can be reconciled when one recognizes that verb classification depends greatly on the perspective and scope of a particular analysis. Consequently, the most accurate and comprehensive classification of the (English verbal) lexicon requires one to posit classes at numerous levels of granularity.

To account for the similarity of semantically related verbs (when compared against other classes) as well as their differences (when compared against one another), I introduced a novel method for capturing (frame-)semantic and constructional behavior at various levels of granularity. The shared behavior of verbs within (fine-grained) verb classes is captured by means of the *frame-constructional verb class* (FCVC) which is formulated as a construction, i.e. a pairing of meaning and form. The semantic side of the FCVC specifies the *shared meaning* characterizing all verbs in the class. The shared meaning is defined using principles of Frame Semantics – namely by specifying the Frame Elements (i.e. semantic roles) central to the situation described by the verbs as well as their interrelations – but goes beyond FrameNet frame descriptions by providing more detailed information about meaning components that further specify individual verbs, describing arguments that are not obligatory but nonetheless relate to the verb's semantic frame (unlike traditional "adjuncts" or "modifiers"), and explicitly specifying how the given FCVC differs from closely related verb classes. The formal side of the FCVC captures the syntactic properties of the verb class by means of the *constructional range*. Simply put, the constructional range is the list of valency constructions (i.e. argument realization patterns) occurring with verbs of the class to realize the class's semantic frame (along with its participants). However, unlike the alternation lists characterizing Levin's (1993) classes or the verb-specific valency reports of FrameNet, the constructional range is structured and semantically motivated. Specifically, individual valency constructions comprising the constructional range are organized into a network-like hierarchy capturing interrelations among them (e.g. among transitive and intransitive pairs of constructions), and both the entire constructional range and its individual constructions are connected to the shared meaning (i.e. semantic frame) of the class and to specific perspectives on the frame as seen in verb meanings and in concrete utterances. Furthermore, the constructional range of a given FCVC can be contrasted with those of grammatically similar classes by investigating the potential for formal variation in the phrase types instantiating a given argument, which represents an extension of the concept of "allostructions" discussed in Construction Grammar research (Cappelle 2006; Herbst 2014; Perek 2015).

The other central construct in the proposed approach is the *multi-grained verb entry* (MGVE), which captures the full range of a verb's item-specific semantic and syntactic properties but also allows for its classification into larger verb classes. At the coarsest level of granularity (in the present analysis), the MGVE specifies the FCVC of the verb, thus associating it with other verbs in the class by assigning it the general meaning and specifying its potential to occur in valency constructions within the constructional range. The MGVE's finest level of granularity captures the precise meaning and valency distribution of the individual verb. To maximize parsimony, the verb-specific level draws on the class-level properties of the FCVC by specifying whether any (additional) meaning components further specify the general meaning and distinguish it from other verbs of the class and by defining which valency constructions (listed in the constructional range) the verb occurs with and its relative frequency in each of these. At an intermediate level of analysis, a verb's MGVE can include a subclass specification, which captures highly subtle syntactic-semantic correspondences among subsets of verbs within a class by identifying fine-grained grammatically relevant meaning components, which correlate an additional meaning component with a verb's (frequent or non-)occurrence in certain types of valency constructions.

This multi-level account neatly captures both the shared and unique semantic and syntactic behavior of verbs within a given class. It thereby reconciles two opposing views by both recognizing that verb meaning determines some aspects of syntactic behavior (e.g. Fillmore 1968; Levin 1993) and appreciating that every verb is unique and must be treated individually (e.g. Boas 2003; Faulhaber 2011).

The next major question pursued in this monograph pertains to the comparability of verb meaning and valency behavior for verbs of different semantic domains from both a language-specific and contrastive perspective. Besides the obvious need to conduct analyses on multiple verb classes before making claims about the general structure and nature of verb classes, these comparisons are also motivated by the lack of research explicitly comparing verbs or verb classes of different semantic domains and by recent findings that a verb's degree of descriptivity influences its syntactic behavior.

The comparison of Theft verbs against Change verbs showed that the semantic domain of a verb class greatly influences many aspects of their semantic and syntactic behavior, both within and across languages. Specifically, the comparison suggested that high-descriptivity verbs and classes have richer and more numerous meaning components but a narrower range of possibilities for argument realization. From a contrastive perspective, it appears that high-descriptivity verbs and classes are less susceptible to direct translation and occur in valency constructions with more drastic cross-linguistic variation. These comparisons also revealed unexpected differences in the types of meaning components differentiating individual verbs of diverse semantic classes, and they demonstrated that certain syntactic features and phenomena traditionally viewed as independent of verb meaning receive different interpretations when occurring with verbs of different classes. Of course, a wider range of classes must be compared before arriving at conclusive results, but the analyses in this book may serve as a blueprint for future cross-class comparisons and increase the appreciation for a verb's semantic class in research on syntax, morphology, and pragmatics.

The final major topic of this monograph addressed the degree to which the meaning and valency behavior of a given verb class are similar across languages, specifically German and English. Building on Boas's (2010a) suggestions for an integration of Frame Semantics and Construction Grammar in contrastive research, I developed a method for detailed and integrative comparisons of verb meanings and constructions across languages, which can and should be refined through and reproduced for comparisons of other verb classes and other language pairs or groups. The detailed contrastive comparison of German and English Change verbs demonstrated that cross-linguistic analyses may yield more insightful results when they are restricted verbs of a specific semantic domain, rather than comparing large sub-sets of the languages' lexicons. The contrastive comparison of Theft and Change verbs further emphasized the importance of recognizing the detailed (frame) semantics of the compared verbs and constructions, as the results of cross-linguistic research may apply only to verbs of a particular semantic domain but not the entire lexicon. From an applied perspective, this work also identified mismatches in the meaning and syntax of verbs and constructions, which are essential for language learning, translation, and intercultural communication.

I now briefly address the broader contributions of this work in advancing the field's understanding of language structure in general and verb classification in particular. One major contribution of this work is the development and demonstration of methods for the bottom-up, corpus-based analysis of fine-grained verb classes. As discussed in Chapters 2 and 3, many approaches to the syntax-semantics interface assume highly general principles, be they event structure templates or principles for fusing verbs and independently existing constructions, and attempt to accommodate new data into these rigid theoretical constructs. At the same time, researchers in both projectionist and constructional frameworks have emphasized the need for more detailed verb-specific analyses of argument realization.[1] These needs are addressed here by developing a methodology for such analyses and providing crucial data on argument realization within and across verb classes and languages that must be accounted for in future investigations of these topics.

Another important insight of my analysis is that verbs with nearly identical meanings exhibit significant variation in their distribution across syntactic contexts (i.e. valency constructions). For instance, among the five English Change verbs classified together in both Levin (1993) and FrameNet, no two verbs occurred in the same range of valency constructions with similar frequencies and, more strikingly, no valency construction was found to occur with all verbs of the class in the data set. These data are a challenge not only for projectionist approaches (Jackendoff 1990; Rappaport Hovav and Levin 1998), which assume a minimal of (typically five to 10) basic event structure templates that predict argument realization. Specifically, given this small set of templates, one would assume that the fine-grained semantic class of Change verbs must be associated with the same template. If this is the case, then event structure templates must be reformulated if they are to be entirely predictive of grammatical behavior, given the grammatical diversity among Change verbs identified here. The data are equally problematic for constructional approaches such as that of Goldberg (1995, 2006), whose principles state that verbs may be used within a given construction if the verb's participant

1. See Levin and Rappaport Hovav (2005: Chapter 7) for such claims within projectionist frameworks, and the work of Boas (2003, 2006) and Croft (2003, 2012: Chapter 9), among others, for such claims in constructional frameworks.

roles are semantically compatible with the constructional slots of the construction. Given the semantic similarity of Change verbs (and thus their participant roles), one would expect that these verbs would be equally felicitous in the same range of constructions. Again, this conflicts with the data discussed here, necessitating a reformulation of the principles for verb-construction fusion. If the abstract principles, rules, and generalizations proposed in any of these frameworks are intended to adequately account for the full range of linguistic data, then the data provided in the preceding analyses – showing that semantically related verbs differ in their grammatical behavior – must also be taken into account.

In addition to the importance of this verb class data for future characterizations of the syntax-semantics interface, the insights from these analyses can also advance lexicographic work on verb classification by bringing together the strengths of the two most prominent English verb classifications: FrameNet and Levin (1993). FrameNet's emphasis on a verb's frame semantics as criterial for classification leads to well-defined, fine-grained verb classes. However, as a lexicographic resource based on Frame Semantics, FrameNet does directly associate verb classes with any syntactic (i.e. argument realization) properties, but only offers descriptions of individual lexical units' valency behavior based on a limited set of annotated corpus examples. In contrast, Levin's (1993) employs purely syntactic criteria for classification, specifically a (group of) verb's behavior in a hand-selected set of alternation pairs. Although Levin's approach identifies certain aspects of argument realization behavior, its top-down method (i.e. pre-determining specific alternations as criteria for a verb class) precludes the identification of the full range of constructions (or alternation variants) available to a given class (and each of its members individually), not to mention the semantic heterogeneity within classes resulting from her syntax-based approach. The classes investigated here (defined based on shared frame semantics)were each found to occur in a distinct set of structurally related valency constructions, which are not adequately captured by Levin (1993) or FrameNet. My analysis also offered a rich account of the among these construction sets by identifying features that define each construction, organizing them in a network structure according to these shared features, and explicitly associating them with the meaning of the verb class and its individual verbs. The present investigation thus allows for a better picture of the argument realization behavior of verb classes at different levels of abstraction and enables future verb classification research and resources to associate verb classes with construction more systematically.

7.3 Limitations and outlook

In conclusion, I discuss the limitations of the present study and avenues for future research, including those building directly on the present analysis, those employing the approach developed here to other verb classes and languages, and those applying this type of research to practical applications. While this monograph offered a detailed treatment of the valency behavior of two verb classes in German and English, its scope, data, and methodology leave many questions unanswered. For one, I only analyzed a handful of verbs for each of the classes here, which are associated with several more verbs, such as (the English verbs) *convert, develop*, and *morph* for Change and *filch, rustle*, and *misappropriate* for Theft. Future work must therefore investigate all potential members of these classes to gain a fuller picture of the structure and uniformity of verb classes. Furthermore, while the present analysis only investigated smaller, fine-grained verb classes similar to those of FrameNet and Levin (1993), the methodology can easily be scaled up to capture generalizations over larger, more coarse-grained verb classes, such as those discussed in Chapter 2. For instance, the Change verbs analyzed here can be viewed as the most semantically general members in the much larger class of change-of-state verbs, while the Theft verbs analyzed here can be viewed as forming a sub-class within a larger class of Taking verbs, which in turn represents a sub-class of Receiving/Getting verbs. Similarly, the contrastive analysis would benefit from the inclusion of more German verbs. Particularly in the Change verb comparison, the inclusion of *modifizieren* and *transformieren* would allow for a comparison against their English counterparts (*modify, transform*); and analyzing verbs such as *umändern* and *abwandeln* would potentially give a clearer picture of the relative contribution of verb root and prefix to the meaning and syntax of German prefixed verbs.

Another limitation of the present analyses involves the lack of depth in the semantic analysis. The identification of verb meanings relied primarily on dictionary definitions, which are often inaccurate or incomplete (see Fillmore and Atkins 2000). Indeed, there is reason to believe that the analyzed verbs may exhibit subtle and elusive semantic differences which are not captured in dictionary definitions nor adequately identified in this work. Such semantic distinctions relate both to verb meanings and to (features of) valency constructions. For instance, while the dictionaries noted no differences in the types of Undergo_change arguments that may occur with *alter* and *modify*, a detailed corpus analysis may well reveal that one verb or the other is more likely to be used with specific types of arguments. Further, the choice of a *to* or *into* PP to introduce the Final_state with a Change verb is possibly determined by semantic factors (*turn into/*to a frog*; *turn to/?into stone*) that could not be ascertained in the present analysis. Additionally, while the semantic analysis relied on fine-grained semantic roles compared to those in traditional role-based approaches, a much richer role designation for Change verbs is defined in FrameNet, suggesting that a more nuanced analysis of role types may give a better picture of the semantics of Change verbs.[2] Indeed, more detailed investigations are necessary to identify semantic differences among verbs or constructions that did not surface under the present methodology.

The valency analysis could also be improved in various ways. While the amount of data analyzed here is greater than that found in traditional studies of verb classes and constructions, it must be scaled up in future work to gain a more complete picture of the actual valency distribution of verbs and verb classes. Of course, it is likely impossible to gain a "complete" picture of a verb's (or verb class's) precise grammatical behavior, which can only be achieved by analyzing all instances in which each verb has been used (and also accounting for diachronic change in valency behavior of a given verb and the coining of new verbs). In a related fashion, my corpus sample was limited to active, finite clauses and investigated only the realization of core arguments, but did not investigate the verbs' distribution in other clause types (e.g. passive, infinitive clauses) and with other linguistic elements such as adverbs or tense-aspect-modality markers. However, given recent advances in computing and corpus linguistics, such as collostructional analysis (Stefanowitsch and Gries 2003; Gries and Stefanowitsch 2004), the insights arising from this work can be applied to much larger amounts of data to arrive at highly accurate characterizations of verb valency and other grammatical properties.

The analyses in also revealed interesting data that could not be treated in detail given the scope of the present monograph. For example, I viewed the verb-construction relation primarily from the perspective of the verb and its meaning, as I described how frequently each verb appears in each valency construction, but it is equally important to take the opposite view to determine which (types of) constructions are most frequent with which verbs. Further, by limiting my scope to only analyze the core Frame Elements (i.e. obligatory arguments), I did not address the combination and interpretation of more "peripheral" (i.e. adjunct) phrases with the verbs in question. For example, many Change examples include *with* PPs that describe an indirect cause of the event (*change with time*) or phrases describing the direction or result of the change (*change for the better*). Analyzing these types of phrases may reveal further distinctions among the verbs and identify whether certain "adjuncts" may be interpreted differently depending on the

2. For example, FrameNet posits nearly a dozen Frame Elements for the frames containing the Change verbs analyzed here. The FrameNet roles were not used due to methodological issues, but a more rigorous semantic analysis may reveal that these fine-grained distinctions influence verb valency behavior.

frame semantics of the verb they occur with. Finally, the various meaning component types and frame-sensitive syntactic features identified in the comparison of Change and Theft verbs must be investigated with respect to other verb classes to better understand their nature.

The methods and analyses employed here must also be applied to a much wider range of verb classes. For one, while I was able to associate two verb classes with the range of constructions they occur with, an important goal for future work is to relate other verbs to their constructional potentials. In doing so, it may be possible to develop a comprehensive list of (English) valency constructions and integrate it into FrameNet in order to show which types of valency constructions verbs of each frame may occur with, thereby contributing to the development of a constructional inventory of English (a.k.a. the Constructicon, Fillmore 2008; Fillmore et al. 2012). The comparisons of the Change and Theft verb classes also suggested that verb descriptivity influences the syntactic and semantic uniformity of verb classes within and across languages and must therefore be applied to other classes of different descriptivity levels. And of course, all of these analyses must be carried out on more typologically diverse languages to establish the cross-linguistic validity (and potential universality) of verb classes.

Two other topics worthy of further discussion include the etymology and historical development of verb classes and the potential effects of genre- and register-related differences in the variation of verb meaning and valency behavior. The historical-etymological discussions are beyond the scope of the present study, given the detail of its analyses and its synchronic focus and that speakers are generally not aware of a word's historical origins and its behavior in earlier stages of a language. However, an etymological discussion may be useful in identifying correlations between verbs in historically related languages, such as the correspondence of English *other* and German *anders* (from which *ändern* is derived). Such an analysis may also inform research on grammaticalization by showing trends in semantic shift from one verb class to another. For instance, both English *turn* and German *wandeln* originated as motion verbs, suggesting a potential grammaticalization pathway from motion to change verbs.[3] More generally, analyzing the development of verbs, meanings, and constructions in a given verb class over time may help us understand whether (and if so, to what extent) words maintain aspects of their semantic, grammatical, and cultural properties after shifting to express new semantic frames.

3. I thank an anonymous reviewer for bringing up these insights about *wandeln* and *anders/other*. The reviewer also mentions the recent use of English *other* as a verb to refer to make something (usually a person with reference to ethnicity or socioeconomic background) appear different rather than make it different.

Similarly, the analyses here relied only on a random sampling of COCA corpus data and may thus have overlooked variation influenced by text type. While COCA aims for balance between genres and registers (and includes a small portion of spoken data), a further extension of this research is to identify the extent to which verbs and verb classes vary in frequency, semantics, and valency behavior across genres. The present methodology can easily be extended to both genre-specific studies and to comparisons of verb classes across domains and genres, especially given the sophisticated genre-tagging system of many corpora (including COCA) and the existence of domain- and modality-specific corpora. Ideally, the field can arrive at a more conclusive picture of normal semantic and valency behavior, but this is only possible once sufficient analyses of verb classes both within and across domains, registers, genres, and modalities have been conducted.

Finally, the results of the studies described in this monograph can also be used to improve and develop various lexicographic, computational, and pedagogical applications. For one, the lexicographic goals of FrameNet will benefit from the approach to (frame-constructional) verb classes and (multi-grained) verb entries proposed here, as they will enrich the verb- and class-specific semantic and syntactic information available to its users. These are also important for computational applications, particularly natural language processing, as my results provide rich syntactic and semantic information that can be used to interpret large texts, and machine translation, as the cross-linguistic comparisons identify important mismatches in both word meaning and constructional behavior. This work is also highly relevant for language learning and translation, as it establishes which constructions a given verb is most likely to occur in and which words and constructions are the most accurate translation equivalents.

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Author Index

Verb Class Index

Subject Index

While verb classes are a mainstay of linguistic research, the field lacks consensus on precisely what constitutes a verb class. This book presents a novel approach to verb classes, employing a bottom-up, corpus-based methodology and combining key insights from Frame Semantics, Construction Grammar, and Valency Grammar.

On this approach, verb classes are formulated at varying granularity levels to adequately capture both the shared semantic and syntactic properties unifying verbs of a class and the idiosyncratic properties unique to individual verbs. In-depth analyses based on this approach shed light on the interrelations between verbs, frame-semantics, and constructions, and on the semantic richness and network organization of grammatical constructions.

This approach is extended to a comparison of Change and Theft verbs, revealing unexpected lexical and syntactic differences across semantically distinct classes. Finally, a range of contrastive (German–English) analyses demonstrate how verb classes can inform the cross-linguistic comparison of verbs and constructions.

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