Constructional Approaches to Language   27

Nodes and Networks in Diachronic Construction Grammar

edited by

Lotte Sommerer

Elena Smirnova

John Benjamins Publishing Company

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Constructional Approaches to Language

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Volume 27

Nodes and Networks in Diachronic Construction Grammar
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Introduction

The nature of the node and the network – Open questions in Diachronic Construction Grammar

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1. Introduction

This volume has grown out of a very productive workshop on recent *Advances in Diachronic Construction Grammar* held at the 50th SLE meeting in September, 2017 in Zürich. It focuses on several unresolved questions which relate to the nature of the postulated constructions and the chosen network design. The articles in this collection all contribute to the ongoing discussion of how to conceptualize constructional networks best (e.g. nature of the nodes, types of links) and how to model diachronic changes in the network, as for example node creation and loss, node-external reconfiguration of the network, in-/decrease in productivity, schematicity, etc.

It is generally acknowledged that the constructionist approach has been the fastest growing linguistic and interdisciplinary cognitive-functional approach to language during the last decade (Goldberg, 2019, p. 6). This is confirmed by the development of several versions of Construction Grammar (CxG), the growing number of international conferences and workshops, and the large body of journal articles and other types of publications: monographs (e.g. Booij, 2010; Patten, 2012; Perek, 2015; Ellis, Römer & O'Donnell, 2016; Goldberg, 2019; Diessel, 2019); handbooks and edited volumes (e.g. Bergs & Diewald, 2009; Butler & Arista, 2009; Steels, 2011; Boas & Sag, 2012; Hoffmann & Trousdale, 2013; Boogaart, Colleman & Rutten, 2014; Herbst, Schmid & Faulhaber, 2014; Yoon & Gries, 2016; Ruiz de Mendoza Ibáñez, Luzondo Oyón & Pérez Sobrino, 2017; Boas & Höder, 2018); textbooks and academic journal (e.g. Hilpert, 2014; "Constructions and Frames").

Inspired by Israel's seminal paper (1996), also many historical linguists "see an excellent fit between the mechanisms of syntactic change and the basic principles of Construction Grammar" (Barðdal & Gildea, 2015, p. 9). CxG is considered a useful tool for diachronic functional analysis because its theoretical architecture

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invites us to model change in form and function equally (Traugott & Trousdale, 2013, p. 231). Especially a usage-based, cognitive constructionist approach lends itself very well to modeling morphosyntactic change, as it understands change as a gradual, incremental bottom-up process and stresses the importance of frequency, entrenchment, and general cognitive abilities like analogical reasoning, schematization, and categorization. From a usage-based perspective, language is a complex adaptive system (CAS), grammar is an emerging phenomenon, and linguistic change happens through use (e.g. Gell-Mann, 1992; Tomasello, 2003; Beckner et al., 2009; Bybee, 2010; Diessel, 2019).

Consequently, several researchers are currently developing a constructional model of linguistic change (see e.g. Barðdal, 2008; Bergs & Diewald, 2008; De Smet, 2013; Hilpert, 2013; Traugott & Trousdale, 2013; Petré, 2014; Trousdale, 2014; Van de Velde, 2014; Barðdal et al., 2015; Torrent, 2015; Hartmann, 2016; Smirnova, 2017; Coussé, Andersson & Olofsson, 2018; Sommerer, 2018; Van Goethem et al., 2018; Fonteyn, 2019; Zehentner, 2019). However, as Diachronic Construction Grammar (DCxG) is still a rather young enterprise, many theoretical questions have only been touched upon inconsistently so far (also see Hilpert, 2018).

One of the most appealing but also challenging features of the constructional model is the network design adopted for representing the organization of linguistic knowledge. A generally accepted idea in all versions of CxG is that linguistic knowledge is stored in the form of constructions (form–meaning pairings in the sense of de Saussure) and that all constructions are organized in the "construct-i-con" (Goldberg, 2019, p. 36) formed by "taxonomic and meronymic networks of constructional families" (Barðdal & Gildea, 2015, p. 23). Lower level constructions inherit features from higher level constructions; these relations are modeled as connections in the vertical dimension of the network. Additionally, horizontal links between constructions exist. However, whereas vertical relations have been discussed in some detail, not much work has been done on horizontal links or multidimensional networks yet (for details see Section 3). At the same time, different scholars name and interpret concepts in different ways (e.g. constructional family, inheritance, horizontal links), which often leads to misunderstandings and confusion.[1]

An additional challenge for constructional modeling is the simple fact that the constructicon constantly changes. Thus, it has to be discussed how

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1. For example, a threefold distinction between micro-, meso- and macro-constructions was promoted by Traugott (2008) and Trousdale (2008) at one point, but other scholars use alternative but corresponding terminology like "substantive", "semi-substantive" and "schematic" (Croft & Cruse, 2004, p. 255).

the notion of "change" can be incorporated and how it can be visualized when sketching networks.

In current versions of DCxG, all types of linguistic change are being reconceptualized as "network changes". The network can change:

a.   via node creation and node loss ("constructionalization" and "constructional death"),
b.   via node-internal changes ("constructional change"), and
c.   via node-external changes, i.e. constructional network reconfiguration (also see Sommerer, 2018, p. 148–149; Traugott & Trousdale, 2013; Hilpert, 2018)

Of course, a complete classification is still pending and it needs to be investigated theoretically and empirically whether such a simple, threefold classification can be upheld or makes sense in the first place. For example, the distinction between (a) "constructionalization" and (b) "constructional change" has recently been criticized on theoretical as well as on empirical grounds (for details see Section 2.2). At the same time, it is well known that the frequency, the productivity, or the schematicity of a construction may increase or decrease in time and/or that a construction may experience host class expansion (Himmelmann, 2004; Hilpert, 2014; Perek, 2015; Van Goethem et al., 2018). Such developments can also be considered types of changes. Here we argue that these changes can be subsumed under (b) node-internal changes and under (c) node-external changes at the same time. On the one hand, productivity and schematicity are characteristic features of one specific form–meaning pairing, but, on the other hand, these developments might also correspond to a shift in the position of a specific node (e.g. a node moving up or down in the hierarchy) and/or to the establishment of new node-external links.

To improve our understanding of all these types of changes and problematic issues mentioned above, the papers included in this volume will explicitly relate their presented empirical data and line of argumentation to one or more of the following theoretical questions:

1.   How can node creation and node loss be implemented in the network model?
2.   When is it warranted to postulate a new separate node in the network as a result of "constructionalization" and when is it not ("constructional change" only)?
3.   What kinds of connections exist between the nodes in the network (i.e. vertical and horizontal links)?
4.   What is the theoretical status of "allostructions", "homostructions", "constructional families", and "paradigms"?
5.   How can the reconfiguration of node-external linking be modelled in the (existing) network model?

6. How do general cognitive abilities like analogical thinking, routinization/ automatization, abstraction, and categorization/schematization relate to the structure and reorganization of the constructional network?

7. (How) should the existing network model be enriched or reconceptualized in order to integrate aspects missing so far?

We believe that answering these questions in one way or the other will have significant repercussions for a diachronic model. Furthermore, we hope that the discussion of these questions will contribute to developing DCxG further and spark off many constructional diachronic case studies by clarifying theoretical aspects, thereby making the framework more applicable.

We would like to use the remainder of this introduction not only to introduce the individual papers, but also to revisit and critically discuss some of the terms and concepts that have been established – apparently unanimously – in the DCxG community. First, we focus on the nature of the nodes. We briefly come back to some well-known characteristic features and classifications of constructions (Section 2.1), but also discuss the diachronic phenomenon of "node creation" and "node loss". Here we also revisit the postulated distinction between "constructionalization" and "constructional change" (Section 2.2). Afterwards, we reflect on some of the existing proposals of how to conceptualize node external linking (Section 3). As a next step, we will present some suggestions of how to reconceptualize the existing model as a whole in order to integrate aspects missing so far (Section 4). While discussing all the points mentioned, we will always add information on how the contributors to this collection conceptualize the respective issues. We will conclude this introduction by giving information about the investigated phenomena, period, and language each author investigates and the empirical data they used in order to do so (Section 5).

2.   The nodes

2.1   The nature of the node

What all construction grammarians have in common is the belief that almost all linguistic knowledge is stored in the form of constructions. A "construction" is a conventionalized form–meaning pairing or form–function unit (Goldberg, 2006, p. 3; Diessel, 2011, p. 130). It is a symbolic sign in the sense that it links a formal side to a particular meaning/function via a symbolic correspondence link (Croft & Cruse, 2004, p. 258). Like words, phrasal and clausal (schematic) constructions are also signs which themselves carry meaning that can be independent of the

words used in the particular phrase (Goldberg, 1995, p. 1; 2013, p. 16). However, the meaning of a schematic formal template is often quite abstract and rather procedural (see classification and examples below).[2]

Several definitions of the term "construction" have been offered throughout the years (e.g. Fillmore, Kay & O'Connor, 1988; Goldberg, 1995, 2006, 2019; Bybee, 2010; Diessel, 2019). In this collection, most authors employ Goldberg's, 2006 definition:

> 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 recognizable 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, p. 5)[3]

Note that this definition encompasses single morphemes as well. This commitment has manifested itself in the literature as Goldberg's famous claim for language to be "constructions all the way down" (2006, p. 18).

Constructions have been classified in several ways and on various dimensions, especially regarding their size and formal "schematicity". It has been postulated that constructions can be atomic and substantive (e.g. lexical items like *green, banana, head,* or function words like *the, who*) or atomic and schematic (e.g. an abstract category like ADJ "adjective" or CN "common noun"). Other constructions are complex and can be fully specified (e.g. fixed phrases like *How do you do?*), semi-specified in the sense that they have substantive and schematic parts (e.g. *call* NP$_{agent}$ *a liar, looking forward to V-ing*),[4] or completely schematic (e.g. the ditransitive construction [Subj V Obj$_1$ Obj$_2$]). In other words, complex constructions can have sequential structure with positions that are either fixed and filled

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2. For Traugott and Trousdale (2013, pp. 12–13), following Terkourafi (2011, pp. 358–359), linguistic expressions are "procedural" if they code grammatical information which helps the speaker to combine various concepts into one conceptual representation. For example, case and aspect markers or markers of indexical reference or information structure are classified as procedural elements.

3. In her recent book, Goldberg provides a slightly different, more psychological definition: "Constructions are emergent clusters of lossy memory traces that are aligned within our high-(hyper)! dimensional conceptual space on the basis of shared form, function and contextual dimensions" (2019, p. 7). Lossy, a term from computer science, in this context means "not fully specified".

4. In constructional modeling, the fully-specified and semi-specified levels are as important as the abstract levels, as these are the levels where idiomatic meaning, collocational, and colligational preferences, distributional lexical biases, and constraints for specific constructions are being expressed (e.g. Boas, 2003; Stefanowitsch & Gries, 2003; Gries & Stefanowitsch, 2004).

lexically or positions that are open (Croft & Cruise, 2004, p. 255; Goldberg, 2013, p. 17; Diessel, 2015, p. 312).

To better understand this classification scheme, Figure 1 shows several types of N(P) constructions which differ in their size and specificity (M = meaning, F = form):

M	{proximal demonstrative/ marker of proximity}
F	[*this*]$_{determinative}$

atomic, substantive

M	{demonstrative}
F	[DEM]

atomic, schematic

M	{Season greeting}
F	[Merry Christmas!]

complex, fully-specified

M	{state of being X}
F	[ADJ-ness]$_N$

complex, semi-specified

M	{proximal entity}
F	[[*this*] + [CN]]$_{NPdef}$

complex, semi-specified

M	{deictic entity}
F	[[DEM] + [CN]]$_{NPdef}$

complex, schematic

Figure 1. Types of constructions

As can be seen in Figure 1, polymorphemic constructions can be considered morphologically complex as well. Similar to the phrasal level, one finds fully specified constructions like compounds, e.g. *armchair, swimming pool*, or semi-specified templates, e.g. *un*-ADJ; V-*er* (see Booij, 2010 and Masini & Audring, 2018 for details on constructional morphology).

Two additional characteristic features of constructions need to be mentioned at this point: polysemy and compositionality. "Polysemy" refers to the capacity of a linguistic form to express more than one related meaning. A construction like [*this*]$_{determinative}$ is polysemous in the sense that it cannot only express spatial deixis but also intertextual deixis.[5] Similarly, a common noun like [*head*]$_{CN}$ is polysemous because it can express the literal meaning {body part} but also the metaphorical meaning {head of a hierarchical system}. Also a complex abstract construction like the ditransitive [Subj V Obj$_1$ Obj$_2$] can be considered polysemous as it can have several meanings: {Agent successfully causes Recipient to receive Patient},

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5. The linguistic form *this* can also function as a pronoun which heads its own NP. In such cases, we argue that [*this*]$_{pronoun}$ constitutes a separate node in the network. Although [*this*]$_{demonstrative}$ and [*this*]$_{pronoun}$ are historically related, we categorize this as a case of homonymy, as their current syntactic environment (i.e. dependent prehead determinative vs. independent head) and semantic functions are very different from each other.

{Agent enables Recipient to receive Patient}, {Agent intends to cause Recipient to receive Patient}, or {Agent causes Recipient not to receive Patient}, among others (see Goldberg, 1995, p. 38). As will be shown, polysemy is a challenging issue when conceptualizing language change because one crucial question is when to postulate an extension of the semantic range of a particular existing construction and when to postulate the emergence of a completely new form–meaning pairing (see Section 2.2 on node emergence).

Constructions also differ in their degree of compositionality. "Compositionality" can be understood in two different ways: The complex constructions in Figure 1 are compositional in the sense that they are made up of combined constructions. Many complex abstract constructions have slots which can be filled by a limited number of other constructions; in short, they are compositional in the sense of a "slot and filler" model. At the same time, a multiword construction made up of combined constructions may gain unit status from a cognitive processing perspective. For example, a fixed collocational phrase like [*ladies and gentlemen*] or [*This is it*!] can be entrenched as a chunk so that during processing and production compositional scaffolding does not necessarily take place. Frequent chunks or formulaic sequences are often stored as prefabricated wholes and "processed in a holistic manner, that is, by means of an access-and-retrieval rather than an online, computational procedure" (Schmid, 2016, p. 17). In that sense, they are non-compositional with regard to their storage and processing.

On the other hand, a multiword construction like [*This is it!*] has also been classified as semantically non-compositional for its idiomatic nature. Its discourse-pragmatic function of expressing that a process is completed at the time of utterance cannot be derived from the respective elements in the sequence.[6] The term non-compositionality has been regularly used in studies on idiomatic expressions. Some idioms are said to be semantically non-compositional because their meaning is not directly derivable from the meaning of the component parts. For example, in the idiom *to saw logs* the overt constituent *logs* (direct object) does not semantically contribute anything to the intransitive meaning of the overall phrase {to snore}. In contrast, a construct like *Bill ate a burger* is fully compositional: the individual parts all contribute equally and directly to the final meaning of the clause (see e.g. Nunberg, Sag & Wasow, 1994; Langlotz, 2006; Wulff, 2008).[7]

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6. At the same time, the internal structure of a construction may remain immanent and a speaker may still be able to deconstruct the units involved (Evans & Green, 2006, p. 756). In the case of [*This is it!*], the speaker still recognizes the individual constructions [*this*], [*is*], and [*it*].

7. We side with those researchers who distinguish between the notion of "semantic compositionality" and "semantic transparency" (non-opacity), a notion which refers to a speakers'/listeners' intuitive ability to detect an (often metaphorical) motivation for using a particular expression to

From a usage-based cognitive perspective, constructions can also be distinguished in terms of their strong or weak entrenchment. With linguistic items, input frequency is especially linked to neuronal cognitive implementation (i.e. entrenchment). Frequency influences how strongly linguistic constructions are represented in memory and how fast they can be retrieved as a whole. Every time a speaker/listener processes a construction, this activates one or more nodes. The more often a node is activated, the stronger and better connected it becomes. Often used nodes and node connections show signs of linguistic strength and are said to be more strongly entrenched, whereas units that are used infrequently lack this strength and are only weakly entrenched (Langacker, 1987, p. 59).

The concept of "entrenchment" has been defined differently by different scholars (Blumenthal-Dramé, 2012, p. 4). Whereas Langacker (1987) focuses on the relative strength in memory space, De Smet and Cuyckens (2007) highlight that strongly entrenched units are holistic rather than componential. For them, an entrenched unit "represents an automated, routinized chunk of language that is stored and activated by the language user as a whole, rather than creatively assembled on the spot" (De Smet & Cuyckens, 2007, p. 188). Phrases and combinations that often occur together will sometimes be stored as one chunk or single processing unit. Entrenchment, in other words, can be understood in two ways: in terms of representation strength and in terms of holistic chunking (Schmid, 2016, p. 10). As a reaction to the complexity of the issue, Blumenthal-Dramé offers the following rather broad working definition for entrenchment: "Entrenchment denotes the strength or autonomy of representation of a form–meaning pairing at a given level of abstraction in the cognitive system" (Blumenthal-Dramé, 2012, p. 4).

Whereas the notion of entrenchment refers to the way a construction is processed by individual speakers/listeners, the "conventionality" of a construction can only be accessed at the level of speech community (Langacker, 1987, p. 66). Conventionality, or the degree of conventionalization of a construction (related terms are "usualization" and "institutionalization", Brinton & Traugott, 2005, pp. 45–47), corresponds to the degree to which a construction is accepted and common in a given speech community: the more different speakers use a construction, the higher the degree of conventionality. In other words, conventionality refers to a construction's successful spread in the speaker population. Of course, entrenchment and conventionality – as understood here – are closely

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express an idiomatic meaning. Transparency must not be confused with semantic predictability. The level of transparency can only be decided upon after a speaker/listener has been taught the meaning of the idiomatic expression. For example, *to skate on thin ice* or *to rock the boat* would be considered transparent idioms (e.g. Keysar & Bly, 1995).

related to each other: conventional constructions tend to be strongly entrenched, and strongly entrenched constructions tend to be conventional.

Constructions can also be described by investigating their "productivity". Again, the notion of productivity has been defined in several ways. Productivity has been used to "refer to the range of different lexical items that are attested in a particular slot of a construction, as can be observed in a corpus; this corresponds to what Baayen (2009) more specifically calls 'realized productivity'" (Perek, this volume). At the same time, productivity can refer to a construction's ability to potentially attract new or existing items; this has been termed "extensibility" by Barðdal (2008; see Barðdal & Gildea, 2015 for a more detailed discussion of productivity). The productivity of a construction is linked to its schematicity (see Gyselinck and Perek, this volume).

In this section, we have been briefly discussing characteristic features of constructions like size, specificity, polysemy, compositionality, entrenchment, conventionality, and productivity. All these features are especially relevant in a diachronic model, which we will now focus on.

2.2   Node creation vs node-internal changes

As has already been mentioned, the constructicon changes when a new node emerges or a node dissolves in the network. A prototypical example for such a change would be the creation of a completely new form–meaning pairing (e.g. *selfie* or *Netflix*) or the integration of a foreign word into the constructicon through lexical borrowing (e.g. *sushi* or *devour*, see Traugott & Trousdale, 2013, pp. 186–190 for more examples).

We may model the emergence of a new construction in the following very simplified way. If a language learner encounters the linguistic expression *Merry Christmas!* for the first time and successfully assigns to it the particular function {season greeting in December}, this may constitute the emergence of a new node in her/his constructicon. More realistic, however, is a scenario where the learner needs to encounter this expression repeatedly (= as many exemplars), and only then stores and produces the construction her-/himself. Repetition and hence frequency are crucial for the construction to get successfully entrenched (see Section 2.1 for entrenchment). Once the construction *Merry Christmas!* is stored as a unit, it may sanction many constructs; this constitutes the emergence of a new specified node[8] in the network which is locally separated from the (possibly still) related nodes [*merry*] and [*Christmas*].

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8. Of course, it is also possible, that a new abstract schematic node emerges (for the emergence of schematic nodes see Section 3.1 on schematization, vertical links, and inheritance networks).
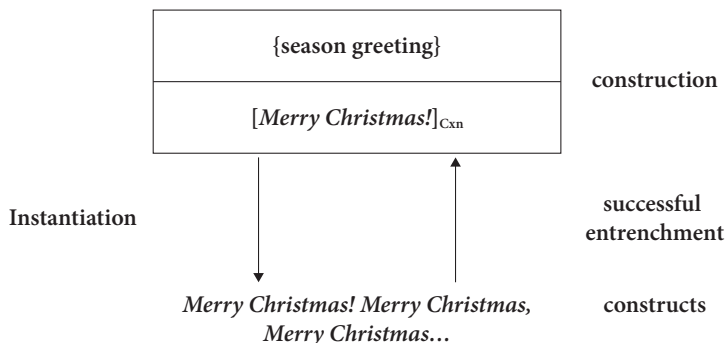
Figure 2. Emergence/acquisition of a construction through language use

At this point, we assume that the process of emergence or acquisition of a construction works more or less similar for different individuals in a population of speakers/listeners.[9] The moment a construction is used by more and more speakers in more and more contexts, it gets spread within a linguistic community and becomes more and more conventional (see Section 2.1 on conventionalization).

In the literature, this process has been termed "node emergence" (e.g. Sommerer, 2018; Hilpert, 2018), "node creation" (e.g. Torrent, 2015; Trousdale, 2018), and even "node genesis" (e.g. Hieber, 2018). However, the most frequently used term for the process is "constructionalization" (Cxzn), introduced initially in Noël (2007) and elaborated on in Traugott and Trousdale (2013):

> Constructionalization is the creation of $form_{NEW}$-$meaning_{NEW}$ (combination of) signs. It forms new type nodes, which have new syntax or morphology and new coded meaning, in the linguistic network of a population of speakers. It is accompanied by changes in degree of schematicity, productivity, and compositionality. […] [M]inimally, constructionalization involves neoanalysis of morphosyntactic form and semantic/pragmatic meaning.   (Traugott & Trousdale, 2013, p. 22)

In their seminal (2013) book, Traugott and Trousdale argue that formal changes alone and meaning changes alone do NOT constitute constructionalization (Traugott & Trousdale, 2013, p. 22). Instead, they constitute constructional changes (CCs) which affect the internal set up of an existing construction and do not involve the creation of a new node (Traugott & Trousdale, 2013, p. 26). "Constructional changes" are understood as small incremental steps which often precede and feed constructionalization or follow it (Traugott & Trousdale, 2013, p. 27).

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9. This does not mean that all speakers in a population have the same constructional repertoire or the same networks. Several studies have shown that individual speakers use and understand grammatical patterns differently, which is indirect evidence for the fact that individual constructions most likely differ from each other, especially with regard to the level of abstraction (e.g. Dabrowska, 2012).

As examples of Cxzn, Traugott and Trousdale (2013) give the emergence of binominal partitives in English, as e.g. *a lot/bit/shred of* N, and of the construction [BE *going to* V_{inf}]. In both cases, a new, previously non-existent construction enters the constructional network and is added to the constructional hierarchy: binominal partitives get integrated into the family of noun modifiers, whereas the construction [BE *going to* V_{inf}] enters the family of future reference constructions.

In contrast, using the same examples, Traugott and Trousdale (2013, pp. 27–29) argue that the semanticization of invited inferences of "quantity" in the case of binominal partitives and of "intention" in the case of [*be going to* V_{inf}] constitute only constructional change, as they concern only changes in semantics (= "pre-constructionalization constructional changes"). In other words, nothing changes in the formal characteristics of e.g. [*a bit of* N] when it starts being used with the conventionalized partitive meaning. On the other hand, phonological reduction processes leading to *a lotta* and *gonna* are CCs after Cxzn, affecting only the formal side of the constructions without accompanying changes on the semantic side (= "post-constructionalization constructional changes").

Since Traugott and Trousdale (2013), the conceptual distinction between Cxzn and CC(s) has become one of the central distinctions in the framework of DCxG. These concepts have been repeatedly applied in empirical studies dealing with the diachronic development of constructions, in syntax as well as in morphology (see e.g. Trousdale & Norde, 2013; Hüning & Booij, 2014; Norde & Van Goethem, 2018). The conceptual distinction between Cxzn and CC is indeed very appealing, as it clearly separates the "birth" of a new construction from all possible "changes" that may occur to constructions which already exist in a language.

Moreover, this distinction allows a more or less straight (visual, graphical) implementation into the two-dimensional constructional network model. If a completely new node is added to the existing network, it is Cxzn (see Figure 4). CCs, on the other hand, do not add a new node to the network, but affect one or more internal aspect(s) of this node, often leaving the external organization of the network unchanged, i.e. CC may be conceived of as "node-internal changes", see Figure 3.[10]

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10. Figure 3 and Figure 4 introduce a very simplified model of a constructional network with only two levels of schematicity, and are meant to illustrate the difference between constructionalization as "node creation" and constructional changes as "node-internal changes"; for a more elaborate discussion of the vertical and horizontal architecture of the network, see Section 3 below.
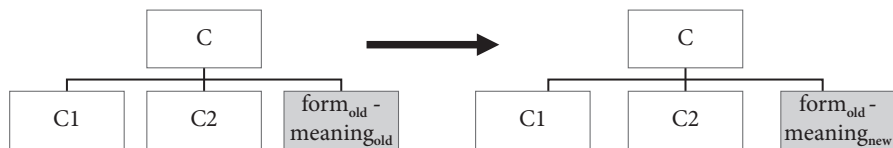
Figure 3. Constructional change as meaning change within a construction
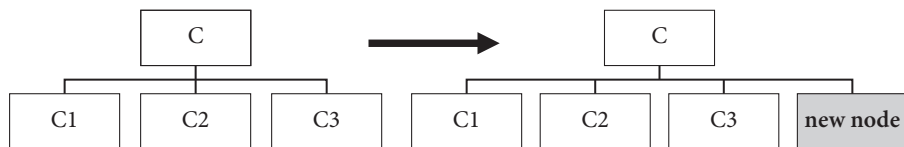

Figure 4. Constructionalization as creation of a new node in a network

However, as this conceptual distinction has quickly gained in popularity, it has also increasingly become subject of much controversy. As we see it, the distinction poses problems at the theoretical as well as at the empirical level. With respect to theoretical aspects, we would like to concentrate on the three following points:

a. Defining constructionalization as the creation of "$form_{NEW}$-$meaning_{NEW}$" signs;
b. Interpreting constructionalization as a gradual process;
c. Claiming that constructionalization is accompanied by "changes in degree of schematicity, productivity, and compositionality".

In all versions of constructionist approaches, constructions are basically defined as form–meaning pairings, i.e. linguistics signs in the tradition of de Saussure. That means that form and meaning are inextricably connected in a construction and cannot be separated from each other.[11] From this, it follows that any change in form, meaning, or both of them would destroy the "unanalyzable whole" of the construction. As a consequence, any change should be conceptualized as the emergence of a new construction (for a detailed critical assessment, see e.g. Diewald, 2015, p. 119; Smirnova, 2015, pp. 88–93; Sommerer, 2018, pp. 148–153).

Thus, Traugott and Trousdale's (2013) definition of constructionalization is problematic because it conflicts with de Saussure's concept of a sign. When an existing form–meaning pairing is affected internally, i.e. only on its semantic or only on its formal side (see Figure 3), these changes should qualify as a case of constructionalization, because any new construct of this construction would no longer be sanctioned by the previously existing construction. Börjars, Vincent and Walkden agree that "[e]ven a change to either form or function no longer sanctions the new construct" (2015, p. 371). Also Barðdal and Gildea stress that

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11. In Cognitive Grammar, symbolic units as "unanalyzable wholes" are considered basic units of language (see e.g. Langacker, 1987, pp. 57–58). This concept corresponds to the bilateral sign concept of de Saussure and is basically compatible with the definition of construction in CxG.

"[w]e must posit a new construction every time a new form–meaning association is both readily differentiable from previous associations and sufficiently robust to be considered 'conventionalized'" (2015, p. 18). These considerations make the neat distinction between constructionalization and constructional changes more spurious and less tangible.

To illustrate this with an example, we report on the development of complex adpositions in German. In present-day German, most complex adpositions are formed after the pattern [P_1 N P_2/GEN], see e.g. (1):

(1) in_{P_1} *Folge* von_{P_2}/GEN 'in reaction to'
      im_{P_1} *Fall(e)* von_{P_2}/GEN 'in case of'
      im_{P_1} *Verlauf(e)* von_{P_2}/GEN 'in the course of'
      im_{P_1} *Zug(e)* von_{P_2}/GEN 'during'
      aufgrund von_{P_2}/GEN 'due to'
      in_{P_1} *Bezug* auf_{P_2} 'with regard to'
      im_{P_1} *Hinblick* auf_{P_2} 'looking at'
      im_{P_1} *Zusammenhang* mit_{P_2} 'in connection with'

Most complex adpositions emerge via reanalysis from a fully compositional syntactic structure of the same form, but with a different internal structure, namely a prepositional phrase with P_1 whose noun is further modified by an attributive prepositional phrase with P_2/GEN, as exemplified in (2):

(2) $[im_{P1+DET}$ $[Zug_N$ $[nach_{P2}$ $Berlin_N]$ $_{PP}]_{N'}]_{PP}$
      (on the train to Berlin)
      $[mit_{P1}$ $[leiser_A$ $Hoffnung_N$ $[auf_{P2}$ $Frieden_N]_{PP}$ $]_{N'}]_{PP}$
      (with hope for peace)
      $[auf_{P1}$ $[dem_{DET}$ $Grund_N$ $[des_{DET/GEN}$ $Meeres_{N/GEN}]_{NP}]_{N'}]_{PP}$
      (at the bottom of the sea)

The complex adpositions exemplified in (1) differ from the syntactic structures they originate from (2). For example, the noun (e.g. *Folge, Fall, Zug*) is not grounded by determiners or modified by adjectives; P_1 cannot be replaced by another semantically similar preposition; likewise, P_2 is fixed and does not vary, etc. (see Di Meola, 2000).[12]

Interestingly, there is a considerable number of syntagmatic combinations [P_1 N *von*/GEN] which function very similarly to complex adpositions exemplified in (1). However, they do not show any signs of formal shifts of the kind mentioned

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12. Often, we observe univerbations, such as *aufgrund < auf Grund, anhand < an Hand* etc. With respect to function, they resemble simple adpositions (e.g. *in* 'in', *an* 'at', *auf* 'on', *mit* 'with') in that they assign case to their complement and express semantic notions which are shared with the class of traditional, simple adpositions (local, temporal, causal, modal, etc.).

above. As exemplified in (3) for *unter Berücksichtigung von*/GEN 'in consideration of', variation can be observed with respect to P_1, the use of determiners, and further modification of N.

(3)   *unter*$_{P_1}$ *Berücksichtigung*$_N$ *von*/GEN
variation of P_1:
unter/ bei/ in *Berücksichtigung von*/GEN
determiner and adjectival modification of N:
(unter/bei) der$_{DET}$*/ besonderer/ gleicher/ starker/ notwendiger*
Berücksichtigung von/GEN

Given the neat conceptual distinction between Cxzn and CC in the sense of Traugott and Trousdale (2013), we are faced with difficulties in assessing the structure in (3). Do we face a case of constructional change, namely a slight meaning change towards a less compositional structure functioning as an adposition? Is this coupled with an increase of usage frequency of the particular combination *unter + Berücksichtigung*? However, this meaning change is closely related to and cannot be dissociated from changes in collocational distributions of the noun, which points to an increase of formal fixedness on the one hand (i.e. combination with fewer P_1 and particular adjectives) and, on the other hand, to a strengthening association of *unter Berücksichtigung* with the class complex adpositions. We argue that in this case, these changes qualify as a case of constructionalization, because any new construct is no longer sanctioned by the previously existing construction. In a model that strictly differentiates between Czxn and CC, we seem to be forced to tear apart these closely associated changes on the semantic side of the sign from those on the formal side in order to successfully determine a point of "emergence" of a new form–meaning pairing. The question is thus where exactly and why we should draw the line, and, ultimately, whether it is possible at all to do so?

As to the second point, we identify a contradiction in Traugott and Trousdale's postulation of gradualness. In their book, they adhere to the view that any change, including both Cxzn and CC, is basically gradual, which is more or less a trivial fact. However, if the emergence of a new construction is conceptualized as the (discrete) addition of a new node into a network (see Figure 4), this necessarily invites the interpretation of an abrupt, instantaneous change, since there cannot be something like a smooth transition from "zero/no node" to "node". Traugott and Trousdale explicitly address this point by distinguishing two different types of Cxzn, i.e. a gradual and an instantaneous type, saying that the constructionalization of schematic constructions is always gradual, whereas substantive and fully specified constructions may be created gradually as well as instantaneously (2013, p. 22). The basic idea remains, however, that many linguistic changes are essentially gradual.

The problem with this view is that the conceptual distinction between Cxzn and CC becomes even more blurred. The very appealing idea to distinguish between (a) the creation of new constructions by neo-analysis (aka reanalysis), i.e. non-gradualness, and (b) changes to existing constructions, i.e. gradual shifts in different constructional properties, becomes even more problematic. In addition, from a methodological point of view, the question is how to integrate the notion of gradualness into the network model, which (so far) consists of discrete nodes and links between them. Some linguists try to overcome this problematic issue by re-interpreting the notion of Cxzn exclusively in terms of the result, i.e. Cxzn as the end point of a gradual change instead of the dynamic process leading to this point. On the one hand, this strategy radically undermines the original idea of separating CC and Cxzn, as it reduces two different processes to only one process and posits Cxzn as a mere point of demarcation. On the other hand, this strategy is confronted with the same problems as described above, namely where to set the demarcation point along the line of gradual development.

Our third point of critique concerns the fact that there are different types of constructions, which are located at different levels of abstraction, schematicity, and complexity (see Figure 1 and Section 3 below). Moreover, constructions differ from each other with respect to their semantics, covering the range from (more) contentful to (more) procedural meanings. In its actual form, the definition of Cxzn does not capture the emergence of different construction types in a unified manner, since it posits that all types of Cxzn involve changes in degree of schematicity, productivity, and compositionality. This is particularly problematic for the type of instantaneous "Cxzn" alluded to above: when a completely new form–meaning pairing (e.g. *selfie* or *Netflix, sushi* or *devour*, see Traugott & Trousdale, 2013, pp. 186–190) instantaneously enters into the constructicon, there is no construction of origin to which the degree of schematicity, productivity, and compositionality of this new construction might be compared. Also for other processes of change leading to the emergence of new constructions, changes in degree of schematicity, productivity, and compositionality do not apply in the same unified manner. We can briefly illustrate this point using the example of complex adpositions again. As has been said above, in present-day German, the most productive formation pattern of complex adpositions is [P N GEN], see e.g. (1) above. Each individual complex adposition, e.g. *im Fall(e)* GEN 'in case of', *anhand* GEN 'by means of', *zugunsten* GEN 'in favour of', etc., has emerged at different points in time and, until today, has advanced up to a particular point in its development. Some of them show up in the univerbated form (*anhand* 'by means of', *zugunsten* 'in favor of'), others have still preserved their original syntactic structure (*auf der Basis* 'on the basis of', *auf der Grundlage* 'on the basis of', *nach dem Vorbild* 'after the model of'), and some of them are in between these two

poles of structural transparency (*am Rand(e)* 'on the verge of', *im Fall(e)* 'in case of', *im Rahmen* 'within the scope of'). The network of the individual adpositions can be roughly modelled in the following manner (see Figure 5). Looking at each complex adposition and considering each of them as an individual construction type which developed independently at a specific point in time, we may posit several nodes on different levels of the construction (see Figure 5). Each of these developments would qualify as a case of Cxzn, following the model proposed in Traugott and Trousdale (2013), as they involve the addition of a new node to the constructicon (but see our critical discussion of *unter Berücksichtigung* above). We also do observe critical changes with respect to compositionality, as a fully compositional syntactic structure is turned (via reanalysis) into a non-compositional one. However, we cannot detect any relevant changes with respect to productivity and schematicity, as – similarly to what has been said above – there is no preexisting construction which could serve as the basis for this type of comparison.
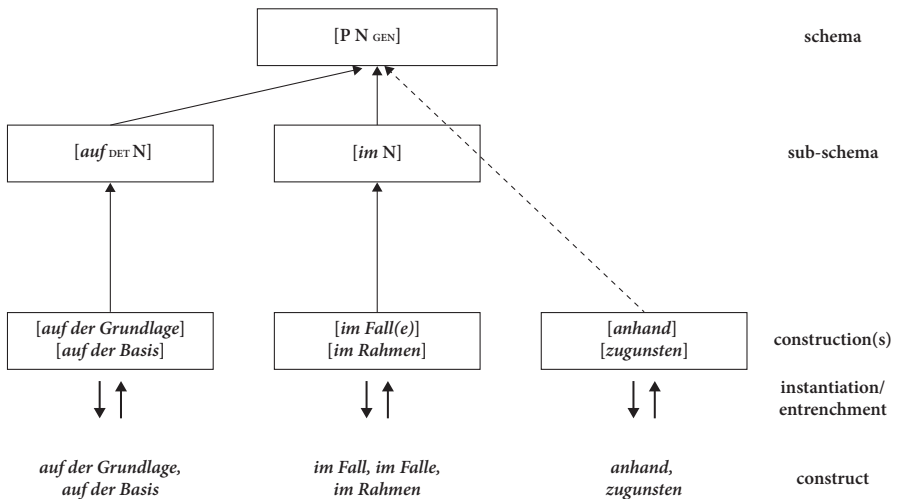
Figure 5. Partial network of German complex adpositions

Crucially, every development at the most specific level of the hierarchy has contributed to the generalization and establishment of more schematic constructions (higher up in the hierarchy, see levels "sub-schema" and "schema" in Figure 5), albeit to a different degree. From a synchronic perspective, very old univerbated complex adpositions such as *anhand* and *zugunsten* may be considered as only marginally instantiated by the schema [P N GEN], and only indirectly contributing to its activation (represented by the dotted line in Figure 5). The appearance of each more or less schematic construction at each level of abstraction may and should be interpreted as the emergence of a new construction, i.e. Cxzn, as each

time a new node is added to the network. With respect to these processes, changes in degree of productivity and schematicity are undoubtedly the most relevant observable shifts; whether compositionality is also influenced by this type of developments may however vary depending on the specific case of change we are considering. In our view, there is a crucial difference between the emergence of new construction types (low in the hierarchy) and new constructional schemas (higher up in the hierarchy), as they tend to follow different dynamics; and this fact cannot be accounted for by the unified concept of Cxzn proposed by Traugott and Trousdale (2013).

To sum up so far, the distinction between Cxzn and CC, albeit very appealing on an intuitive basis, poses several problems, as it lacks definitional clarity, violates the basic definition of construction, and cannot be applied in a unified manner to the emergence of different types of constructions. Empirical problems, or problems of applicability to empirical data, follow directly from the theoretical shortcomings mentioned above. As these problematic issues have been repeatedly addressed in the literature (see e.g. Börjars et al., 2015; Hilpert, 2018; Sommerer, 2018; Hartmann, 2018), it will suffice at this point to quote Hilpert (2018, p. 27) who remarks that

> […] the term constructionalization ultimately invites the notion of a discrete threshold between an existing construction that has changed and a new construction that has come into being. This threshold may turn out to be a line in the sand that is impossible to draw with certainty.

In this volume, the empirical problem of "drawing the line in the sand" is the central topic of the paper by **Susanne Flach** on the emergence of the *into*-causative. She argues that the existing notion of Cxzn is ambiguous between the eventive "process reading", i.e. the gradual changes before and after node creation, and the resultative "new-node reading", i.e. the node creation itself. In her view, this ambiguity is at the core of problems related to the empirical applicability of this notion. Flach proposes to reserve the term Cxzn to the second reading, i.e. to the point when a new construction can be postulated by an analyst, and to label changes before and after this point "constructional emergence".[13] More generally, she sees the notion of Cxzn as a mere analytical definition, which is crucially dependent on the view and the "zoom factor" taken by the linguist, which may differ from one person to another (often depending on the specific research question). In this sense, there is no "real" distinction between Cxzn and CC, it is always a matter of

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13. Note that in her terminological distinction, Flach employs the term "emergence" differently than we do in this introduction where the term "emergence" is not restricted to the eventive process reading but also often used to refer to the resultative interpretation of "constructionalization".

definition which hinges on the decisions of a particular linguist influenced by his/her descriptive and analytical goals.

Lotte Sommerer tackles the issue of constructionalization from a different perspective, concentrating not only on the emergence of a new construction, but also on the disappearance of a node from the existing network, i.e. constructional death. By discussing the demise of POSS DEM constructions in Old English, Sommerer shows that constructional death is not really different from constructional emergence in the sense that both can be driven by the same mechanisms and factors motivating change, such as frequency effects and analogical reasoning. With regard to the distinction between Cxzn and CC, she proposes the following slightly different distinction and terminology. Linguistic change comes about (a) via the addition of new nodes ("constructionalization *novo loco*") and (b) via the local substitution of existing nodes ("constructionalization *in situ*"/ "constructional substitution").

The important characteristic feature of constructionalization *novo loco* is that the newly emerged construction represents a new node occupying a new (previously non-occupied) space in the network which has to be linked to existing nodes. Crucially, it does not replace an existing node when it arises, which constitutes constructionalization *in situ*. For Sommerer, Traugott and Trousdale's "constructional change" is also a case of constructionalization but often *in situ*. An existing construction is substituted by another (albeit very similar) newly emerged form–meaning pairing. This could also be called a case of "local node adjustment". Even if an existing node only changes in form or in function, this is conceptualized as constructionalization as well.

The term "constructionalization" is thus an umbrella term, which is simply defined as "the emergence of a new form–meaning pairing which previously did not exist in the constructicon and which is added as a new node to the network". This definition subsumes Traugott and Trousdale's special cases of form$_{NEW}$-meaning$_{NEW}$ pairings, but also cases where a new sign is established that only differs in form or function from its source. In any case, any constructionalization often will be motivated and/or accompanied by newly emerging links to related (already existing) constructions, which brings us to the topic of node external linking.

3.   The links in the network

One of the most fundamental but also challenging features of constructional modeling is the fact that the constructions of a language are organized in multiple structured inheritance networks called the "constructicon". The constructicon is not simply a list of unrelated constructions but is conceptualized as "taxonomic

and meronymic networks of constructional families" (Barðdal & Gildea, 2015, p. 23). However, no complete account as to how constructions are linked to each other exists yet, and the general organization of the constructicon is clearly an under-researched area. Although relations (= links) have been assumed to hold between nodes (= constructions) in the vertical and horizontal dimensions of the network, and these relations have been used to model different phenomena, many questions have not been answered satisfactorily. As will be shown below, scholars differ extremely when it comes to sketching (changing) constructional networks.

Several classification schemes for different types of links have been put forward in the last years. Goldberg (1995, pp. 74–81) proposed the following four types of inheritance links: (1) "instance" links, existing between constructions of different degrees of specificity (see Section 2.1); (2) "polysemy" links, which are posited between the prototypical sense of a construction and its extensions (see also Section 2.1 on polysemy); (3) "metaphorical" extension links, connecting a basic sense of a construction to a metaphorically extended sense; and (4) "subpart" links, which hold between constructions of different degrees of complexity. Diessel (2019) recently postulated a slightly different classification. He distinguishes six main types of links: (1) symbolic relations which connect form and meaning, (2) sequential relations which connect linguistic elements in sequences, (3) taxonomic relations which connect linguistic patterns at different levels of abstraction, (4) lexical relations which connect lexemes with similar or contrastive forms and meanings, (5) constructional relations which connect constructions at the same level of abstraction, and (6) filler-slot relations connecting particular lexemes or phrases with particular slots of constructional schemas (Diessel, 2019, pp. 12–13).

In general, most scholars distinguish between vertical, i.e. taxonomic inheritance links, and other relational links. After looking at inheritance relations in the next subsection (3.1), we will discuss the nature of horizontal connections (3.2) and the diachronic reconfiguration of networks (3.3). On the way, we will highlight open questions in the respective areas and, at the end of the section, outline some of the suggestions that the authors in this volume make pertaining to the nature of different types of links.

3.1   Vertical links

It was already mentioned in Section 2.1 that the grammar consists of a range of different constructions. Each construction is assumed to represent a node in a network which is connected via links to other nodes. In terms of two-dimensional visualization, it has been decided that more specific constructions are located on the lower levels of the network. They are said to vertically "inherit" features from more abstract, higher-level constructions situated towards the top of the network.

In other words, if constructions are linked through a vertical inheritance link, then characteristic features of form and meaning are passed on in a downward fashion. The lower-level construction is thus a special instance of the higher-level construction (see above on instance links; cf. also Goldberg, 1995, pp. 79–80; Hilpert, 2014, p. 59).

Figure 6 represents a simplified model of a taxonomic hierarchy with vertical inheritance relations: constructions on higher levels of the hierarchy are schematic (= Schema), multiple levels further down in the hierarchy are possible (= Subschema), and at the bottom are fully specified constructions (= Constructions). Note that constructs are not represented in this figure.
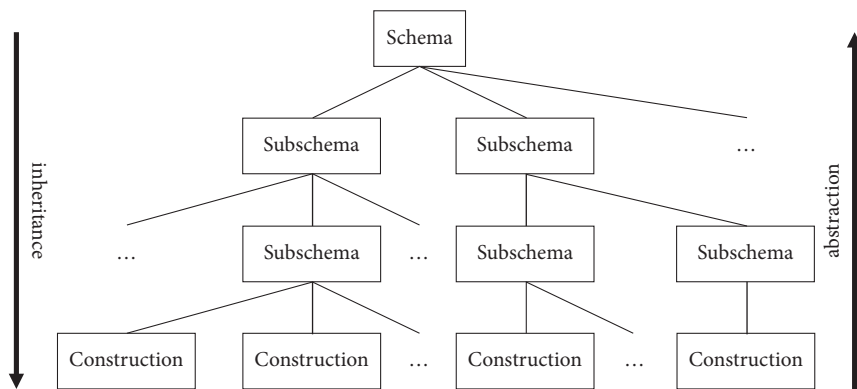
Figure 6. Simplified taxonomic hierarchy

The advantage of such a taxonomic network model is that it allows general information from the higher levels to be passed on to all lower-level constructions. At the same time, more specific, non-shared information pertaining to (idiomatic) sub-regularities may be captured directly on the level of constructions positioned on various midpoints of the hierarchical network (Boas, 2013, p. 244; Goldberg, 1995, p. 67).

Note that although inheritance is a top down feature (represented by the arrow on the left-hand side in Figure 6), constructional networks – from a usage-based, cognitive point of view – are "constructed" in a bottom-up fashion during language acquisition (represented by the arrow on the right-hand side in Figure 6). The repeated usage of a particular construct leads to its successful memorization and entrenchment. At the same time, the speaker's ability to detect similarities between constructs and his/her ability to abstract leads to the generalization of more schematic constructions (Diessel, 2019, pp. 30–32).

The repetition of varied items which share formal or functional similarities can lead to the formation of a variable schema. For example, structures with a high type frequency, i.e. patterns which occur with many different lexicalizations

(e.g. *John kicks the ball, Peter kisses Mary*), still share a common albeit abstract meaning, namely {A affects B}. The repeated exposure to such constructs can lead to the generalization of the abstract, transitive argument structure construction [Subj V_{tr} Obj] (Goldberg, 2006, pp. 39, 98–101; Schmid, 2016, pp. 10–12). To give another example for vertical relations, Figure 7 shows a preliminary sketch of a taxonomic hierarchy of definite, deictic NPs in English:
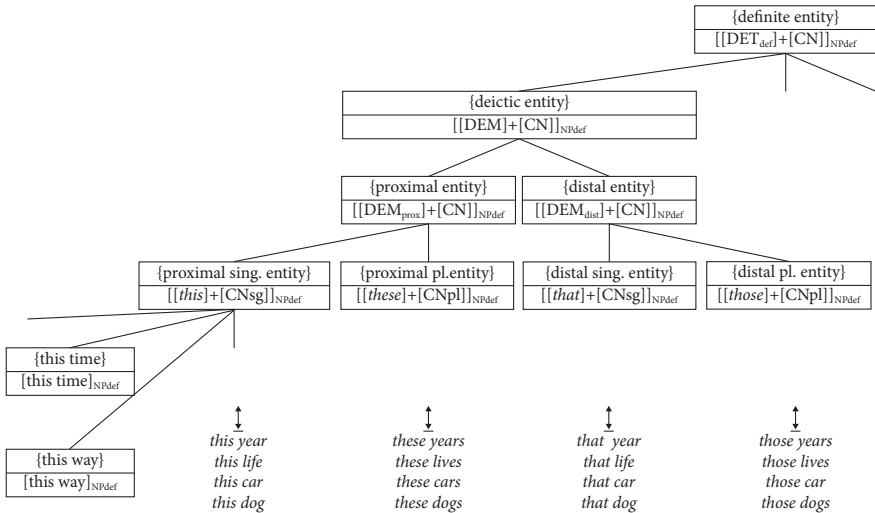
Figure 7. Constructional sketch of definite deictic NPs with common noun head in English[14]

It is assumed that a speaker, influenced by listening to many constructs like for example *this house, this dog, this year*, at one point recognizes and successfully stores the following semi-specific $[[this]+[CN_{sg}]]_{NPdef}$ template, which corresponds to the meaning of {proximal singular entity}. In a similar vein, the speaker will store the following form–meaning pairing: $[[these]+[CN_{pl}]]_{NPdef} \leftrightarrow$ {proximal plural entity}.

The speaker will also conclude that *this* and *these* are both demonstrative markers of proximity, which assumedly leads to the formation of an even more abstract schema $[[DEM_{prox}]+[CN]]_{NPdef}$. Once this node is in place and connected to the nodes below, information is inherited in a downwards manner. The speaker establishes a similar relationship for distal demonstratives (*that/those*). This results in further abstractions/schematizations and linking, and ultimately in the postulated network in Figure 7.

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14. Note that in the vast majority of constructional network sketches, connections between nodes are not being "weighed" (like they are in computational connectionist networks, Rumelhart & McClelland, 1986; Elman et al., 1996).

Although inheritance is an extremely crucial network feature, it still has to be investigated in much more detail. At the moment, three different interpretations of inheritance have been employed in order to capture vertical constructional relations: the "complete inheritance" model, the "default inheritance" model, and the "full-entry" model (Croft & Cruse, 2004, pp. 262–279; Hilpert, 2014, Chapter 3). The complete inheritance model postulates that any information is represented non-redundantly at the highest possible level and then inherited by all lower-level constructions. In the default inheritance model, only information from above which does not conflict is inherited; lower constructions may block inheritance from above and contain more specific information. In contrast, the full entry model redundantly specifies all information in every node in the network. Similar to the default inheritance model, a lower node does not necessarily change when the higher nodes change (Boas, 2013, p. 245; Barðdal & Gildea, 2015, p. 4). Most scholars in DCxG adopt a default inheritance model. However, it is still a matter of debate which inheritance model is preferable for synchronic and diachronic descriptions.[15]

The sketched networks in Figures 6 and 7 invite critical assessment and prompt the following general question: when is it warranted to postulate a separate node in the network? As can be seen above, lexically specified constructions like [*this time*] or [*this way*] are positioned as separate nodes on the lowest, fully specified network level, but is it feasible to do so? In general, most scholars side with Croft and Cruse (2004) who postulate that

> [a]ny construction with unique idiosyncratic morphological, syntactic, lexical semantic, pragmatic or discourse-functional properties must be represented as an independent node in the constructional network in order to capture a speaker's knowledge of their language. That is any quirk of a construction is sufficient to represent that construction as an independent node.(Croft & Cruse, 2004, p. 263)

In our specific NP network introduced in Figure 7, it can be argued that [*this time*] or [*this way*] qualify as separate nodes because they are quite idiomatic and sometimes can have a very specific stress pattern and meaning. Whereas (4a) and (4b) would be licensed by $[[this]+[CN_{sg}]]_{NPdef}$, (5a) and (5b) are obviously different:

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15. Another aspect of inheritance, which has not been mentioned yet, is that a particular construct (i.e. an actual expression) is often the result of the parallel activation of several constructions (i.e. "multiple inheritance"). According to Goldberg (2013, p. 28), multiple inheritance can be observed in the question *What did Mina buy Mel?,* which has inherited features from "the ditransitive – construction", "the non-subject question – construction", "the subject-auxiliary inversion – construction", "the VP – construction", "the NP – construction", and "the indefinite determiner – construction". It has to be admitted that multiple inheritance as an integral ingredient of the model is currently an underdeveloped concept in CxG.

(4) a. *This time* on my watch is off.
     b. *This way* leads nowhere.

(5) a. *I want you to do better this time.*
     b. *It seems it would be better to do it this way.*

Constructs in (5a) and (5b) are most likely licensed by the fully-specified nodes represented in the network on the lowest level. But should we stop at idiosyncratic nodes? If one subscribes to Goldberg's definition of a construction, compositional but highly frequent constructs like *this year* will also be licensed by a separate, fully-specified [*this year*] construction, which is entrenched as a frozen chunk simply due to its extremely high frequency. It is primarily usage-based construction grammarians who are willing to accept nodes whose existence is only motivated by their high frequency. This obviously begs the question of how frequent a particular construction has to be to deserve its own node.

A second pressing question regards the status of the most abstract level of the taxonomy, represented by very abstract "parent" or "mother nodes".[16] For example, Diessel (2019, p. 16) postulates the existence of an abstract possession/genitive schema which is mother to two sister constructions $[[POSS]+ [CN]]_{Cx}$ and $[[CN]\text{'s} [CN]]_{Cx}$:
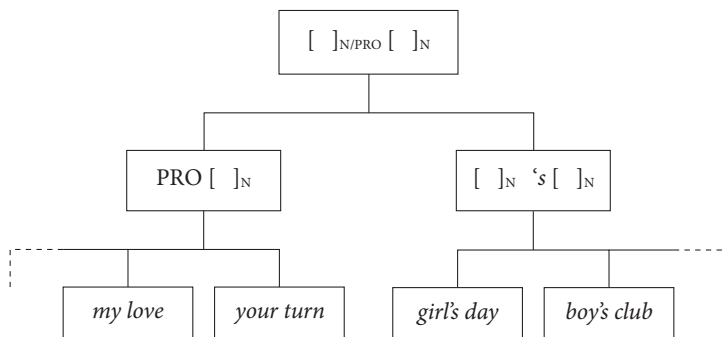
Figure 8. Taxonomic network of possessive/genitive constructions in English (Diessel, 2019, p. 16)

Striving for cognitive plausibility, the question is: is it really likely that speakers abstract that far? With respect to the basic definition of a construction, the problem is as follows. If constructions are form–meaning pairings that emerge over similar exemplars, which kind of meaning should we assume for such extremely abstract constructions and how similar do they have to be in terms of form and function?

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16. The popular terms "parent" and "mother" are to a certain extent misleading in the sense that, in first language acquisition, "mother" nodes always develop after their "daughters".

In other words, is it always plausible and necessary to assume the existence of such high levels or can the linguistic knowledge of speakers be described equally well by staying on the lower levels, for example via horizontal links between "sister nodes" (see Section 3.2).

Lieven and Tomasello (2008) point out that "higher-level schemas may only be weakly represented and, indeed, they may sometimes only exist in the formalized grammars of linguists!" (p. 186). In a similar vein, Blumenthal-Dramé (2012, p. 29) states that "the most schematic constructions in the constructional hierarchy only represent potential (rather than actual) abstractions in the mental representation of speakers", while Hilpert (2014, p. 57) maintains that "purely formal generalizations, that is constructions without meaning, have no natural place in the construct-i-con". For example, Frank et al. (2012), Jackendoff and Audring (2018), Sommerer (2019), and Audring (accepted) argue that highly abstract "mother nodes" do not always need to be postulated. In some cases (in particular constructional families) it is likely that speakers stop to abstract at mid-level or only establish sister relations.

The questions mentioned in this section basically relate to two bigger issues, namely (a) if the chosen constructional model allows abstract "formal" templates which have no identifiable meaning and (b) if it strives for psychological plausibility. Whereas several scholars (Barðdal, 2008, p. 45) argue that schemas can and should be viewed from a primarily psycholinguistic perspective, for others schemas are descriptive devices created by the linguist and are not meant to correspond to mental representations. Whereas some scholars shun away from the possibility that information is stored redundantly, others see it as the psychologically more realistic approach.

At this point, we would like to conclude that, of course, being a usage-based, cognitive model, which is grounded in the cognitive commitment, (D)CxG should strive for psychological plausibility. Generally, a model which by hypothesis mirrors psychological reality most closely is preferable to a model which does not. Ideally, if one postulates the existence of an abstract node like [SUB V_{tr} OBJ], this should be motivated by the assumption that this pattern is meaningful and identifiable somewhere in the neural network of the speaker as a stable configuration of neurons, which is activated when a respective construct is produced or parsed. The same goes for the most specified constructions at the lowest levels of abstraction.

Let us now turn to the fact that nodes in the network are not only connected in a vertical manner via inheritance/abstraction, but also horizontally.

3.2 Horizontal links

Most scholars differentiate between "taxonomic links" (symbolizing relatedness through inheritance) and "horizontal links" (symbolizing partial similarity but non-inheritance). As mentioned above, Goldberg (1995) talks about subpart links which Diessel classifies as "constructions at the same level of abstractness (horizontal links)" (2015, p. 414). Also Goldberg's metaphorical extension links are often interpreted to be of a horizontal nature. Some researchers, like for example Cappelle (2006, p. 18), have proposed to equate horizontal links between constructions with relations between "allostructions", that is, constructions which display some differences in form but which share the same meaning. These are seen to be connected to a higher-level schema, often called "superconstruction", or "constructeme".

$$[_{VP, trans} \; V \; \{Prt\} \; NP_{Direct \, O} \; \{Prt\}]$$

$$[_{VP, trans} \; V \; Prt \; NP_{Direct \, O}] \quad \longleftarrow - - - \longrightarrow \quad [_{VP, trans} \; V \; NP_{Direct \, O} \; Prt]$$
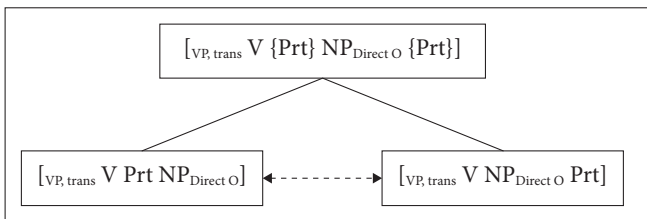
Figure 9. Capelle's superconstruction/constructeme (2006, p. 18)

The abstract constructeme in Figure 9 only encodes those elements that are shared by both variants; the horizontally connected allostructions on the lower level specify those details which make the constructions differ from each other. This view on horizontal links has been adopted by Perek (2015) and Zehentner and Traugott (this volume). Figure 10 shows the locative constructeme with its allostructions CAUSED-MOTION construction and the *with*-Applicative (Perek, 2015, p. 162).

$$NP_X \; V \; \{ \, ?_Y \; ?_Z \, \}$$
$$X \; \text{CAUSE} \; Y \; \text{TO GO} \; Z$$

$$NP_X \; V \; NP_Y \; PP_Z$$
$$X \; \text{CAUSE} \; Y \; \text{TO GO} \; Z$$
$$X \; \text{ACT ON} \; Y$$
CAUSED-MOTION

$$NP_X \; V \; NP_Z \; \textit{with} \; NP_Y$$
$$X \; \text{CAUSE} \; Y \; \text{TO GO} \; Z$$
$$X \; \text{ACT ON} \; Z$$
WITH-APPLICATIVE

Figure 10. The locative constructeme and its allostructions (Perek, 2015, p. 162)

The two allostructions in Figure 10 are synonymous and share several features (i.e. the presence of two object arguments), but they still differ in various construction-specific features, which are not part of the abstract schema but are only encoded for the individual patterns.

There are other linguists who seem to understand horizontal links rather in terms of paradigmatic relations between different choices or cells in a paradigm, similarly to the cells in an inflectional paradigm, which do share some general meaning but at the same time are opposed to each other in terms of their semantics/function (e.g. Van de Velde, 2014). Horizontal links are said to be important to show that "the form–function relation of a particular construction may be partly motivated in relat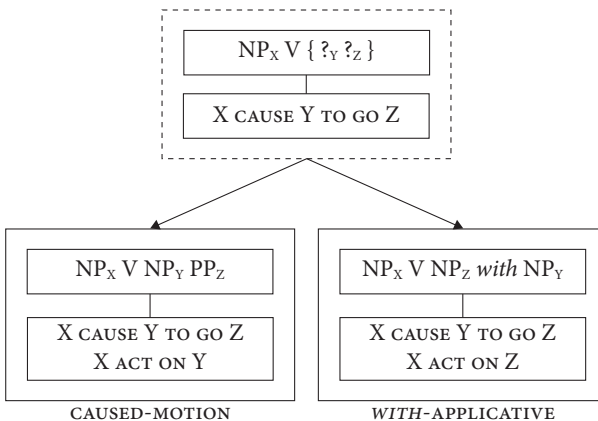ion to its neighbors" (Van de Velde, 2014, p. 147). Figure 11 illustrates such horizontal relations in the domain of Dutch clause types.
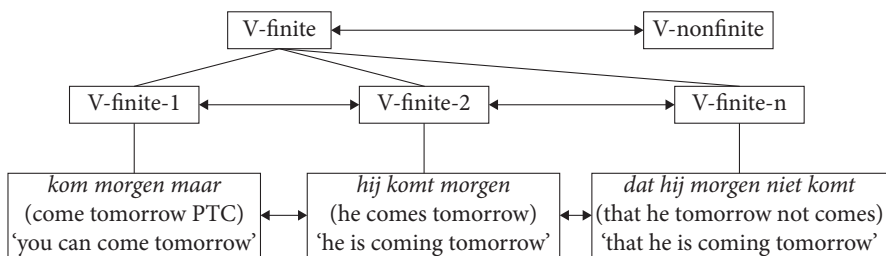
Figure 11. The position of the finite verb in Dutch clauses as a constructional network with horizontal relations (Van de Velde, 2014, p. 150)

In contrast to the allostruction account introduced above, the horizontally related constructions in Figure 11 do not share the same meaning; instead, they are opposed to each other in terms of their semantics. Of course, some shared semantic component is guaranteed by the higher-order schema [V-finite], but no semantic similarities are postulated at the same level of horizontal dimension.

We would like to give another example for an account of horizontal relations which is similar to Van de Velde's (2014). In the case of English demonstratives, we find the following distributional paradigm:

Table 1. Modern English demonstratives

	Singular	Plural
proximal	this	these
distal	that	those

This paradigmatic distribution was already formalized in the network sketch in Figure 7, which is partially repeated in Figure 12 below.

| {deictic entity} |
| [[DEM]+[CN]]$_{NPdef}$ |

| {proximal entity} | {distal entity} |
| [[DEM$_{prox}$]+[CN]]$_{NPdef}$ | [[DEM$_{dist}$]+[CN]]$_{NPdef}$ |

| {proximal sing. entity} | {proximal pl.entity} | {distal sing. entity} | {distal pl. entity} |
| [[*this*]+[CNsg]]$_{NPdef}$ | [[*these*]+[CNpl]]$_{NPdef}$ | [[*that*]+[CNsg]]$_{NPdef}$ | [[*those*]+[CNpl]]$_{NPdef}$ |

Figure 12. Partial network of English demonstratives

We suggest that the four semi-specified constructions at the bottom are also horizontally linked to each other: they are formally similar but semantically different, although they share some semantic features (due to belonging to the same higher order schema or paradigm).
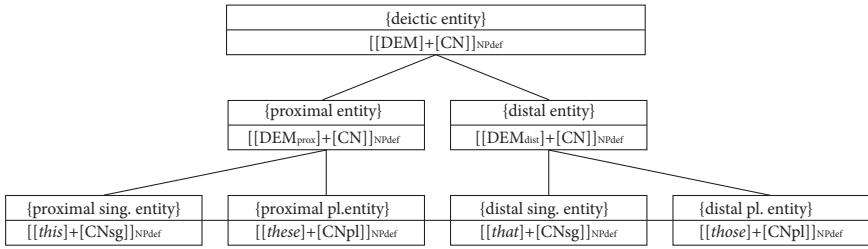
Several open questions remain about the nature of the postulated horizontal links:[17] The first question pertains to the conceptual ground of the links. As mentioned above, the allostruction approach (Capelle, 2006; Perek, 2015) is based on shared semantics: two formally divergent constructions are related horizontally, i.e. they represent allostructions of one constructeme, if they are synonymous. The paradigmatic approach (Van de Velde, 2014), on the other hand, assumes that horizontal links are based on semantic distinction and opposition, not similarity. In both cases, the semantic dimension of constructions is given priority. Whether horizontal links may be also posited on formal grounds (only) remains open to discussion (see e.g. Lorenz, this volume).

The second question relates to the psychological plausibility of the postulated links, similar to the question raised above about vertical inheritance and the plausibility of the highest levels. If one looks at Figure 12, the constructions at the lowest level are related to each other in a double manner: not only are they instantiated by a more schematic construction in the vertical dimension, they are also related by horizontal links at the same level of abstraction. The question is whether speakers really connect constructions in this way, or whether a more economic approach with only one (vertical? horizontal?) relation would suffice to capture the fact that these constructions are related to each other in a network. In other words, what is the division of labor between vertical and horizontal links?

Finally, we would like to make a side remark, which is however of great importance to theorizing and modeling in general. A two-dimensional network representation cannot do justice to the fact that neural networks are three-dimensional (or even hyper-dimensional, as recently described in Goldberg, 2019, pp. 16–17). Links are possible in multiple different directions. Thus, from a

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17. Also see Hilpert and Audring (2019) for additional open questions about paradigmatic relations.

neurological perspective, the whole discussion whether links are vertical or horizontal is completely irrelevant. When linguists write that the speaker's network "can grow 'upwards' via schematization, 'outwards' via extension and 'downwards' as more detailed instances are added" (Evans & Green, 2006, p. 546), they do not talk about the mind/brain but refer to the printed visual representations of linguistic networks.

By now it should have become apparent that scholars do not agree on the nature of horizontal links. As will be shown below, several papers in this volume especially contribute to the discussion of horizontal links. Before we present them one by one, some diachronic aspects deserve our attention.

3.3   Diachronic change as node-external reconfiguration of the network

In DCxG, linguistic change is reconceptualized as network change, i.e. as change in the nodes and in the links. The network does not only change when new nodes are added, but primarily when node-external links between constructions are rearranged. Hilpert (2018) calls those "connectivity changes" in which the network undergoes some re-wiring. Links between existing constructions may fade and disappear, or new links may emerge. It is also possible that constructional nodes shift with regard to their position in the network (i.e. their level of schematicity, see Perek, this volume).

Torrent (2015, p. 173) proposes two diachronic hypotheses: "The Constructional Convergence Hypothesis" and "The Constructional Network Reconfiguration Hypothesis". The first claim is that "historically unrelated constructions are capable of participating in the same formally and functionally motivated network" (Torrent, 2015, p. 175). The second hypothesis proposes that "inheritance relations in construction networks change over time as new constructions emerge" (Torrent, 2015, p. 175).

One question is: what is responsible for the disappearance or rearrangement of links between constructions? "Divergence" is one possible answer to this question. Constructions with high frequency in some contexts exhibit greater autonomy. This is known as "divergence" (Hopper, 1991; Bybee, 2003 a, b) or "emancipation" (Lorenz, 2013a, b, this volume). Certain subschemas which are used very often undergo semantic bleaching or phonological reduction and are often semantically opaque and independent from the meaning of their relatives, because they have strong individual cognitive representations that do not need a direct comparison with other constructions (Bybee, 2003b, p. 618). For example, the future marker *gonna*, which is the contracted version of the *going to* construction, has obviously lost its etymological compositionality, which is why it is likely that speakers no longer associate it with the lexical verb *go* (in the sense of walk). We can say that

this particular subschema has emancipated itself from the other construction, which corresponds to the dissolving of the assumed links between those nodes (Bybee, 2003b, pp. 604, 618). Instead, due to its function as an informal future reference marker and its structural shape, new links might be established, e.g. to the *wanna* construction by analogy (Lorenz, 2013a, b, this volume).

Of course, many other reasons for the establishment of new node external links exist. If a completely new construction emerges, it will be integrated into the network by linking it to other constructional nodes. Any type of semantic change can potentially lead to new links, e.g. the developing metaphorical use of a construction might connect to other nodes than its literal use. Also if a construction takes up a new discursive function, this may affect node external linking. For example, when speakers use constructions like [*Hey dude*!] or [*Hey bro*!] as greeting devices, this will most likely also lead to new links to other more traditional greeting devices.

Five papers in this volume primarily focus on vertical and horizontal links and network reorganization. **Emmeline Gyselinck**'s paper zooms in on vertical links. She investigates factors which influence the hierarchical architecture and diachronic change of the network. Changes, which have traditionally been classified as constructional changes, can be (re)interpreted as movement within the constructional network from one level to another. By discussing the recent history of the intensifying reflexive resultative construction in Dutch, Gyselinck focuses on processes of network expansion, low-level schematization, upward and downward movement, and very local losses within the network. She shows how network shifts can involve changes in schematicity (viz. the level of abstractness and productivity) and productivity (viz. the extensibility of the (sub)schema). When new subschemas emerge as an abstraction over a set of specific lower-level instances, a new node is added to the network and might push existing subschemas to a higher level. Overall, the hierarchic organization gains in complexity, and the schematicity at the higher levels of abstraction is increased. Looking at the ability to schematize over instances, the paper obviously also deals with constructionalization/node creation. Established subschemas may also become even more schematic over time, which is often, again, related to an increase in productivity. Schematicity and productivity are tightly interconnected: the fact that the more productive schema is subject to fewer constraints entails that it is more abstract or schematic, and, accordingly, situated at a higher level in the hierarchy. Gyselinck also shows that a subschema might decrease in productivity, which may weaken its representation and may eventually lead to the loss of that specific subschema in the network. Importantly, she shows that node creation, shifts, and node loss are not mutually exclusive and may be taking place at the same time in different areas of the network.

Florent Perek tackles the issue of schematicity and productivity as well by discussing recent semantic shifts of the *way*-construction. He argues that the relation between schematicity and productivity is often indirect, which is why the two notions should not be collapsed. Perek distinguishes between the schematicity of lexical slots inside a particular construction and the schematicity of the constructional meaning itself. Only the former is, by definition, directly related to productivity. He also concludes that "an increase in schematicity can be defined as the creation or reinforcement of a node superordinate to a construction, and an increase of productivity as the creation of lexically-specific nodes subordinate to a construction" (this volume). By discussing schematicity and productivity, Perek discusses two properties of individual nodes; by discussing schematization and/or increasing schematicity, he discusses the nature of constructionalization and the emergence of vertical links and vertical shifts.

When **Eva Zehentner** and **Elizabeth Traugott** sketch various networks for different stages in the development of the English benefactive alternation, they put special emphasis on horizontal linking. Their paper is mainly concerned with the crystallization of *for* as the standard or prototypical alternant for benefactive verbs as well as the establishment of a "benefactive alternation" constructeme. They stress "that the emergence and/or presence of horizontal links is taken to be a driving factor behind the constructionalization of higher-level, alternation-based generalisations such as the dative alternation or the benefactive alternation" (this volume). They also discuss how horizontal links can help to explain idiosyncrasies in the history of the patterns and how they not only trigger constructional competition, but also the development of a peaceful co-existence, a division of labor-situation as evidenced by the two alternations under discussion.

Michael Percillier's paper also investigates network reconfiguration by examining the semantics, the frequency, and the diachronic development of secondary predicate constructions (SPCs) in Middle English. When grouping various SPCs together, Percillier employs and discusses the notion "constructional family". He also investigates the nature of (changing) allostructions and polysemic links. A language contact component also gets introduced by discussing the potential constructional influence of French. The traditional concept of lexical homonymy is extended to constructions and the author introduces the term "homostructions", i.e. constructions sharing common forms but not their meanings and origins (in relation to native constructions). Crucially, homostructions are different from polysemic constructions. In his discussion, Percillier sheds light on horizontal links (i.e. links between allostructions) and vertical links (i.e. links of allostructions to a more schematic constructeme). However, he stresses that it is difficult to determine the nature of homostructional links; describing them in terms of hierarchical dimensions such as horizontal or vertical is tricky because, in such cases, the relation

caused by a shared form is "accidental", "whether caused by language-internal developments such as phonological or morphological changes, or the introduction of new unrelated constructions via reduplication in language contact situations."

David Lorenz primarily discusses the nature of horizontal links. In his paper on *to*-contraction, he attempts to show how *gonna, wanna* and *gotta,* start out as representations of phonetic reduction (i.e. phonetic variants), but in time establish themselves as new separate constructional nodes in the network. He argues that the high frequency of some phonetically reduced variants leads to their "emancipation", which triggers their addition to the network as new lexical nodes. In a next step, these new constructions develop similar behavior, which increases their association strength and corresponds to the emergence of horizontal links between them. Here, Lorenz especially identifies analogical thinking as a crucial driving force for that development (also see Sommerer, this volume on analogy).

When talking about horizontal links, Lorenz adopts Leino and Östman's (2005) proposal on "metaconstructions", which for them are generalizations over constructions that "capture systematic similarities and differences which occur between several *pairs* of constructions" (p. 207, emphasis in original). According to Lorenz, a metaconstruction "is not on a higher taxonomic level but simply a formulation of analogy relations, that is, a paradigmatic association, or horizontal link" (this volume). Crucially, the observed systematic similarities between *gonna, wanna*, and *gotta* are captured on the horizontal plane by the metaconstructional link, without recourse to higher levels of abstraction. This view differs from any allostructional account in which the variants have to be instantiations of a higher-level "supercategory" (cf. Cappelle, 2006, p. 19).

4. Beyond current network models

In the previous section, we have discussed the notions of vertical and horizontal links by explicitly referring to the two-dimensional model of the constructional network. To put it simply, vertical links hold between constructions in the vertical dimension, whereas horizontal links relate constructions in the horizontal dimension. Our discussion above as well as the papers in this volume reveal, however, that matters are more complicated. Both kinds of links have not received a unified account so far and are currently being interpreted in different ways.

In this section, we will discuss some suggestions on network design which go beyond the two-dimensional model with nodes (= constructions) and connections (= links) as its basic components. We will look at more recent suggestions as to how to (re)conceptualize the constructional inventory and diachronic changes within the system of constructions.

In general, the issues to be discussed in this section concern some relevant notions which either have long existed in linguistic research but have not received particular attention in DCxG to date, or pertain to the existing network models outside linguistic research which have not been used extensively in DCxG so far.

Our first point concerns the linguistic dimension in which horizontal and vertical links are situated: do they pertain to the syntagmatic or to the paradigmatic axis of linguistic structuring? The approaches presented in the previous section all seem to prefer the paradigmatic dimension. Both allostructions and paradigmatic choices represent constructions which may be substituted for each other, either due to their synonymy/similarity or due to their contrast/opposition. The short remark by Hilpert and Diessel (2016, pp. 60–61) on subpart links mentioned at the beginning of Section 3.2, on the other hand, points to a potential syntagmatic interpretation of links.

From the perspective of grammaticalization, **Gabriele Diewald** (re)introduces the notion of paradigm as a particular type of construction, which crucially differs from vertical and horizontal paradigmatic links described above. She sharply criticizes the fact that the concept of paradigm has been lost in constructional approaches, and argues that it should be maintained in order to capture the essence of grammaticalization. Though inheritance relations (= vertical links) can be conceived as paradigmatic in the sense that they are associative relations between constructions, they are not sufficient to represent grammatical paradigms of a language in her view. Diewald proposes to treat a paradigm as a separate node type within the constructional network: a paradigm is a "hyper-construction", whose meaning is defined by the specific number of paradigmatic choices or cells. Vertical and horizontal links hold within a paradigm: vertical links are relations between a zero-marked cell/construction and the marked constructions; horizontal links are oppositions between sister cells.

Sara Budts and **Peter Petré** on the other hand, explicitly argue that syntagmatic and paradigmatic relatedness exist in both dimensions of the constructional network: there are syntagmatic and paradigmatic relations between constructions which are connected vertically as well as horizontally. For example, horizontal syntagmatic connections comprise the co-occurrence patterns of constructions, as known from research on collocates and collostructions, and hence go beyond the usually assumed relation of construction and slot-filler, whereas paradigmatic horizontal connections are based on similarity. This view adds another dimension and thus another level of complexity to the basically two-dimensional constructional network discussed above. Also, Budts and Petré argue that there is a dynamic relationship between syntagmatic and paradigmatic relatedness which holds at all levels of the constructional hierarchy, i.e. from atomic to partly substantive to fully schematic constructions. Due to this relationship and its inherent

dynamic potential, connections between constructions, and as a result (parts of) the constructional network, may and do constantly change over time.

To sum up so far, not only the nature of vertical and horizontal connections between constructions still remains an issue open to discussion (see Section 3). Unresolved issues also concern the question whether and how to integrate the more traditional notions of syntagmatic and paradigmatic levels of linguistic organization into the constructional model, as well as the question whether and how to differentiate between lexical and grammatical constructions on the basis of connections postulated in the constructional network.

Our second point concerns the core aspects of the network model. As has been discussed in Section 2, most constructionist approaches adhere to the two-dimensional taxonomic model with two types of basic theoretical objects, nodes and links. However, this is not the only way to model linguistic knowledge in the form of a network. For example, Schmid (2016, p. 25) argues for a view in which there is no place for nodes, and where associative connections are the only basic elements of linguistic knowledge:

> Usage-based models usually assume that entrenchment operates over construc-
> tions and constructional schemas which are characterized as form–meaning pair-
> ings. Furthermore, they claim that these constructions and schemas are related to
> each other in a massive associative memory network organized mainly in terms
> of hierarchical relations […]. The present proposal diverges from this idea in two
> important ways: First, it rejects the distinction between constructions serving
> as nodes in the network and relations between nodes and instead assumes that
> linguistic knowledge is available in one format only, namely associations.

Hilpert (2018) argues, in a similar vein, that a connection-centered view of linguistic knowledge might be preferable, because it allows for an inherently dynamic representation of the constructional network. Connections, understood as those between the neurons in the human brain and subject to spreading activation, are inherently dynamic and constantly changing. Especially from the diachronic perspective, this connection-centered view might thus bear great advantages in contrast to a more static model with constructions as nodes in the network.

In this volume, it is the paper by **Budts** and **Petré** that explicitly adheres to the connectionist view, clearly visible in the title "Putting connections centre stage in diachronic Construction Grammar". In this paper, it is argued that change of constructions resides in changing connections, and what we perceive as change in constructions is first and foremost change in the syntagmatic and paradigmatic relatedness, i.e. associative links between constructions. The case study on periphrastic DO uses learning algorithms, known as Artificial Neural Networks. In this model, a construction is conceived of as a unique pattern of activation; several

constructions are similar when they exhibit the same distributional features to a similar degree. That is, the knowledge of constructions is to a high degree dependent on the knowledge of the syntagmatic co-text, and when constructions are used in similar co-texts, they are also associated in people's minds. That is, a construction (as a node) is an object that emerges on the basis of different associative links, which are – in this paper – modelled primarily as syntagmatic distributional information.

To conclude this section, there seems to be no unified view on how to conceptualize connections between constructions (or even connections without constructions?) in a network model. In the papers of this volume, the focus is primarily on horizontal connections, but some of the papers present solutions that go beyond the distinction between vertical and horizontal links.

5.   Range of phenomena

The individual chapters of this volume significantly contribute to the development of DCxG in that they explicitly address one or more of the open questions introduced at the beginning of this chapter. When addressing these theoretical and conceptual issues, the papers of the present volume rely on authentic corpus data and deal with a wide range of linguistic phenomena. In this section, we provide a short overview of the individual chapters with regard to the linguistic phenomena they discuss, the language under consideration, the time period concerned, as well as with regard to the data sources used for analysis.

Susanne Flach's object of interest – the English *into*-causative construction – figures in the title of her paper "Constructionalization and the Sorites Paradox: the emergence of the *into*-causative". An instance of the *into*-causative construction is for example *Nixon talked Congress into passing the bill*; this construction usually depicts complex events where someone prompts someone else to perform an action. Flach traces the emergence and development of this construction between 1500 and 1700 relying on corpus data from two different sources, the *Penn-Helsinki Corpus of Early Modern English* (PCEME, 1500–1710) and the *Early English Books Online* (EEBO, 1500–1700).

Lotte Sommerer's paper is entitled "Constructionalization, constructional competition and constructional death: investigating the demise of Old English POSS DEM constructions". The paper reconstructs the process of marginalization and loss of a constructional family within the broader context of the English nominal phrase. The family under consideration is constituted by four different patterns, where two determinative elements, a demonstrative and a possessive, co-occur for example, *his that neighbor*. The analysis is based on 13 Old English prose texts from the *York-Toronto-Helsinki Parsed Corpus of Old English Prose* (YCOE).

An argument structure construction is the object of **Emmeline Gyselinck**'s study "(Re)shaping the constructional network: modelling shifts and reorganizations in the network hierarchy". The paper is concerned with the intensifying fake reflexive resultative construction of the form [SUBJ V REFL XP] in Dutch, which may be illustrated using the following example from the study: *Als cliënt van deze firma betaal ik me elke maand blauw* 'As a client of this firm, I pay myself blue every month'. For her empirical analysis, a diachronically continuous, genre-consistent corpus of Dutch newspaper issues has been compiled on the basis of the Delpher data base of the *Koninklijke Bibliotheek* for the periods between 1800 and 1999.

The paper by **Florent Perek** "Productivity and schematicity in constructional change" investigates the recent changes in another argument structure construction, namely the English *way*-construction. More specifically, Perek focuses on one variant of this construction, usually called "path-creation" sense, e.g. *But a silent sorrow had made its way into her bosom*. Using data from the *Corpus of Historical American English* (COHA) and focusing on the time span between 1830 and 2009, Perek observes how the construction changes with respect to the semantic dimension "concrete" vs "abstract" motion.

The paper by **Eva Zehentner** and **Elizabeth Closs Traugott** "Constructional networks and the development of benefactive ditransitives in English" addresses the issue of syntactic alternation using two English benefactive constructions, DOC ("double object construction") and *for*-POC ("prepositional object construction"), as in *John baked Mary a cake* vs. *John baked a cake for Mary*. Based on a quantitative study of ditransitive benefactive verbs, the authors reconstruct the emergence and the development of the benefactive alternation. The period under investigation is Early Modern English (1470–1700); the data comes from two historical corpora of English: the *Penn-Helsinki Parsed Corpus of Early Modern English* (PPCEME) and the corpus of *Early English Books Online* (EEBO).

Another case of constructional alternation is dealt with in the paper by **Michael Percillier** "Allostructions, homostructions, or a constructional family? Changes in the network of secondary predicate constructions in Middle English". The paper studies the secondary predicate constructions with the prepositions *as* (*He entered the restaurant as a hungry man*), *for* (*He takes him for a fool*), *into* (*He ground the nuts into floor*), and *to* (*He burned the wood to ashes*), alternating among each other, as well as with the construction without preposition (*He considered him a friend*). Percillier focuses on the development of this constructional network during the Middle English period (1150–1500); the data comes from the *Penn-Helsinki Corpus of Middle English* (PPCME2).

In his paper "Converging variations and the emergence of horizontal links: to-contraction in American English", **David Lorenz** addresses a more recent English phenomenon: the development of *to*-contractions in certain verbal constructions

such as e.g. *want to > wanna, going to > gonna,* and *got to > gotta.* Lorenz contrasts contracted and non-contracted forms of the same verbal constructions from a diachronic perspective (1800–2000) using the data from the *Corpus of Historical American English* (COHA).

The paper by **Gabriele Diewald** with the title "Paradigms lost – paradigms regained: paradigms as hyper-constructions" differs from the other articles in this volume in that it does not provide a detailed corpus study of a particular phenomenon. Instead, Diewald develops an elaborated theoretical argumentation and offers evidence in support of her claims which comes from different areas of German syntax, as for example the verbal tense and mood system, the paradigm of modal particles, and the system of the German nominal determiners.

In their paper "Putting connections centre stage in diachronic Construction Grammar", **Sara Budts** and **Peter Petré** present two case studies. Both studies use corpus data from the *Early English Books Online* (EEBO), covering the period between 1477 and 1700. The first study deals with the emergence of the construction [BE *going to* INF]; the second case study investigates the paradigmatic relations between periphrastic DO and the modal auxiliaries in English, applying the CBOW architecture of the open source python library Gensim.

6. Conclusion

We would like to conclude by pointing out that, as editors and authors, we are fully aware that many important issues could and will not be revisited or discussed in this collection (and introduction). Next to many others, the following issues – which are not the focus of the present volume – need to be discussed and resolved in DCxG in the next years: (1) how to conceptualize phonological knowledge and phonological change, (2) if and how to integrate the notion of Aristotelian categories, (3) how to model multilingualism and language change induced by contact, (4) how to successfully model discourse pragmatic phenomena, and (5) how to model multiple inheritance and how it affects and is affected by change.

Still, we hope that this collection of leading experts in the field of DCxG brings us closer to a flexible but more constrained, albeit cognitively plausible network model of change.

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The nodes

Creation, change and loss

Constructionalization and the Sorites Paradox

The emergence of the *into*-causative

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This article discusses the relationship between "constructionalization" and "constructional change" (Traugott & Trousdale, 2013). Expanding on recent critical reviews, the paper argues that the problems with constructionalization arise from the ambiguity of the concept: it refers simultaneously to processes leading to the creation of a new node and to the point of node creation itself. The issues are illustrated by tracking the emergence of the *into*-causative: the data show that a series of interrelated changes in multiple parts of the network provided necessary and facilitating conditions, some of which predate the *into*-causative by several generations. The suggestion is that constructionalization should be reserved for its point reading, while aspects of its process reading are better captured by "constructional emergence".

Keywords: constructionalization, constructional change, constructional emergence, *into*-causative, Early Modern English, associative links, modal expressions

1.   Introduction

Construction Grammar (CxG) assumes that language is a structured network of form–meaning pairings called constructions (Goldberg, 1995, 2006; Langacker, 2008). Hence, "constructionalization", which refers to the process of adding a new construction (or node) to the network, is an attractive, even logical extension of constructionist approaches to language change. The concept also allows a distinction between the creation of new nodes on the one hand, and "constructional changes" within existing nodes on the other (Traugott, 2015; Traugott & Trousdale, 2013; Trousdale, 2014).

As straightforward as it seems at first glance, constructionalization has been met with criticism (Börjars, Vincent, & Walkden, 2015; Hilpert, 2015, 2018;

see also Diewald, 2015). The sceptical views hold that the distinction between constructionalization and constructional change is conceptually imprecise and empirically untenable. Building on these points, the central argument in this paper is that the issues with constructionalization arise from its ambiguity, because constructionalization refers simultaneously to the processes surrounding the creation of a new node and the point of node creation itself. This ambiguity gives rise to the so-called Sorites Paradox (how many grains of sand are a heap?): how many changes constitute the coming into being of a new construction? Where does constructionalization start and where does it end (Börjars et al., 2015; Flach, to appear; Hilpert, 2018)?

The problems are illustrated by tracking the emergence of the *into*-causative (*They talked him into complying with the rules*) from a series of changes in the caused-motion construction (*They talked him into compliance*) and shifts in the English complementation system. Crucially, some of these changes predate the earliest record of the *into*-causative by several centuries, which makes it difficult to identify the scope of constructionalization. Hence, this paper suggests that constructionalization is useful if it refers to its point reading, while its process reading is subsumed under "constructional emergence". All changes, whether they are directly or indirectly associated with a new node, are seen as constructional change. This view substantially reduces the (theoretical) importance of the node and foregrounds dynamic links between elements in the network.

To provide support for this view, Section 2 reviews the relationship between constructionalization and constructional change. Section 3 describes the *into*-causative relative to its neighbours in the network and sketches out a timeline. Section 4 tracks the emergence of the *into*-causative by looking at changes within the caused-motion construction in two corpora of Early Modern English (1500–1700). Section 5 revisits the conceptual issues in the context of the major empirical findings. Section 6 closes with concluding remarks on the implications for node-centric and link-based perspectives in (Diachronic) Construction Grammar, arguing that link-based views are better suited to model the dynamicity of language change.

2.   Constructionalization and constructional change

One of the current questions in Diachronic Construction Grammar (DCxG) concerns the relationship between "constructional change(s)" and "constructionalization" (Hilpert, 2018). Constructionalization involves changes in both form *and* meaning, leading to a new form–meaning pairing (F_{NEW}–M_{NEW}). Constructional

change refers to change(s) in *either* form (F_{NEW}–M_{OLD}) *or* meaning (F_{OLD}–M_{NEW}) (Traugott, 2015; Traugott & Trousdale, 2013; Trousdale, 2014).

The problems with this otherwise straightforward distinction lie in the details of its three main properties. First, constructionalization is said to be "accompanied by changes in degree of schematicity, productivity, and compositionality" (Traugott & Trousdale, 2013, p. 22). In addition, constructionalization may be preceded or followed by constructional change(s), so-called "pre- and post-constructionalization constructional changes", respectively (Traugott & Trousdale, 2013, p. 27). Analogously, I will refer to the accompanying changes as "con-constructionalization constructional changes".

Second, constructionalization is considered to be gradual (Traugott & Trousdale, 2013, p. 22), because it is accompanied by constructional changes. However, gradualness is at odds with the definition of constructionalization as a change in *both* form *and* meaning, which invites the idea of a more abrupt change (similar to reanalysis).

Third, to count as change, constructionalization is complete only when the new form–meaning pairing has spread from the innovation of an individual to other members of the speech community (Traugott, 2015, p. 54; Traugott & Trousdale, 2013, p. 2).

As an interim summary, the distinction between constructionalization and constructional change essentially involves up to five phases:

a. pre-constructionalization constructional changes,
b. con-constructionalization constructional changes (changes that accompany constructionalization),
c. F_{NEW}–M_{NEW} (a new node with new form and new meaning),
d. conventionalization (spread in a population of speakers), and
e. post-constructionalization constructional changes.

Under Traugott & Trousdale's (2013) definition, constructionalization comprises phases (b)–(d): constructionalization is accompanied by constructional changes, which results in the new form–meaning pairing, which subsequently requires spread from the innovation of a single speaker to count as a conventionalized unit.

This characterization has evoked reference to the Sorites Paradox (Börjars et al., 2015; Hilpert, 2015, 2018). The paradox arises in contexts of phenomena that assume implicit, but numerically unspecifiable thresholds: how many grains of sand make a heap? With respect to constructionalization, this translates to two main sets of questions.

The first set of questions concerns the relationship between constructionalization and constructional change. How many steps $F_{NEW1...n}$–M_{OLD} and/or F_{OLD}–$M_{NEW1...n}$, i.e., constructional changes, are required in the lead-up to F_{NEW}–M_{NEW}?

It is difficult to identify the beginning of constructionalization without arbitrary starting points for both *F* and *M* (Börjars et al., 2015; Hilpert, 2015, 2018). A related issue is the question how accompanying changes ("con-") are distinguished from changes preceding or following constructionalization ("pre-", "post-"). It is impossible to say which type of change counts as constructionalization and which counts as constructional change (Börjars et al., 2015; Diewald, 2015; Hilpert, 2018).

A second set of questions concerns the relationship between constructionalization and conventionalization. How much spread in the speech community is required for innovation to count as a new node? When does propagation stop being a con-constructionalization change and become ordinary frequency change, i.e., a form of post-constructionalization change? In other words, what distinguishes altered replication (Croft, 2000) in the innovation-to-change phase from altered replication in post-constructionalization? (At least in open-slot constructions, even the first replication likely involves some form of visible node-internal change, such as the expansion of collocational material.) In addition, making spread in the population a necessary condition for constructionalization is complicated by the fact that the idea of the speech community is itself subject to the Sorites Paradox: how many speakers make a speech community (Börjars et al., 2015, p. 364)? Measuring conventionalization is an inherently difficult empirical challenge, but it is particularly problematic to draw the empirical line in a diachronic context in general and between constructionalization and constructional change in particular (Hilpert, 2018).

What appears to be at the root of the problem is that "constructionalization" is ambiguous between a "process" and a "point" reading: it refers simultaneously to constructional changes surrounding the new node *and* the new node itself. The Sorites Paradox arises primarily because the point reading of (c) is a hyponym of the process reading of (b)–(d).

We can look at what the definition of "constructionalization" entails from a different angle. If constructionalization is defined as F_{NEW}–M_{NEW} such that neither a new form, nor a new meaning alone constitute a new form–meaning pairing, then constructionalization is necessarily instantaneous: the assumption *constructionalization is gradual* is logically impossible, or at least inconsistent with its definition.[1]

This article proposes to reserve "constructionalization" for the point when a new construction is observed as per the definition laid out for the construction. This reduction is symbolized by the shorthand "cxzn". For example, if we define

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1. As Diewald points out (2015, p. 119), the definition of constructionalization is further complicated by the nature of a construction as a Saussurean sign, i.e., an indivisible combination of form and meaning. Therefore, change in either *F* or *M* necessarily constitutes a new form–meaning pairing by definition.

the *into*-causative as an object-control structure with a sentential complement (cf. Section 3), finding this pattern in historical records constitutes cxzn. Any preceding and subsequent changes are subsumed under "constructional emergence" and include changes in form, function, frequency, internal distribution, productivity, and/or communal spread (Hilpert, 2013, p. 16). This view makes it possible to describe changes in the network of related constructions without arbitrary distinctions of pre-, con-, or post-constructionalization changes.

3.   The *into*-causative

This section describes the *into*-causative as a construction – i.e., as a generalization over similar instances – which is sufficiently distinct in form and meaning from other constructions in the network. This is less trivial than may appear at first. But, as pointed out above, the definition of a node (and its distinction from other nodes) determines the location of cxzn. The section concludes with a sketch of the *into*-causative's conjectured emergence.

3.1   Synchronic properties

The *into*-causative is a complex transitive argument structure construction with a prepositional sentential complement, as illustrated by these examples from contemporary American English (COCA; Davies, 2008):

(1)   a.   *If he'd been caught, he'd surely have been lynched. He **tricked the slaves into believing** he was taking them to freedom.*   [COCA, 2011]

   b.   *How could I have let Alexis **talk me into lying** to my parents?*
   [COCA, 2001]

   c.   *Booksellers **were terrorized into removing** it [Rushdie's book].*
   [COCA, 1990]

A CAUSE(R) prompts a CAUSEE (*slaves, me, booksellers*) to perform an action specified in the oblique (*believing he was taking them to freedom, lying to my parents*). The matrix verbs specify the manner of causation (*trick, talk, terrorize*). While the construction has been noted for its lexical creativity (Davies, 2012; Hunston & Francis, 2000; Kim & Davies, 2016; Rudanko, 2005), the productivity is limited to a fairly narrow range of FORCE, TRICKERY, FEAR, and COMMUNICATION verbs (Gries & Stefanowitsch, 2004; Stefanowitsch, 2014). Since the verbs are not inherently causative, the meaning "x CAUSES Y DO Z" is contributed by the syntactic form [SUBJ V OBJ *into* V*ing*]. The division of labour between lexis and syntax makes the *into*-causative particularly suitable for an analysis in Goldbergian CxG

(Rudanko, 2005, 2011; Stefanowitsch, 2014; Stefanowitsch & Gries, 2005; Wulff, Stefanowitsch, & Gries, 2007).

The *into*-causative is closely related to the caused-motion construction (sometimes seen as a subtype, Rudanko, 2005, 2011), as in (2):

(2)   a.   *The advent of World War II **ushered Greece into a new period** of German occupation.*   [COCA, 1990]
      b.   *When they finished, they **kicked the shells into the sea**.*   [COCA, 2007]

The *into*-causative and the caused-motion constructions share the general form [subj v obj obl$_{pp}$] and the associated general meaning "x causes y move z", where the causee moves along a path into a physical or metaphorical container. As both constructions imply successful causation, Rudanko (2011, Chapter 2) has also argued that they are subtypes of the resultative (e.g., *he hammered the metal flat*, Goldberg, 1995, Chapter 8).

Their strong connection is evident in ambiguous cases with deverbal nouns (*engineering, hiding, nursing, plumbing, teaching*):

(3)   a.   *Anne, her sister and her parents **were forced into hiding**.*   [COCA, 1999]
      b.   *Mrs Campos blamed [him] for **coercing Hector into engineering**.*
                                                                              [COCA, 2006]
      c.   *they're trying to figure out how to **get their kids into birding***
                                                                              [COCA, 2003]

The classification of ambiguous uses depends on properties assigned to the *-ing* gerund. For example, should the corresponding verb be a conventional verb to count as an instance of the *into*-causative? In the absence of clear indications to the contrary (e.g., coordination in *forced into hiding and exile*), this would classify (3a) and (3b) as *into*-causatives (*to hide, to engineer*), but (3c) as caused-motion (*?to bird*). Which strategy is chosen is a definitional question, but the ambiguity shows tight structural and semantic links. In a diachronic context, ambiguous uses play an important role as "bridges" or "critical contexts" (Diewald & Smirnova, 2012; Smirnova, 2015) and they are key in tracking the *into*-causative's emergence. In the synchronic context, important formal and semantic differences provide good arguments that they are separate constructions: the *into*-causative is more specific both in form and meaning.

First, the *into*-causative is structurally more complex. The oblique is a sentential complement with object-control (*slaves believed NP, booksellers removed NP*). The object of the matrix clause is the understood subject of the complement clause and its referent is therefore in control over the action specified in the oblique. It is for this reason that structures such as *the team poured energy into completing the project* are not *into*-causatives: it is *the team* (subject) that completed the project,

not *energy* (the object). This is an analytical distinction in the definition of the node that is not necessarily shared by others (Duffley, 2018). But whether object-control is seen as formal (Sag & Pollard, 1991) or purely pragmatic (Duffley, 2018) does not change the fact that the CAUSEE (*slaves, booksellers*) controls the action in the oblique (*believing, removing*).

Object-control entails a semantic constraint on the CAUSEE, which needs to be animate. Objectively inanimate objects are construed as (metonymically) animate:

(4) a.   *… 3. Require them to maintain high interest rates to **entice capital into staying** in the country.*   [COCA, 1998]

b.   *Because freezers work best when filled with food, you can **"fool" the freezer into using** less energy: Fill milk cartons with water at least halfway and place them in the freezer.*   [COCA, 1991]

c.   *We'll make molecules that will **fool the body into making** antibodies to breast cancer.*   [COCA, 1998]

There is no animacy constraint in the caused-motion construction (*He kicked the shells into the sea*), so that subject-control patterns (*They poured money into completing the project*) could be seen as a complex extension of the caused-motion construction.

By the same token, the oblique argument (the GOAL) is more specific in the *into*-causative. First, by definition, the *into*-causative is restricted to the preposition *into*, while the caused-motion construction occurs with a much wider variety of prepositions (*she sneezed the foam **off** the cappuccino, he loaded the hay **onto** the truck*). Second, while movement can be *into*, *off*, or *out of* a container, a location, or a state of being in the caused-motion construction (*onto the truck, off the cappuccino, into compliance*), movement in the *into*-causative is always movement into self-controlled action. Under this definition, *They talked us into being nice to her* is an instance of the *into*-causative (*be* as a copula), while the "existence" sense in *God brought us into being* is not.

The greater structural complexity and the more specific semantic constraints motivate the postulation of the *into*-causative as a separate construction, because aspects of its form and/or meaning are unpredictable from its parts or from related constructions (Goldberg, 1995, p. 4). However, what we consider essential properties of a construction remains a question of definition and the zoom factor on both *F* and *M*. For a different analytical purpose, it may not be necessary to assume that the meaning of the *into*-causative is "x CAUSES Y DO Z", and one could be content with the more general description of "x CAUSES Y MOVE Z" of the caused-motion construction. The same logic holds for form [SUBJ V OBJ *into* V*ing*], as the *into*-causative is more specific than [SUBJ V OBJ OBL$_{PP}$], the form of the caused-motion construction. Under a more coarse-grained view, the *into*-causative and

the caused-motion construction may not be seen as separate nodes. (Although the decision for the more specific definition(s) is a well-motivated analytical choice.)

3.2   Diachronic assumptions

Not much is known about the origin of the *into*-causative. Its earliest cited records so far date from the mid-18th century (Rudanko, 2000, 2015). The construction grew steadily during the Late Modern English period and increased five-fold in frequency over the last 200 years alone (Davies & Kim, 2019; Flach, to appear). Previous research focused on this frequency development as a function of lexical innovation and semantic expansion (Davies, 2012; Davies & Kim, 2019; Rudanko, 2000, 2005, 2015). In Flach (to appear), I suggest that the syntactic form has become a more reliable cue of causative meaning: stronger links between syntax and semantics mean that the construction could license an increasingly greater variety of formerly less compatible lexical material by supplying the argument roles.

Based on the high prominence of nominal *into*-patterns in COHA, Davies (2012, pp. 164–166) suspects that the *into*-causative emerged from patterns with an NP or nominal *being* (*they bullied themselves <u>into power</u>; he called them <u>into being</u>*). This hypothesis is consistent with the construction's close connection to the caused-motion construction, which makes a diachronic relationship highly plausible (see Rudanko, 2015 for a detailed discussion of Davies' conjecture regarding the relationship between the nominal and verbal patterns in Late Modern English). As we see below, their connection goes back to (at least) Early Modern English.

Since the *into*-causative is more complex, it is a reasonable working hypothesis that it is the younger construction. This chronology receives further support by the spread of gerundials since Old English and associated changes in the complementation system during Early Modern English (De Smet, 2008; Fanego, 2004; Fonteyn, 2019; Rohdenburg, 2006; Vosberg, 2006). These developments provided both necessary and facilitating conditions for the emergence of the *into*-causative.

Example (5) shows the proposed timeline. It distinguishes four transitive *into*-patterns, based primarily on the nature of the oblique: NPs (A), nominal $-ing_N$ (B), complex, ambiguous, but potentially sentential $-ing_C$ (C), and clearly sentential verbal $-ing_V$ (D):

(5) a.   (Pattern A) *He moved the army into France.*   [*into* NP]
     b.   (Pattern B) *It turned mirth into mourning.*   [*into* $-ing_N$]
     c.   (Pattern C) *We put ourselves into mourning for her.*   [*into* $-ing_C$]
     d.   (Pattern D) *You hectored me into telling the truth.*   [*into* $-ing_V$]

This classification foregrounds formal properties that distinguish between constructions. That said, I use "pattern" rather than "construction" to highlight the fact

that A–C are heuristic, coarse-grained reference points for the analysis (although at least Patterns A and B represent instances of the caused-motion construction). While more specific semantic properties could be identified *within* these patterns, such as the animacy of the CAUSEE (*the army, mirth, ourselves, me*) or the abstractness of the GOAL (*France, mourning*), the current argument does not require a more fine-grained classification. Finally, Pattern D is the new node F_{NEW}–M_{NEW} as the end-point of the accumulation of changes in other parts of the network (Patterns A–C). In Pattern D, ambiguity has disappeared: it has no alternative reading as an instance of a previously established pattern as per the definition (Smirnova, 2015, p. 89; "isolating context", Diewald, 2006, p. 82).

4.   Constructional emergence

4.1   Data

The data for the transitive Pattern A were extracted from the tagged version of the *Penn-Helsinki Corpus of Early Modern English* (PCEME, Release 2, ~2m tokens, 1500–1710; Kroch, Santorini, & Delfs, 2004). Since Patterns B–D are extremely rare, they were extracted from the *Early English Books Online* database (EEBO-V3, 1bn tokens, 1500–1700, via CQPweb at Lancaster University). For the illustration of subsequent developments, additional examples are cited from the *Corpus of Late Modern English Texts* (CLMET-3.1, ~35m tokens, 1710–1920; De Smet, Flach, Tyrkkö, & Diller, 2015) and the *Corpus of Historical American English* (COHA, ~450m tokens, 1810–2009; Davies, 2010).

The queries looked for a verb followed by up to four unspecified tokens and *into* (Pattern A; PCEME), followed by a string in *-ing* (Patterns B–D; EEBO). All matches were manually cleaned, and only transitive or passive uses were retained. EEBO tokens with prenominal modifiers in *-ing* were removed, because they are instances of Pattern A (e.g., *into raging fires, into boiling water*). Allowing only four-token objects to increase precision likely affected recall (aggravated by the problem that many matrix verbs are not tagged as verbs; cf. Flach, in press).

This yielded 1,198 tokens for Pattern A (PCEME, 689.4 pmw) and 1,985 for Patterns B–D (EEBO, 2.4 pmw). The results are summarized in Table 1 for PCEME and in Table 2 for EEBO. The EEBO tokens were not further distinguished between Patterns B and C due to rampant ambiguity. However, the data contain five clear examples of Pattern D from the late 17th century.

Since EEBO has substantial limitations with respect to balance, representativeness and tagging, EEBO data have to be interpreted carefully. However, since the expected evidence of Patterns B and C in conventional corpora would only amount

to a handful of instances (~2.4 pmw), EEBO is an immensely valuable resource by its sheer size. Many of its shortcomings are not unique to EEBO but apply to diachronic material in general. Nevertheless, examples from EEBO are only cited if they could be verified in fully scanned copies in online archives or Google Books to ascertain the year of attestation with a greater degree of confidence.

Table 1. Frequency breakdown of 1,198 tokens of Pattern A [SUBJ V OBJ *into* NP] in PCEME

Period	N	F_{rel} (pmw)	% abstract GOAL
1500–1569	289	509.0	13.5%
1570–1639	437	695.3	19.7%
1640–1710	472	871.5	27.1%

Table 2. Frequency breakdown of 1,985 tokens of Patterns B–D [SUBJ V OBJ *into* ing] in EEBO

Period	N	F_{rel} (pmw)	% animate CAUSEE
1525–1549	11	2.9	9.1%
1550–1574	46	1.9	4.3%
1575–1599	175	3.6	8.0%
1600–1624	206	2.0	7.8%
1625–1649	283	1.9	9.9%
1650–1674	606	3.4	15.3%
1675–1699	663	2.0	22.1%

4.2 Analysis

Given its frequency of 689.3 pmw across PCEME, it is safe to assume that the canonical caused-motion construction was well-established in Early Modern English:

(6) a. *And Iesus came agayne into Cana of Galile, wher he **turned water into wyne**.*   [PCEME, 1534]
  b. *Have I not **brought my selfe into troubles** ynoughe?*   [PCEME, 1556]
  c. *She laboured to **translate them again into French**.*   [PCEME, 1571]
  d. *hee **draweth them hedlong into manie grieuous sinnes**.*   [PCEME, 1593]

Pattern A [*into NP*] occurs freely with CAUSEES on all levels of animacy (individuals, collectives, animals, inanimate objects). The GOAL designates physical movement into a variety of containers, such as locations (*Scotland, France, market*

place), vehicles (*vessel, ship*), body parts (*head, arteries*), substances (*wine, water, blood*), or states of being (*troubles, sin, wickedness*).

The relevant change in Pattern A is the rise of abstract GOALS (*wickedness, possession, punishment*) at the expense of concrete places, containers, or substances (*France, house, wine*). As can be seen from Table 1, the proportion of abstract GOALS doubles from 13.5% in the first period (1500–1569) to 27.1% in the third period (1640–1710).[2]

In EEBO, Pattern B [*into ing*$_N$] starts appearing in the second quarter of the 16th century, mostly of the type *merry queer is turned into weeping* (1534) or *turn the blessing of God into cursing* (1540). The nominal status of the GOAL can be inferred from frequent coordination (*mirth shall be turned into <u>mourning and lamentation</u>*). The majority of the earliest examples have inanimate objects (*mirth, joy, prayers, cursing*), but there are cases with animate objects:

(7) a. *But that … the Patriarches were circumciſed, **being allured into partakinge of the couenant** hauinge vdoutedly … bin taught righteouſneſſe and innocence*
>[John Calvin (1578). *Institvtion of Christian Religion*, translated by T. Norton]

  b. *God hath set thee in this world, and he hath spread out his gracious gifts and the great treasures of his goodness upon thee, which if thou mark in thy body, thou shalt have matter enough to **ravish thee into wondering***
>[Jean Calvin (1574). *Sermons of Master Iohn Caluin*, translated by Arthur Golding]

Although these examples come from a French author, they were translated into English by different people. This suggests, as a minimal assumption, that Pattern B licensed animate objects, although they remain low throughout the 16th century (cf. Table 2).

The nature of the matrix verbs suggests that Pattern B is a more specific subtype of the caused-motion construction, because it occurs mostly with verbs of change (*turn, change, convert, metamorphosize*), creation (*form, make, produce*), declaration (*decree, speak, call [into being]*), or transfer (*bring, put, take*). They encode the transition of an object from one state to another, implying strong causal involvement of the CAUSER.

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2. These proportions depend on whether *hand* (e.g., *put matters into thy hands*) is seen as abstract (in a "care" or "control" sense) or as a metaphorical container (in a "body part" sense). In the latter case, the proportions of abstract GOALS are 9.7%, 15.8%, and 22.2% across the three PCEME periods. Since the differences remain on the same order of magnitude, the choice of classification does not affect the argument of the relevant distributional shift.

The major change in Patterns B [*into ing*$_N$] and C [*into ing*$_C$] occurs during the 17th century, when their proportion of animate CAUSEES increases from below 10% to around 22% (cf. Table 2). The examples in (8) also illustrate the ambiguity of the GOAL between state (nominal) and action (verbal) that arises almost naturally with animate CAUSEES:

(8) a. *it is not the pure love of ſin that **drawed backe the godly into ſinning** againe*   [J. Sedgwick (1639). *The bearing and burden of the spirit*]

  b. *and by ſetting forth promiſes and priviledges, and prerogatives, and works done on Gods part, and Chriſts part for us and in love, rather **argues us into going & working, & loving reflections** again*
           [J. Saltmarsh (1646). *Free-grace: Or, The Flowings of Christs Blood Freely to Sinners*]

  c. *If God deal thus with his people, that when he **leads them into suffering and difficult work***   [R. Tichborne (1649), cited from EEBO-ID A94343]

  d. *God hath predeſtinated us to Sufferings, and we are **baptized into Suffering***   [J. Taylor (1653). *Eniautos a course of sermons for all the Sundaies of the year*]

The GOAL is normally nominal during this period. The CAUSEE is moved into states of sin or suffering, which are not usually self-controlled processes (especially in a religious context). The nominal character is evident in frequent coordination (*into suffering and difficult work*). While sinning implies more self-control than suffering, the ambiguity between the state a person is in and the self-propelled process associated with that state remains. The ambiguity is facilitated by the absence of a definite article (*the partaking of the convent* would also be possible), which provides a link between purely nominal and more verbal gerunds (De Smet, 2008; Fanego, 2004).

  Despite the persistent ambiguity, there is a notable change during the 17th century. Consider the examples in (9): the semantics of *speak* and *mock* imply a much greater agentivity of the CAUSEE, so that a verbal interpretation of the GOAL becomes possible, if not more likely:

(9) a. *we need no Fines, Racks, nor heavy Imprecations, to **scare us into Truth-speaking***   [W. Penn (1672). *The spirit of truth vindicated*]

  b. *And wee ſee by Experience, that an Oath will not bind ill men, but is a Snare and a ſtumbling block to the upright hearted, who need no ſearing Aſſervations, to **awe them into Truth-ſpeaking***
           [W. Holgate (1683). *To all who desire satisfaction in the case of oaths*]

  c. *Another thing that **leads foolish ones into mocking** at sin, is, because it doth not appear to them at present in its proper colours, it appears to them in Disguises, in Masks.*

[J. Ryther (1677). *A looking-glass for the wise and foolish, the godly & ungodly*, EEBO-ID A58034]

Truth-speaking implies a conscious act of speaking on the part of the CAUSEE in (9a) and (9b). Likewise, the complement *mocking at sin* in (9c) suggests a willful act of mockery, in which the CAUSEE has control or responsibility over the result.

Once the possibility of a control interpretation has emerged and CAUSEES can be moved into states of action, it is a short step to unambiguous object-control structures with sentential complements (Pattern D), which first appear by the end of the 17th century. Five such clear examples could be identified in EEBO, which occur in relatively short succession:

(10)   a.   *whereby he was honestly **trepanned … into giving** <u>sentence against himself</u>*.
           [S. Rolle (1678). *Loyalty and peace, or, Two seasonable discourses*]

       b.   *Visitation, which is no less comfortable to the dying, is yet less dangerous to the living: it **frightens not men into enriching** <u>an order</u>, by impoverishing their heir; nor into expiating the sins of their life by a worse at their death.*
           [J. Harrington (1687/1688). *Some reflections upon a treatise call'd Pietas Romana & Parisiensis*]

       c.   *Besides, you **Hector'd me into saying** <u>I lov'd both</u>, because you scorn'd to Name the one you Lov'd.*   [R. B. Orrerey (1689). *Mr. Anthony a comedy*]

       d.   *Then throwing her false, but showy, charming Arms, about the Neck of her Heart-breaking Lord, and Lover, who lay sighing, and listening by her Side, he was **charmed and bewitched into saying** <u>all Things that appeased her</u>*   [A. Behn (1698). *All the histories and novels written by the late ingenious Mrs. Behn*]

       e.   *This was paid above-board; but when the Captain and I am at leisure, to aunt for all the Sums of Money he as clandestinely received from the Party that **Fooled him into being** <u>an Author</u>, it will surprise the Nation to hear there was so much mischief carried on, under so Thin and Mean a Cover.*
           [R. Kingston, & R. Smith (1700). *A modest answer to Captain Smith's immodest memoirs*]

The examples in (10) exhibit the structural and semantic properties defined for the *into*-causative: a CAUSE(R) acts upon a CAUSEE in a way that the CAUSEE performs the action specified in the oblique – cxzn has occurred. To be sure, its precise point is a question of corpus size and the quality of the tagging and the query; we would likely find earlier uses in larger and better databases.

A final point shows that demarcation remains difficult and illustrates that the evaluation of the evidence is influenced by hindsight knowledge. Consider Example (11) from 1577, a century before the examples in (10):

(11) *That in the morne awake, I could but merueile much, What cause by day, by night should* dryue, ***me into dreaming*** *such.*

[N. Breton (1577). *A floorish vpon fancie*]

From a modern perspective, this is an instance of the *into*-causative with *such* as a pronominal complement. Yet, it seems more likely that *such* is a prenominal modifier (*such dreaming*) and that the verse form influenced the position of *such* to rhyme with *much*. In PCEME, modifying uses (*such intention, such a case of joy*) far outnumber pronominal uses. The indirect evidence against an *into*-causative in (11) is supported by the fact that nearly a hundred years pass before similar patterns appear. It illustrates how assuming a new form–meaning pairing also requires that alternative analyses are significantly less likely (Diewald, 2006; Smirnova, 2015). Having said that, without hindsight knowledge that the *into*-causative *did* become a well-established member of the constructional network, all instances of Pattern D, like (10) and (11), may have been classified as instances of the caused-motion construction, the idiosyncrasies of a few individuals, or an error in the data (Flach, to appear).

After cxzn in the late 17th century, the *into*-causative continues to rise in frequency in Late Modern English:

(12) a. *I do not wonder my niece was* ***frightened and terrified into taking*** *this measure; and, to speak honestly, I think my niece will be justified to the world for what she hath done.*   [CLMET, 1749]

   b. *The house was large and elegant, and* ***betrayed me into furnishing*** *it rather better than suited my present circumstances;*   [CLMET, 1763]

   c. *Do not* ***be laughed into doing*** *that which you know to be wrong.*

[CLMET, 1837]

   d. *Recently it has been rumored that Hambros has been trying to* ***coerce the grand, foxy old man of Greece … into concluding*** *an agreement which would give it an absolute monopoly of Greek public financing.*

[COHA, 1929]

   e. *"Whoa. Back up. I couldn't possibly* ***smooth-tongue you into doing*** *something you didn't want to do. Do you want to do it?"*   [COHA, 1966]

While there is no change in form or meaning, the examples in (12) illustrate a subtle construction-internal distributional shift. The matrix verbs in early Late Modern English are predominantly verbs of FEAR (a), TRICKERY (b), or OTHER (c), while verbs of FORCE (d) and COMMUNICATION (e) that dominate the contemporary

into-causative are in the minority or even largely absent. This distribution is reshuffled over the late 19th and 20th centuries: verbs without an implied cause for action (esp. COMMUNICATION) or those with pre-empting alternative complementation profiles (esp. FORCE) increasingly feed on the ability of the construction to provide argument roles independent of verb meaning or subcategorization constraints (Flach, to appear).

A final empirical remark, before discussing the findings, concerns the rise of prepositional -*ing* complements in English as an additional facilitating factor. As a rough approximation, the frequency of a preposition (mostly *of, in, by, for, without*, and *from*) followed by verbal -*ing* rises from 399.8, to 1118.6, to 2655.1 per million words over the PCEME periods (1500–1569, 1570–1639, 1640–1710). Similarly, non-finite gerundial complements as part of the Great Complement Shift are on the rise in Early and Late Modern English (Rohdenburg, 2006; Vosberg, 2006).

In summary, there is a consistent development from the movement of a CAUSEE into a location (Pattern A), to movement into a state (Pattern B), to movement into a metaphorical container ambiguous between state and action (Pattern C), and to movement into action over which the CAUSEE has control or responsibility (Pattern D). These changes are accompanied by pattern-internal shifts, e.g., in the animacy of the CAUSEE or the abstractness of the GOAL. The rise in frequency of all patterns facilitated newer developments, as continued use strengthened their existing links.

5.   Discussion

This section revisits the two main sets of questions concerning constructionalization (as laid out in Section 2) against the background of the empirical data (as discussed in Section 4). The first set asked how many changes constitute constructionalization and how accompanying changes are distinguished from changes preceding or following constructionalization. The second set pertained to the relationship between constructionalization and conventionalization.

As a starting point for the discussion, Figure 1 summarizes the findings from Section 4 in diagrammatic form; it is impressionistically based on the data in EEBO and PCEME, as precise numbers are difficult to determine, especially for the highly ambiguous instances of Patterns B and C.

The diagram depicts the emergence of the *into*-causative as the result of a multi-layered succession of constructional changes in different parts of the network. These changes result in cxzn, which in turn is followed by constructional changes. The phases in the original conception (pre-, con-, and post-constructionalization changes) are subsumed under "constructional emergence" The vertical lines

symbolize assumed associative links between related argument structure patterns (A–D). (While links are assumed to exist between X and A–D, they have been left out for better readability.)
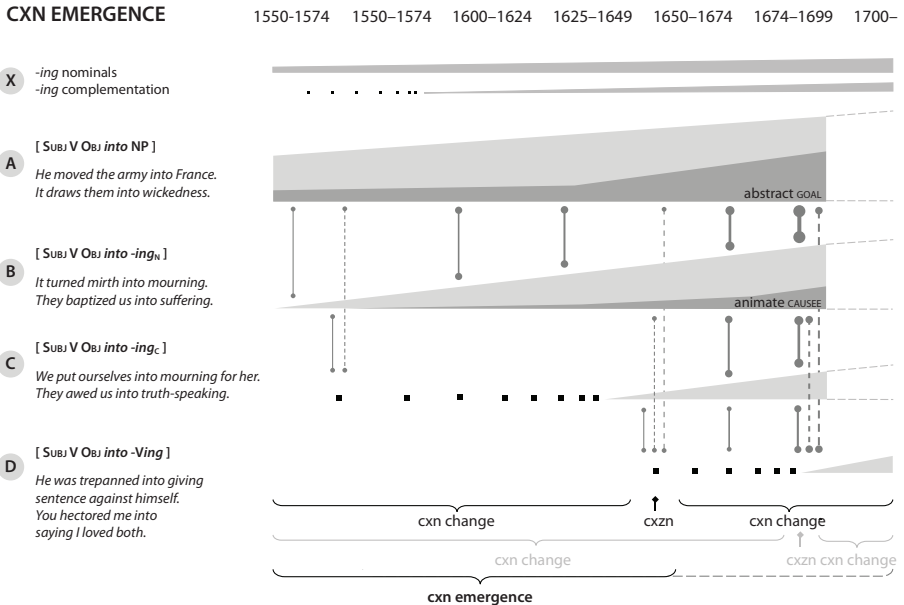

Figure 1. Emergence of the *into*-causative as the result of multi-layered successive constructional changes in the network. The dots and the height of the grey areas represent frequencies, but are not drawn to scale

In the 16th and 17th centuries, the well-established caused-motion construction in Pattern A rose in frequency and shifted towards a higher proportion of abstract GOAL arguments (*wickedness, possession, punishment*). This contributed to the rise of Pattern B, which itself occurred increasingly more often with animate CAUSEES towards the end of the 17th century. These changes were mutually reinforcing (indicated by thicker vertical lines) and paved the way for the ambiguous, but potentially complex Pattern C. Pattern C increasingly implied that the CAUSEE had control over the state or process in the oblique, which further strengthened the preconditions for the *into*-causative. At the end of this development was Pattern D in the late 17th century, i.e., a new form [SUBJ V OBJ *into* V*ing*] with a new meaning "X CAUSES Y DO Z" with no alternative analysis.

This cxzn is instantaneous, as both form and meaning are new: none of the attested examples up to this point warrants the assumption of F_{NEW}–M_{NEW}. That is, all instances until cxzn are F_{OLD}–M_{NEW} or F_{OLD}–M_{OLD} (depending on one's definition of M). Note that if the definition of the *into*-causative had been more general, i.e., that of the caused motion construction ([SUBJ V OBJ OBL$_{PP}$] and "X CAUSED Y

to move z"), the time window here would not show cxzn at all. In a way, cxzn is an analytical anchor, but it is constructional change that we see in the data.[3] Put differently, constructional emergence looks at constructional change through the lens of the construction under investigation without assigning a special status to any associated changes (as preceding, accompanying, or following changes).

The diagram highlights the demarcation problem between constructional changes that precede constructionalization (pre-) and those that accompany it (con-): is C the starting point of constructionalization? Or B or even A? It is impossible to separate two types of changes for the constructionalization of the *into*-causative in the network of related patterns (A–C) and beyond (X).

The second set of problems concerns the relationship between constructionalization and conventionalization. Recall that the constructionalization view assumes that a linguistic innovation needs to spread in the community to count as change (Traugott, 2015; Traugott & Trousdale, 2013). But how much spread in the community lies on either side of the boundary between constructionalization and post-constructionalization change?

At face value, it is a convincing argument that one example is not enough for F_{NEW}–M_{NEW} (Traugott & Trousdale, 2013, p. 2). If we accept this position, we need to shift cxzn of the *into*-causative further to the right, say, to around the time when unambiguous tokens are frequent enough to qualify as a conventional unit (assuming we can define sufficient frequency). This is illustrated by the grey scenario in Figure 1. But this immediately raises the question of what the dots are *before* the later cxzn point, if not instances of F_{NEW}–M_{NEW}.

It is a well-established assumption in diachronic linguistics that the earliest attested example is likely not its first use. But we could step back for a moment and think about what this actually means. If an observation is in all probability not the first time the pattern has been used, then we necessarily acknowledge that it *has* already gained foothold in the speech community. This foothold may be restricted to a very limited part of the community, but since the idea of the speech community is itself subject to the heap paradox (Börjars et al., 2015, p. 364), limited spread is not per se an argument against assuming that cxzn has occurred. (Moreover, even if a first attestation was its first use, the construction did not come into being *ex nihilo*: a first use is nearly always an extension of conventional material by utterance recycling, i.e., most of its parts were already shared by interlocutors to

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3. Note at this point that many processes that are commonly evoked in grammatical change or constructionalization have not been discussed in this paper at all, such as schematicity, productivity, or compositionality (Traugott & Trousdale, 2013, p. 22). This is partly because the *into*-causative immediately feeds on the schematicity and non-compositionality of its relatives, and there is no evidence that the *into*-causative was systematically restricted in productivity.

the point where the use of known material in slightly altered form or in a new environment may go unnoticed. This argument is analogous to assuming that the first replication of a new pattern plausibly involves some form of change.)

It is important to remember that limited spread in a population of speakers is not unique to diachronic data. Usage-based approaches acknowledge that speakers form their constructional inventories relative to their linguistic experience, which varies substantially between speakers (Dąbrowska, 2015). It is conceivable that there are speakers with no or only a weak representation of the *into*-causative. Yet, just as this possibility does not invalidate the constructional status of the *into*-causative today, the lack of communal spread in diachronic data (however defined) does not invalidate the assumption that the *into*-causative was part of the constructional inventory of (at least) some speakers in a (sub)section of the historical speech community. In addition, upholding the distinction between innovation and spread, as theoretically relevant for constructionalization, essentially assumes monogenesis by a single speaker. Yet, polygenesis is an equally plausible scenario: as the precursory patterns for the *into*-causative are plentiful, speakers in unrelated parts of the larger speech community may have had sufficient conventionalized material to go from Patterns B or C to D independently.

Trivially, detecting any kind of spread depends on the size of the corpus and sheer luck. Patterns C and D are rare even in the EEBO corpus.[4] Again, this neither speaks against conventionalization, nor is lack of recorded evidence unique to diachrony. Many synchronic structures are so rare that they remain undetected in the largest of corpora for any number of reasons, but they may well be shared between a sizeable amount of speakers. That is, the size and quality of the fishing net determines the quantity of the catch: without EEBO, cxzn of the *into*-causative would have been placed much later (the same holds for the detection of the low-frequency Patterns B and C). Conversely, a bigger and/or better EEBO database might hold even earlier examples of Patterns B–D. While earlier evidence would shift cxzn of the *into*-causative further back in time, the range of this shift is bounded by the development of *-ing* nominals and prepositional complementation. This suggests that the picture above (Figure 1) presents a reasonably accurate guesstimate of the emergence of the *into*-causative.

We also need to recall that the assumption of a separate construction for the *into*-causative is influenced by hindsight knowledge, precisely because it is the result of successful conventionalization. In other words, if the *into*-causative had

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4. The tokens of Patterns B–D with animate CAUSEES have a combined frequency of just 0.3 pmw in EEBO. Hence, the expected frequency in the 2-million token PCEME corpus is well below 1 in any given period. Likewise, the query used for this study may well have missed a number of earlier tokens of all patterns.

not caught on in the speech community, isolated examples may have been judged as errors in the data, the idiosyncracy of an individual, or a partially sanctioned extension of the caused-motion construction.

In summary, by reserving the term "constructionalization" to the point of a new form–meaning pairing (cxzn), the question of how many changes in either form or meaning comprise a new form–meaning pairing does not arise. Second, if "spread" is removed as a necessary condition for cxzn, it falls under constructional change as a form of frequency change (Hilpert, 2013, 2018). This has the advantage that measuring spread in a population of speakers does not require a solution in both constructionalization and post-constructionalization contexts. It can be discussed together with other constructional changes as the result of altered replication of conventional material (Bybee, 2006; Croft, 2000).

6.   Concluding remarks

This contribution addressed the relationship between constructionalization and constructional change and critically evaluated a number of problems that arise from this distinction. Starting from the observation that the notion of "constructionalization" (Traugott & Trousdale, 2013) is ambiguous between a process and a point reading, the suggestion is that cxzn is analytically helpful for the identification of F_{NEW}–M_{NEW}. Its process-reading is covered by "constructional emergence", which in turn subsumes cxzn as well as constructional change(s) on either side of cxzn. This perspective avoids, or at least significantly reduces, many of the issues resulting from terminological and conceptual ambiguity. In addition, the alternative perspective relegates conventionalization solely to constructional change. While measuring conventionalization remains challenging, it becomes an empirical question in the context of constructional change.

The point of cxzn depends on pre-defined properties of the construction under investigation. Many aspects are analytical distinctions, sometimes arbitrary, and depend on the "zoom factor" of the descriptive goal. For some purposes, subschemas are relevant, for others, including the present one, they are backgrounded. The question what constitutes a node is relative, not only with respect to the starting point of either F or M (Hilpert, 2018).

All developments in the constructional emergence of the *into*-causative presumably lead to connective links between network members. This is tantamount to assuming that emergence, which looks at (parts of) the network through the lens of the emerging construction, is always part of larger restructuring processes (Torrent, 2015). This conclusion is not new; functional approaches to language change have always stressed the importance of viewing change as a dynamic and

interdependent process. However, by backgrounding the relevance of the node, link-centered perspectives are rather well equipped to integrate this dynamicity (Hilpert & Diessel, 2016; Schmid, 2016).

Modeling (almost) all changes in the network as "constructional change(s)" has additional advantages beyond reducing demarcation problems. While the discussion in this paper focused on the emergence preceding cxzn, emergence does not stop at cxzn. This is indicated by the dashed curly bracket in Figure 1 and was the window of attention in Flach (to appear). The emergence perspective can be linked straightforwardly to the idea of "emergent grammar" (Hopper, 1987). This is not to say that constructionalization is *per se* incompatible with emergent grammar. But due to its focus on the node, the high relevance assigned to the distinction between constructionalization and pre- or post-constructionalization changes, and their arbitrary boundaries make the connection to emergent grammar more difficult. On a related note, principles of emergence do not only apply to the rise and strengthening of links (and nodes), but also to their potential weakening and eventual disappearance. Put differently, constructionalization does not cover "constructional death" (Sommerer, this volume) and it is difficult to imagine what "deconstructionalization" would be.

Finally, it should be kept in mind that this discussion analyzed a fully schematic syntactic construction. It remains an open question whether "constructional emergence", which subsumes both the process- and the point-reading of cxzn, applies straightforwardly to morphological paradigms and/or partially filled constructions. It could be noted that the cxzn view does not make a principled distinction between procedural (grammatical) and contentful (lexical) cxzn. Instant node creation is perhaps less contentious for lexical than for grammatical constructions. But with the rare exception of ad hoc coinage, virtually all new lexical items, including their new meanings, are subject to some form of recycling of previously known material. Just as the emergence of a schematic construction results from an accumulation of changes elsewhere in the network, new lexical constructions are the result of accumulated constructional changes (and their identification also depends on analytical definitions). Since lexical and grammatical constructions lie on a continuum of constructions, it is feasible to assume that the principles of constructional emergence can be applied for units along this continuum.

So although the suggestion of "constructional emergence" may appear to add to unnecessary terminological proliferation, it should be seen as a modest attempt to contribute to clarification, discussing some pointers for future refinements of issues in Diachronic Construction Grammar.

Acknowledgements

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Constructionalization, constructional competition and constructional death

Investigating the demise of Old English POSS DEM constructions

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This paper revisits POSS DEM constructions in Old English (OE) by analyzing 13 OE prose texts from the *York-Toronto-Helsinki Parsed Corpus of Old English Prose* (YCOE). It aims to explain the marginalization and ultimate demise of this constructional family by discussing how the emergence of a new node ("constructionalization") but also the reorganization of node-external, vertical and horizontal links can lead to constructional competition and ultimately to the disappearance of (a) node(s) in the network. It will especially discuss frequency effects and cognitive factors like strong/weak entrenchment or analogical thinking as driving forces of network change, especially constructional loss. Additionally, this paper makes some suggestions on how constructions should be annotated and sketched in networks.

Keywords: nominal determination, co-occurrence of determinatives, determination slot, constructionalization, node loss, constructional death, analogy

1. Introduction

In the current literature on DCxG, it is suggested that the constructicon is constantly changing (1) via node creation, i.e. constructionalization, or node loss, (2) via node internal changes, and (3) via node external changes, i.e. reconfiguration of node external linking (Sommerer, 2018, pp. 148–149; also see Traugott & Trousdale, 2013; Torrent, 2015; Barðdal & Gildea, 2015; Hilpert, 2013, 2018; Smirnova & Sommerer, introduction of this volume).

When investigating linguistic change of the type (1) mentioned above, DCxG researchers – including myself – have primarily focused on how and why (grammatical) constructions emerge. In contrast, not many scholars have been focusing on the question why and how constructional nodes dissolve from the network; a phenomenon which will be termed "constructional death" or "constructional loss".[1] However, I believe that when aiming for a comprehensive, constructional model of linguistic change, it is as crucial to investigate reasons for the loss of a construction as it is to investigate reasons for its emergence. A construction simply does not dissolve from the network out of the blue, but various system-internal and system-external factors are responsible for its disappearance.[2] I argue that node emergence and node loss are two sides of the same coin in the sense that the constructionalization and the disappearance of a node affects and is affected by other constructional nodes.

To show this dependency, this paper revisits the constructional family of POSS DEM constructions in Old English. It aims to explain the marginalization and ultimate demise of this constructional family by discussing how the emergence of a new, abstract procedural node ("grammatical constructionalization") but also the reorganization of node-external, vertical, and horizontal links can lead to the disappearance of (a) node(s) in the network.

It will especially discuss frequency effects and cognitive factors, like strong/weak entrenchment or analogical thinking, as driving forces of network change. Ultimately, this paper aims to contribute to our general understanding of how and why the constructicon changes, with a special focus on how to annotate constructions and how to sketch diachronic changes in the network visually.

In Old English, a demonstrative and a possessive determinative sometimes co-occur in the same NP. This is considered ungrammatical (or at least highly marked) in PDE.[3] The following 4 main syntactic co-occurrence patterns have been identified in the literature (e.g. Traugott, 1992; Wood, 2007):

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1. Some noteworthy exceptions to this trend are the following papers and collections: Trousdale (2008), Colleman and Noël (2012), Breban and Kranich (2015), and Kranich and Breban (2018). In these papers, the researchers investigate secondary grammaticalization and the disappearance of grammatical constructions and categories.

2. By system-internal factors I mean frequency-driven or cognitive factors like, for example, weak entrenchment, analogical levelling, iconicity, or processing economy. As language-external factors I subsume triggers like language contact (borrowing), politeness, or fashion. These are all factors which can make a speaker drop a certain linguistic form; often for the good of a competing alternative.

3. Whereas typologically the co-occurrence of a demonstrative and a possessive determinative is ungrammatical in several languages (e.g. French, Dutch, Swedish), it is permitted in

$[[\text{DEM}_{\text{infl}}]+[\text{POSS}_{\text{infl}}]+[\text{ADJ}_{\text{infl}}]+[\text{CN}_{\text{infl}}]]_{\text{NPdef}}$

(1) *Hu   ne is þæt þeah   **sio eowru hehste gesælð** þara cyninga anweald?*
     How not is that, however **that your   highest felicity** the kings'   power?
     'Is it not the case, however, that this highest felicity is the power of kings?'
                                                      (coboeth, Bo: 29.65.18.1219)

$[[\text{DEM}_{\text{infl}}]+[\text{POSS}_{\text{infl}}]+[\text{CN}_{\text{infl}}]]_{\text{NPdef}}$

(2) ***Se   heora cyning** ongang þa   singan &   giddian*
     That their king began then to sing and to recite
     'then their king began to sing and to recite'   (coorosiu, Or_1: 14.35.14.683)

$[[\text{POSS}_{\text{infl}}]+[\text{DEM}_{\text{infl}}]+[\text{ADJ}_{\text{infl}}]+[\text{CN}_{\text{infl}}]]_{\text{NPdef}}$

(3) *& æfter his deaðe Rehcaredus se cyning ne fylgde   ne na onhirede*
     and after his death Rehcaredus, the king,   not followed nor strengthened
     ***his þone treowleasan fæder**, ac his broþer þone martyr*
     his that unloyal   father, or his brother the martyr
     'and after his death, Rehcaredus the king did not follow or strengthen his
     unloyal father or his brother the martyr'
                                          (cogregdC, GDPref_and_3_[C]: 31.239.15.3364)

$[[\text{POSS}_{\text{infl}}]+[\text{DEM}_{\text{infl}}]+[\text{CN}_{\text{infl}}]]_{\text{NPdef}}$

(4) *Gif hwa   ðonne   of giernesse &   gewealdes ofslea **his þone nehstan***
     If anyone then out of greed   and power   slays **his that neighbor**
     þurh   searwa, aluc ðu hine from minum weofode to   þam þæt he
     through treachery separate you him from my   altar so   that he
     deaðe swelte
     death suffers
     'If anyone slays his neighbor treacherously out of greed and power, separate
     him from my altar so that he suffers death'   (colawafint, LawAfEl: 13.37)

In (1) and (2), the demonstrative precedes the possessive determinative, but it
follows it in (3) and (4). A modifying adjective (ADJ) is present in two of the
constructional types.[4] According to the literature, $[[\text{POSS}_{\text{infl}}]+[\text{DEM}_{\text{infl}}]+$
$[\text{ADJ}_{\text{infl}}]+[\text{CN}_{\text{infl}}]]_{\text{NPdef}}$ is as possible as $[[\text{DEM}_{\text{infl}}]+[\text{POSS}_{\text{infl}}]+[\text{ADJ}_{\text{infl}}]+$
$[\text{CN}_{\text{infl}}]]_{\text{NPdef}}$ when an adjective is present, but the first is much more frequent.
When no adjective is present $[[\text{DEM}_{\text{infl}}]+[\text{POSS}_{\text{infl}}]+[\text{CN}_{\text{infl}}]]_{\text{NPdef}}$ is preferred
but $[[\text{POSS}_{\text{infl}}]+[\text{DEM}_{\text{infl}}]+[\text{CN}_{\text{infl}}]]_{\text{NPdef}}$ also exists (Allen, 2008, pp. 280–281;

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some languages like Bulgarian, Russian, Czech, Portuguese, and Italian (e.g. *il mio libro*)
(Wood, 2007, p. 339).

4. See Section 4 for details about the chosen annotation style and a more fine-grained construc-
tional account of the existing subtypes.

Traugott, 1992, p. 173; Mitchell, 1985, pp. 104–112). It remains to be seen whether all four types deserve to be given independent constructional status (see Section 3).

Heltveit termed those co-occurrence patterns "concatenative contructions" and remarks that they are constructions "where the items combined are mutually exclusive in present-day English" (1977, p. 47). These constructions are claimed to be "relatively frequent" (Kytö & Rissanen, 1993, p. 254) in Old English – especially in texts with a Latin source – and have sporadically been discussed in the literature (Heltveit, 1977; Mitchell, 1985; Traugott, 1992; Allen, 2004, 2006, 2008).[5]

Co-occurrence has been approached from various angles. On the one side, it has been debated whether the constructions are Latin *calques* (loan translations) used primarily in Latin translations with the observable co-occurrence of demonstrative and possessive not being representative of genuine OE syntax but being an exceptional Latin loan. This notion has been discussed by scholars investigating manuscript production and medieval translation practices (Kytö & Rissanen, 1993; Wood, 2007; Allen, 2006, 2008; see Section 2 for details). On the other side, the possibility for two determinatives to co-occur implies that the structural organization of the OE noun phrase must have been different from the one we find today; a fact relevant for scholars interested in syntactic change, nominal determination, and category emergence. For example, some generative formalists who reject a universal DP hypothesis[6] have used the existence of POSS DEM constructions to argue for an emergent DP in Old English. They argue for a flatter West Germanic NP structure, with a functional D projection only to emerge later (e.g. Yamamoto, 1989; Vincent, 1997; Osawa, 2000, 2007; Denison, 2006).

To my knowledge, nobody so far has looked at these constructions from a constructional point of view except myself (Sommerer, 2018). Additionally, nobody has conducted a large-scale corpus study which uses inferential statistics.[7] Moreover, it is well known that these constructions are not productive in Modern English; still not many studies convincingly explain why this is the case. As a reaction to these shortcomings, this paper empirically analyzes 13 Old English prose texts in the *York-Toronto-Helsinki Parsed Corpus of Old English Prose* (YCOE)

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5. Co-occurrence is not only found in Old English but also in Old High German and Old Norse (Behaghel, 1923; Heinrichs, 1954; Faarlund, 2004)

6. Proposed in Abney, 1987; also see Roberts & Roussou, 2003; Stark, Leiss & Abraham, 2007; Bošković, 2008; Börjars, Harries & Vincent, 2016.

7. Note that Kytö & Rissanen (1993) and Allen (e.g. 2006, 2008) offer some quantitative data on the frequency of these constructions in Old English, Middle English, and Early Modern English.

(Taylor et al. 2003)[8] qualitatively and quantitatively. For analysis, *Corpus Search*[9] and *R* (R Core team, 2017)[10] have been used (see Section 3 for details).

It will be shown that the possessive and demonstrative co-occur in the investigated manuscripts in 241 examples, which only corresponds to 0.25% of all NPs with a common noun head (henceforth CNPs). Thus, co-occurrence is extremely rare, especially if one excludes ambiguous cases where it could be argued that DEM and POSS are not part of the same nominal (see Section 2 for details).

This extremely low frequency, which is often downplayed in the literature, suggests that these patterns are non-canonical constructions with a very specific discourse-pragmatic function. Thus, statements about their relatively high frequency are misguided and obscure the constructions' real status. In any case, the paper reveals that co-occurrence significantly decreases throughout the OE period. The empirical analysis will also reveal that the constructions are not used significantly more often in Latin translations, something which speaks against their status as loan translations.

Additionally, I will argue that the constructional family ultimately disappears from the network due to the constructionalization of an abstract NP construction with a determination slot that can only be filled by one determinative:

$$[[DET_{def,infl}]_{DETERMINATION}+[CN_{infl}]_{HEAD}]_{NPdef} - construction$$

This construction has a positional, syntactic, lexically underspecified "determination slot" which must be filled obligatorily by only one grounding element. The emergence of this construction is seen as a case of "constructionalization *novo loco*" (i.e. the emergence of a new form–meaning paring which previously did not exist in the constructicon before and which occupies a new space in the network). Complex analogy and frequency effects trigger the emergence of this abstract construction (Sommerer, 2012, 2015, 2018). This constructionalization leads to an extensive reorganization of the network of OE referential, definite NPs in which linguistic information is inherited down to lower levels in a new manner and no longer licenses co-occurrence. On the one hand, this leads to the recruitment of the demonstrative as a default slot filler (= emergence of the definite article category), and, on the other hand, it causes the observable decrease of POSS DEM /DEM POSS co-occurrence patterns. A new macro-construction develops, which in time ousts other existing and competing constructions.

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8. http://www-users.york.ac.uk/~lang22/YCOE/YcoeHome.htm

9. http://corpussearch.sourceforge.net/index.html

10. https://cran.r-project.org/

The paper will be structured as followed: In Section 2, I will discuss the POSS DEM constructions in more detail, showing that the observable co-occurrence of POSS DEM/DEM POSS has to be treated with caution, as not every example found needs to be analyzed with the two determinatives being part of the same NP (2.1). Section 2.2 discusses the influence Latin might have on these constructions. Section 2.3 lists some additional discourse-pragmatic features. Section 3 presents the empirical data analysis. In 3.1, I present raw frequencies and discuss the overall distribution of all types; in 3.2 I test the variables "text type" (translation vs. non-translation) and "historical period" (early vs. late texts). Section 4, as the main section, proposes a constructional annotation and a sketch of this constructional family based on the empirical findings (4.1) as well as a constructional scenario to explain the decline of the constructions in late Old English (4.2). The paper ends with a conclusion which links the findings to more general questions in Diachronic Construction Grammar.

2.   The phenomenon

As was already pointed out in the introduction, the co-occurrence of demonstrative and possessive is said to be relatively frequent in Old English (Kytö & Rissanen, 1993; Allen, 2008). However, the existence of these constructions has also been put into question because the OE examples need not be analyzed with the demonstrative and the possessive as part of the same nominal.

2.1   Questioning the existence of co-occurrence patterns

First of all, in some OE examples DEM and POSS may not be part of the same nominal (Wood, 2007, p. 350). In (5), *þa* might be an adverb (translatable as *then*) which is not part of the NP in the first place.

(5)   *ac   he teah   forð þa   his ealdan wrenceas*
      but he brought out **then/these his old   tricks**
      'and he brought out his old tricks'

                                        (cochronE, ChronE_[Plummer]: 1003.6.1640)

Moreover, an alternative reading is possible in which the demonstrative is used in a topicalized, appositive structure: [demonstrative] + [poss+ noun] (*these, his old tricks*). We might face "parallel NPs in apposition rather than jointly filling a single determiner slot" (Denison, 1998, p. 115). Such a structure is also used in Present Day English, e.g. in

(6) *On **this, his** last voyage, the bones had mercifully rolled his way again, as they had so many times in the past.*   (COCA, 2017, FIC, BK: GuineveresPrayer)

Here, "the demonstrative acts as a focus marker to emphasize the following nominal" (Wood, 2007, p. 348). In Present Day English, a comma would be used to indicate such apposition. Unfortunately, OE scribes did not use punctuation in the same way. From that point of view, it is hard to decide if such a pattern should be analyzed either as an appositional construction or DEM and POSS in the same NP.

Example (7) could also be parsed differently. Due to the rather free word order of Old English, the possessive pronoun may be part of a separate genitive construction translatable as *that holy soul of his*:

(7) þet he mid þam   dynte nieðer sah […] and **his þa   haligan sawle** to
     that he with the/that blow down sank […] and his that holy   soul to
     Godes rice asende
     Godes rice asende
     'Then he died due to that blow and (X) sent that holy soul of his to God's
     kingdom'   (cochronE, ChronE_[Plummer]: 1012.12.1834)

Moreover, *se* could sometimes also function as a personal pronoun in Old English. In (2) in the introduction, which is repeated as (8) below for convenience, "*se* is probably a pronoun in a topicalized construction because the adverb *ða* follows the subject rather than being verb initial" (Traugott, 1992, p. 173). So (8) could be translated as *he, their king,…*.

(8) **Se heora cyning** ongang þa   singan &   giddian
     He their king   began then to sing and to recite
     'then he, their king, began to sing and to recite'

                                        (coorosiu, Or_1: 14.35.14.683)

The question is how tightly the demonstrative is integrated into the NP. Still, not all existing examples can be dismissed. Several non-ambiguous cases exist. However, the possibility to parse the co-occurrence of DEM POSS/POSS DEM differently forces us to thoroughly analyze the constructions one by one.

2.2   Co-occurrence as a Latin *calque*

It has also been discussed whether the found examples showing co-occurrence are Latin *calques* (loan translations), which primarily occur in texts for which a Latin source is either known or probable (Mitchell, 1985, § 108; Kytö & Rissanen, 1993; Wood, 2007; Allen, 2006, 2008; Sommerer, 2018). In Latin, the co-occurrence of a demonstrative and a possessive is allowed, and, according to Wood, we usually find that POSS DEM/DEM POSS directly translates a combination of a possessive

and a demonstrative in the original Latin source (2007, p. 152). Although Kytö and Rissanen (1993, p. 258) also mention that the constructions were probably supported by Latin models, they observe that not many of the OE examples are literal translations from Latin (Kytö & Rissanen, 1993, p. 256). They list various examples in which the construction is used in an OE text when no similar pattern can be found in the Latin source. Often the word order in the OE translation is completely independent of the order found in the Latin original. Similarly, Sommerer (2018, pp. 240–243) investigated all the co-occurrence constructions in *Orosius* (i.e. a translation from Latin) and could show that very often the existing co-occurrence constructions are not direct translations from the original. Nowhere in *Orosius* do we find a direct translation of the co-occurrence of demonstrative and possessive.

Allen draws a clear functional line between the constructional types and states that DEM POSS constructions were part of a Latinate register that a writer might decide to use. "[I]t made a text more similar to Latin, and so might be employed even when it was not translating a Latin original very closely" (Allen, 2008, p. 289). In the case of POSS DEM constructions, however, she claims that "we are dealing with a native English construction. This construction is found in all types of OE writings, including native poetry." (Allen, 2008, p. 288).

The discussion on whether Latin influenced one type of this constructional family relates to the more general question of whether DEM POSS/POSS DEM are free variants of one pattern, or if they should be seen as completely different syntactic constructions with different functional properties. Whereas some early publications and handbooks treat the constructions as free variants, especially Allen (2006, 2008) and Wood (2007) have pointed to their separate functional status and independence. With regards to this question, I will show that a Construction Grammar model must side with the latter approach because in Construction Grammar terms, all four constructions are independent form–meaning parings which exist in their own right and which are linked in a taxonomical network on the same hierarchical level. From such a point of view, none of the constructions constitutes the basic default with the others being derived variants of it. In any case, it remains to be seen whether DEM POSS/POSS DEM constructions are used significantly more in translations form Latin.

2.3   Additional characteristic features

One question that must be asked is why a speaker would opt for constructions like $[[POSS_{infl}]+[DEM_{infl}]+[CN_{infl}]]_{NPdef}$ or $[[DEM_{infl}]+[POSS_{infl}]+[CN_{infl}]]_{NPdef}$ (with co-occurring determinatives) instead of a less complex construction like $[[DEM_{infl}]+[CN_{infl}]]_{NPdef}$ or $[[POSS_{infl}]+[CN_{infl}]]_{NPdef}$. In other words, we have

to ask for the specific discourse-pragmatic functions of the existing but rare co-occurrence constructions.

Allen (2008, p. 283) argues that the two constructions have different discourse functions, with the demonstrative in first position having a topic function in the left periphery of the NP. In DEM POSS, the demonstrative is typically referring back to a noun which has already been introduced into the text. For instance, in (9) the bishop was mentioned earlier in the text and is being reintroduced:

(9) *Hie   þa   lærde   **se heora halga bisceop,** [...] **þæt hie dydon þreora***
     Them then instructed **that their holy bishop** [...] that they did   three
     daga fæsten
     days fast
     'Then their holy bishop instructed them [...] to fast for three days'
                              (coblick, LS_25_[MichaelMor[BlHom_17]]: 201.88.2578)

In contrast, Allen claims that the POSS DEM construction is found only with adjectives and that the construction with the possessive in first position has the specific function to emphasize the (often contrastive) adjective (Allen, 2006, p. 149). For her, the adjective is an essential part of the construction, e.g. (10).

(10) *&   æfter his deaðe Rehcaredus se cyning ne fylgde   ne na onhirede*
      and after his death Rehcaredus, the king,   not followed nor strengthened
      ***his þone treowleasan fæder,** ac his broþer þone martyr*
      his that unloyal   father or his brother the   martyr
      'and after his death, Rehcaredus, the king, did not follow or strengthen his
      unloyal father or his brother the martyr'
                              (cogregdC, GDPref_and_3_[C]: 31.239.15.3364)

Example (11) below does not falsify her hypothesis, as the word *nehstan* is not a normal noun but a converted substantial adjective. At the same time, the construction below can be interpreted as an elliptical construction where the main head noun is missing. This, her argument goes, makes those examples belong to the more complex $[[POSS_{infl}]+[DEM_{infl}]+[ADJ_{infl}]+[CN_{infl}]]_{NPdef}$ construction type.

(11) *Forðon he wiste &   gemunde: se þe   cwæð, lufa ðu þinne Dryhten*
      For   he knew and remembered: he who said: love you your Lord
      God, se ilca cwæð,   lufa ðu þinne ðone nehstan
      God, the same one said: love you **your that next/neighbor**
      'Because he knew and remembered: the one who said: love your God also
      said: love your neighbor'   (cobede, Bede_4: 29.370.6.3698)

Furthermore, Allen claims that POSS DEM only occurs with the so-called simple demonstrative *se* but not the complex demonstrative *þes*. In contrast,

co-occurrence of DEM and POSS is found with both *se* and *þes* in Old English (Allen, 2008, pp. 285–288).[11] It remains to be seen if my empirical analysis corroborates Allen's findings.

With regard to the historical development of all constructional types, it should be mentioned that POSS DEM constructions completely disappear from English in Early Middle English with no occurrences after 1100. In contrast, DEM POSS constructions – after a period of complete disappearance in the 12th and 13th century – reemerge in the 14th century (Kytö & Rissanen, 1993; Allen, 2008)

3.   Empirical analysis

In this chapter, I will investigate how frequent the four constructions really are in Old English. Additionally, I will test the hypotheses that the constructions occur more often in Latin translations and that their usage decreases in time. Table 1 shows the 13 Old English prose texts in the *York-Toronto-Helsinki Parsed Corpus of Old English Prose* (YCOE) (Taylor et al., 2003)[12] which were analyzed. *Corpus Search* [13] and *R* (R Core team, 2017)[14] were used for the analysis.

As can be seen in Table 1, 3 texts have been classified as late OE texts (vs. 10 early manuscripts), and 5 texts are categorized as translations (vs. 8 non-translated original texts).

Table 2 and Table 3 reveal that the demonstrative collocates with the possessive in all the investigated manuscripts in 241 examples, except in the *Parker Chronicle* and the *Laws of Alfred* which show no co-occurrence at all. It is crucial to

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11. In Old English, there are two demonstratives: the so-called "simple" ("distal") demonstrative *se* and its paradigm, and the so-called "compound" demonstrative *þes* with its paradigm. *þes* is formed from the simple demonstrative by the addition of the particle *-se/-si*. The semantic opposition between *se* and *þes* is not clear; it is claimed that *þes* often contrasts with *se* "by pointing to something near" (Mitchell, 1985, p. 127), similar to today's proximal *this*. But *se* can sometimes be translated as modern *this,* and *þes* as *the*. Note that Old English had no grammaticalized proximal/distal contrast as in PDE *this* vs. *that*. Only after the 12th century does the old neuter nominative/accusative singular *þaet* begin to emerge with a clear distal sense (opposed to *þis*) (Mustanoja, 1960, pp. 168–170; Lass, 1992, p. 114). However, already in Old English (but especially in Middle English), the sense of *þes* tended to include a stronger deictic notion contrasting with *se*'s developing anaphoric function. *þes* is much less frequent than *se*. See Sommerer (2018, pp. 75–77) for detailed paradigms of *se* and *þes*.

12. http://www-users.york.ac.uk/~lang22/YCOE/YcoeHome.htm

13. http://corpussearch.sourceforge.net/index.html

14. https://cran.r-project.org/

Table 1. Investigated OE manuscripts

Manuscripts	Filetag	Period		Word count	Latin translation	Manuscript in YCOE
Peterborough Chronicle	PB	o.3/4	late	40,641w	original	cochronE.o34
Ælfric's Lives of Saints	LOS	o.3	late	100,193w	original	coalelive.o3
Ælfric's Catholic Homilies	CH	o.3	late	106,173w	original	cocathom1.o3
Parker Chronicle	PA	o.2/3	early	14,583w	original	cochronA.o23
Blickling Homilies	BH	o.2/3	early	42,506w	original	coblick.o23
Laws of Alfred	LAW	o.2	early	3,314w	original	colawaf.o2
Laws of Alfred Introduction	LAWI	o.2	early	1,966w	original	colawafint.o2
Laws of Ine	INE	o.2	early	2,755w	original	colawine.ox2
Gregory's Dialogues	GD	o.2/4	early	91,553w	translation	cogregdC.o24
Bede's History of the English Church	BED	o.2	early	80,767w	translation	cobede.o2
Boethius	BOS	o.2	early	48,443w	translation	coboeth.o2
Cura pastoralis/The Pastoral Care	CUR	o.2	early	68,556w	translation	cocura.o2
Orosius	OSI	o.2	early	51,020w	translation	coorosiu.o2

understand that the number of co-occurrence patterns is far below 1% of all CNPs in every text (except one document, namely the *Blickling Homilies* with 1.09%). This clearly shows that the co-occurrence of demonstrative and possessive is not a very productive pattern.

Tables 2 and 3 also show that the search queries produce hits for all of the four types of co-occurrence patterns in the *Blickling Homilies, Gregory's Dialogues, Bede*, and *Boethius*.[15]

3.1   Analyzing the four constructional subtypes

In this subsection, I will discuss the frequency of all four subtypes one by one. Note that the constructions' semantic and discourse pragmatic features will be investigated only later in Section 4 where I will sketch their form–meaning pairings, and also argue that all of them deserve their own node in the network.

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15. Compare Allen's study (2008, p. 281) on the co-occurrence patterns in OE texts.

Table 2. Co-occurrence of DEM POSS/POSS DEM in OE prose (raw frequency)

Co-occurrence	Peterborough Chronicle, no trans.	Ælfrics Lives of Saints, no trans.	Ælfrics Catholic Homilies, no trans.	Parker Chronicle, no trans.	Blickling Homilies, no trans.
NPs total (incl. Pro, PN, CN)	15972	36606	40120	6208	15821
CNPs	6093	14715	17150	2140	6298
Dem + CN	2026	3951	4207	562	1498
Poss + CN	531	1984	2290	135	855
Dem + Poss + CN	0	2	0	0	19(15)
Dem + Poss + Adj + CN	1(0)	0	0	0	3
Poss + Dem + CN	0	0	0	0	7
Poss + Dem + Adj + CN	2	1	4	0	40
TOTAL CO-OCCURRENCE	**3**	**3**	**4**	**0**	**69**

Table 3. Co-occurrence of DEM POSS/POSS DEM in OE prose (%)

Co-occurrence	Peterborough Chronicle, no trans.	Ælfrics Lives of Saints, no trans.	Ælfrics Catholic Homilies, no trans.	Parker Chronicle, no trans.	Blickling Homilies, no trans.
NPs total (incl. Pro, PN, CN)	15972	36606	40120	6208	15821
CNPs	6043	14715	17150	2140	6298
Dem + CN (% in CNPs)	33.4%	26.9%	24.5%	26.3%	23.8%
Poss + CN	8.7%	13.5%	13.4%	6.3%	13.5%
Dem + Poss + CN	0	0.01%	0	0	0.3%
Dem + Poss + Adj + CN	0.01%	0	0	0	0.05%
Poss + Dem + CN	0	0	0	0	0.1%
Poss + Dem + Adj + CN	0.03%	0.01%	0.02%	0	0.64%
TOTAL CO-OCCURRENCE	**0.04%**	**0.02%**	**0.02%**	**0**	**1.09%**

Laws of Alfred, no trans.	Laws of Alfred Introduction, no trans.	Laws of Ine, no trans.	Gregorys Dialogues, yes trans.	Bedes History of the English Church, yes trans.	Boethius, yes trans.	Cura pastoralis, yes trans.	Orosius, yes trans.
1572	848	1261	31824	31412	17042	25151	20245
637	256	526	13108	12577	5960	8568	6709
135	51	110	4707	3246	1801	3119	2208
52	39	68	1373	1359	644	1184	765
0	0	2	30(29)	13(10)	16(13)	5(4)	1
0	0	0	3	2(1)	1(0)	0	0
0	2	0	7	3	1	0	0
0	0	0	37	24	2	2	11
0	**2**	**2**	**77**	**42**	**20**	**7**	**12**

Laws of Alfred, no trans.	Laws of Alfred Introduction, no trans.	Laws of Ine, no trans.	Gregorys Dialogues, yes trans.	Bedes History of the English Church, yes trans.	Boethius, yes trans.	Cura pastoralis, yes trans.	Orosius, yes trans.
1572	848	1261	31824	31412	17042	25151	20245
637	256	526	13108	12577	5960	8568	6709
21.2%	19.9%	20.9%	35.9%	25.8%	30.2%	36.4%	33%
8.2%	15.2%	12.9%	10.5%	10.8%	10.8%	13.8%	11.4%
0	0	0.38%	0.23%	0.1%	0.27%	0.06%	0.01%
0	0	0	0.02%	0.02%	0.02%	0	0
0	0.78%	0	0.05%	0.02%	0.02%	0	0
0	0	0	0.28%	0.19%	0.03%	0.02%	0.16%
0	**0.78%**	**0.38%**	**0.58%**	**0.33%**	**0.34%**	**0.08%**	**0.17%**

3.1.1   *[[DEM$_{infl}$]+[POSS$_{infl}$]+[ADJ$_{infl}$]+[CN$_{infl}$]]$_{NPdef}$ construction*

In the texts, the [[DEM$_{infl}$]+[POSS$_{infl}$]+[ADJ$_{infl}$]+[CN$_{infl}$]]$_{NPdef}$ construction is extremely rare. All in all, the construction is only used 10 times.

(12)   *þa   sumu we nu gemdon   geþeodan   in þis user*
       which some we now have taken care to insert in **this our**
       ciriclice   stær
       ecclesiastical history
       'of which some we now have taken care to insert in our ecclesiastical history'
                                            (cobede, Bede_4: 8.282.20.2857)

(13)   *Him þa   **se   heora arwyrða bisceop,** eadiglice &   halwendlice*
       Him then **that their venerable bishop** happy   and successful
       geðeaht forðbrohte
       plan   proposed
       'Then their venerable bishop proposed a happy and successful plan to them'
                                      (coblick, LS_25_[MichaelMor[BlHom_17]]: 205.153.2624)

In four examples, it is debatable whether we should analyze the pattern with DEM and POSS as elements of the same NP, or if we should give the demonstrative appositional status. For instance, in (12), it is possible to interpret *this* as an independent appositional phrase in the sense of *this, our ecclesiastical history.* To argue for an appositional structure also seems reasonable because *þis* here is the compound demonstrative with a stronger deictic force. Also (13) may be constructed along those lines (*that, your highest felicity*). To account for this ambiguity, Table 2 additionally lists the number of hits in brackets after all ambiguous cases have been subtracted. Although the [[DEM$_{infl}$]+[POSS$_{infl}$]+[ADJ$_{infl}$]+[CN$_{infl}$]]$_{NPdef}$ construction is very rare, I will argue in Section 4.1 that it deserves its own constructional node in the network.

3.1.2   *The [[DEM$_{infl}$]+[POSS$_{infl}$]+[CN$_{infl}$]]$_{NPdef}$ construction*

The [[DEM$_{infl}$]+[POSS$_{infl}$]+[CN$_{infl}$]]$_{NPdef}$ construction occurs 88 times, for example in *Orosius*, in *Bede* (14), in *Boethius* (15), in the *Pastoral Care* (16), and relatively often in the *Blickling Homilies* and *Gregory's Dialogues*. A first glance at the raw frequencies suggests that it seems to occur more often in early manuscripts which are Latin translations, which confirms Allen's observation that DEM POSS constructions are part of a Latinate register. As a matter of fact, the *Blickling Homilies*, the *Lives of Saints* and the *Laws of Ine* (17) are the only exceptions to this overall trend, as these manuscripts have been categorized as original, non-translated texts. However, the *Blickling Homilies* is a religious text full of sermons with several sections that very likely could have had a Latin (albeit unknown) source produced for and by an educated audience influenced by Latin (Kelly,

2003). In that sense, the high number of DEM POSS constructions in this text may be explained by its special nature.

(14) *& þa   gemette **þone his geþoftan** slæpende*
      and then found   **those his comrades** sleeping
      'and then found his comrades sleeping'   (cobede, Bede_3: 19.244.1.2492)

(15) *ða   **mine þeowas** sindon wisdomas &   cræftas &   soðe welan*
      those my   customs are   wisdom   and virtues and true wealth
      'My customs are wisdom and virtues and true wealth'

                                                                    (coboeth, Bo: 7.18.5.287)

(16) *Swa eac **ða   his folgeras** swa hie   unwiðerweardran &   gemodran*
      So   also **those his followers** so   they friendly   and unanimous
      beoð, swa hie   swiður hlecað tosomne
      are, so   they close   unite   together
      'So his followers are as friendly and unanimous as they closely unite'
                                                                    (cocura, CP: 47.361.19.2448)

(17) *Gif ceorl   ceap forstilð &   bireð into his ærne &   befehð þærinne*
      If   husband cattle steals   and brings to   his house and finds   in there
      *mon   þonne bið **se his dæl** synnig butan   þam wife anum*
      someone then   is   **that his part** guilty without the   wife alone
      'If a husband steals cattle and brings it into his house and someone finds it
      there, then he alone without his wife is guilty for his deeds'
                                                                    (colawine, LawIne: 57.153)

Again, from the 88 found examples, we may subtract 12 ambiguous cases. For instance, (14) seems to be an appositional construction (*þone* is singular whereas *his
geþoftan* is plural, which suggests a construction like *and found this, his comrades*).
In (15) and (16), *ða* could also be the adverb *then*. Still, with many non-ambiguous
examples left and a very specific discourse pragmatic function – which will be
discussed in Section 4.1 – it cannot be denied that this constructional type existed
in Old English.

3.1.3   *The [[POSS$_{infl}$]+[DEM$_{infl}$]+[ADJ$_{infl}$]+[CN$_{infl}$]]$_{NPdef}$ construction*
More examples for the   [[POSS$_{infl}$]+[DEM$_{infl}$]+[ADJ$_{infl}$]+[CN$_{infl}$]]$_{NPdef}$ can be
found; the pattern is attested in nine out of thirteen manuscripts with an added
frequency of 123. After a first glance, it seems to occur much more often in translations from a Latin source, e.g. in *Orosius, Bede* or *Gregory's Dialogues* (18).

(18) *& æfter his deaðe Rehcaredus se cyning ne fylgde   ne na onhirede*
     and after his death Rehcaredus, the king,   not followed nor strengthened
     his þone treowleasan fæder, ac his broþer þone martyr
     his that unloyal   father or his brother the   martyr
     'and after his death, Rehcaredus, the king, did not follow or strengthen his
     unloyal father or his brother the martyr'
                                    (cogregdC, GDPref_and_3_[C]: 31.239.15.3364)

(19) *He sealde **his þone readan gim,** þæt   wæs **his þæt halige blod,** mid*
     He sold   **his that red**   **jewel,** which was **his that holy   blood**, with
     þon   he us gedyde dælnimende þæs   heofonlican rices
     which he us made   participating in the heavenly   kingdom
     'He sold his red jewel, which was his holy blood, by which he made us take
     part in the heavenly kingdom'   (coblick, HomU_18_[BlHom_1]: 9.125.121)

(20) is an example from the *Peterborough Chronicle,* which is definitely not a
translation.

(20) *Þa þa   seo gode cwen Margarita þis gehyrde **hyre þa   leofstan***
     Then when that good queen Margaret this heard   **her   that dearest**
     hlaford &   sunu þus beswikene heo wearð   oð deað on mode geancsumed
     lord   and son thus betrayed   she became to death in mind anguished
     'Then when that good queen Margaret heard this, that her dearest lord and
     son was thus betrayed, she became anguished in mind to the point of death'
                                    (cochronE, ChronE_[Plummer]: 1093.27.3133)

The results confirm Traugott's observation that the $[[\text{POSS}_{infl}]+[\text{DEM}_{infl}]+[\text{ADJ}_{infl}]+[\text{CN}_{infl}]]_{\text{NPdef}}$ construction is far more frequent than the $[[\text{DEM}_{infl}]+[\text{POSS}_{infl}]+[\text{ADJ}_{infl}]+[\text{CN}_{infl}]]_{\text{NPdef}}$ construction. Note, however, that again it could be argued
that several examples should be disregarded, because they can be parsed differently
as a construction with an integrated but separate genitive, e.g. *that unloyal father of
his.* Although such an alternative analysis is possible, I find it a bit far-fetched and
have decided not to exclude those examples from my calculations.

3.1.4 $[[\text{POSS}_{infl}]+[\text{DEM}_{infl}]+[\text{CN}_{infl}]]_{\text{NPdef}}$ construction

The $[[\text{POSS}_{infl}]+[\text{DEM}_{infl}]+[\text{CN}_{infl}]]_{\text{NPdef}}$ construction is also not frequent. It
occurs 20 times in only five manuscripts. These are *Bede, the Blickling Homilies,
Gregory's Dialogues, Boethius* (21), and the *Introduction to Alfred's Laws* (22).

(21) *gegaderode þa saula &   þone lichoman mid **his þam anwealde***
     gathered   the souls and the body   with **his that power**
     'gathered the souls and the body with his power'
                                    (coboeth, Bo: 30.69.22.1291)

(22) *Gif hwa   ðonne   of giernesse &   gewealdes ofslea **his þone nehstan***
    If   anyone then out of greed   and power   slays **his that neighbor**
    þurh   searwa, aluc   ðu hine from minum weofode to þam þæt he
    through treachery separate you him from my   altar   so that   he
    deaðe swelte
    death suffers
    'If anyone slays his neighbor treacherously out of greed and power, separate
    him from my altar so that he suffers death'   (colawafint, LawAfEl: 13.37)

In the majority of cases, the head of the NP is an adjectival noun (22). Also all the examples in Gregory's Dialogues have *nehstan* as their head. Allen mentions that (21) is the only example that she could find with a "real" common noun, whereas all the others are substantive adjectives. My data confirms the fact that mostly substantive adjectives are used in head position.

Rephrased in constructional terms, we can postulate a slightly different constructional template with the specification that a substantive adjective takes the head position: $[[POSS_{infl}]+[DEM_{infl}]+[CN_{SUB.ADJ,infl}]]_{NPdef}$. A template with an elliptical CN head has to be disfavored in a constructional model, which generally does not postulate silent categories/category slots. Also, I did not find any examples where the compound demonstrative *ses* is used in the POSS DEM constructions, a fact which supports Allen's (2008) hypothesis about POSS DEM constructions only employing *se*. From a constructional point of view, this could lead to the postulation of a more specified construction with the simple demonstrative [*se*] as the only potential slotfiller; i.e.

$$[[POSS_{infl}]+[DEM_{se,infl}]+[ADJ_{infl}]+[CN_{infl}]]_{NPdef} \quad \text{and}$$
$$[[POSS_{infl}]+[DEM_{se,infl}]+[CN_{SUB.ADJ,infl}]]_{NPdef}.$$

These constructions will be discussed in more detail in Section 4. However, before we can do so, it will be investigated if the variable "text type" and "historical period" have an influence.

3.2   Testing the variable 'text type' and 'historical period'

In Table 4 below, all co-occurrence types, including the ambiguous cases, have been added for each manuscript. Co-occurrence seems to be favored in texts which are from the early Old English period and in texts which have a Latin source.[16]

In order to confirm whether being a translation or being an early text significantly increases the likelihood for co-occurrence patterns to be used, I ran a

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16. One exception is the *Blickling Homilies* with 69 examples, which has been classified in the literature as a non-translated text, as a Latin source is missing.

Table 4. Co-occurrence constructions in OE manuscripts

Construction	PB	LOS	CH	PA	BH	LAW	LAWI	INE	GD	BED	BOS	CUR	OSI
CNPs	6093	14715	17150	2140	6298	637	256	526	13108	12577	5960	8568	6709
co-occurrence (+ ambigu-ous)	3	3	4	0	69	0	2	2	77	42	20	7	12
rest	6090	14712	17146	2140	6229	637	254	524	13031	12535	5940	8561	6697

multivariate mixed logistic regression model (generalized linear mixed model with logit link, GLMM), with fixed effects being the "historical period" (early vs. late; early as baseline) and the "text type" (original vs. translation; original as baseline). As random effect, the model integrates "text" as the grouping variable (random intercept). The investigated dependent variable was the "co-occurrence" (co-occurrence vs. other CN; other CN as baseline). In contrast to a simple chi-square test, such a model captures the impact of multiple variables on constructional choice at once, additionally taking into account that some data points are grouped in the sense that they are taken from the same text.[17]

As the results in Table 5 and Figure 1 reveal, text type is not an influential factor but period is.

Table 5. GLMM of construction type (co-occurrence vs. other CN) depending on type and period with text as random intercept ($SD = 0.8$; 13 groups; $N = 94737$)

	Coefficient β	SE	Effect on OR	p	Significance
Intercept	−5.91	0.46	0.0027	<0.001	***
type (translation)	−0.07	0.58	0.93	0.90	
period (late)	−2.37	0.73	0.09	0.0012	**

Significance code:
$*p < 0.05$
$**p < 0.01$
$***p < 0.001$
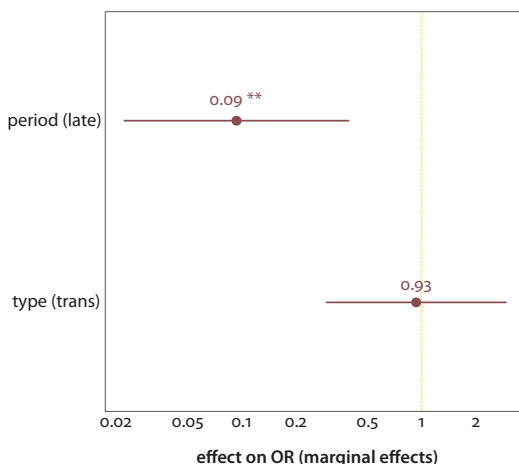
Figure 1. Fixed effects of period and type on the odds of being a co-occurrence construction vs. other CN (odds ratio, OR)

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17. All computations were done in R (R Core Team, 2017). GLMMs were computed with the lme4 package (Bates et al., 2015) and visualized with sjPlot (Lüdecke, 2017).

Note, however, that the analysis includes the *Blickling Homilies* which is a strange outlier, in the sense that it is the only original text with a lot of co-occurrence; a fact which is also confirmed by the analysis in Figure 2 below.
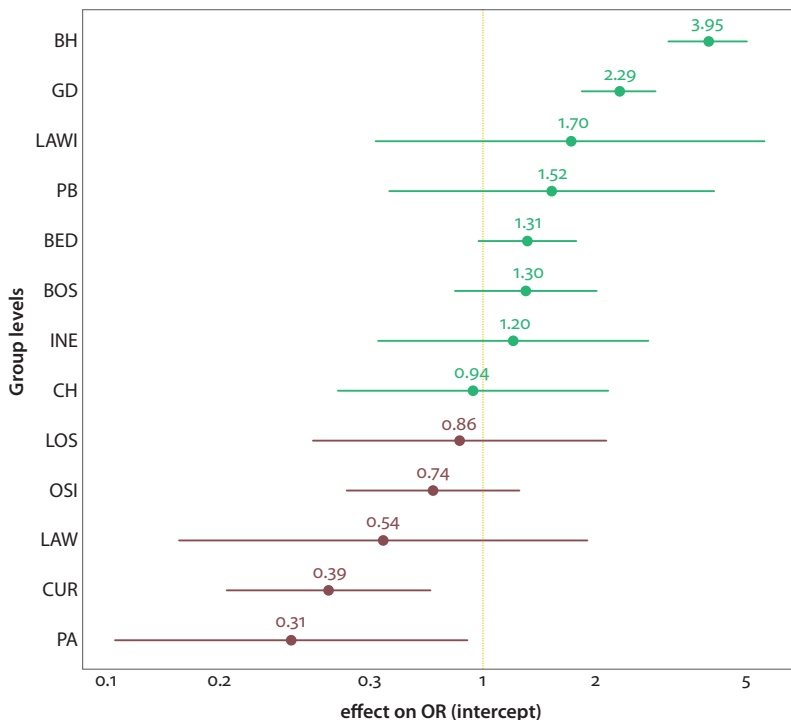
Figure 2. Effects of text on the intercept of the model (random intercept; effects shown on the OR scale)

However, even if we exclude the *Blickling Homilies* manuscript from the investigation (Table 6), the model does not confirm that co-occurrence constructions occur significantly more often in translations.

Table 6. GLMM of construction type (co-occurrence vs. other CN) depending on type and period with text as random intercept ($SD = 0.6032$; 12 groups; $N = 88439$)

	Coefficient β	SE	Effect on OR	p	Significance
Intercept	−6.69	0.53	0.001245	<0.001	***
type (translation)	0.73	0.60	2.085006	0.22	
period (late)	−1.58	0.68	0.206470	0.02	*

Significance code:
*$p < 0.05$
**$p < 0.01$
***$p < 0.001$

This result is extremely surprising, as the results in Table 2 and 3 suggest that co-occurrence constructions are found more often in translations than in originals (also in terms of relative frequencies). The result speaks against the constructions' connection to a Latinate register but might simply be based on the small number of hits, which make reliable calculations difficult.

Regarding the variable "period", time exerts a significant effect on the likelihood of co-occurrence. In late texts, the odds of co-occurrence are decreased by 0.09 ($\beta = -2.37$; $p = 0.0012$). In other words, the co-occurrence of the demonstrative with a possessive decreases in time, and this decrease seems to happen between early and late Old English. The question why English developed into a language which does not allow the co-occurrence of a demonstrative and a possessive remains. I argue that a constructional approach works well to explain this change in English NP structure, which is why I will sketch a possible constructional scenario of the observable process in the next chapter. There, it will be shown how and why the 4 co-occurrence constructions dissolve as nodes in the network.

4. A constructional sketch

4.1 A constructional family: Nodes in the network

Adhering to current DCxG tenets (e.g. see Smirnova & Sommerer, introduction to this volume), I argue that the following POSS DEM /DEM POSS constructions are all schematic, abstract NP templates, which constitute a "constructional family":

1. $[[DEM_{infl}]+[POSS_{infl}]+[ADJ_{infl}]+[CN_{infl}]]_{NPdef}$
2. $[[DEM_{infl}]+[POSS_{infl}]+[CN_{infl}]]_{NPdef}$
3. a. $[[POSS_{infl}]+[DEM_{infl}]+[ADJ_{infl}]+[CN_{infl}]]_{NPdef}$
   OR
   b. $[[POSS_{infl}]+[DEM_{se,infl}]+[ADJ_{infl}]+[CN_{infl}]]_{NPdef}$
4. a. $[[POSS_{infl}]+[DEM_{infl}]+[CN_{infl}]]_{NPdef}$
   OR
   b. $[[POSS_{infl}]+[DEM_{se,infl}]+[CN_{SUB.ADJ,infl}]]_{NPdef}$.

As a reaction to the findings in my empirical part, which confirm Allen's previous research (2008), I offer two different formal annotations for type (3) and (4). Type (3) and (4) – with the possessive preceding the demonstrative – only occur with the simple demonstrative *se* and its paradigm. In contrast, type (1) and (2) are not restricted in their choice of demonstrative. Type (4) constructions also seem to be restricted to substantive adjectives. This could be specified in the chosen template

4b. However, as Example (21) would not be licensed by (4b), I will use the template (4a) from now on.

So far, the "special" semantic and discourse pragmatic features of the investigated POSS DEM constructions have not been sketched. After all, there should be a functional reason why speakers code their messages with these templates. Postulating constructional status is warranted if a construction shows special semantic and discourse-pragmatic features. As already mentioned in Section 2, one specific discourse pragmatic feature of the DEM POSS order seems to be the anaphoric topicalizing function of the demonstrative. That is why I postulate the following form–meaning pairing:

M: Sem: {intertextually deictic[1] possessed[2] specified[3] entity[4]}
   Prag: Latinate formal register/style, marker of anaphoric topicalizing definite reference[5]
   $\updownarrow$
F: Syn: $[[DEM_{infl}{}^{1}]+[POSS_{infl}{}^{2}]+[ADJ_{infl}{}^{3}]+[CN_{infl}{}^{4}]]_{NPdef}{}^{5}$

Constructs like *þis user ciriclice stær* or *se heora arwyrða bisceop* lead to the abstraction and entrenchment of this construction. As most examples confirm, the demonstrative especially stresses that the referent has been mentioned before. On the other hand, the POSS DEM constructs like *his þæt halige blod, hyre þa leofstan hlaford, his þone treowleasan fæder* may have a special adjective emphasizing function:

M: Sem: {possessed[1] intertextually deictic [2] specified[3] entity[4]}
   Prag: Formal style, marker of definite reference highlighting typ-modification
   $\updownarrow$
F: Syn: $[[POSS_{infl}{}^{1}]+[DEM_{se,infl}{}^{2}]+[ADJ_{infl}{}^{3}]+[CN_{infl}{}^{4}]]_{NPdef}$

Note that the used annotation does not follow any current formalization conventions used in a specific Construction Grammar framework. The formalization of NP-schemas is a mix of conventions used by different researchers (Croft & Cruse, 2004; Booij, 2010; Traugott & Trousdale, 2013; Petré, 2014). Square brackets […] represent the formal side of a construction, which includes the morphosyntactic representation. In the postulated schematic constructions, capitalized elements represent word classes (e.g. DEM for "demonstrative"; POSS for "possessive"; CN for "common noun") or phrases (e.g. NP for "noun phrase"). Anything in subscript is additional information on important grammatical features or restrictions (e.g. "infl" for "inflected"). Curly brackets {…} indicate semantic and discourse-pragmatic features. The semantic representation is partial and informal in the sense that not all meaning aspects will be captured. Additionally, phonetic transcription is not always added but would also be required in a full

constructional representation. Inside the brackets, any completely italicized form represents a fully specified construction (e.g. [*his*]). In contrast, italicized strings without square brackets represent constructs.[18]

As can be seen, also superscript indices are used in the construction above. These indices show that the construction is transparent and compositional, in the sense that the indexed parts contribute the indexed meaning to the overall construction. If a particular semantic or discourse-pragmatic feature cannot be assigned to an individual element in the construction but rather emerges "holistically", the whole construction should be indexed instead.[19]

One assumption that all Construction Grammarians share is that all the constructions of a language form the "constructicon": a structured inventory of multiple inheritance networks. Constructions that are similar in form and function are assumed to be organized in constructional families, i.e. they are linked closely to each other via vertical and horizontal links in the network (Barðdal & Gildea, 2015, p. 23). I define a constructional family as a network of closely related "sister" nodes (connected via horizontal links) and their "mother" nodes (connected via vertical links) which are similar in form and function.

To capture vertical constructional relations, this paper will adopt a default inheritance network model. During the linguistic acquisition process, the constructicon emerges in a bottom up fashion. Nodes constructionalize, and the repetition of varied items which share formal or functional similarities encourages the formation of variable abstract schemas (i.e. grammatical constructionalization). Once abstract nodes are in place, lower-level constructions, which are more specific, vertically inherit characteristic features of form and meaning from higher-level, more abstract constructions situated towards the top of the network. In the default inheritance model, only information from above, which does not conflict, is inherited. Constructions lower in the hierarchy may contain information that conflicts with the inherited information from the dominating constructions. This is possible because the model allows for lower constructions to block inheritance

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18. Note that any italicized, fully specific form is also a kind of abstraction/generalization; the chosen specified form must be seen as a prototypical representative in a cloud of exemplars. Speakers constantly produce different phonetic (or even different orthographic) versions of a construction (constructs). These versions are subsumed (and cognitively stored) in so-called exemplar clouds with a prototypical centre. A construction in that sense is the representation of that cloud or the prototypical member of that cloud (see Bybee, 2003, 2010).

19. Note that for the sake of readability, I will not always index compositionality in all constructions which will be discussed. Often compositionality is so transparent that the reader will be able to assign indices him- or herself.

from above, when it conflicts with more specific information (Croft & Cruse, 2004, pp. 262–279; Boas, 2013, p. 245; Hilpert, 2014, Chapter 3; Diessel, 2015).

The nature of horizontal links is less clear. Some researchers, like Cappelle (2006, p. 18), equate horizontal links between constructions with relations between "allostructions", which are defined as constructions which display some differences in form but share the same meaning. These are seen to be connected to a higher-level schema, often called "superconstruction" or "constructeme". Others (e.g. Van de Velde, 2014) seem to understand horizontal links rather in terms of paradigmatic relations between different choices or cells in a paradigm, similarly to the cells in an inflectional paradigm, which do share some general meaning but at the same time are opposed to each other in terms of their semantics/function. Horizontal links are important to show that "the form–function relation of a particular construction may be partly motivated in relation to its neighbors" (Van de Velde, 2014, p. 147). The way I conceptualize horizontal links is similar to Van de Velde's proposal. Horizontal links connect constructions which show the same degree of abstractness and which are related to each other because they share similar formal and/or semantic features. In other words, there is a difference between taxonomic links (symbolizing relatedness through inheritance) and horizontal links (symbolizing partial similarity but non-inheritance).

If we apply this kind of modeling to our constructions, a network could be envisaged in which the listed co-occurrence constructions are all positioned on the same level of abstractness with horizontal links between them (see Figure 3).
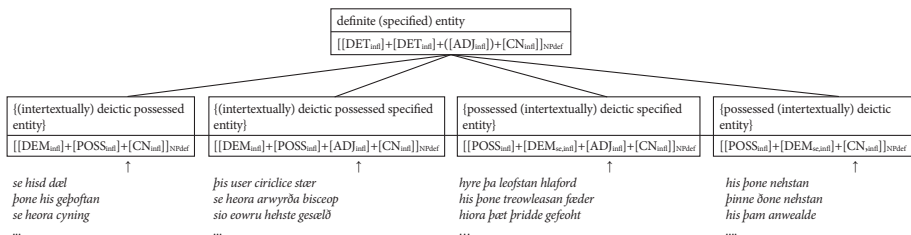
Figure 3. Network of Old English DEM POSS/POSS DEM constructions (with simplified semantic side)

One question is whether all 4 constructions should be connected by horizontal links. After all, POSS DEM constructions are different to DEM POSS constructions in terms of their form and – if we believe Allen – to a certain extent in terms of their function. This is why it could be argued that the horizontal line between the first two and the last two constructions should be deleted. Another crucial question is whether speakers really abstract an even more schematic template higher in the network. As the discourse semantic features of these constructions are very special and depend on the order of the determinatives, I argue that the

main characteristic features, which a speaker might abstract from both main constructional types (POSS DEM vs. DEM POSS) in early Old English, are structural word order features (e.g. about the left-branching nature of English NPs with determination occurring before modification) and the potential co-occurrence of two determinatives to mark definite reference. It is a kind of syntactic $[[DET_{def,infl}]+[DET_{def,infl}]+([ADJ_{infl}])+[CN_{infl}]]_{NPdef}$ schema with double marking of definite reference, which is primarily used in formal writing as a stylistic feature to create a Latinate style. At the same time, postulating such an abstraction is problematic because it is always debatable what semantic features such a construction holds, and it can be argued that such a construction would license the co-occurrence of the same determinative twice, something which is obviously not the case. For now, however, let us assume that speakers had a constructional double marking schema similar to the one entrenched in their networks.

The question remains: why these constructions marginalized and gradually disappeared from the constructicon (as shown in Section 2.3)? In the next section, it will be shown that not every constructional node can successfully block inheritance for a long period of time. Only the strongly entrenched ones with very special discourse-pragmatic features manage to do so. Low-frequency constructions are always in danger to change or even dissolve as nodes from the network if their structure clashes with structural preferences from connected more strongly entrenched constructions.

4.2   Constructional loss: Demise of the constructional family

I will now argue that the discussed co-occurrence constructions dissolve in the network due to the emergence of a new node, namely the

$$[[DET_{def,infl}]_{DETERMINATION}+[CN_{infl}]_{HEAD}]_{NPdef} - \text{construction}$$

This construction is a form–meaning pairing in the sense that on the construction's "semantic side" we find "the concept of definite reference", which is formally expressed in the grammar by an NP with a fixed determination slot that has to be filled obligatorily by only one determinative. The constructionalization of this construction, which I claim happened between early and late Old English, generally leads to a complete reorganization of definiteness marking in English, and especially to constructional competition and the demise of co-occurrence. The next pages will discuss in more detail how and why the postulated neoanalysis of the linguistic system possibly comes about.

When investigating texts from the early Old English period, two observations have often been made in the literature: firstly, Old English (NP) word order was less fixed than in later stages of the language (e.g. Traugott, 1992; Ringe & Taylor,

2014), and, secondly, definiteness marking was less obligatory and more optional than it is today (e.g. Christophersen, 1939; Ackles, 1997; Sommerer, 2018).[20] Such statements are partially based on the existence of OE examples in which bare nominals without any determiner code definite referents (23) or in which adjectives are positioned in a non-default manner (24):

(23) *þa   þe   nolden   ær   to his libbendum lichaman onbugan, þa   nu*
those who would not earlier to his living   body   bow,   those now
*eadmodlice **on cneowum** abugað to his dædum banum*
humbly   **on knees**   bow   to his dead   bones
'those who would not bow to his living body earlier, now bow to his dead bones humbly on their knees' (cochronE, ChronE_[Plummer]: 979.19.1488)

(24) *& þa biscopas Eadnoð & Ælfhun & seo burhwaru   underfengon*
and the bishops Eadnoth and Ælfhun and the townspeople took up
haligan þone lichaman
holy   the   body
'and the bishops Eadnoth and Ælfhun and the towns people picked up the holy body'   (cochronE, ChronE_[Plummer]: 1012.15.1835)

The following two constructions license the constructs in Example (23) and (24):

$$[[CN_{infl}]]_{NPdef} \quad or \quad [[ADJ_{infl}]+[DEM_{infl}]+[CN_{infl}]]_{NPdef}{}^{21}$$

It is assumed that these two constructions were as entrenched in the OE constructicon as various other schemas. Next to the templates that have been mentioned so far, of course, several "default" constructions must have been entrenched in the constructicon as well, e.g.:

$$[[DEM_{infl}]+[CN_{infl}]]_{NPdef} \quad or \quad [[POSS_{infl}]+[CN_{infl}]]_{NPdef}$$

I now argue that, whereas the last two schemas were strongly entrenched, the constructional schemas mentioned before (including the co-occurrence templates) were entrenched rather weakly, due to their low frequency and usage.[22]

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20. At this stage, no definite article existed yet. Definiteness was only marked "indirectly" when speakers used demonstratives or possessive determinatives.

21. The speaker/listener has also entrenched many other definite, indefinite or non-referential CNPs which follow other templates, e.g. $[[DEM_{infl}]+[ADJ_{infl}]+[CN_{infl}]]_{NPdef}$ with adjectival modification located after determination, or heads which are only modified by a quantifier or only by an adjective,…).

22. In usage-based Construction Grammar models, it is assumed that constructions are based on generalizations over actual utterances, which is why a certain degree of type and token frequency is necessary to uncover the structure of any linguistic input. High token frequency

As was shown in the empirical part of this paper (Section 3, Table 2 and 3), co-occurrence constructions are not very frequent (less than 1% of all CNPs). That is why I argue that the constructional co-occurrence schemas are only weakly entrenched. In contrast, other constructional schemas are extremely frequent in early Old English. As shown in Sommerer (2018, pp. 224–228), in all investigated OE manuscripts the $[[DEM_{infl}]+[CN_{infl}]]_{NPdef}$ construction, which, for example, licenses constructs like *se bisceop, sio æ, þone ford, ðæm æscum*, makes up between 23% and 36% of all CNPs. Similarly the $[[POSS_{infl}]+[CN_{infl}]]_{NPdef}$ construction occurs in a range between approximately 6% and 15% in all the manuscripts. Also the $[[GenP_{infl}]+[CN]]_{NPdef}$ construction is used between 5% and 12%. In all the manuscripts, only those three constructions with only one element preceding the head noun make up between 45% and 55% of all CNPs.

That is why I suggest that although various NP schemas exist (e.g. schemas with no marking of definite reference but also double marking of definite reference), speakers of early Old English conclude that definite reference is preferably marked overtly by only one element. This grounding element is almost always located to the left of any potential modifiers. Speakers/listeners observe this pattern preference based on the majority patterns in their linguistic input. As a reaction to this frequency distribution, they ultimately neoanalyse the system of definiteness marking in a new manner, basically switching from optional definiteness marking to obligatory definiteness marking in a specific position. This new coding strategy, in constructional terms, corresponds to the constructionalization of an abstract construction with a local fixed determination slot:[23]

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leads to the emergence of collocations, and high type frequency leads to the abstraction of syntactic templates and their strong entrenchment (Langacker, 1987, p. 59; Goldberg, 2006, pp. 39, 98–101; Bybee, 2010, p. 9; Hoffmann & Trousdale, 2013, p. 5; Diessel & Hilpert, 2016, p. 21).

23. At the earliest stages of Old English, the majority of speakers do not have a locally fixed prehead slot reserved to indicate definite reference and so, no slot has to be filled obligatorily. Nevertheless, in the linguistic output, the position is filled most of the time. This might lead a subset of the population to draw different conclusions. For the majority of (potentially "older") speakers, the marking of definite reference is only a "variable strategy". The variable strategy is to use determinatives more freely and only in certain semantically motivated situations. However, a subset of speakers (primarily the younger generation) neoanalyzes the system as one where definiteness has to be marked obligatorily by one determinative.
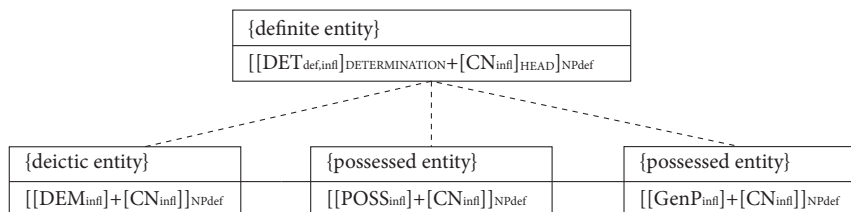
Figure 4. Emergence of an abstract definite NP schema

At this point in time, I would like to introduce another, more fine-grained, terminological distinction, namely the one between "constructionalization *novo loco*" and "constructionalization *in situ*". As can be seen in Figure 4, the newly emerged construction occupies a new, previously unoccupied space in the constructicon and has to be connected to already existing constructions via new links. This is a case of "constructionalization *novo loco*" (Sommerer, 2018, pp. 149–151). This type of constructionalization is different from "constructionalization *in situ*" where an existing construction is locally adjusted, either on its formal side, its meaning side or on both sides (see Sommerer, 2018, pp. 149–151 and the introduction to this volume for details on the distinction).

The constructionalization in Figure 4 is mostly influenced by the high frequency and strong entrenchment of some specific NP constructions. At the same time, Sommerer (2018, pp. 267–302) discusses several additional functional and cognitive reasons why the constructionalization came about at the time. It would go beyond the scope of this paper to elaborate on all the potential causes in detail. Still, the following arguments shall be mentioned:

a. The neoanalysis of the system (adding a determiner position early in the NP string) increases on-line processing efficiency for the human parser who uses the determiner as a signal for nominality (Hawkins, 2004, 2015)

b. Obligatory overt definiteness marking increases communicative speaker listener interaction by reducing difficult inferencing from context. An overt definiteness marker is a functional element to code anaphoric intertextual relations improving informativeness by distinguishing between referential and non-referential contexts or definite and indefinite contexts. An overt obligatory definiteness marker acts as an unambiguous signal for referentiality and successfully grounds the nominal in the discourse (Givón, 1981; Traugott, 1982; Langacker, 1991).

c. A variable linguistic strategy is more complex and evolutionarily less stable than an unconditioned strategy which states to always mark definiteness overtly with common nouns (Ritt, Smith & Fehér, 2014). The obligatorification process is a matter of systemic simplification, as it is more difficult for a speaker to establish a detailed hypothesis on when to mark or not mark definiteness overtly.

d. The constructionalization of the construction mentioned above is triggered by the speaker's ability to perform analogical reasoning (see below).

In the present case of constructionalization, a lot of analogical reasoning on the speaker's side can be detected as well. I strongly adhere to the idea that the linguistic structure of a particular language is based on analogy (Fischer, 2007, 2008, 2010; De Smet, 2009, 2012). Analogy will be treated as a "psychologically real phenomenon which has causal efficiency" (Itkonen, 2005, p. xii) and which will be conceptualized in a wider sense as "rule generalization/extension" at a higher meta-linguistic level (Traugott & Trousdale, 2010, p. 36). The formal similarity of constructions and the adjacency of signs are an important force in constructionalization and network reorganization.

At one point in time, the speaker/listener notices that the three highly frequent constructions $[[DEM_{infl}]+[CN_{infl}]]_{NPdef}$, $[[POSS_{infl}]+[CN_{infl}]]_{NPdef}$, $[[GenP_{infl}]+[CN]]_{NPdef}$ have something in common conceptually and formally, namely that one unit which is positioned in front of the head noun expresses definiteness. This is the point when the speaker abstracts the $[[DET_{def,infl}]_{DETERMINATION}+[CN_{infl}]_{HEAD}]_{NPdef}$ construction.

On the one hand, this new node, once it is successfully entrenched, leads to the recruitment of the OE demonstrative *se* ('that') as a default filler which triggers the grammaticalization of this gram (i.e. its phonological and semantic reduction, etc.). On the other hand, this new construction competes with other templates to express definite reference. The following schemas are argued to be in competition:

a. $[[DET_{def,infl}]_{DETERMINATION}+[CN_{infl}]_{HEAD}]_{NPdef}$
b. $[CN]_{NPdef}$
c. $[[DET_{def,infl}]+[DET_{def,infl}]+([ADJ_{infl}])+[CN_{infl}]]_{NPdef}$

This competition is resolved via analogical reasoning and reconfiguration of node external linking: the newly emerged (a) construction gets a position in the network and new vertical links are established (see Figure 4). Once this inheritance relation is in place, the new marking strategy with one overt definiteness marker gets analogically extended to the other semantically definite but syntactically alternative constructions: the bare CN cases and the co-occurrence constructions (being less frequent and thus less prototypical). Put differently, the speakers overgeneralize the majority pattern and extend the schema to non-prototypical instances to get rid of "the odd man out". This is the reason why ultimately the bare CNP node (b) and the co-occurrence nodes (c) dissolve from the network, thereby rendering any constructs ungrammatical. So a new schematic construction constitutes a model according to which other constructional patterns are realigned.

5. Conclusion

This paper has tried to show that constructionalization but also the death of a construction can be driven by frequency effects and cognitive and systemic factors, like analogical reasoning. The overall shape of the synchronic system leads to the formation of a new productive grammatical schema, which in turn leads to the constructional demise of competing nodes.

I also made some suggestions for how a usage-based, cognitive (diachronic) construction grammar model should annotate constructions and their (changing) networks. Applying constructional thinking to the specific phenomenon has also directly led to some burning "open" questions. One of the questions is whether it is likely that speakers really abstract over abstract templates like

$$[[DEM_{infl}]+[POSS_{infl}]+[ADJ_{infl}]+[CN_{infl}]]_{NPdef}$$

and

$$[[POSS_{infl}]+[DEM_{se,infl}]+[ADJ_{infl}]+[CN_{infl}]]_{NPdef}$$

and entrench a $[[DET_{def,infl}]+[DET_{def,infl}]+([ADJ_{infl}])+[CN_{infl}]]_{NPdef}$ construction. Is it cognitively realistic and even necessary to assume the existence of extremely abstract schemas high up in the network? If yes, which "special" semantic meaning do we then postulate for these constructions? An anonymous reviewer to this paper has rightfully pointed out that instead of postulating the existence of a $[[DET_{def,infl}]+[DET_{def,infl}]+([ADJ_{infl}])+[CN_{infl}]]_{NPdef}$ construction, another modeling option would be to assume the existence of a constructeme where the word order of DEM and POSS is not specified.

Another question is whether it is feasible to postulate a construction which has an optional modification slot or if, instead, two separate templates have to be postulated: one with an adjective present and one without:

$$[[DET_{def,infl}]+[DET_{def,infl}]+[ADJ_{infl}]+[CN_{infl}]]_{NPdef}$$
$$[[DET_{def,infl}]+[DET_{def,infl}]+[CN_{infl}]]_{NPdef}$$

Put differently, how should construction grammars sketch templates in which some elements are optional? In this paper, I modelled 4 independent constructions. However, it would also seem possible to start out with only two types in the first place (namely $[[DEM_{infl}]+[POSS_{infl}]+([ADJ_{infl}])+[CN_{infl}]]_{NPdef}$ and $[[POSS_{infl}]+[DEM_{se,infl}]+([ADJ_{infl}])+[CN_{infl}]]_{NPdef}$ with an optional modifier slot.

Finally, another question is whether and how the three constructions (a) $[[DET_{def,infl}]_{DETERMINATION}+[CN_{infl}]_{HEAD}]_{NPdef}$, (b) $[CN]_{NPdef}$, and (c) $[[DET_{def,infl}]+[DET_{def,infl}]+([ADJ_{infl}])+[CN_{infl}]]_{NPdef}$ are connected vertically or horizontally in the network. Although further research needs to be conducted and although these

questions remain unanswered so far, I hope to have managed to shed some additional light on how constructional loss should be conceptualized and explained using a construction grammar model.

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The links

Vertical and horizontal relations

(Re)shaping the constructional network

Modeling shifts and reorganizations in the network hierarchy

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This paper takes a dynamic perspective on constructional networks by investigating which factors play a role in the architecture of the network and how its internal structure may be reorganized over time. It starts from the idea that the network hierarchy is constantly being reconfigured: new generalizations may give rise to new subschemas, and existing subschemas can move up to a higher level or, conversely, subschemas may marginalize and eventually disappear completely. Such network shifts typically involve changes in schematicity (viz. the level of abstractness) and/or productivity (viz. the extensibility of the (sub)schema). An ideal candidate to investigate these productivity shifts and internal reorganizations is the Dutch intensifying fake reflexive resultative construction. In present-day Dutch, the network of this construction displays an intriguing combination of subschemas at different levels of abstraction, displaying varying degrees of productivity, as well as conventionalized or even fossilized micro-constructions. Tracing back the recent history of this construction, the paper aims to show how mechanisms like schematization and conventionalization work together in creating the constructicon's network structure, and how certain constructional changes can be (re)interpreted as shifts within the constructional network. It will be discussed what new insights can be gained from such a network approach and which further steps may be taken to further flesh out the theory on constructional networks.

Keywords: modal expressions, constructional networks, productivity, schematicity, intensification, Dutch, constructional reorganization

1.   Introduction

This paper is aimed at investigating how the constructional network is (re)shaped through different kinds of shifts in its internal architecture. Drawing on the framework of (Diachronic) Construction Grammar, I suggest that a construction can be conceptualized as a taxonomic network of interrelated schemas, subschemas, and micro-constructions at different levels of abstraction, which may exhibit varying degrees of openness or fixedness. Importantly, this constructional hierarchy is not set in stone: it is formed and constantly reformed through language use. Such network-internal shifts typically involve changes in schematicity, which can manifest in different ways. For example, new subschemas may emerge as an abstraction over a set of specific lower-level instances; when a new node is added to the network, the hierarchic organization gains in complexity and the schematicity at the highest level of abstraction is increased. Established subschemas may also become even more schematic over time, which is often related to an increase in productivity. Schematicity and productivity, although two distinct properties of a construction, are tightly interconnected: the fact that the more productive schema is subject to fewer constraints entails that it is more abstract or schematic, and, accordingly, situated at a higher level in the hierarchy (Barðdal, 2008; Traugott & Trousdale, 2013; Perek, 2016; and see Perek, this volume, for some discussion on the interdependency of schematicity and productivity). Of course, it is also possible that a subschema suffers a decrease in productivity, which may weaken its representation and may eventually lead to the loss of that specific subschema in the network. Importantly, I will show that these different kinds of developments are not mutually exclusive and may be taking place at the same time in different areas of the network. In that regard, this paper aims to shed some more light on the question on how cognitive abilities, like conventionalization (or routinization), abstraction, and schematization, affect the structure and reorganization of the constructional network (general research question n°6 of this volume). Importantly, I will also explore how these mechanisms, which can result in node creation and node loss, can be conceptualized or modeled in a constructional network model (research question n°1 of this volume).

In order to investigate these shifts, I will focus on a very specific construction in Dutch, viz. the intensifying fake reflexive resultative construction, illustrated in the following examples (from the Delpher corpus, cf. infra).

(1)   *Als cliënt van deze firma **betaal** ik **me** elke maand **blauw**.*
      as client of this firm pay I myself every month blue
      'As a client of this firm, I pay a lot of money every month.'

(2) *Ik heb het nog steeds hartstikke druk. Ik **werk me** nog steeds **de griebels**.*
I have it still extremely busy I work myself yet still the jitters
'I'm still extremely busy. I still work very hard.'

(3) *Mota **schrok zich een hoedje** toen de taaie Russin aan haar zijde verscheen.*
mota startled herself a little hat when the tough russian by her side appeared
'Mota was very startled when the tough Russian appeared by her side.'

(4) *Waarom is de Tutti Frutti van De Schaap zo verrukkelijk? Omdat De Schaap **zich kleurenblind zoekt** naar de lekkerste vruchten die er bestaan.*
why is the tutti frutti of the sheep so delicious because the sheep itself
colour-blind searches for the most tasty fruits that there exist
'Why is the Tutti Frutti of De Schaap so delicious? Because De Schaap searches high and low for the best fruits there are.'

This construction shares its formal structure [SUBJ V REFL XP] with the literal fake reflexive resultative construction, illustrated in examples like *Hij schiet zich dood* 'He shoots himself dead' or *Hij drinkt zich regelmatig dronken* 'He often drinks himself drunk/drinks until he is drunk'. In the literal fake reflexive resultative construction, the verb is combined with an obligatory reflexive pronoun and a (often adjectival) postverbal phrase (XP) which has the function of a true resultative phrase. It expresses that the subject has undergone a change of state as a result of the verbal activity, i.e. the subject shot himself so (as a result) he is dead or the subject drinks a lot, so (as a result) he is drunk. In the intensifying fake reflexive resultative construction, however, the postverbal phrase is not really a resultative phrase because it does not denote an actual end result of the verbal activity. We cannot say that someone actually turns blue when making his monthly payments (1), nor does he become colour blind after an intensive search (4), and in examples (2) and (3), someone does not literally receive the jitters or a little hat by working or being startled, respectively. Instead, the postverbal phrases in the examples above act as intensifiers, which indicate that the verbal activity is boosted or performed with a heightened intensity in one way or another. Moreover, the intensifier presents itself as a wide variety of syntactic categories: NP (e.g. *een breuk* 'a fracture', *een hoedje* 'a little hat', *de pokken* 'the smallpox', *een aap* 'a monkey', etc.), AP (e.g. *suf* 'drowsy', *dood* 'dead', *blauw* 'blue', *kapot* 'broken', etc.), PP (e.g. *te pletter* 'to smithereens', *uit de naad* 'out of the seam', etc.), NP+PP (e.g. *het vuur uit de sloffen* 'the fire out of the slippers', *de longen uit het lijf* 'the lungs out of the body', etc.), NP+AP (e.g. *het hoofd suf* 'the head drowsy', *de vingers blauw* 'the fingers blue', etc.) and NP+particle (e.g. *het licht uit* 'the light out', but this category is highly infrequent). The construction can be schematically represented as follows:

(5)   [SUBJ   V   REFL   INTENSIFIER]
      Ik   werk   me   de griebels
      'I   work   –   very hard'

There are several reasons why this construction presents itself as a well-suited candidate for the aims of the present investigation. First of all, the construction displays signs of large-scale productivity and creativity at the highest level of abstraction, but there also appears to be a considerable degree of conventionality involved. Most native speakers will agree that examples (1) and (3) are more conventional uses of the construction (and more conventional intensifiers) than examples (2) and (4). Although the construction may host a wide variety of over 200 different verbs and intensifiers in present-day Dutch (see Gyselinck, 2018 for a full list), there are certain constraints on the possible intercombinations of these two elements that keep the productivity within certain bounds. The individual verbs and intensifiers may display varying degrees of combinatorial flexibility, with some verbs and intensifiers being used in a large array of different combinations (e.g. the verbs *schrikken* 'to be startled', *zich ergeren* 'to be annoyed', *werken* 'to work', *lopen* 'to run', etc., and the intensifiers *dood* 'dead', *suf* 'drowsy', *rot* 'rotten', *te pletter* 'to smithereens', etc.), whereas others are (almost) exclusively used in so-called "conventional expressions" (e.g. the intensifier *groen en geel* in *zich groen en geel ergeren* 'to annoy oneself green and yellow', or the intensifier *een hoedje* in *zich een hoedje schrikken* 'to startle oneself a little hat').

Second, there are indications that the construction has a relatively short history. Judging by the citations index of the *Woordenboek der Nederlandsche Taal* [WNT], it appears that the intensifying pattern was already used pre–19th century, but it was still highly infrequent and constrained at the time. I retrieved a number of examples with the intensifier *dood* 'dead' in combination with a small set of verbs (e.g. *zich dood zweten* 'to sweat oneself dead', *zich dood schamen* 'to embarrass oneself dead' etc.) and some attestations with the verb *lachen* 'to laugh' (e.g. *zich ziek lachen* 'to laugh oneself sick', *zich stom lachen* 'to laugh oneself stupid', etc.). Interestingly, the oldest example in the WNT is precisely the combination *zich dood lachen* 'to laugh oneself dead', which may indicate that the construction as we know it today has developed from this "fixed expression".

(6)   Och, ach ick **lachmen doodt**, ick kan 't niet langher harden.   (1617)
      'Oh, I'm laughing so hard (lit. laugh myself dead), I can't bear it any longer.'

This paper is not primarily concerned with the origins of the construction per se, but with the constructional changes that it has undergone more recently and how these changes can be interpreted within the constructional network. Based on the above findings, the variation of verbs and intensifiers attested in present-day

Dutch must have come about rather recently, which makes these interesting developments traceable in digitally available corpora.

Finally, the exponential expansion of the construction and the linguistic creativity that is observed in present-day Dutch may be related to the intensifying meaning component of the construction. There is abundant evidence in the literature that the domain of intensification is characterized by a kind of pragmatic wear-and-tear, in the sense that intensifiers are vulnerable to shedding some of their expressive or intensifying force if they become too frequent or wide-spread. This may result in a process of constant lexical renewal, as new intensifiers are introduced to replace or at least complement those that are no longer felt to be sufficiently expressive in specific contexts (Stoffel, 1901; Bolinger, 1972; Partington, 1993; Lorenz, 2002; Ito & Tagliamonte, 2003; Tagliamonte, 2008; De Clerck & Colleman, 2013, inter alia).

This paper is structured as follows. In the next section, I briefly introduce the methodology used to retrieve examples of this construction in a diachronic corpus and present an overview of the most important changes that the construction has undergone since the early 19th century. The focus is primarily on shifts in token and type frequencies at the maximum level of schematicity, as well as on the collocational behavior and distributional patterns of specific verbs and intensifiers. The third section then zooms in on a number of specific case studies to illustrate how certain constructional changes may be conceived of as shifts in productivity and/or schematicity, which in turn can be represented as internal reorganizations in the constructional network. In the fourth section, I discuss some challenges, pertaining to the theory of constructional networks, that still lie ahead. The final section briefly concludes the results of this paper.

2.   Tracking constructional changes: Empirical analysis of the Dutch intensifying fake reflexive resultative construction

2.1   Methodology

In order to track the changes that the Dutch intensifying fake reflexive resultative construction has undergone since the early 19th century, I compiled a diachronically continuous, genre-consistent corpus for the period under investigation. On the basis of the Delpher database of the *Koninklijke Bibliotheek* (the Dutch Royal Library), currently consisting of over 1.3 million Dutch newspaper issues for the period 1618 to 1995, a sample corpus was drawn including data for each

odd decade between the 1800s and the 1990s.[1] The corpus was queried follow-
ing a two-step search procedure, with the aim of retrieving an exhaustive set of
examples of the intensifying fake reflexive resultative construction. I started from
the ten most frequently intensified verbs in present-day, 21st century Dutch (cf.
previous research on the basis of the SoNaR corpus, see Gyselinck, 2018), viz.
betalen 'to pay', *lachen* 'to laugh', *lopen* 'to run', *piekeren* 'to worry', *schrikken* 'to be
startled', *werken* 'to work', *zich ergeren* 'to be annoyed', *zich schamen* 'to be embar-
rassed', *zich vervelen* 'to be bored', and *zoeken* 'to search'. The reason behind this
verb-based input is that, while there is no reason to assume that there have been
significant changes in the types of verbal activities that are prone to intensification,
there has likely been a lot of fluctuation in the intensifier slot. As was mentioned
in Section 1, the domain of intensification is characterized by a process of constant
lexical renewal and innovation, so it is not inconceivable that we find evidence of
intensifiers emerging or falling out of use to keep pace with linguistic fashion.

Concretely, I first searched for all possible forms (and spelling variants found
in the WNT) of these ten verbs in combination with the following reflexive pro-
nouns within a span of five words on either side.

(7)   *me, mij, mezelf, mijzelf, my, myzelf, myself, je, jou, jezelf, jeself, jouzelf, jouself,*
       zich, zichzelf, sich, sichzelf, sichself, sickzelf, sickself, zig, zigzelf, zigself, ons,
       onszelf, onsself, jullie

The 205,537 hits were manually skimmed in order to weed out all irrelevant hits
(i.e. doubles, examples of other constructions, etc.) in the process, leaving us with
a dataset of 3,171 relevant example sentences for the period between the 1830s
and 1990s (none were retrieved for the 1810s). This dataset already contained 171
different intensifier types that were, at some point or other, used in the construc-
tion in that period of roughly 150 years. In the second step, I queried the corpus
for the 171 intensifier types in combination with the reflexive pronouns in (7) in
order to retrieve more examples with other verbs.[2] From the 94,078 hits that were
obtained, 2,154 were selected as relevant. This eventually gave us a total dataset of
5,325 items, featuring 188 different intensifier types and 201 different verb types.
Some examples are given in (8) to (10) below.

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1. Only 12 newspapers – which were selected for reasons of historical continuity and size – were
included in my data collection. The aim was to sample approximately 300 million words per
decennium, but for the 1810s, 1830s, and 1850s, I only had approximately 8 million, 51 mil-
lion and 115 million words, respectively. The total size of the sample corpus is approximately
2.3 billion words.

2. Some wildcards were added in the input intensifiers to allow for the retrieval of spelling
variants or new intensifiers that may have been missed in the first round.

(8) *Je **lacht je** gewoon **een aap**, meneer, hij kan iedereen nadoen!*   (1910–1919)
you laugh yourself just a monkey, sir, he can imitate anyone
'You will laugh your head off, sir, he can imitate anyone!'

(9) *Maar ook socialistische dagbladen, hebben **zich het vuur uit de pen***
*** geschreven** in de maanden, die achter ons liggen.*   (1950–1959)
but also socialist newspapers have themselves the fire out of the pen written
in the months that behind us lie
'But socialist newspapers have been writing incessantly over the past couple
of months.'

(10) *Waarom zou ik **me** vijf dagen **te blubber werken** als het ook in zes dagen kan.*
   (1980–1989)

why would I myself five days to blubber work if it also in six days can
'Why would I work hard for five days, if I can do it in six.'

Each item was subsequently annotated for a set of linguistic variables (e.g. reflexivity of the verb, transitivity of the verb, etc.), but for present purposes I only refer to the verb and intensifier lemmata.

2.2   Results: Diachronic frequency and productivity increase

Before we can have a closer look at the shifts and internal reorganizations in the constructional network, we first need to identify what kinds of productivity changes this construction has undergone and how such changes are relevant to the network structure. This section will mainly focus on the general frequency of the construction and the changes in the attested slot fillers, but also on the shifts in collocational preferences and the emergence (or disappearance) of conventional expressions. Consider the frequency data in Table 1.

The results in Table 1 tell us that the construction has not only become increasingly frequent in the corpus, it also displays a considerable increase in (realized) productivity. In fact, the frequency development curves of the (normalized) token frequency and both verb and intensifier type frequencies are strikingly parallel, see Figure 1 below.

However, this general expansion glosses over many of the more interesting shifts that are taking place at lower levels in the network, i.e. the level at which either the verb or the intensifier has been lexically specified (e.g. [SUBJ *lachen/ schrikken/ergeren* REFL INT] or [SUBJ V REFL *dood/te pletter/een hoedje*]), or the micro-construction level in which both verb and intensifier are specified (e.g. [SUBJ *schrikken* REFL *een hoedje*]). If we look at the behavior of individual verbs and intensifiers, we find that, although many verbs and intensifiers have increased their frequency over time, they have not all done so at the same pace or to the

Table 1. Frequency development since early 19th century

	1830s	1850s	1870s	1890s	1910s	1930s	1950s	1970s	1990s
Absolute frequency	6	8	56	96	156	271	574	842	2,035
Normalized frequency (per 10 million words)	1.17	0.69	1.83	3.19	5.29	8.93	18.90	28.13	68.51
Verb types	5	6	17	25	38	39	53	96	131
Intensifier types	4	8	15	23	29	37	71	96	115
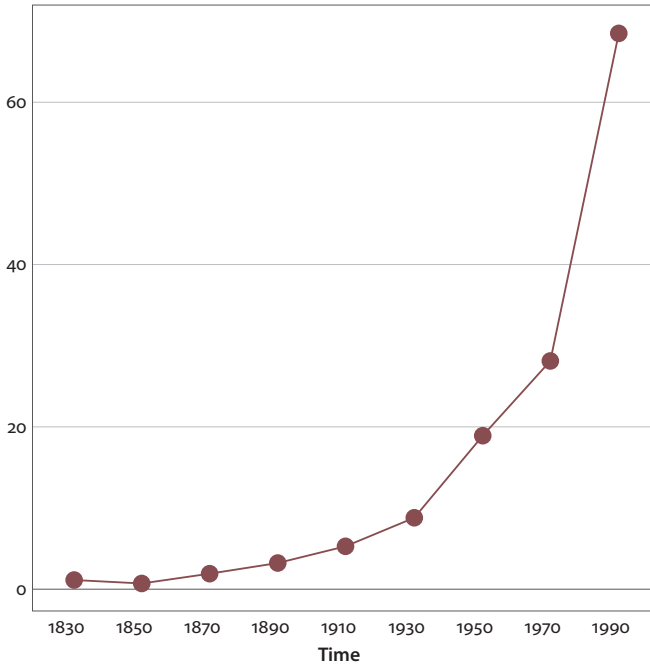
a. Normalized frequency
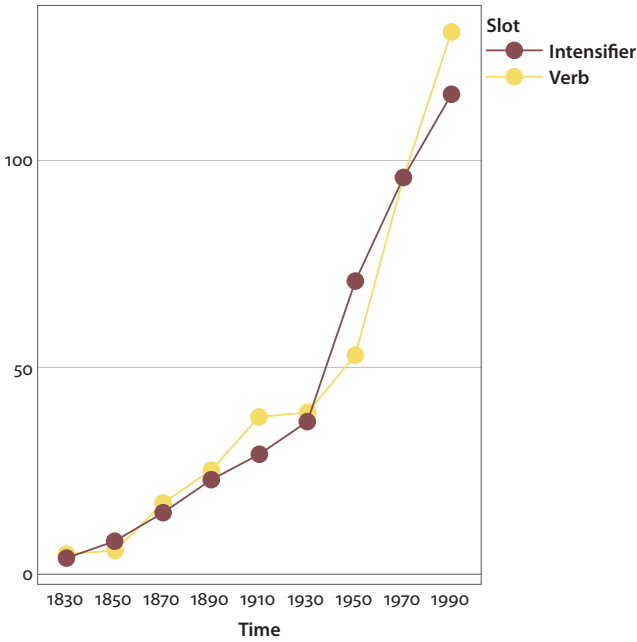
b. Type frequency

Figure 1. Token (normalized) and type frequency (raw) development curves

same extent. To give an example from the verbs, the verb *schrikken* 'to be startled' (introduced in the 1910s) exponentially increased its frequency from 47 attestations in the 1930s to 470 in the 1990s, whereas *lachen* 'to laugh' (already used in the 1830s) shows a much more gradual development, going from 64 attestations in the 1930s to 166 in the 1990s. With respect to the intensifiers, it appears that several of the highly frequent intensifiers in present-day Dutch (e.g. *rot* 'rotten', *te pletter* 'to smithereens', or *een hoedje* 'a little hat') were not yet used before the second half of the 20th century, although we also have some intensifiers that were successful in the long-term like *dood* 'dead' and *suf* 'drowsy'; both were already used in the 1830s and are still in the top five today.

If we have another look at Table 1 and Figure 1, we can now add that the exponential token frequency increase may well be concomitant with a type frequency increase, but it is primarily carried by a number of highly frequent verbs and intensifiers.

In addition, there is considerable variation in the degree of productivity of these different subpatterns. For example, the intensifiers *een hoedje* 'a little hat' and *wezenloos* 'vacant' are equally token frequent with 66 attestations in the 1990s, but the former is used with just one verb type (viz. *schrikken* 'to be startled'), whereas the latter is used with 23 different verb types, among which 17 are (creative) one-offs, see examples (11) to (14).

(11) *Hij maakte de enveloppe zonder retouradres open. Hij **schrok zich een hoedje** want het bleek een intieme liefdesbrief te zijn.* (1990–1995)
he made the envelope without return address open he startled himself a little hat because it appeared an intimate love letter to be
'He opened the envelope without return address. He was very startled when it turned out to be an intimate love letter.'

(12) *Krikke **ergert zich wezenloos** aan de manier waarop zijn medebewoners met hun woongebouw omspringen.* (1990–1995)
krikke annoys himself vacant by the way which-on his co-tenants with their building dealt
'Krikke is very annoyed by the way his co-tenants dealt with the building.'

(13) *Planners van transportondernemingen **bellen zich** meestal **wezenloos** om retourlading te regelen.* (1990–1995)
planners of transport agencies call themselves usually vacant to return shipment to arrange
'Planners of transport agencies usually have to make phone call after phone call just to arrange a return shipment.'

(14)   *Nel Trijssenaar, die dit evenement al vanaf 1979 meemaakt, **roert zich***
       ***wezenloos** in de erwtensoep.*   (1990–1995)
       nel trijssenaar who this event already since 1979 lives stirs herself vacant in
       the pea soup
       'Nel Trijssenaar, who has been part of this event since 1979, keeps stirring
       and stirring the pea soup.'

In other words, while the intensifier *wezenloos* 'vacant' is unmistakably a productive intensifier which can be freely combined with a range of different verbs, the exclusive association of *een hoedje* 'a little hat' with the verb *schrikken* 'to be startled' indicates that *een hoedje* is not productive at all. It is only used in this construction as part of a specific collocation, which could be considered as a conventional(ized) expression. Note that, the strength of the collocation *zich een hoedje schrikken* 'to startle oneself a little hat' is in the first place determined by the intensifier-to-verb attraction, but much less so by a verb-to-intensifier attraction (see, e.g., Gries, 2013 on asymmetry in the association between elements of a collocation): *schrikken* 'to be startled' in fact does occur with a wide variety of other intensifiers besides *een hoedje* 'a little hat'. Another intensifier which has a similar token frequency is *uit de naad* 'out of the seam' (71 attestations in the 1990s). *Uit de naad* does show some signs of productivity, as it is used with 13 different verbs, 9 of which are hapaxes. A closer look at the types of verbs occurring with *uit de naad* 'out of the seam' reveals that these verbs are remarkably coherent in terms of their semantics: all verbs denote an activity that requires some physical effort, as illustrated in (15) to (17).

(15)   *Ik heb **me** niet twee jaar **uit de naad gewerkt** om een zak centen te vangen en*
       dan weg te wezen.   (1990–1995)
       I have myself not two years out of the seam worked to a bag money to catch
       and then away to be
       'I didn't work my butt off for two years just to grab a bag of money and then
       get out of here.'

(16)   *Ben je gek, op deze muziek blijf je niet zitten, je **danst je uit de naad**.*
                                                                      (1990–1995)
       are you crazy on this music stay you not sit you dance yourself out of the
       seam
       'Are you crazy, you can't sit still to this music, you need to dance your butt
       off.'

(17) *Dat relaxte maar oh zo swingende ritme, waarvoor drummer en percussionist zich uit de naad sloegen.* (1990–1995)
that relaxed but oh so swinging rhythm which-for drummer and
percussionist themselves out of the seam beat
'The relaxed but oh-so-swinging rhythm, created by the intense beats of the
drummer and percussionist.'

While *uit de naad* 'out of the seam' definitely has some degree of combinatorial flexibility, in that it can combine with multiple verbs, its use and extensibility are limited to a delineated semantic domain. As argued by Barðdal (2008), the productivity of a pattern is determined not only by its (type) frequency – as has traditionally been assumed in studies on productivity (Bybee, 1985, 1995; Bybee & Thompson, 1997, inter alia) – but also by its semantics. Although the notion of productivity – which is in itself not unproblematic – is not at the center of this paper, there is a tight interrelatedness between productivity and schematicity, in the sense that the productivity of a subschema *in part* determines the level at which it is represented in the constructional network (although there is no necessary causal link cf. Section 1 and Perek, this volume).

From a diachronic point of view, the productivity of these subschemas is subject to change over time, following shifts in the collocational patterns of the individual verbs and intensifiers. Accordingly, their representation within the constructional network may change as well. For example, it appears that the intensifier *uit de naad* 'out of the seam' was introduced as part of a conventional collocation *zich uit de naad werken* 'to work oneself out of the seam' – i.e. a micro-construction [SUBJ *werken* REFL *uit de naad*] (which still accounts for about 70% of all attestations in present-day Dutch) – around the mid-20th century, and only came to be used with other verbs of physical effort in the late 20th century. This suggests that the semantically defined subschema probably has arisen only very recently. In addition, it will be interesting to see whether *uit de naad* 'out of the seam' continues to expand its collocational range to other semantic domains.

Based on the results so far, it appears that the construction presents a complex, dynamic constructional network that is made up of a highly schematic schema at the macro-level, a combination of several islands of productivity at different lower levels in the hierarchy, as well as both creative and conventionalized, virtually fossilized collocations at the micro-construction level. In the next section, I will examine how a representation of the constructional network can capture this interesting mix between productivity and idiomaticity and how its internal structure was (re)shaped through shifts in the productivity and/or schematicity at different levels of abstraction.

3.   A dynamic constructional network: Shifts at different levels of abstraction

In this paper, the postulated constructional network takes the shape of a hierarchy from lexically-specified instances at the bottom to increasingly more abstract schemas at the top. As befits a usage-based framework, this network is built from the bottom up, starting out with actual utterances in language use which have been referred to as constructs (Traugott, 2007, 2008a, 2008b; Traugott & Trousdale, 2013). If there are certain formal and/or semantic commonalities between these utterances, we can capture this in the form of an overarching abstraction, i.e. a micro-construction that consists of both lexically filled slots and one or more open slots. Moving further upwards, we arrive at an intermediate level of meso-constructions or subschemas which abstract over lower-level micro-constructions. The most abstract schematic level is that of the macro-construction or schema which generalizes over all patterns at lower levels. This terminology has been introduced as a heuristic device to describe the hierarchical organization of the constructicon, but in no way does it claim that any construction is reducible to just four discrete levels of description (Hilpert, 2013). As has been shown by Trousdale (2008), multiple intermediate or meso-levels of abstraction may be needed before arriving at the macro-schema depending on the construction under investigation. To be sure, it is no trivial matter to decide how many levels of description are appropriate, and the hierarchy may take a somewhat different shape depending on the focus or research aims of the individual researcher.

If we briefly apply this to the intensifying fake reflexive resultative construction, using the examples (11) to (17) presented earlier in Section 2.2, I suggest that *wezenloos* 'blank' can be positioned at a subschema level in the form of [SUBJ V REFL *wezenloos*]: given that it is found to co-occur with 23 different verb types from different semantic categories, it forms a productive subschema with an open, schematic verb slot. The intensifier *uit de naad* 'out of the seam' can also be represented as a subschema with a partially productive verb slot, but given that it is subject to collocational restrictions, it is arguably less schematic than *wezenloos* 'vacant'. We can account for this by adding a semantic restriction to the verb slot as follows: [SUBJ $V_{physical\ effort}$ REFL *uit de naad*], and by positing this schema at a lower level in the hierarchy than the schema of *wezenloos*. At the micro-construction level, we find patterns in which both the verb and the intensifier have been lexically specified. One of those patterns is the collocation *zich een hoedje schrikken* 'to startle oneself a little hat', which is formalized as [SUBJ *schrikken* REFL *een hoedje*]. Given its exclusive association to the verb *schrikken* 'to be startled', however, we cannot assume the existence of an overarching intensifier-specific subschema with an open (or even semantically restricted) verb

slot [SUBJ V REFL *een hoedje*]. As was pointed out, taking the point of view of the verb rather than the intensifier, we find that *schrikken* 'to be startled' does allow for several intensifiers in its intensifier slot. In the constructional hierarchy, this implies that there is in fact an overarching verb-specific subschema [SUBJ *schrikken* REFL INT] that licenses the micro-construction [SUBJ *schrikken* REFL *een hoedje*], but no intensifier-specific subschema [SUBJ V REFL *een hoedje*]. In Section 4, we will discuss how these different kinds of perspectives may pose a challenge to the constructional network representations and how such asymmetry in the association of collocations can be dealt with.

From a diachronic perspective, the configuration of micro-constructions and subschemas is subject to change. Different kinds of changes may be taking place at multiple levels of abstraction. Small-scale shifts may over time lead to important reorganizations of the network hierarchy. This section will discuss how some of the shifts or changes observed for the intensifying fake reflexive resultative construction can be accounted for within the network, primarily focusing on a number of concrete case studies, viz. the intensifiers *suf* 'drowsy', *het vuur uit de sloffen* 'the fire out of the slippers', and *wild* 'wild'.

3.1   Expansion and schematization

It was mentioned in Section 2.2 that the recent development of the intensifying fake reflexive resultative construction can be described, in very general terms, as dramatic expansion, both in terms of frequency of use (token frequency) and in terms of the different verbs and intensifiers that are used in its open slots (type frequency). Purely in terms of "size" then, the network of the construction has also expanded: while it may have been limited to a number of low-level micro-constructions and perhaps a handful of subschemas in the early 19th century, it now seems an infeasible task to actually map out the entire structure of the network in the 21st century given the myriad of possible combinations at the micro-construction level and many intermediate subschema levels. New verbs and intensifiers typically enter the constructicon as part of one specific verb-intensifier combination, that is, at the micro-construction level. If we abstract away from the specific subject and reflexive pronoun, we get [SUBJ *specified verb* REFL *specified intensifier*]. Over time, they may come to extend their collocational range to other items. The formation of subschemas as an abstraction over formal or semantic similarities between specific linguistic expressions at a lower level has been termed "schematization". As the number of possible verbs and intensifiers increases, so do the attested inter-combinations at the micro-construction level, and a larger variety of micro-constructions creates more opportunities for schematization to take place. Once a subschema has been created, it may further increase its degree

of abstractness – by attracting even more types and relaxing certain collocational constraints – and shift to a higher position in the network. Note that the schematization we are dealing with here is schematization of the lexical slots in the construction, not (at least not necessarily) of the constructional meaning (see Perek, this volume, for more discussion on the different types of schematization and how they relate to productivity).

As will be shown below, this process of schematization and further increase in schematicity does not happen at the same pace for each individual item, nor does it *necessarily* happen for each and every verb or intensifier. There are certain verbs or intensifiers that were introduced as part of a "fixed expression" and that remained exclusively associated to that specific collocation for several decades. One such example is the expression *zich groen en geel ergeren* 'to annoy oneself green and yellow', illustrated in (18).

(18) *En thans **ergert** men **zich groen en geel** omdat Grammens de hem door de Vlaamsen-nationalisten aangeboden candidatuur heeft aanvaard.* (1950–1959)
and now annoy one himself green and yellow because grammans the himself by the flemish-nationalists offered candidacy has accepted
'Now people are very annoyed because Grammens has accepted the candidacy that was offered to him by the Flemish nationalists.'

The intensifier *groen en geel* 'green and yellow' was introduced as part of a collocation with *zich ergeren* 'to be annoyed' – a verb which was, and still is, used with an array of different intensifiers – and has been exclusively used in that particular combination in its entire existence. The same can be said for *een hoedje* 'a little hat', which has been used as part of the expression *zich een hoedje schrikken* – some rare exceptions notwithstanding – since its introduction around the 1950s. As was mentioned in the previous section, these cannot be considered productive, "free" intensifiers and no schema-formation has taken place (at least not for the intensifiers, cf. Section 4 below on the verb perspective). These processes create an increasingly complex internal structure of patterns at multiple levels of abstraction which is constantly in flux. The remainder of this section zooms in on the diachronic development of two interesting intensifiers which both display clear signs of schematization, although their development is different in important respects.

3.1.1   *Case 1: Suf*
A prime example to illustrate how the process of schema-formation can gradually give rise to a multi-layered complex structure in the constructional network is the intensifier *suf* 'drowsy'. Its first attestation in the corpus dates back to the 1830s in combination with the verb *denken* 'to think', see (19).

(19) *De goede sukkel krabt achter zijn oor, knijpt in zijn neus, **denkt zich suf** en vraagt bij zichzelven: Wat scheelt mijne vrouw?* (1830–1839)
the kind fool scratches behind his ear, pinches in his nose, thinks himself drowsy and ask by himself: what bothers my wife
'The kind fool scratches behind his ear, pinches his nose, thinks hard and asks himself: What is bothering my wife?'

Between the moment of its introduction and the end of the 19th century, *suf* 'drowsy' was (virtually) exclusively attested with the near-synonymous verbs *denken* 'to think' and *peinzen* 'to think'. It is therefore suggested that the representation of *suf* 'drowsy' within the network was at the time still confined to the micro-construction level, as in Figure 2 – the bolded lines indicate that these micro-constructions are highly token frequent and may have "collocation" status.[3]
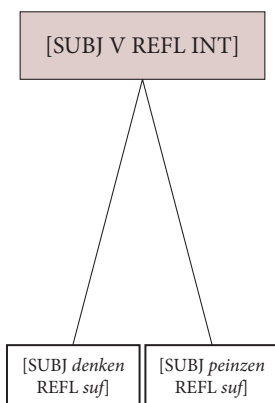
Figure 2. Network representation around the late 19th century for the intensifier *suf*

During the first half of the 20th century, we start finding a number of other verbs that are still semantically *similar* to but less clearly (near-)synonymous with the

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3. Note that the network representations presented here are meant to provide a very general picture of the "status" of the construction during a delineated period, glossing over any small-scale shifts that may have happened during that time. Given that the structure of the network is actually constantly changing, we ideally need interactive models of the network that can accommodate this dynamic character (cf. Section 4 infra). Even though there are likely still some additional intermediate subschemas at higher levels of abstraction (e.g. high-level semantic or formal generalizations) before we arrive at the macro-schema [SUBJ V REFL INT], I left them out in order to mainly focus on the lower levels of abstraction here. Note that the semantics of the schemas are not added in the network. For each of the (sub)schemas, the general meaning is "to V intensely", although some slightly different paraphrases (e.g. "to V a lot/extensively/ hard…") may be necessary for some specific verbs.

original collocates *denken* and *peinzen* (e.g. *filosoferen* 'to philosophize', *lezen* 'to read', *piekeren* 'to worry', *verzinnen* 'to invent', see (20)–(21)).

(20) *Al moet men wonderen van zuinigheid doen en **zich suf piekeren** om er eenigszins dragelijk te komen.*   (1910–1919)
if must one wonders of frugality do and himself drowsy worry to there somewhat bearable to come
'Even if one has to perform miracles to save money and worry a lot about how to survive.'

(21) *Komen 's avonds de jongens bij heer Burk om boeken. Burk zelf **leest zich suf**.*
(1930–1939)
come at night the boys with lord burk for books burk himself reads himself drowsy
'At night, the boys visit Burk to borrow some books. Burk reads a lot.'

This suggests that an abstraction may have been formed in the network, allowing *suf* 'drowsy' to be used as a booster for any verb that denotes some kind of cognitive or mental activity, as in Figure 3. This specific semantic constraint is likely motivated by the original lexical meaning of *suf* which expresses a kind of mental state of light-headedness. At the same time, a new verb-intensifier combination has conventionalized into a strong collocation next to the still frequent collocations of *zich suf denken/peinzen*, viz. *zich suf piekeren* 'to worry oneself drowsy'.[4]
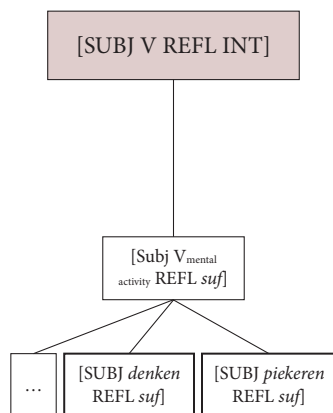
Figure 3. Network representation around the early 20th century for the intensifier *suf*[5]

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4. For now, we are only concerned with the taxonomic links within the network; the possible added value of horizontal (and other) links will be discussed in Section 4.

5. The three dots at the bottom indicate that there are other micro-constructions with *suf* that need to be represented at this level. I did not spell them out for the sake of simplicity.

Around the 1950s, *suf* 'drowsy' is occasionally used with a verb that does not so clearly denote a purely mental activity, as in (22) below.[6] The gradual relaxation of the mental activity constraint goes hand in hand with a large-scale collocational expansion, which will eventually promote *suf* to its status of most flexible intensifier in present-day Dutch. In the 1990s, *suf* 'drowsy' is found in combination with over 50 different verb types from multiple semantic classes, see (23) to (25).

(22) *Die vlag woei er omdat van 1844 tot 1912 op deze plaats badhuis De Veer stond, waarnaar gisteravond vierhonderd hoofdstedelijke autorijders **zich suf zochten**.* (1950–1959)
the flag waved there because from 1844 to 1912 on this place bath house the feather stood which-for yesterday evening four hundred capitalist drivers themselves drowsy searched
'The flag was there because, from 1844 to 1912, this was the location of bath house De Veer, which 400 drivers from the capital had been searching for like crazy last night.'

(23) *Je **schaamde je suf**, als kleuter, met zo'n vader.* (1990–1995)
you embarrassed yourself drowsy as toddler with such a father
'You were so embarrassed as a toddler, with a father like that.'

(24) *Je **zapt je suf** en je kijkt naar programma's, die je nog nooit gezien hebt.* (1990–1995)
you browse yourself drowsy and you look at show that you yet never seen have
'You browse through the channels like crazy, watching shows you have never seen before.'

(25) *Die speelde de hoofdrol, die moest **zich** links en rechts **suf naaien** maar het was geen porno acteur.* (1990–1995)
that one played the main part who must himself left and right drowsy screw but it was no porn actor
'He played the main part, he had to screw everyone left and right, but he was no porn actor.'[7]

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6. One reviewer argued that *zoeken* 'to search' in a way could also refer to a mental activity of sorts. Although I believe that this is not so much the case in the example given here, I do agree that *zoeken* can have mental connotations. In fact, *zoeken* 'to search' clearly illustrates that the 1950s should be seen as a transitionary period where the constraint on purely mental activity is gradually starting to relax, but we do not see purely physical activities or other non-mental verbs just yet.

7. The extra addition of *links en rechts* 'left and right' even further boosts the verbal activity, in addition to the construction-inherent intensifier *suf* 'drowsy'. This may indicate that *suf* is

It appears that *suf* 'drowsy' has developed into a "pure" intensifier, the distribution of which is no longer constrained by its original semantics. In other words, there is sufficient evidence in the data to support the existence of a more abstract subschema in which only the intensifier *suf* is lexically specified and the verb slot is open. Although the original mental activity verbs are no longer dominant, they still form a remarkably coherent group among the numerous different activities. For that reason, I have kept the mental activity subschema in the network in Figure 4. With the exception of *zich suf piekeren*, which continues to account for about 1/3 of the data, the older collocations are no longer particularly frequent.
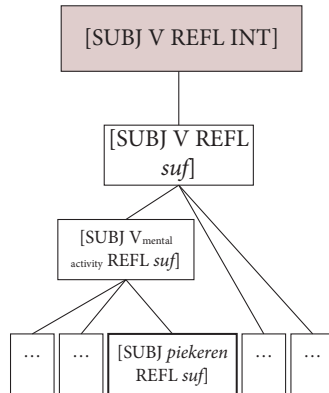
Figure 4. Network representation around the late 20th century for the intensifier *suf*

3.1.2 *Case 2: Het vuur uit de sloffen*

The diachronic development of *suf* 'drowsy' is an example of far-reaching semantic expansion and abstraction, but we also find more subtle cases of schematization. The intensifier *het vuur uit de sloffen* 'the fire out of the slippers' forms an interesting case because it was already introduced in the late 19th century but has only recently given rise to a low-level abstraction. In fact, between its first attestation in the 1870s and the 1950s, this intensifier was exclusively associated with the verb *lopen* 'to run'. If we add *het vuur uit de sloffen* to the network representations from before, see Figure 5, we find that in contrast to *suf* 'drowsy', its position in the network remains unchanged between the late 19th century and the first half of the 20th century.

already losing some of its expressive intensifying power, and needs to be further strengthened with another intensifier.
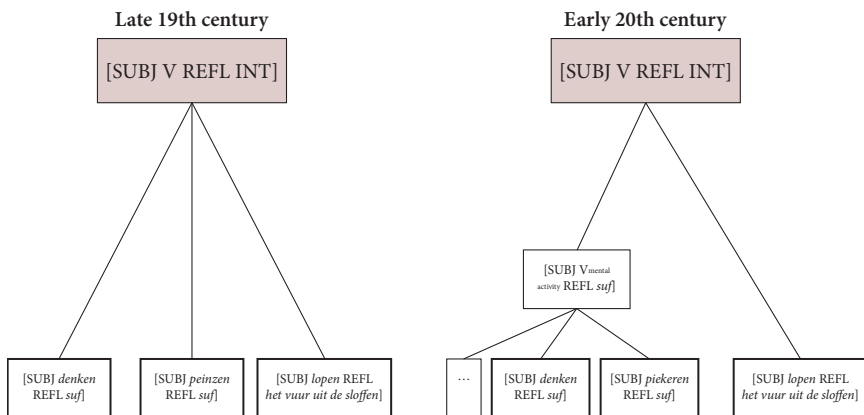
Figure 5. Network representation around the late 19th century (left) and early 20th century (right) for the intensifiers *suf* and *het vuur uit de sloffen*

Only in the 1950s do we start encountering *het vuur uit de sloffen* with other verbs than *lopen* 'to run'. These new verb types are semantically related to *lopen* in the sense that they also express an activity that is generally performed with the feet or legs and involve some speed, such as *fietsen* 'to cycle', *trappen* 'to pedal', *racen* 'to race', or *draven* 'to trot'.

(26) *Wim van Est, die drommels goed wist, dat twee van zijn maats voorop lagen,* **trapte zich het vuur uit de sloffen** *om het wiel van de sprintende Magni te houden.*   (1950–1959)
wim van est who damn well knew that two of his mates ahead lay pedaled himself the fire out of the slippers to the wheel of the sprinting magni to keep
'Wim van Est, who knew damn well that two of his teammates were in the lead, pedalled like crazy to stay in the wheel of the sprinting Magni.'

(27) *De beunhazen en ijdele dilettanten slaan zich altijd op de borst, willen overal vooraan staan en* **draven zich het vuur uit de sloffen** *om toch maar in het nieuws te komen.*   (1950–1959)
the bunglers and vain amateurs hit themselves always on the chest want everywhere in front stand and trot themselves the fire out of the slippers to yet again in the new to come
'The bunglers and vain amateurs are always boasting, always want to be in front and trot around trying to make the news.'

The data indicate that the "lexical" constraint on *het vuur uit de sloffen* 'the fire out of the slippers' has relaxed into a "semantic" constraint, allowing for some more flexibility in the verb slot (Zeschel, 2012, p. 7). Around the end of the 20th century,

the data even contain some verb types in which the semantic constraints no longer seem to apply at all, see the examples below.

(28)   *Of van iemand die het eenvoudigweg mooi werk vindt om **zich het vuur uit de sloffen** te **werken** voor het skütsjefonds.*   (1990–1995)
or of someone who it simply beautiful work finds to himself the fire out of the slippers to work for the skütsje fund
'Or someone who simply finds it pleasant to work his butt off for the "skütsje" fund.'

(29)   *Achterhaald is het beeld van de beminnelijke oudere dame, die **zich het vuur uit de sloffen vergadert** over een onderdak voor thuisloze zwerfpoezen.*
                                                                         (1990–1995)

outdated is the image of the lovely older lady who herself the fire out of the slippers meets about a shelter for homeless stray cats
'The idea of a lovely older lady who meets with a bunch of people, trying to find shelter for stray cats, is outdated.'

While it is not implausible that these verb types are the first symptoms of a further relaxation of collocational constraints, they are currently still rather marked in the sense that some native speakers may find the sentences in (28) and (29) to sound somewhat odd. I instead suggest that the examples above should perhaps be interpreted as deliberate overrides of the semantic constraints, in order to create a special rhetorical effect or draw more attention from the reader. For that reason, the current data do not sufficiently support the existence of a more abstract subschema [SUBJ V REFL *het vuur uit de sloffen*] in the network representation, but we do have a subschema [SUBJ V$_{+speed/+legs}$ REFL *het vuur uit de sloffen*], see Figure 6.
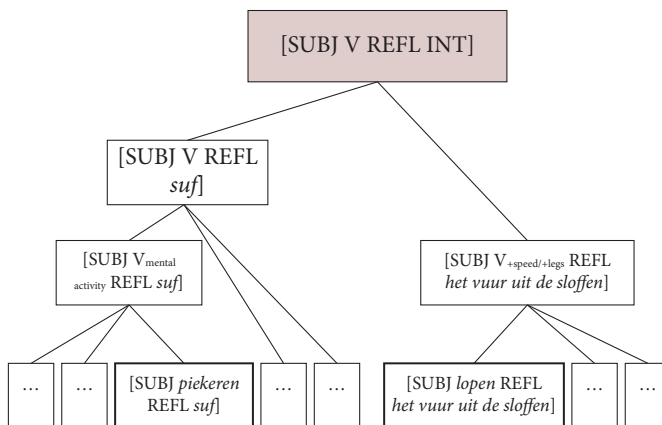
Figure 6. Network representation in the late 20th century for the intensifiers *suf* and *het vuur uit de sloffen*

3.1.3   Discussion

It appears that the two intensifiers have gone through a rather similar development. Both were introduced as part of fixed collocations during the 19th century, and their use in the construction remained limited to those collocations for quite some time. At some point in the past century, they seem to have started to emancipate themselves from their respective collocations and opened up their collocational range to other verb types. In the network representation, I modeled this as an abstraction arising in the form of a partially productive subschema, allowing for some variation in the verb slot within a delineated semantic domain. That is, it appears that an increase in verb type frequency is paralleled by a steady widening of semantic scope. However, the original meaning of *suf* 'drowsy' appears to have bleached more easily than the meaning of *het vuur uit de sloffen* 'the fire out of the slippers'.

As the collocational constraints on the verb slot further relaxed, *suf* 'drowsy' gradually developed into the most flexible intensifier in Dutch by the late 20th century. In the network, *suf* can be said to abstract further upwards: the semantic restriction on the verb slot is dropped and a new subschema in which the verb slot is fully schematic is formed – meanwhile, *het vuur uit de sloffen* is (for now) still confined to a semantically constrained subschema. One possible explanation for the difference between these two intensifiers lies in the "lexical weight" of the item, in the sense that a short, unspecific adjective like *suf* 'drowsy' is more susceptible to semantic bleaching than a highly lexically specific intensifier like *het vuur uit de sloffen* 'the fire out of the slippers' (see, e.g., Hoeksema, 2012; ten Buuren et al., to appear on adjective bleaching in elative compounds). In general, though, it is not always easy to interpret why some intensifiers seem to spread to new verbs (or gain productivity) more readily than others. Syntactic category or lexical weight is only part of the story. While it does appear to be the case that the majority of the NP+PP (as well as the small category of NP+AP) intensifiers are still to a large extent constrained by their original semantics (cf. the principle of persistence in grammaticalization research, Hopper, 1991), the case is much less clear-cut for other syntactic categories like the nominal, prepositional, and even adjectival intensifiers. In fact, there are non-trivial differences between the individual developments of several adjectival intensifiers as well. That is, there are also several examples of adjectives which did not gain the same "reach" as *suf* 'drowsy', despite having rather similar semantics (see Gyselinck, 2018 for a more detailed comparison of several intensifiers).

All of this goes to show that there are several quantitative and qualitative factors (e.g. type frequency and semantics) that may influence the combinatorial behavior of certain intensifiers and their development over time. My representations here are just one possible way of visualizing the abstraction of (sub)schemas out

of lower-level units, based on concrete findings in one diachronic corpus. They are descriptive abstractions that give the linguist a heuristic tool for modeling certain shifts within the constructional network but are far from "fixed constructs". The concept of a multirepresentational or multiconfigurational approach to networks will be further discussed in Section 4. At any rate, it is impossible to discuss the dynamics of the constructional network in terms of sweeping generalizations like "expansion". As will become even more obvious in the next section, it appears that there are multiple mechanisms or forces at work at lower level of abstractions or in very local areas of the network.

3.2   Conventionalization and loss

The previous section has illustrated that individual items which used to be more or less exclusively used in a fixed collocation may expand their use beyond the bounds of that collocation and come to function as more "free", flexible items in the construction – a process which, in the network theory, is described as schematization. Occasionally, the "original" collocation may decrease in frequency and lose its status as conventional collocation – in which case it just becomes one of the many micro-constructions licensed by the newly created subschema (e.g. *zich suf denken* 'to think oneself drowsy'). In other cases, the collocation continues to exist and increase in token frequency at the micro-construction level, while processes of schematization are taking place at higher levels in the network. The best example of this is *zich het vuur uit de sloffen lopen* 'to run oneself the fire out of the slippers', which may still be considered as a kind of fixed expression, accounting for 69 of the 76 tokens in the 1990s, even though *het vuur uit de sloffen* 'the fire out of the slippers' can pair up with other verbs as well. In addition, certain on-the-fly verb-intensifier combinations may start to increase in token frequency and only later develop into conventional collocations. This appears to be what happened in the case of *zich suf piekeren* 'to worry oneself drowsy' (cf. supra): the verb *piekeren* 'to worry' was introduced as one of several new mental activity verbs in the early 20th century, but it has managed to become one of the preferred collocates of the currently highly flexible intensifier *suf* 'drowsy'. Clearly, these examples show that schematization and conventionalization are not mutually exclusive; on the contrary, there are indications of both processes happening simultaneously at different levels within one and the same constructional network hierarchy.

However, there are also cases in which the conventionalization – or perhaps even fossilization – of a specific instance of a construction is concomitant with a decrease in the productivity and eventual loss of the overarching subschema. The erstwhile productive construction retreats to a set of specific collocations, which serve as relics of its former productivity. This is why we sometimes find a

(substantial) number of lexicalized types that appear to be instantiating the same pattern, even though that pattern can no longer be extended to new types (i.e. is no longer productive) (see Anshen & Aronoff, 1999; Hilpert, 2013 on the loss of the word-formation pattern *–ment* as in *entertainment*). An interesting example in the intensifying fake reflexive resultative construction is the intensifier *wild* 'wild'.

3.2.1 Case 3: Wild

The first attestations of *wild* 'wild' in my dataset are from the 1950s (8 tokens), at which point the intensifier was already found to combine with a variety of 5 verbs from multiple semantic classes, viz. *lachen* 'to laugh', *gillen* 'to screech', *schrikken* 'to be startled', *zich schamen* 'to be embarrassed', and *zoeken* 'to search', see, e.g., (30) and (31).

(30)   *De raket landde op 300m van de lanceerinrichting in een moeras, zodat het bedieningspersoneel **zich wild** moest **zoeken** om haar terug te vinden.*
       (1950–1959)

       the rocket landed at 300m of the launcher in a swamp so-that the operating crew themselves wild had to search to her again to find
       'The rocket landed 300m away from the launcher in a swamp, so the operating crew had to search intensely to find it.'

(31)   *Iedereen **lachte zich wild** en niemand durfde ook maar het plan opperen deze "rare dingen" aan te trekken.*   (1950–1959)
       everyone laughed themselves wild and no one dared even the plan suggest these weird things on to put
       'Everyone was laughing hard and no one even dared to suggest actually wearing these silly things.'

Although *wild* 'wild' was not a particularly frequent intensifier at the time, its use does not appear to be constrained by any obvious semantic constraints, so it is quite possible that a subschema like [SUBJ V REFL *wild*] had already been formed in the network. By the 1970s, *wild* 'wild' had 21 attestations, featuring 7 different verbs (e.g. *stoken* 'to heat', *trappen* 'to pedal', *zich ergeren* 'to be annoyed'), but at the same time, the verb *schrikken* 'to be startled' is found in 13 of the 21 tokens, suggesting that this combination has conventionalized into a strong collocation, see the network representations below in Figure 7.
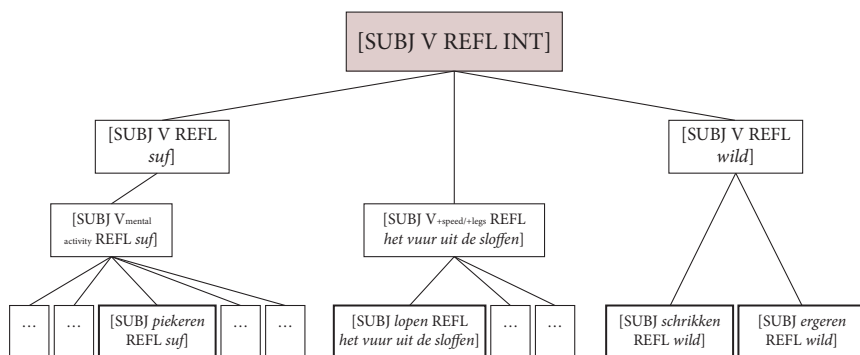
Figure 7. Network representation around the 1950s for the intensifiers *suf, het vuur uit de sloffen*, and *wild*

Jumping forward to the 1990s, we suddenly find that *wild* 'wild', although it has continued to increase in frequency to 33 tokens, has become exclusively associated with just two verbs, viz. *schrikken* 'to be startled' (24 tokens) and *zich ergeren* 'to be annoyed' (9 tokens). In other words, *wild* appears to have decreased in productivity between the end of the 1970s and the early 1990s, resulting in the loss of the subschema (see Figure 8). Still, the fact that it has become part of two conventional fixed expressions may guarantee its survival as an intensifier (at least for now).
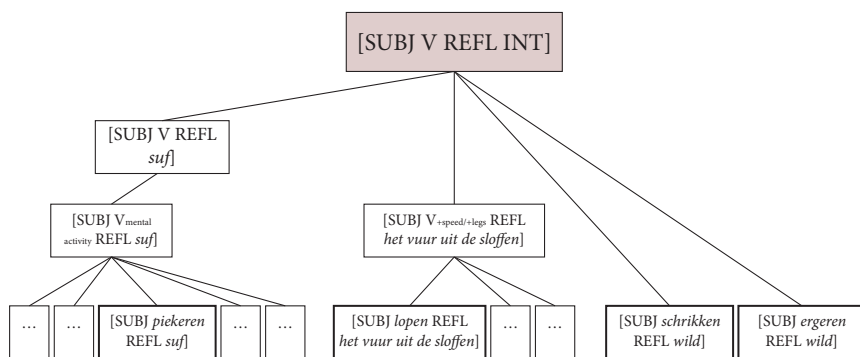
Figure 8. Network representation around the 1990s for the intensifiers *suf, het vuur uit de sloffen*, and *wild*

It is not entirely clear why, in this specific case, the conventionalization of two collocations has ousted all other verbs from the collocational range (which has not happened in the case of, e.g., *zich suf piekeren* 'to worry oneself drowsy', supra). In Section 1, it was mentioned that the domain of intensification is characterized by a process of constant lexical renewal. It is important to point out that the renewal is often not "complete", in the sense that new items do not simply replace the old

items; instead we get an interesting kind of layering of old and newer intensifiers as is adequately captured in the following quote by Bolinger:

> The old favorites do not vanish but retreat to islands bounded by restrictions (for example, *precious few* but no longer *precious hot*), and the newcomer is never fully successful and extends its territory only so far. Nothing has quite time to adjust itself and settle down to a normal kind of neighborliness before the balance is upset again.   (Bolinger, 1972, p. 18)

Ito and Tagliamonte (2003, p. 277) agree that "it appears that old intensifiers do not fade away; they stick around for a very long time" but they add that old intensifiers can even "be brought out of exile to be recycled". Although there are no clear examples of intensifier recycling in my data, we do find several "occasional visitors", i.e. (low frequency) intensifiers that are not consistently represented in every decade but that have been popping in and out of the construction over the past two centuries (e.g. *een stuip* 'a fit', *een koliek* 'a colic'). If anything, this shows that one needs to be careful not to confuse "unattested" with "impossible": the fact that an intensifier is no longer attested (for a certain period of time) does not necessarily mean that it is no longer *possible* to use it in the construction. Still, if newer intensifiers are deemed to be more expressive, and thus, more successful, it is surprising that *suf* 'drowsy' – which has been around since the early 19th century – continues to expand its collocational range, whereas a fairly recent intensifier like *wild* 'wild' was only productive for a short span of time. It would seem that the outcome of this "competition" between intensifiers is often unpredictable: several unexplored factors may well play a role and there is undoubtedly a considerable degree of conventionality involved (see De Smet et al., 2018 on the different possible outcomes of competing linguistic functions).

4.   Discussion: Challenges in constructional network theory

The investigation presented in this paper has shown how certain constructional changes or developments – like type frequency increase, collocational expansion/restriction, and conventionalization – can be (heuristically or descriptively) modeled in a constructional network representation. At the same time, however, it has also uncovered some potentially problematic aspects of the constructional network that deserve closer inspection.

4.1   Multiple representations

Starting off with a rather practical argument, the current two-dimensional visual representations of the networks impose certain limitations that need to be kept in mind when interpreting the figures presented here. For one, it is impossible to visualize the full extent of the constructional network and capture all interesting shifts that are taking place at different levels in the network. Instead, we have to select a small set of case studies and necessarily gloss over or merge together small-scale shifts in the network structure. In addition, this specific taxonomic structure forces the linguist to make certain choices when building the constructional hierarchy. Concretely, I started out at a low level of the network with micro-constructions in which both the verb and intensifier are lexically specified. If the intensifier was found to occur with a certain variety of verb types, I moved up to the subschema level, abstracting away from the specific verb in intensifier-specific subschemas with open verb slots like [SUBJ V REFL *specified intensifier*]. Given the numerous different verbs and intensifiers that are used in the construction and their many potential and attested inter-combinations, it makes sense that several verbs can not only be used with the same intensifier, different intensifiers can also be used with the same verb. One of the most flexible verbs in the construction is *schrikken* 'to be startled', which is found with a variety of 32 different intensifiers in the 1990s, 15 of which are hapaxes. That is, the network contains multiple subconstructions like [SUBJ *schrikken* REFL *suf*], [SUBJ *schrikken* REFL *een hoedje*], [SUBJ *schrikken* REFL *rot*], [SUBJ *schrikken* REFL *dood*], etc. If we were to abstract away from the specific intensifier (instead of the verb), we would get a verb-specific subschema with an open intensifier slot [SUBJ *schrikken* REFL INT], as in Figure 9.
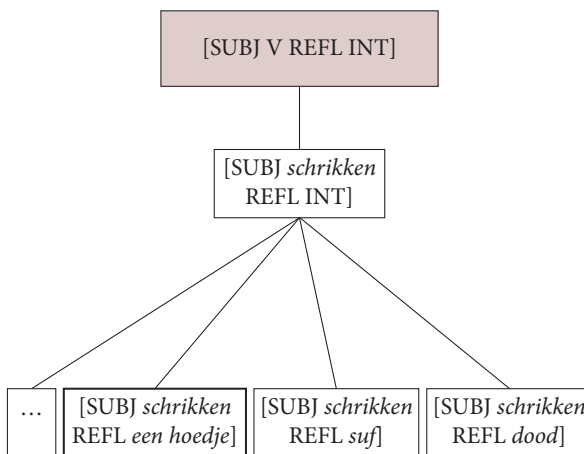
Figure 9. Network representation around the late 20th century for the verb *schrikken*

While I have argued earlier that the micro-construction [SUBJ *schrikken* REFL *een hoedje*] was not licensed by a low-level subschema [SUBJ V REFL *een hoedje*] – which, given the limited combinatorial flexibility of *een hoedje* 'a little hat', does not "exist" – we now find that it is perfectly motivated within the verb-based network in Figure 9. Within the current visualization method, the verb-based and intensifier-based perspectives are hard to reconcile because they involve different types of generalizations at the same level of abstraction. That is, as linguists, we need to decide whether we are primarily going to focus on the intensifier slot or on the verb slot, and the path that is chosen will determine the outline of the network structure. This idea of multiple configurations has not really been touched upon in the existing literature, because it is generally the verb slot that is at the center of attention. Indeed, many argument structure constructions are "verbal" in nature (e.g. the ditransitive construction, causative constructions, or motion constructions), in the sense that the verb is the central element (studies like Croft, 2003; Barðdal, 2008; Torrent, 2015; Perek, 2015 all deal with verb-specific and verb-class-specific subschemas). However, as I have shown here, and as has been argued by Zeldes (2012, p. 125), multiple different, non-verbal slots may be of equal interest. It also needs to be pointed out that such decisions are not necessarily relevant to the language user: speakers are likely to recognize multiple regularities in the usage of a construction and there is nothing that prevents them from making generalizations over the fillers of multiple slots at the same time. It may well be the case that language users perceive of certain similarities between the intensifiers that we, as linguists, did not notice or did not find to be particularly relevant. The crucial idea here is that language users do not have to pick just one network, but they can access all of these configurations concurrently. An interactive computational model of the constructional network may be better equipped to not only deal with these multiple configurations, but also capture the dynamicity of the network structure (van Trijp & Steels, 2012).

4.2   Other types of links?

Another issue that could be explored in future research concerns the internal relationships within the network. In the present paper, the primary focus is on the representation of patterns or nodes at different levels of abstraction and how this "vertical" hierarchy of nodes has changed over the past two centuries. However, the changes of the hierarchic structure of the network also bring about reconfigurations of the different kinds of *links* between the nodes in the network. In addition to vertical inheritance links, there may be other types of links capturing relationships between the nodes in the network. Several studies have introduced some kind of horizontal links to capture formal or semantic similarities between

patterns at the same level of abstraction that are not necessarily motivated by or reducible to the same overarching schema. In Van de Velde (2014, p. 149) horizontally linked constructions are said to form a kind of syntactic paradigm, i.e. "a set of alternating forms with related meaning differences". Drawing on evidence from psycholinguistic experiments in priming and L1-acquisition, Diessel (2015) as well finds that language users are able to recognize similarities across different constructions that could be related on a horizontal rather than a vertical axis. In Gyselinck (2018), I have suggested a specific type of horizontal link to visualize the relationship between the intensifier-based and verb-based perspectives that, as was mentioned above, are hard to reconcile within the same two-dimensional representation. As was mentioned earlier, there are evidently several intensifiers that share the same verbs in their collocational range. If we immediately abstract away from the specific verb in intensifier-specific subschemas (cf. Figures 2 to 8), this similarity is no longer relevant to the hierarchic structure of the network and risks being ignored. Conversely, there are multiple verbs that share the same intensifier, but if we abstract away from the specific intensifier in verb-specific subschemas (cf. Figure 9), we risk losing sight of that similarity as well. By introducing horizontal links, we can bring attention to similarities between micro-constructions (i.e. patterns at the same level of abstraction) that are not picked up in the taxonomic representation of the network. We could say that these horizontal links are actually reinterpretations of the vertical links in another possible configuration of the network. In addition to horizontal links, it is worth exploring whether other kinds of relationships should be introduced in the network. Interesting in that regard is the recent proposal by Schmid, who has suggested a new model which

> rejects the distinction between constructions serving as nodes in the network and relations between nodes and instead assumes that linguistic knowledge is available in one format only, namely, associations. These associations come in four types: symbolic, syntagmatic, paradigmatic, and pragmatic. (Schmid, 2017, p. 25)

A more moderate approach is found in Hilpert and Diessel (2017), who argue that a model that puts greater emphasis on the links between constructions could be better suited to deal with the cognitive organization of constructions than the nodes themselves. I agree that it would be valuable to try and integrate a more connectionist view into the traditional view of networks, but doing away with nodes entirely may be throwing out the baby with the bath water.

4.3   Cognitive reality

The suggestion by Hilpert and Diessel (2017) brings us to the final aspect that I have not really discussed in this paper, which is the extent to which these network

representations are more than just abstract heuristic devices but may also aspire to have some cognitive reality. In general, it has been argued that all abstractions in the network should reflect generalizations in the minds of the speaker. Barðdal (2008, p. 48) observes that "constructions can only be assumed to exist at abstract schematic levels if there are linguistic data in support of such an analysis". Indeed, the linguist can posit certain high-level abstractions to capture similarities between instances of the same construction or between different constructions, but he cannot truly prove that language users recognize these similarities as well (see also Lieven & Tomasello, 2008; Perek, 2015). The cognitive implications of the network hierarchy have not always been explicitly addressed. It is still an open question in Diachronic Construction Grammar in general whether a more explicit cognitive commitment or references to psychological reality should be a priority in its research field (see, e.g., some discussion in von Mengden & Coussé, 2014; Hilpert, 2018). I merely hope to have shown in this paper that, as a theoretical construct, the constructional network can account for a substantial amount of the variation and change attested in constructions.

5. Conclusion

On the outset of this paper, it was mentioned that the intensifying fake reflexive resultative construction displays an interesting mix of productivity and lexical idiosyncrasy. Although characterized by a large variety of different verb and intensifier types at the highest level of schematicity, it was shown that there are important differences with respect to the distributional behavior of the semi-specified constructions with specific verbs and intensifiers. While there are many verbs and intensifiers that appear to be free agents within the construction, there are also specific conventional collocational patterns that add some nuance to the idea that "anything goes". As Construction Grammar in general does not assume a strict dichotomy between grammar and the lexicon, this kind of collocational frozenness is more easily accounted for within a constructionist framework than within traditional formal frameworks which treat rule-based productivity as part of the grammar, whereas idiomatic expressions are relegated outside of the grammar, as part of the lexicon (Jackendoff, 2008, 2013). The Lexicality-Schematicity Hierarchy allows us to account for higher-level generalizations – each lower level inherits certain properties from the higher levels – as well as lower-level idiosyncrasies, such as specific semantic or formal restrictions that pertain to some subschemas but do not operate on the construction as a whole (Croft, 2003; Barðdal, Kristoffersen, & Sveen, 2011; Barðdal & Gildea, 2015; Colleman, 2015). In other words, it straightforwardly accommodates both large-scale productivity

and idiomaticity within the same construction. From a diachronic point of view as well, the network approach offers a unified framework for dealing with different kinds of developments that straddle the distinction between traditional grammaticalization and lexicalization, or contentful versus procedural constructionalization. Using the Dutch intensifying fake reflexive resultative construction as a case study, it has been illustrated how several of the constructional changes within the constructions can be represented in the constructional network focusing on processes of network-broad expansion, low-level schematization, conventionalization (and/or fossilization), and very local losses within the network.

While the advantages of the Lexicality-Schematicity Hierarchy as a theoretical framework are clear, there is still room to further refine the constructional network theory and there remain some challenges for the future. First of all, with respect to the general research questions n° 3, there is still a lot that remains to be explored in the domain of network-internal and network-external (cross-constructional) links or associations. Many studies – including, to a large extent, my own – have focused on the taxonomic structure of the network, i.e. on vertical (inheritance) links. While the concept of horizontal links has been touched upon, there is some discussion on what kind of similarities, exactly, these horizontal links capture, and what their added value from a diachronic point of view could be. If we want to move towards a more cognitively realistic kind of representation, there are indubitably many more kinds of links to be added. This also brings us to research question n° 7: the current network representations, which are primarily two-dimensional, are still highly abstract and could (or, more precisely, should) be enriched with more detailed information on how a construction is represented in the minds of the speakers – think of, e.g., usage contexts or discourse functions but also extralinguistic factors like gender or age differences. I hope that, by touching upon some of these issues in this paper and showing how some aspects of the network are not so unproblematic after all, I have inspired other scholars to venture upon this perhaps uncertain but definitely interesting path.

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Productivity and schematicity in constructional change

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In Diachronic Construction Grammar, many instances of language change can be captured in terms of variation in the schematicity and productivity of constructions. These two notions are often thought to be interrelated, which suggests that they might be collapsed and treated as essentially the same property. By contrast, this paper argues that schematicity and productivity, while related, should be kept separate and considered in their own right. Cases are reported from the literature showing that the relation between schematicity and productivity is at best indirect. It is argued that a distinction should be made between the schematicity of lexical slots inside a particular construction and the schematicity of the constructional meaning itself. Only the former is directly related to productivity. The latter may or may not be, and if so, only in very specific ways that can be assessed not by looking merely at the lexical items attested in the slots of the construction, but only by examining the semantics of earlier uses in their entirety. To illustrate this idea, a case study of recent change in the abstract uses of the *way*-construction is reported on, in which the increasing range of abstract verbs can be related to an increase in the variety of abstract situations conceptualized as motion in uses of the construction. This is interpreted as an increase in the schematicity of the motion component of the constructional meaning.

Keywords: schematicity, productivity, constructional meaning, *way*-construction

1. Introduction

In Diachronic Construction Grammar, many instances of language change are said to affect two properties of constructions: schematicity, referring to the level of abstraction at which a construction is represented, and productivity, referring to the ability/property of a construction to recruit a wide range of lexical items as

slot fillers. This article critically examines these two properties and the relation between them, drawing on the network model of Construction Grammar. As such, it seeks to clarify when it is warranted to postulate a new separate node in the network (question 2 of this volume), especially in the case of expanding constructions, and how schematization may affect the structure of the constructional network (question 6).

Section 2 provides some general background on Construction Grammar and the network model. Section 3 discusses the concepts of schematicity and productivity in detail and defines them with regards to the network model introduced in Section 2. Section 4 focuses on the relation between productivity and schematicity. While it is acknowledged that the two properties are related, it is argued that this relation is not always as direct as is often assumed, and that it depends on the amount and type of meaning contributed by the construction itself, in particular as it pertains to how the new lexical items combine with it. It is argued that a difference must be made between two kinds of schematicity: that of the lexical slots of the construction, and that of the constructional meaning as a whole. Only the former is directly related to productivity, while the latter requires an examination of individual instances to be characterized and potentially related to productivity. To illustrate this idea, Section 5 reports on a case study of the recent history of abstract uses of the *way*-construction. It is shown that there has been a sharp rise over the past 180 years in the diversity of the types of abstract situations conceptualised as motion in uses of the construction, which can be linked to an increase in the schematicity of the constructional meaning.

2.   Diachronic Construction Grammar and constructional networks

Diachronic Construction Grammar aims to describe and explain language change by drawing on the idea that the grammar of a language consists of an inventory of form–meaning pairs, called constructions. Construction Grammar rejects the notion of a sharp distinction between lexicon and syntax, and therefore allows constructions of any complexity that can contain fully specific lexical material as well as syntactic slots with various degrees of openness (Fillmore et al., 1988; Croft & Cruse, 2004; Bybee, 2010). A textbook example of a construction, the *way*-construction, is exemplified by (1) and (2) below and represented diagrammatically in Figure 1.

(1)   *They hacked their way through the jungle.*

(2)   *We pushed our way into the pub.*

$$\boxed{\begin{array}{c} \boxed{\text{NP}_x \text{ V PossDet}_x \textit{ way } \text{PP}_y} \\ \hspace{4cm}\text{Form} \\[4pt] \boxed{\text{'X moves along Y by Ving'}} \\ \hspace{4cm}\text{Meaning} \end{array}}$$
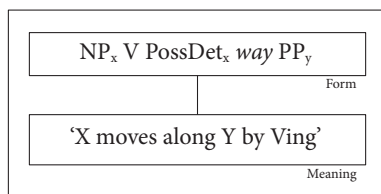
Figure 1. The way-construction

As shown in Figure 1, the construction formally consists of a subject noun phrase, a verb, a possessive determiner co-referential with the subject, and a prepositional phrase. In one of the uses of this construction (called the "means interpretation" by Goldberg, 1995, p. 207), this form is paired with the notion that the subject referent performs the action described by the verb, and as a result moves along the trajectory described by the prepositional phrase (cf. Goldberg, 1995; Israel, 1996; Jackendoff, 1990; Perek, 2018).

Importantly, constructions do not exist in a vacuum: they are linked to each other in a network that can comprise various kinds of relations. In particular, inheritance relations relate more general constructions to their more specific instantiations, forming a kind of taxonomic hierarchy (Croft & Cruse, 2004; Goldberg, 1995). For example, when the *way*-construction mentioned above is combined with a particular verb, this forms a more specific construction that inherits from the general *way*-construction. This is illustrated in Figure 2 below with the verbs *find* and *make*; for the sake of simplicity, only the formal side of the relevant constructions is represented. Inheritance relations are marked by arrows pointing from the more general construction to the more specific ones that inherit from it.

$$\text{NP}_x \text{ V PossDet}_x \textit{ way } \text{PP}_y$$

$$\text{NP}_x \text{ FIND possDet}_x \textit{ way } \text{PP}_y \qquad \text{NP}_x \text{ MAKE possDet}_x \textit{ way } \text{PP}_y$$
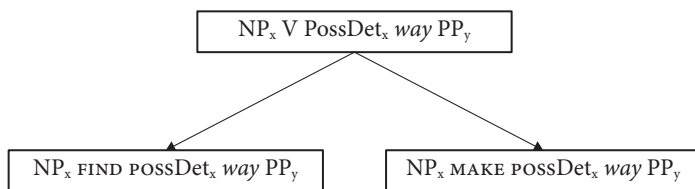
Figure 2. The way-construction and two of its lexically-specific constructions

As soon as a lexical item is attested in a construction, a lexically-specific sub-construction containing this item may in principle be added to the network. Hence, constructions of different levels of generality can co-exist in the grammar. Frequent and highly conventionalised lexically-specific constructions, as is the case for instance for "find one's way" and "make one's way", are particularly likely to receive their own constructional node in the network.

In Diachronic Construction Grammar, language change is described in terms of change in constructions: either the creation of new constructions, change in the

properties of particular constructions, change in the structure of the constructional network, or any combination of these (Hilpert, 2013; Traugott & Trousdale, 2013). Two properties of constructions are often discussed in Diachronic Construction Grammar studies: productivity and schematicity. These two notions are discussed in the next section with reference to the constructional network model outlined above.

3.   Productivity and schematicity

In a Diachronic Construction Grammar approach, many instances of language change can be captured in terms of variation in two properties of constructions: schematicity and productivity. These two concepts will be described in turn.

3.1   Schematicity

Schematicity commonly refers to the level of detail that is stored in the representation of a construction; in the context of this paper, the term is applied to the semantic side of constructions.[1] In a usage-based Diachronic Construction Grammar approach, such as that of Hilpert (2013) and Traugott and Trousdale (2013), grammatically complex constructions of some degree of abstractness are conceived of as schemas generalizing over a range of instances of language use. If certain aspects of form and meaning recur across different uses, the commonalities between these uses are stored in a schematic form–meaning pair. The more semantically diverse these uses are, the more schematic the constructional meaning will be. Conversely, a construction with a more schematic meaning is available for sanctioning a wider range of new uses and applies to the description of a wider range of situations than a construction with a less schematic meaning. In diachrony, it is common for constructions to increase in schematicity, as they are creatively exploited by speakers to fulfill expanding communicative needs. Increases in schematicity are typically involved during and after grammaticalization, as lexical items come to be associated with grammatical meanings that are related to, yet more general than, their original lexical meaning, and newly

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1. The term can also be applied to the form of constructions. In that context, an increase in formal schematicity means that a construction is allowed more variability in form to express the same meaning. For example, the ability of different grammatical categories to occur in the slots of constructions (e.g., prepositional phrases and subordinate clauses in the focus position of *it*-clefts, initially restricted to noun phrases, cf. Patten, 2012), can be described as an increase in formal schematicity.

grammaticalized meanings tend to be extended to an increasingly wider range of contexts (Bybee & Pagliuca, 1985; Himmelmann, 2004; Gisborne & Patten, 2011; Patten, 2012).

In sum, an increase in schematicity of the meaning of a construction means that the same form becomes associated with a wider range of possible meanings. An example of this can be found in the *be going to V* construction, which originally used to have a more restricted meaning than the Present-day English meaning of futurity. Studies of this construction generally report that *be going to* followed by a verb initially grammaticalized into a marker of intentionality (cf. Disney, 2009; Traugott & Trousdale, 2013); for instance, *I am going to be an architect* became an acceptable way of saying *I intend to be an architect*, without any implication of motion originally found in the lexical source of the construction (i.e., the verb *go*). Over time, the construction came to be associated with the more general meaning of futurity, which covers the original meaning (since intentionality entails futurity) in addition to other meanings such as prediction (e.g., *It's going to rain tomorrow*).

As is clear from this example, schematicity relates to the position of a construction within the taxonomic network mentioned previously. In terms of the network metaphor, an increase in schematicity can be defined as follows: a certain form is said to become a more schematic construction if a superordinate node in the constructional network that pairs the same form with a more general meaning is created and thus subsumes the earlier construction. This is diagrammed in Figure 3a, where C refers to the original construction and C' refers to the new,
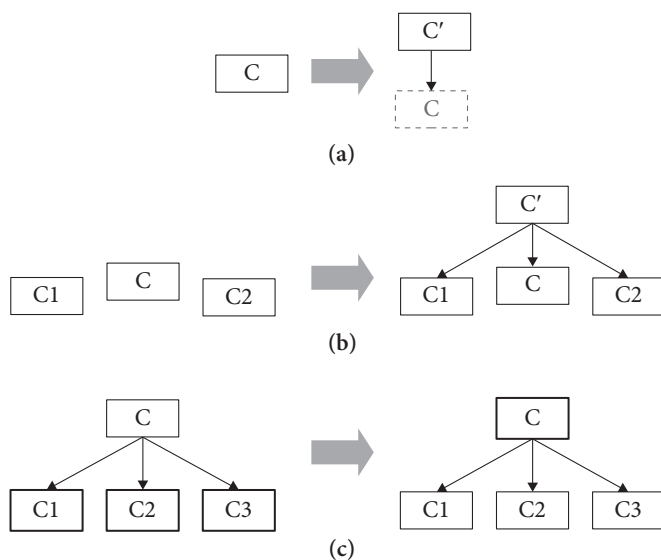
Figure 3. Different representations of an increase in schematicity of a construction C

more schematic construction that subsumes C. Such a change is especially likely to happen if the more schematic construction subsumes other uses as well (which may themselves have been generalized into sub-constructions); this is illustrated in Figure 3b, where C1 and C2 are "sister" constructions of C and the more schematic C' is abstracted from C, C1, and C2. Over time, the superordinate node can be reinforced and become more available for the categorization of matching expressions, over the more specific constructions, as shown in Figure 3c, with bolder lines representing relative degrees of entrenchment or cognitive accessibility between a construction and its subordinate nodes. This too can be said to correspond to an increase in schematicity.

3.2   Productivity

Productivity is a more familiar notion to many linguists, as the term has a long history in the domain of morphology (Bauer, 2001; Plag, 1999). The productivity of a construction has to do with how open it is to different lexical items. This is often interpreted in two ways. Productivity can refer to the range of different lexical items that are attested in a particular slot of a construction, as can be observed in a corpus; this corresponds to what Baayen (2009) more specifically calls "realized productivity". In a related interpretation, productivity can also refer to the property of a construction to be extended to new lexical items that were not attested in it; this is called "extensibility" by Barðdal (2008). For instance, if some construction is observed to occur with the verbs *say*, *whisper*, and *mutter*, its realized productivity corresponds to these three verbs, while its extensibility relates to what other verbs could be acceptable (though not attested) in this construction according to speakers of the language; in this particular case, the construction might be extensible in particular to other manner of speaking verbs.

These two definitions of productivity are of course related, especially in diachrony: over time, a construction with high extensibility is likely to increase its realized productivity. However, extensibility can only be assessed by asking speakers about their intuitions of what lexical items might be acceptable in a given construction; therefore, it is not measurable in diachronic times.[2] The only kind of productivity that can be investigated in diachrony is realized productivity at different points in time, as measured by looking at the range of lexical items attested

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2. As pointed out by an anonymous reviewer, in the literature on morphological productivity, the number of hapax legomena observed in different time periods, i.e., types with a corpus frequency of one, is sometimes used as a proxy to measuring extensibility. It is, however, merely a crude measure, since not all new types are first attested as hapaxes, and conversely not all hapaxes might be equally novel, among other issues.

in the slot of a construction in different time sections of a diachronic corpus. The comparison of realized productivity at different points in time, does, however, retrospectively give an indication of extensibility: a construction that is found to be extended between two different periods (i.e., attested with new types) can be claimed to be extensible from the earlier period on.

In the network model, productivity relates to nodes that are subordinate to a construction and correspond to more specific instantiations of the construction with one of the slots filled by a particular lexical item. Realized productivity is captured by the subordinate nodes themselves; extensibility is the likelihood for new subordinate nodes to be created. An increase in realized productivity means that new subordinate nodes to that construction are created in the network, as diagrammed in Figure 4, where C1 to C5 are lexically-specific constructions of C. Retrospectively, this is evidence for extensibility of the construction.
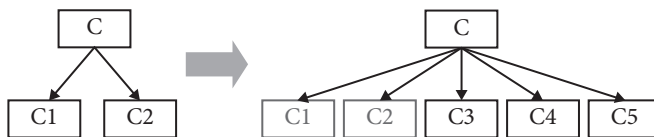
Figure 4. Increase in productivity of a construction C

3.3   The relation between productivity and schematicity

Productivity and schematicity are commonly thought to be interrelated in that one is seen to impact the other and vice versa (Barðdal, 2008; Traugott & Trousdale, 2013). Quite trivially, an increase in schematicity is likely to cause an increase in productivity: a more schematic meaning can be applied to the description of a wider range of situations, and consequently a wider range of lexical items are compatible with the schema. As Trousdale (2008, pp. 170–171) puts it, "[t]he more schematic the construction, the more productive it will be […]; the more substantive the construction, the less productive it will be". The converse can also be seen to hold in that the occurrence of new types may contribute to schema extension. Constructions are not fully categorical grammatical representations: they allow for the occurrence of lexical items that are not fully in line with the established schema, a phenomenon that is commonly referred to as coercion in the Construction Grammar literature (Michaelis, 2005; Lauwers & Willems, 2011). This captures the notion that speakers occasionally push the boundaries of conventional usage to achieve particular communicative goals. If the use of a new lexical item in a construction is not covered by the construction's schematic meaning, the latter has to be adjusted in order to make it compatible with the lexical meaning. If similar instances of coercion recur, the adjusted schema can itself

become a conventional unit, paving the way to an extended schema covering both the original schema and the adjusted one, corresponding to an increase in schematicity (cf. Langacker, 2008, Chapter 6). This view is also articulated by Traugott and Trousdale (2013, p. 16), who comment that "partially sanctioned extensions of an existing conventionalized construction may over time become fully sanctioned instances of a more general, schematic construction, which has changed as a result of the speaker/hearer's experience with language".

The perceived interdependency between productivity and schematicity makes it tempting to conclude that these two notions can be collapsed into one and treated as essentially the same property of a construction. Under this view, the lexical distribution of a construction could be used to make claims about its schematicity, in that an increase in the range of lexical items attested in a construction is taken to mean that the constructional meaning has become more schematic. Yet, it is clear that the two notions involve different aspects of the constructional network, hence they are indeed distinct properties.

Besides, while productivity and schematicity do work in tandem in many cases, this is not necessarily the case. This is especially true when the construction contributes substantial meaning of its own that does not directly correspond to the meaning of its typical lexical items. In such cases, it is possible for the constructional meaning to live a life of its own and undergo changes in schematicity independently of its lexical distribution. Conversely, the productivity of the construction is not necessarily commensurate with its degree of schematicity. Hence, while the relation between productivity and schematicity cannot be denied, it is in many instances a very indirect one.

First, it is important to clarify that the productivity of a construction attested in diachrony is only indirectly dependent on the representation of the construction and its degree of openness. Since productivity is essentially a fact about usage, it is subject not only to grammatical constraints on possible tokens but also to whether these tokens are useful to speakers to fulfill their communicative needs. While a pattern may be available for creative uses, such uses will not be attested until the need for them arises. This can be illustrated by the use of the verb *spend* in the *way*-construction. The first instances of this verb in the construction in the 400 million word Corpus of Historical American English (COHA; Davies, 2012), spanning from 1810 to 2009, date back to the 1930s:

(3) *Is it true that we can spend our way to prosperity?* (1935)[3]

(4) *There is no recorded instance of any nation having spent its way out of a depression.* (1935)

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3. From (3) on, all the examples used in this paper are from the COHA.

(5)   *[S]uch a statement stands in clear opposition to the Administration's*
      philosophy of spending our way into recovery.   (1939)

These examples, all from newspapers or magazines, clearly refer to the New Deal:
a policy of public spending started in 1933 by Franklin D. Roosevelt as a way
of pulling the United States out of the Great Depression by injecting funds into
the American economy, notably through major publicly-funded construction
projects. As the idea was fairly new at the time, these journalists relied on this
creative use of the *way*-construction to describe it. Importantly, however, there is
no evidence that anything prevented the construction from being used in this way
before these first corpus attestations. Uses of the construction to express transition
to a state (or out of one) were attested for about a century (and probably earlier),
as shown by the following examples:

(6)   *[H]e had at last fought his way into some degree of notoriety at home.*   (1829)

(7)   *Smith, however, was poor, and was obliged to carve his way to fame without*
      the aid of chroniclers.   (1838)

(8)   *[T]o make his difficulties more perplexing, I have secured his purse, so that he*
      can not bribe his way out of them.   (1846)

Moreover, the construction is also attested with semantically related verbs, like
"pay" or "buy", long before it was first used with "spend" in the corpus:

(9)   *Kershaw & Co. will not be able to pay their way out of their present difficulties.*
                                                                     (1887)

(10)   *They confront privilege buying its way to power.*   (1904)

This suggests that *spend* could have been used in the *way*-construction earlier than
it is actually found to be, in that the construction showed all signs of being open
to uses like (3) to (5) above before the 1930s. It is, however, the specific socio-
historical context that called for this particular idea to be expressed by speakers
(or at least strongly supported its use). As a result, this novel combination of *spend*
with the *way*-construction was coined.

   This example illustrates that just because a particular usage is grammati-
cally possible does not necessarily mean that it will be attested right away: this
is dependent on the communicative needs of speakers. This predicts that a direct
relation from schematicity to productivity does not always hold. At best, schema-
ticity defines the productivity domain, i.e., the set of items that *may* in principle
be used in the construction, but not those that will actually be used. In line with
this view, the literature on grammaticalization and constructionalization is replete
with examples of emerging constructions that gradually expand their distribution

over time instead of immediately being used with all types that are presumably compatible with the constructional meaning. For instance, Traugott and Trousdale (2013) discuss the case of the quantifiers *a lot of / lots of*, which emerged in the late 18th century from binominal constructions with *lot/lots* as their head, meaning "a group of", as illustrated by (11) below (see also Brems, 2011, 2012; Traugott, 2008).

(11) $[(a) \text{lot(s)}_{\text{head}} [\text{ of N }]]$ 'group of N' → $[[(a) \text{lot(s) of}] \text{N}_{\text{head}}]$ 'many N'

Traugott and Trousdale (2013, p. 115) report that after its creation, the construction was initially used mostly with concrete nouns that were typically countable and plural, such as *people* and *goods*. This is in line with the original meaning of the partitive use of *lot* from which the construction originated, meaning "group". Mass nouns, such as *room* and *time*, only started occurring in the construction in the 19th century, and abstract nouns like *ideas* and *power* only became common from the mid-19th century onwards.

It would be spurious to assume that these gradual changes in productivity are due to corresponding changes in the schematic meaning of the construction, or vice versa that these new types joining the distribution of the construction cause its meaning to become more abstract (if different at all). According to Brems (2011, 2012), the quantifier meaning of the construction is in evidence since at least the 1780s. This meaning arguably stays the same throughout the various productivity phases described above; it does not become more abstract. What does become more abstract, however, is the generalisation over the kind of entities that can be quantified using that construction. In other words, changes in the lexical distribution of a slot can be said to cause changes in the schematicity of that slot in the representation of the construction, which in this case becomes gradually more open until the construction can be combined with virtually any noun. To the extent that lexical slots can be seen as part of the constructional meaning (since they do refer to an aspect of the situation that the construction describes), it can be claimed that there is indeed an increase in the schematicity of that particular part of the constructional meaning, but it does not entail that the rest of the constructional meaning is affected in any way.

In light of these observations, it seems that an adequate description of change in the schematicity and productivity of a construction, and the relation between them, requires to make a distinction between two aspects of the schematic meaning of a construction: (1) schemas representing the lexical slots of the construction, i.e., generalizations over the meaning of the lexical items occurring in it, and (2) the schema representing the construction's own semantic contribution above and beyond the meaning of the individual lexical items occurring in it. For example, the *way*-construction discussed in Section 2 conveys the idea that the subject referent moves along a certain trajectory. It combines with verbs that do not convey

motion on their own but refer to the means that enable motion. Hence, the motion component is part of the schematic meaning of the construction.

The productivity of a construction is directly related only to the schematicity of the lexical slots, but not necessarily to that of the rest of the construction. A more schematic slot entails that a wider range of types can be used in the construction; conversely, when new types enter the distribution of a construction, the corresponding lexical slot may increase in schematicity if the types are not covered by the existing schema. Under this view, it is perfectly legitimate to use the lexical distribution of a construction to make claims about the schematicity of the corresponding lexical slots: an increase in the range of attested types corresponds to an increase in the schematicity of the slot.

However, claims about the schematicity of the entire constructional meaning are often less straightforward to make on the basis of the lexical distribution alone. In the case of constructions that do not contribute much, if anything, beyond the words that they combine, the constructional meaning is essentially described by the lexical slots, hence the relation between schematicity and productivity (and in turn, the lexical distribution) is rather direct; a good example of such constructions are the case argument structure constructions in Icelandic studied by Barðdal (2008). But if the construction makes a semantic contribution of its own, the relation between schematicity and productivity is less straightforward, and claims about changes in schematicity depend on how new types relate to the constructional meaning. Some types might not be fully compatible with the constructional meaning and require a semantic extension or even instantiate a different constructional meaning altogether. These types of change can only be directly observed at the level of individual instances, and while lexical distributions can sometimes give an indication of a trend, the observations they provide merely afford tentative conclusions until they have been examined in context. This is illustrated in the next section by a case study on the recent history of the *way*-construction.

4.   Case study: Abstract uses of the *way*-construction

The history of the *way*-construction is a typical example of constructionalization (Israel, 1996; Trousdale & Traugott, 2013; Perek, 2018; Fanego, 2018). According to various studies, one of the main uses of the *way*-construction originates from sentences combining a transitive verb with the noun *way* to express the actual creation of a physical path through some obstacle. The notion that the subject referent undergoes motion as a result of the verbal event likely started as a mere implicature and gradually became part of the conventional meaning of the construction (Israel, 1996; Trousdale & Traugott, 2013).

A constant trend noted by several studies in the history of the construction is its sustained productivity, with many new verb types regularly joining the construction over time. In line with its diachronic origin, the construction was initially centered on verbs referring to physical action that can be typical ways to create a physical path. For instance, from OED data, Israel (1996) reports "pave", "smooth", and "cut" in the 17th century, and "bridge", "hew", "sheer", "plough", "dig", and "clear" in the 18th century. In more recent times, the construction is used with an increasing number of verbs referring to abstract actions, especially from the 19th century onwards: for instance, "smirk", "spell", "write" (Israel, 1996), "joke", "laugh", "talk", and "bully" (Perek, 2018).

Following the approach to productivity and schematicity outlined in the previous section, this latter development corresponds to an increase in the schematicity of the verb slot of the construction, which, in particular, becomes more open to different kinds of abstract verbs. However, this change in productivity could also be seen to be tied to a change in schematicity. The semantic contribution of the construction mostly consists of a motion component, and historically, the verbs used in the *way*-construction tend to refer to typical ways in which the motion of the subject referent can be enabled. However, many of the new verb classes attested in later periods correspond to implausible ways to cause or enable physical motion: interaction, commerce, cognition, etc. These verbs are more likely to involve abstract motion, i.e., when a different kind of event is metaphorically construed in terms of motion, as illustrated by the following examples:

(12) *[T]hey talk about Uncle Paul having bought his way into the Senate!*

(13) *[She] managed to talk her way out of the ticket.*

(14) *For a short unmemorable time, he'd bluffed his way in the trainer's position at a small farm in Florida.*

If the *way*-construction is taken to convey concrete motion as its central meaning, these examples can be analyzed as involving a metaphorical mapping from the source domain of motion coded in the constructional meaning, to various, more abstract target domains, following the terminology of conceptual metaphor theory (Lakoff & Johnson, 1980). Motion in these abstract domains can be enabled by a different and probably wider range of actions than physical motion, especially by abstract ones. A likely interpretation of the productivity of the construction in terms of schematicity is therefore that the motion component of the construction becomes more open to metaphorical instantiations: this is an increase in the schematicity of the constructional meaning. However, as argued in the previous section, as likely as this interpretation might be, it is merely a hypothesis, especially since there is evidence that metaphorical construals are not always needed for verbs like

those exemplified in (12) to (14) above to occur in the *way*-construction. This is shown by Examples (15) to (17) below, in which the construction conveys physical motion of the subject and no metaphorical extension is involved; in other words, abstract means of enabling motion does not necessarily entail abstract motion.

(15) *The Kremlin announced that Russians could buy their way out of the country by paying a passport fee.*

(16) *[I]t took Beau more than an hour to talk his way into the Fort Morgan brig.*

(17) *He was guiding just one refugee, a Guatemalan woman who seemed too harrowed by past ordeals to try bluffing her way past uniformed men at a port of entry.*

It may thus be the case that the construction only becomes more productive in these verb classes, yet does not vary in schematicity, in the sense that metaphorical uses do not become more prominent. To investigate this question, I examined data from the Corpus of Historical American English. All instances of a verb followed by a possessive determiner, the word *way*, and a preposition between 1830 and 2009[4] were extracted from the corpus (20,197 tokens). These corpus hits were manually filtered for instances of the *way*-construction, yielding 17,972 instances. For this study, only instances of the path-creation sense of the construction were considered (Traugott & Trousdale, 2013; Perek, 2018), in which the verb describes the means whereby the motion of the subject referent is caused or enabled. This ruled out cases where the verb describes the manner of motion (as opposed to its means) or some action performed simultaneously with motion but unrelated to it, as exemplified by (18) and (19) below respectively.

(18) *The horse was plodding its way through the snow-drifts.*

(19) *She heard him whistling his way up the stairs and into the bathroom.*

The 15,446 tokens of the path-creation sense thus obtained were further annotated as to whether they refer to concrete or abstract motion. If the sentence described motion of the subject in a concrete sense in physical space, it was labelled concrete motion, if not, it was labelled abstract motion. Figure 5 below shows diachronic variation of a range of quantitative measures, comparing abstract vs. concrete uses of the construction.

Figure 5a shows variation in token frequency per decade, normalized by the corpus size of each decade. Token frequency is relatively stable for both kinds

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4. The corpus also contains data from the 1810s and the 1820s, but these two decades were removed from consideration because they are markedly smaller than later ones and are less well balanced in genre.
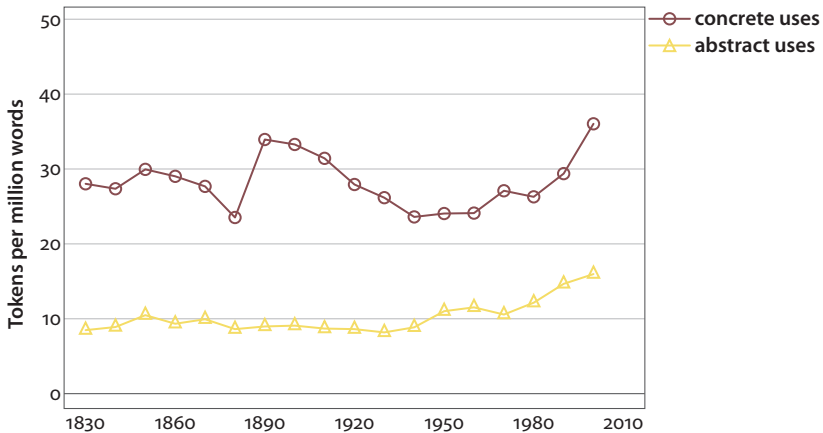
a. Token frequency
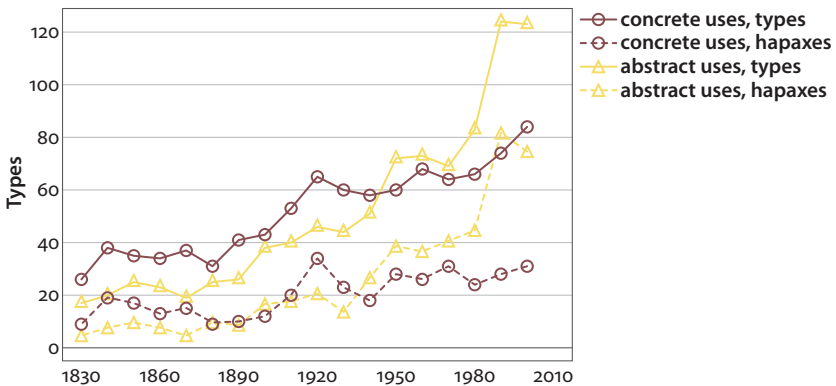
b. Type frequency and hapax legomena

Figure 5. Token frequency, type frequency and hapax legomena of concrete vs. abstract uses of the way-construction

of uses. Abstract uses tend to increase in frequency in the latest decades, but so do the concrete uses (and even more sharply at that). In sum, abstract uses do not seem to become significantly more common and their frequency seems to follow the general trends of the construction. Figure 5b shows variation in the number of different verb types found in concrete vs. abstract uses, and in their hapax legomena, i.e., of the verb types attested only once in each decade, how many exemplify a concrete vs. an abstract use of the construction. While both abstract and concrete uses are on the rise in all measures, the increase is stronger for abstract uses, to the extent that they overtake concrete uses in later decades. In other words, abstract uses end up instantiating more verb types than concrete uses, and most productive uses of the construction (as measured by the number of hapax legomena) tend to be abstract in later decades. This gives quantitative

support for the idea that the recent productivity of the construction primarily lies in uses instantiating abstract motion.

As argued earlier, an increase in productivity does not always correspond to an increase in schematicity of the constructional meaning. In the case of the *way*-construction, it may be the case that new verb types are attested in the construction in large part because speakers use the construction to express new kinds of abstract events in terms of the motion component coded by the construction; in these new types of abstract motion, the action that enables motion might be one that was previously unattested in the construction. In other words, it could be hypothesized that this increase in productivity is tied to an increase in the schematicity of the constructional meaning, in particular its motion component, which becomes more open to more diverse types of metaphorical motion.

To confirm this intuition and gain a better understanding of change in abstract uses of the *way*-construction, the remainder of this case study focuses on characterizing the different types of abstract uses and whether they increase in diversity. A subset of the abstract uses of the *way*-construction was examined, namely those with the preposition *into*. The choice of this sample was motivated by two facts. First, *into* is the most frequent preposition found with abstract uses of the construction (31% of uses) and one of the most frequent overall; this resulted in a smaller yet sizeable sample. Second, focusing on a particular preposition keeps the spatial path relation between the subject of the sentence and the complement of the preposition stable, providing a more restricted set of metaphors than the whole sample. Given the semantics of the preposition, it was also expected that most of the metaphors would be container metaphors, conceptualizing some abstract entity in terms of a container, and the abstract event expressed by the construction as entering that container. This expectation was borne out to a limited extent.

This dataset was annotated according to the kind of abstract motion use exemplified by each token. Identifying metaphors in naturally occurring text is a notoriously difficult task; sorting many diverse metaphorical uses into a discrete number of categories is an even more challenging one. Contrary to grammatical or even some semantic categories, there is no pre-existing list of motion metaphors that could be relied on to annotate the data. Such a list would probably be open-ended anyway: with motion being such a basic domain of human experience, the range of target domains that can be conceptualized in terms of motion is virtually endless. Moreover, it can be difficult to decide whether two different examples exemplify two different metaphors or the same metaphor in different ways, in particular by drawing on different mappings between source and target domain.

It is not within the province of this case study to provide definite answers to these thorny methodological issues. The main question is whether the abstract uses of the *way*-construction have increased in diversity over time; hence, it does

not matter what classification scheme is used as long as it is applied consistently in all time periods. The following method was used to annotate the abstract uses of the *way*-construction. First, a subset of the corpus was selected in order to obtain reliable counts for the metaphor categories over time. This is because decades in the COHA vary quite substantially in size, from 13 million words in the 1830s to 29 million words in the 2000s. However, it is well-known that type counts do not vary linearly with sample size (Zipf, 1935; Baayen, 1992, 2009), hence there is no straightforward way to normalize these measures across samples; instead, equal sample sizes are required. Random samples were compiled for each decade of the corpus by randomly selecting texts until the target sample size (i.e., the smallest available sample size: 13 million words) was reached. Second, the early periods (1830s, 1840s and 1850s) in this subset were considered separately (120 tokens); in this dataset, abstract uses were sorted into categories according to the general kind of abstract event that the construction described. Then, the resulting set of categories was used to annotate the later periods (1860s onwards); any token that could not be matched to one of the categories derived from the earlier periods was annotated as "other". The growth of the "other" categories is our main measure of the increase in diversity of abstract uses. Essentially, what this method captures is how the distribution of abstract uses in later periods differs from that found in earlier periods, or in other words, how well the categories needed to capture the earlier periods cover the later periods. Twelve categories of abstract uses were posited to sort out the 1830–1859 data; they are summarized in Table 1. The left-most column provides a short description of the conceptual metaphor underlying the abstract motion use, in the manner of Lakoff and Johnson (1980). A short identifier is also provided ("mind", "heart", etc.) that is used to refer to the category in Table 2 and Figure 6 below. The right-most column contains two to three examples of each type from the corpus.

Table 1. Categories of metaphorical uses of the way-construction with the preposition "into" in the early decades of the corpus (1830–1859)

Type of abstract use	Examples
The Mind is a Container for Thoughts (mind)	*The truth of many of these reflections made their way into the mind of Margaret Cooper.* *Indeed, there is no notion too improbable to find its way into the head of a political hypochondriac.*
The Heart is a Container for Feelings, Emotions, etc. (heart)	*But a silent sorrow had made its way into her bosom.* *[N]o human feelings found their way into his long-hardened heart.*

Table 1. (*continued*)

Type of abstract use	Examples
Texts are Containers for Ideas, Stories, Words, etc. (text)	*The anecdote has found its way into the newspapers.* *[T]heir prejudices and feelings found their way into the account of the voyage of Lord Byron in the Blonde.*
A Group of People is a Container for its Members (group)	*He has forced his way into good society.* *[O]ne could always cut his way into the patrician ranks by the sword.* *The learned pressed their way into the field of metaphysics.*
States are Containers (state)	*He fought his way into notice by a duel with one of the Rutledges.* *The Antiquary […] was more slow in making its way into favor.*
Change of Possession is Change of Location (possession)	*I'm glad the money finds its way into the pockets of the like of him.* *[M]any a comfortable donation […] found its way into the parish treasury.* *Some of them […] found their way into the hands of persons, who did not scruple to claim and publish, as their own, the discoveries and inventions which they contained.*
A Whole is a Container for Parts (part-whole)	*The black currant should always find its way into every garden.* *The leading doctrines of Political Economy […] have been finding their way into the systems of education.*
Ideas are Moving Entities (idea)	*[T]his accursed superstition […] is working its way into the empire.* *In 1811 this new branch of Industry made its way into France.*
Sound is a Moving Entity (sound)	*[L]ittle belligerent sounds, such as screaming and kicking, occasionally find their way into church.* *It was not long before a strange voice made its way into the darkness.*
Light is a Moving Entity (light)	*… the brightest sunlight that ever found its way into a kitchen* *Thus, the cheerful sun […] never found its way into the close, cellar-like apartment where the Widow Hope sold needles, tape, and various other articles of trifling value.*
Sickness is a Moving Entity (sickness)	*I found the cholera had made its way into these fastnesses of nature.* *[Y]et [the plague] found its way into our little family.*

The main focus in positing these categories was on the general kind of situation that is being expressed, since it is presumably what is metaphorically encoded by the constructional meaning. Some of these categories correspond to classic examples of conceptual metaphors identified in the literature, such as "The Mind is a Container" (148), "Texts are Containers for Ideas, Stories, Words, etc." related to the Conduit metaphor (Reddy, 1979; Lakoff & Johnson, 1980, Chapter 3), and "The Heart is a Container for Emotions" (Kövecses, 2000) among others. As can be noticed from some of the examples in Table 1, these categories are meant to allow some variation in terms of the vehicles that are used to refer to the target domain. For instance, the "The Mind is a Container" metaphor can be used not only with the word *mind* as container, but also with the related words *head* and *brain*. Different vehicles are often related by metonymy; this is the case in particular in the "Change of Possession is Change of Location" metaphor, where words such as *hands*, *pocket*, and *treasury* (among others) metonymically refer to someone's possession.

A category was only posited if there were a least two examples exemplifying it in the 1830–1859 data. This left the following eight orphan tokens (Examples (20)–(27)), which each exemplify a different kind of abstract use that could not be matched to any of the other categories. Some of them really strike as creative, nonce metaphors, such as Examples (24) and (25), while others might well stem from conventional metaphors that are nonetheless not especially prominent in the *way*-construction.

(20)   *The people are slowly working their way into some sort of empirical knowledge.*

(21)   *[S]omething new and extraordinary had found its way into the market.*

(22)   *[H]e with difficulty engineered his way into [his nether garments].*

(23)   *I hev the power to feel my way into Rafe's head, and when I gits thar, I jest handles his pocket like my own.*

(24)   *The vitality and force, which are abundantly displayed in every department of active life, would soon find their way into a higher channel, to meet the new and clamorous necessity for mental food.*

(25)   *And hence this book presents its author to our mind, as one who has traveled out of the beaten track of human experience and inquiry, has peeped over those precipices along the pathway of life, which most travelers think it prudent to avoid, and has groped his way into the dark caverns that open, upon the earthly pilgrim's course, generally keeping himself either out of sight, or else in exposed situations, and yet seldom so far off as not to hear the repeated expression from the great body of his fellow pilgrims.*

(26) *It gropes its way into caves and dungeons where the secret agents of know nothingism practice their incantations, to invoke them to its aid.*

(27) *It seemed to be mingled throughout with the recollections of father, mother, brother, and all the trials and preventions through which he had made his way into life.*

The categories in Table 1 were used to annotate the rest of the data. As indicated earlier, any token that did not match any of these categories was sorted into a thirteenth category, "other" (including the examples listed above). The frequency counts of each category across the 180 years of the corpus thus obtained are summarized in Table 2, tallied in 30-year time periods. Change in the relative importance of each category as a percentage of the total number of abstract uses is represented in Figure 6. Since the categories "sound", "light", and "sickness" are very low-frequency, they were collapsed into a single "miscellaneous" category ("misc") in Figure 6.

As can be seen in Table 2 and Figure 6, the initial categories of abstract uses are relatively stable in frequency. Some of them, such as "state" and "text", even decrease slightly, and only "group" seems to somewhat gain in popularity. The less frequent ones (such as "part-whole" and the categories subsumed under "misc"), which could have been seen as innovations on the rise, actually do not become more common. At any rate, none of the initial categories seem to become

Table 2. Frequency variation of types of abstract uses of the way-construction with the preposition "into" across six 30-year time periods

Period	1830–1859	1860–1889	1890–1919	1920–1949	1950–1979	1980–2009
mind	16	10	7	6	8	8
heart	8	10	8	6	3	4
text	15	27	18	8	6	16
group	11	9	8	8	19	24
state	18	17	27	12	9	20
possession	18	16	12	5	8	8
part-whole	5	3	8	5	5	10
idea	13	15	8	15	6	13
sound	2	1	1	0	0	0
light	3	1	1	0	0	1
sickness	3	0	1	0	0	2
other	8	40	41	38	66	74
Total	**120**	**149**	**140**	**103**	**129**	**180**
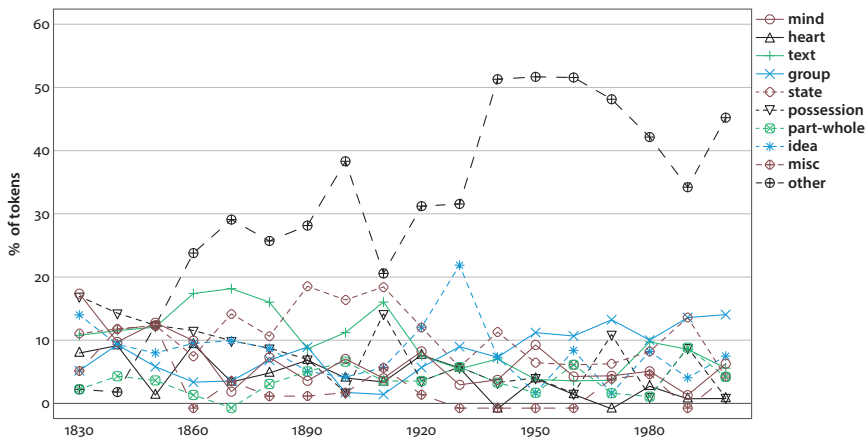
Figure 6. Diachronic change in the distribution of the abstract uses of the way-construction with the preposition "into"

particularly more prominent in later decades. Interestingly for our purposes, the only major development lies in a rapid though unsteady increase of the "other" category, which grows almost twenty-fold: from 3% in the 1830s up to 52.4% in the 1950s of all tokens of abstract uses of the construction do not match any of the categories attested in the first decades of the period of interest. This is evidence that there is indeed a sharp increase in the range of situations conceptualized as motion in uses of the *way*-construction over the last 180 years.

While many of these new uses could well be creative, one-shot metaphors, some of them can be seen to belong to new categories that recur over time. The examples below illustrate some of these new categories:

(28) a. *[T]he word has not yet pushed its way into classic usage.*   (1865)
      b. *When German Walz made its way into English, the unfamiliar initial sound of the German was displaced by English v or w.*   (1921)
      c. *Overnight a fearful new word has bullied its way into our language.*   (1957)

(29) a. *You have bullied your way into the dictatorship.*   (1928)
      b. *Houde had bribed his way into office.*   (1945)
      c. *[H]e'd bluffed his way into the trainer's position at a small farm in Florida.*   (1993)

(30) a. *He had bought his way into the Illinois Central which Stuyvesant Fish controlled.*   (1926)
      b. *Newcomers are fighting their way into the industry.*   (1994)
      c. *[T]he Justice Department suspected the Mob was working its way into the Indian gaming industry.*   (2008)

Examples (28a–c) involve construing a language as a container for words and expressions. In Examples (29a–c), a position, job or role is seen as a container for the person holding it. Finally, in Examples (30a–c), investing in a company or market is construed as motion. To some extent, these new categories can be seen to be somewhat related to the existing ones, which motivate their occurrence in the construction, but they are sufficiently different to be considered distinct and none of these uses are attested in earlier decades, which points to their status as innovative uses of the construction. Importantly, many of these new ways to use the *way*-construction extend the productivity domain of the verb slot of the construction by allowing types of verbs that were not attested so far. For instance, there can be many ways whereby someone manages to assume a position, as in Examples (29a–c) above. Hence, this use brings new verb types into the distribution of the construction, such as *murder* and *steal* which are only attested in this use in the sample under study. Another good illustration is provided by Examples (31a–c) below, which involve a metaphorical construal of gaining unauthorized access to a computer system in terms of breaking into it. This relatively recent use of the construction adds IT-related words to the distribution, such as *dial*, *click*, and the computer sense of *hack*.

(31) a. *Nobody just dials his way into the war games subsystem. Even if he managed to get on line, there are five levels of passwords.* (1983)
      b. *No more clever than hacking your way into records at the coroner's office and police department.* (1995)
      c. *She clicked her way into the Veterans' Administration computer in Chicago.* (2003)

Many of these new uses are quite plausibly motivated by socio-cultural and technological change, not unlike the case of "spend" examined in the previous section. This is obviously the case for the computer hacking uses in (31a–c) and can also be said of the "Investment is Motion" uses in Examples (30a–c). At any rate, there is an increase in the diversity of abstract uses of the *way*-construction over time, which can be interpreted as an increase in schematicity. Figure 7 outlines a description of this change in terms of the network model. The top diagram in Figure 7 is a possible description of the constructional network of the *way*-construction at the beginning of the period of interest; for the sake of simplicity, only the motion component of the constructional meaning is represented, since it is change in this aspect of the construction that is being considered here. The box labelled "Theme moves into Location" represents concrete uses. At the beginning of the period of interest, abstract uses are already well established in the construction; we can thus hypothesize that some of the types of abstract uses, especially the most frequent ones, are also stored as conventional subconstructions, each conveying a

metaphorical variant of the motion component. These are represented in Figure 7 as boxes linked to the concrete use by a dashed arrow, symbolizing a relation of metaphorical extension; the ellipsis suggests that there might be more of these subconstructions than the four pictured in Figure 7. Although this is not the chief concern of this article, these extension relations can be seen to correspond to horizontal links between the abstract uses of the *way*-construction and the central, concrete use they derive from.

In the abstract uses, the motion component relates different kinds of entities from "Theme" and "Location" that cannot be understood in terms of concrete motion, and a metaphorical mapping, indicated in brackets, is involved in the interpretation of the motion component. The presence of these metaphorical extensions allows to posit a more general representation of the construction that abstracts over the variants of the motion component. This higher level of representation retains only a general motion schema but not the ontological type of the elements involved in the schema, and by extension that of the motion component itself. This is represented by the top box in Figure 7, with plain arrows depicting relations of inheritance from this generalization to the concrete use and the abstract uses.

The change occurring in the uses of the *way*-construction with the preposition *into* over the past 180 years, as identified in this case study, is pictured in the bottom diagram of Figure 7. There is an increase in the range of situations conceptualized as motion in uses of the construction; for example, new abstract uses have appeared, such as "Word moves into Language" and "Person moves into Position" in Figure 7.[5] Presumably, this leads to speakers' awareness that the construction has become more open to more diverse abstract uses than it used to be, which in turn allows new kinds of abstract uses to occur in the construction. In terms of the network model, this can be taken to mean that the most schematic node becomes more salient in the network representation of the construction; this is marked by bolder lines in Figure 7. As discussed in Section 3, this corresponds to an increase in the schematicity of the construction. There is less of a tendency for speakers to treat abstract uses as extensions of the concrete meaning than as direct instantiations of the more abstract construction.

To summarize, the examination of metaphorical uses of the *way*-construction with the preposition *into* shows an increase in the diversity of abstract motion

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5. The horizontal links mentioned above between the metaphorical uses and the concrete use are not reproduced in this diagram, mostly for reasons of space and visibility. Also, while there is no reason why these relations would not be kept in the latter stage, it is also possible that these relations become less salient as the abstract uses become more established and thus perceived as independent from the concrete use they originally stem from. I will leave this question for future research.
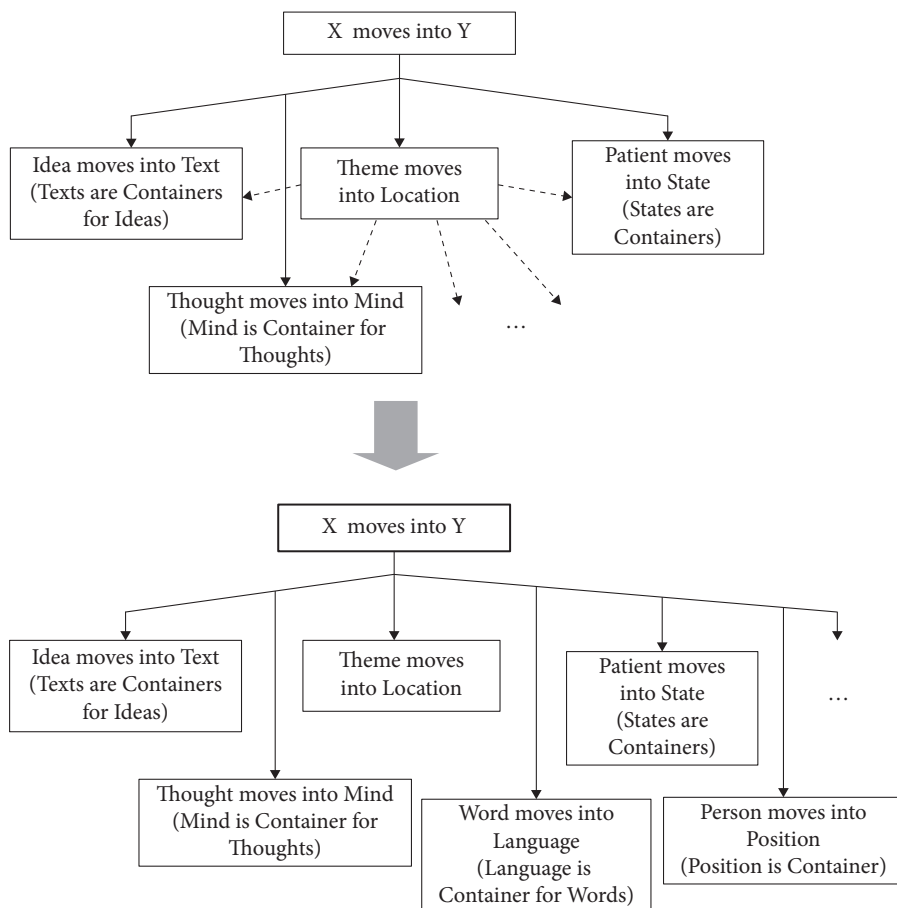
Figure 7. Change in schematicity of the motion component of the way-construction with the preposition *into*

uses, which can be linked to an increase in schematicity. As revealed by previous studies (Israel, 1996; Perek, 2018; Fanego, 2018), there is at the same time an increase in the productivity of the verb slot of the construction. These two changes are probably not fully independent from each other, since the verbs joining the distribution of the construction mostly refer to an abstract action, and hence are more likely to cause abstract, metaphorical motion rather than concrete, physical motion. It seems reasonable to assume that it is the change in schematicity, or more specifically the appearance of new abstract uses, that caused the increase in productivity. Be that as it may, the main point of this case study concerning the relation between productivity and schematicity is that we cannot in principle use one to identify the other; any attempt to do so is merely speculative, since they are manifested differently in the data.

5. Conclusion

Studies in Diachronic Construction Grammar are often concerned with change in two properties of constructions: schematicity and productivity. Schematicity refers to the level of abstraction at which a construction is represented (and its constructional meaning in particular), and productivity refers to the property of a construction to be used with a wide range of lexical items. In terms of the network model, an increase in schematicity can be defined as the creation or reinforcement of a node superordinate to a construction, and an increase of productivity as the creation of lexically-specific nodes subordinate to a construction.

These two properties are often assumed to be so interdependent that change in one should automatically affect the other. However, as argued in this paper, the schematicity and productivity of constructions are not always as directly related as is commonly thought. An increase in schematicity makes a construction applicable to the description of a wider range of situations, which in turns should allow a wider range of lexical items to be combined with it. However, as shown by many studies of grammaticalization and constructionalization, this does not mean that a construction will always be used with the whole range of items compatible with it, as this depends on whether speakers have a communicative need for it. Conversely, an increase in productivity can mean that the construction is used with lexical items that are not fully compatible with its schematic meaning, which in time can lead to an increase in schematicity; this is, however, dependent on how the new lexical meanings relate to the constructional meaning.

To address this discrepancy, a distinction must be made between two kinds of schematicity: that of the lexical slots of a construction, i.e., generalizations over the meaning of a construction's lexical fillers, and that of the constructional meaning as a whole. Only the former is, by definition, directly related to productivity. For constructions with little to no semantic contribution of their own (such as for instance many abstract argument structure constructions), the schematicity of slots is essentially all that the semantic representation of the construction consists of; hence, it is possible to use a construction's productivity to make claims about its schematicity, and vice-versa. If, however, the construction contributes meaning above and beyond that of the lexical items, changes in this constructional meaning must be examined on its own, by looking at individual instances of the construction, but claims about the schematicity of the construction should not be made on the basis of the lexical distribution alone.

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Constructional networks and the development of benefactive ditransitives in English

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In this paper, we address the question of how to model syntactic alternations in Diachronic Construction Grammar terms. We argue that positing horizontal links between constructions in addition to vertical ones is particularly beneficial in accounting for change. Our case study is the emergence of the English "benefactive alternation", with focus on its relation to the more pervasive and more thoroughly studied "dative alternation". Based on a quantitative investigation of ditransitive benefactive verbs in *Early English Books Online* (EEBO), we locate the emergence of the benefactive alternation in Early Modern English later than the dative alternation, which arose in Middle English. We conclude that the benefactive alternation can be modelled as complex networks featuring both horizontal and vertical links on various levels of schematicity.

Keywords: ditransitives, benefactives, syntactic alternations, constructional networks, allostructions, horizontal links, Early Modern English

1.   Introduction

One of the fundamental principles of a construction-based theory is "the idea that the network of constructions captures our grammatical knowledge *in toto*" (Goldberg, 2006, p. 18; original emphasis). The hypothesis that language is organised in a network of form–meaning pairings is broadly accepted within the Construction Grammar community. However, the precise nature of constructional networks and the connections between constructions is still subject to debate (Hilpert, 2018). For example, Van de Velde (2014), Diessel (2015), and Traugott (2018) suggest that besides taxonomic, vertical links such as are typical of Goldberg's work, networks also feature horizontal relations. These may hold both between constructions with the same form but different (even if related) meanings, and between structurally different elements which fulfil the same

function ("allostructions", cf. e.g. Perek, 2015). For horizontal relations to hold between formally distinct constructions, it is necessary that they show a certain extent of semantic overlap, although the overlap may vary in strength (Van de Velde, 2014, p. 172). The proposal of adding horizontal to vertical connections has important repercussions for investigations into the diachrony of constructions and constructional networks. Like vertical links, horizontal ones may newly emerge or be lost over time and may affect the properties of the patterns involved. Assuming that Diachronic Construction Grammar offers a framework for accounting for changes in individual micro-constructions as well as in abstract schemas, we ask what value horizontal constructional links add to vertical ones in modelling the diachronic development of constructional networks. In doing so, we contribute to answering the editors' question 3: "What kinds of connections exist between the nodes in the network?" and question 5: "How can the reconfiguration of node-external linking be modelled?".

We address these questions by looking at a to date largely ignored sub-part of the history of ditransitives in English, namely the benefactive alternation. Ditransitives express a basic sense of "successful transfer" and prototypically involve three participants, an agent, a theme or patient, and a recipient-like entity. Verbs that occur in ditransitive frames are accordingly also known as 'three-place verbs'. Most importantly for our purposes, ditransitives constitute a prime example of syntactic alternations, as most ditransitive verbs are able to appear in two different patterns. This phenomenon is well known as the "dative alternation" and is exemplified in (1). While (1a) illustrates what is commonly known as the "double object construction" (DOC), (1b) is a prepositional pattern involving *to* (*to*-POC):

(1) a.   John *gave* **Mary** <u>a book</u>.
     b.   John *gave* <u>a book</u> **to Mary**.[1]

The English dative alternation and the verbs instantiating the DOC and *to*-POC constructions have come to constitute "a popular test case for theories of argument structure and the syntax-semantics interface" (Colleman & De Clerck, 2011, p. 186). They also play an important role in many constructionist accounts and have been researched extensively from both a synchronic and a diachronic perspective (cf. e.g. Goldberg, 1995, 2006; McFadden, 2002; Mukherjee, 2005; De Cuypere, 2010, 2015a, 2015b; Perek, 2012, 2015; Wolk et al., 2013; Zehentner, 2018, 2019).

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1. We adopt the following formal conventions for examples: recipients (or recipient-like) arguments are marked in bold, while themes are underlined, and verbs are given in italics. The sources of the examples (various corpora and previous literature) are indicated; if no source is provided, the example was invented by the authors.

The goal of this paper is to focus on the development of one particular sub-set of ditransitive verbs and the patterns available to them, a topic that has so far not been addressed in much detail. This group of ditransitive verbs is typically referred to as "benefactives" (cf. Kittilä, 2005; Theijssen et al., 2010) and most prominently includes verbs of creation, preparation or obtainment, such as *bake*, *build*, or *buy*. Expressing a sense of intended reception, they are evidently closely connected to "regular" ditransitive verbs denoting successful transfer (e.g. *give, send*). However, the two groups differ with regard to a few crucial issues. First, while benefactive verbs can be used in the DOC just like basic giving-verbs (2a), in Present Day English (PDE) they have a different prepositional paraphrase: benefactive DOCs alternate with a *for*-pattern (2b) rather than a *to*-POC pattern. Although this association is to some extent fuzzy – with e.g. verbs of performance like *sing* participating in both alternations (3) – it appears to be relatively robust as a phenomenon separate from the *give*-pattern in PDE.[2]

(2) a. John *baked/bought* **Mary** <u>a cake</u>.
     b. John *baked/bought* <u>a cake</u> **for Mary**.

(3) a. you *sang* **me** <u>a song</u> in the language of your village   (COCA; 2015)
     b. She *sang* <u>a song</u> **to him** then and put a kiss on his forehead

                                                                                    (COCA; 2012)

     c. If Paul, like, looked nice or *sang* <u>a song</u> **for me** or something like that

                                                                                    (COCA; 2013)

Second, the two alternations differ in terms of the relative chronology of their emergence, as is discussed more fully in Subsection 3.2. Alternations of DOC with prepositions such as *for* ("benefactive alternation") and *to* ("dative alternation") were absent from Old English, and the standard option for ditransitive verbs in this period was the DOC. The dative alternation with *to*-POC fully developed only in Middle English (McFadden, 2002; Zehentner, 2018, 2019). As for the benefactive alternation with *for*-POC, it did not emerge until the Early Modern English (EModE) period.[3] The precise history of this phenomenon is, however, as yet severely understudied.

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2. The patterns typically show subtle semantic differences. For example, (3b) implicates that the recipient is physically close to the performer or co-present in some way, e.g. via media, whereas (3c) does not have the same connotation. – It is possible to sing a song FOR someone who is not present, but not TO someone, except e.g. on the phone.

3. Periodisation is a matter of debate, but here we take the traditional position that the periods in the history of English were approximately as follows: Old English 650–1100, Middle English 1100–1500, Early Modern English 1500–1700, Late Modern English 1700–1970, and Present Day English 1970-present.

In order to provide a more comprehensive picture of how the English benefactive alternation came into being, we look at a large range of verbs occurring in either the DOC or a prepositional pattern in the corpus of *Early English Books Online* (EEBO; 1490–1700), supplemented by data from the *Penn-Helsinki Parsed Corpus of Early Modern English* (PPCEME; 1500–1720). Based on this quantitative investigation, we sketch the network of ditransitive verbs between Middle and Present Day English, putting special focus on the interaction and potential horizontal links between benefactive and ditransitive constructions at various levels of abstraction. We discuss changes in the network(s) of ditransitives/benefactives over time, in particular the split between the dative and the benefactive alternation after Middle English, i.e. the crystallisation of *for* as the prototypical prepositional variant with benefactive verbs. We comment on the puzzle how and why – just like in the case of the dative alternation – the nominal and prepositional constructions with benefactive verbs have entered a state of steady co-existence over time, with their frequency distribution remaining remarkably stable throughout the centuries. Finally, we suggest that emerging horizontal links can provide an explanation for such phenomena. The study presented here is, however, by no means exhaustive and represents only an initial step in accounting for the history of the benefactive alternation in English.

The structure of the paper is as follows. Section 2 introduces the theoretical background relevant to the project, with particular attention to two constructional network models of syntax: a "vertical" model (2.1), and a "horizontal" one (2.2). Section 3 provides further background information on the dative and benefactive alternation as analysed in Construction Grammar accounts, first in PDE (3.1) and then in early stages of the rise of the benefactive alternation (3.2). In Section 4, we outline the data and methodology used in the corpus study on the benefactive alternation in the history of English. Section 5 presents the main findings and Section 6 discusses them in light of the theoretical issues raised earlier, focussing on the question of how the history of the benefactive alternation can be modelled as a changing network of constructions. Finally, Section 7 concludes the main arguments.

2. Theoretical background

As is well known, one of the basic principles of Construction Grammar approaches is that they take language to consist of "a **structured** inventory of conventional linguistic units" (Langacker, 2008, p. 222; original emphasis), which are form–meaning pairings that make up a speaker's linguistic knowledge. They are organised in a network-like structure and are linked by different types of relations (cf. e.g.

Goldberg, 1995, pp. 74–84; see Section 2.1). These are usually modelled as vertical links, which account for taxonomic relationships. Some researchers also posit horizontal links, which on the one hand account for "polysemy" (Section 2.1), and on the other hand can account for syntactic alternation relationships between so-called "allostructions" (Section 2.2).

2.1   A constructional taxonomic model

Vertical links hold between constructions on different levels of schematicity, which are organised in a network of "inheritance relations". This means that lower-level patterns get their specific features from the higher-level constructions which dominate them. The structure of the more substantive daughter construction is thus "sanctioned" by the more general schema (cf. Langacker, 1987).

Croft (2003) focuses on connections between constructions on a cline from highly general and under-specified schemas to entirely substantive patterns.[4] For example, a lexically fully filled, verb-specific, and semantically not completely compositional construction like *She gave him a kick* at the very bottom of the hierarchy is vertically linked to the most abstract schema of the DOC ('Subj Verb Obj1 Obj2'|'X causes Y to receive Z') at the top (Goldberg, 2006, p. 98). In between the highest-level schema and the lowest-level instantiation, constructions at several levels of abstraction may be present. In the case of *gave him a kick*, a verb-specific, but otherwise underspecified mid-range construction 'Subj *give* Obj1 Obj2' as well as a verb-class specific pairing of 'Subj *transfer-verb* Obj1 Obj2' can be posited. Importantly, these links likewise constitute inheritance relations, e.g. in this example, the abstract DOC specifies the word order in the more concrete sub-constructions.

The vertical links-network proposed by Croft does not only capture differing degrees of schematicity on the formal side of the construction but is also useful in modelling constructions at different levels of semantic specificity. The abstract DOC schema has a comparatively underspecified meaning of "transfer", but links to a number of "lower-level", verb class-specific sub-constructions which instantiate senses like "actual transfer", "intended transfer", or "blocked transfer". Each of these may hierarchically connect to sub-sub-constructions associated with verb sub-classes or individual verbs; "blocked transfer", for instance, may relate to both a construction expressing denying and one denoting "refusing". While the more

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4. There is a range of terms used for the constructions at different levels of abstractness – most commonly, a distinction is made between "macro-schemas", "schemas", "sub-schemas" and "micro-constructions" as the very lowest, most substantive part of the network (see also Traugott, 2018, p. 19).

abstract constructions only specify the common denominators of the subsidiary, lower-level patterns, the latter delimit the range of verbs to those compatible with the meaning of the sub-construction. They impose certain semantic constraints on the verb slot (cf. Croft, 2003, pp. 56–57). This model differs from Goldberg's (1995) account, which views the DOC as a "polysemous" construction in which the different senses cluster around a prototype meaning of "transfer" without a clear hierarchical structure. In this paper, we follow Croft (2003) rather than Goldberg (1995) and refrain from referring to constructional polysemy.

We furthermore argue that these sub-constructions – in addition to being connected via their "mother node" – may also be directly related to each other, drawing on Van de Velde's (2014), Diessel's (2015), and others' proposals that there may be horizontal as well as vertical links between constructions at the same level of schematicity. Vertical links are furthermore inadequate in accounting for the relations between formally different but semantically overlapping constructions, typically referred to as syntactic alternations. These can be captured by a specific type of horizontal links, namely "allostructional links".

2.2   Accounting for constructional alternations

In general, alternation relationships have not received much attention in the constructionist literature until relatively recently. Although Goldberg (1995, p. 91) acknowledges that there is an overlap in meaning between various argument structure constructions, such as ditransitive, caused-motion, and resultative, and views the DOC and the *to*-POC as related by S(ynonymy)-links, she considers them to be represented almost entirely independently of each other. Rather than conceding a central role to alternations, the paraphrase relationship between such patterns is mostly downplayed (cf. Goldberg, 2002, p. 329). This approach accordingly emphasises and privileges vertical relations between a construction and its instantiations. Occurrences of different verbs in the same construction (e.g. the DOC) are seen as more alike than instances of the same verb in different syntactic constructions (such as the DOC and *to*-POC).

Critiques of the disregard for systematic, regular correspondences between formally different variants are found in a range of constructionist and Construction Grammar-sympathetic works, where the aim of capturing linguistic knowledge in its entirety is extended to alternations as part of the linguistic system (Kay & Fillmore, 1999, p. 1). Among proposals that stress the role of paraphrase relationships are Cappelle (2006) and Perek (2012, 2015). Cappelle (2006, p. 13) argues that approaching alternation phenomena "without there being a level of representation at which the two versions are perceived to be semantically identical lacks psychological plausibility". In his model, syntactic variants constitute allostructions

which are linked to a partly underspecified, more abstract construction (Cappelle, 2006, p. 18). While this abstract schema, also called "constructeme",[5] only encodes those elements that are shared by both constructional variants, the allostructions themselves may include further details as to how they differ from one another (Perek, 2015, p. 153).

Perek applies this allostructional model to the English dative alternation and proposes a schematic construction with a relatively broad meaning of "X causes Y to have Z" linked to the two allostructions DOC and *to*-POC (2015, p. 156). Even though these variants are near-synonymous and share a number of features (such as the presence of two object arguments), they nevertheless differ in various construction-specific features which are not part of the abstract schema but are only encoded for the individual patterns. For example, it is well known that the variants show distinct preferences in terms of object ordering: while recipient-theme order is preferred with the DOC, the prepositional pattern is typically preferred with theme-recipient order. These biases correspond to or reflect discourse-pragmatic/ information structure differences. Factors such as pronominality, givenness, discourse accessibility or length of the objects affect the choice of variant (Bresnan & Ford, 2010; De Cuypere, 2015a, p. 227; Theijssen et al., 2010; Wolk et al., 2013; *inter alia*). To illustrate, instances featuring a pronominal recipient and an NP-theme are more likely to be expressed as a DOC, as in (4a), whereas combinations of a pronominal theme and an NP-recipient will typically be found in a *to*-POC (4b).

(4) a.   John *gave* **her** <u>a book</u>.
     b.   John *gave* <u>it</u> **to the woman**.

The benefits of the allostructions model are that such construction-specific constraints can easily be incorporated in it. At the same time, it allows us to capture features that are common to both variants. Furthermore, it is more psychologically plausible than a model that largely views the constructions in isolation, because it more adequately takes into account evidence indicating that speakers do indeed generalise over formally different patterns (cf. e.g. the results gained from a sorting task experiment in Perek, 2012, 2015).

In a different proposal regarding alternation-type relations, Van de Velde (2014) seeks to account for such phenomena in terms of a model of horizontal relations. Instead of being vertically linked to a higher-level abstraction, the alternating constructions are here connected by horizontal links, which hold between constructions at the same level of schematicity (see also Diessel, 2015; Traugott,

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5. The definition of the term "constructeme" in Perek (2015) and others after him – including this paper – differs from the way it was first used in Herbst and Uhrig (2009), who define it as "the set of all valency constructions that share the same participant structures".

2016, 2018). Although it is implicitly or explicitly mentioned in a number of other accounts, the notion of horizontal relations has, however, not been developed in full detail until very recently.

The present paper combines allostructional and horizontal models. Specifically, we assume that while horizontal links may hold between various types of constructions, they importantly also connect alternating patterns, i.e. allostructions, which additionally may vertically connect to a constructeme. Drawing on Van de Velde (2014) and Zehentner (2019), among others, we also follow up on the idea that horizontal links play an important part in the historical development of constructions. For example, if the horizontal association between two patterns becomes increasingly strong, this can lead over time to the establishment of a higher-order abstraction, and can thus also account for the retention of both patterns instead of the loss of one or the other. Such stable constructional co-existence can most prominently be seen in the dative alternation. Although a similar scenario presumably holds for the benefactive alternation, this has not been explored in detail so far and has only been addressed on the basis of empirical data to a very limited extent (cf. e.g. Zehentner, 2019 for a brief discussion of benefactives in Middle English). In particular, investigations of post-Middle English texts are still lacking entirely. We aim to remedy this situation and will argue for a complex and intricately structured multi-level network of constructions in which formally different but semantically overlapping patterns are independently stored alongside each other. They are not simply represented in isolation from each other but are connected via (strongly entrenched) horizontal links as well as by an underspecified and highly schematic constructeme.

3.   Ditransitives, benefactives, and the benefactive alternation

In this section, we present some main points about ditransitive benefactives and the *for*-alternation in PDE (3.1), and then briefly outline the situation in early English before the alternation came into being (3.2).

3.1   Benefactives in Present Day English

The semantics of the PDE double object construction have been subject to much discussion in both non-constructionist and constructionist research. In Goldberg's (1995) seminal constructionist treatment of the pattern, its central and most prototypical sense is stated to be one of "an agent volitionally and successfully causes a willing, animate recipient to receive an object". This sense is most clearly and most frequently expressed by *give* and other, semantically similar verbs, including verbs

of ballistic motion (*throw, kick*) and verbs of bringing and sending (*bring, send*). Furthermore, verbs of abstract transfer (*pay a visit, give a kiss*) and verbs of communication (*tell, show*) are often found in the construction. Additional sub-senses listed by Goldberg (1995, p. 75; 2002, p. 333) on the basis of previous work on ditransitives such as Green (1974), Gropen et al. (1989), Pinker (1989), and Levin (1993) include "future transfer" (*leave, promise, offer*), "enabled transfer" (*allow, permit*), as well as "blocked transfer" (*refuse, deny*).

Most of the uses constitute metaphorical extensions of the basic sense of transfer: for example, *John told Mary the news* is an instance of the "conduit metaphor", which understands communicated messages as travelling towards and being "received" by the listener (Reddy, 1979). The specific meaning relations which hold between the various sub-senses of the DOC are discussed in detail in Colleman and De Clerck (2008), building on Geeraerts' (1998) analysis of the Dutch DOC. In the present paper, the precise semantics of the DOC and the verb classes found in it are not dealt with at greater length, except for the benefactive. As mentioned before, we take it as a given that there are sub-categories of the DOC and that all these sub-senses are represented by lower-level, verb-class specific constructions, which are vertically linked to a highly abstract, under-specified DOC schema (cf. Croft, 2003). In addition, we assume that these individual sub-constructions are horizontally linked to each other, meaning that a sub-construction of *actual transfer* (instantiated e.g. by the verb *give*) has a horizontal connection to a sub-construction of "blocked transfer" (instantiated e.g. by *refuse*). Both of these inherit from a more general double object construction, which is not specified for verb class and accordingly has a relatively open (transfer-related) meaning.

The main focus of the paper is on the particular sub-construction linked to the DOC that expresses a sense of intended, beneficial transfer, and is instantiated by verbs of creating, obtaining, or preparing (*bake, build, cook, get, knit, make, sew*, etc.).[6] This is illustrated in (5), as well as (2) above:

(5)   a.   John *cooked* **Mary** <u>dinner</u>.
      b.   John *cooked* <u>dinner</u> **for Mary**.

Although less prototypical than verbs of giving, this class of benefactive verbs still seems to play a central role in the semantic network of the DOC construction; this is also indicated by the fact that several verbs of creation and obtainment, such as *buy* or *earn*, show up as strongly associated with the DOC in Stefanowitsch and Gries' collexeme analysis of the construction (2003, p. 229).

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6. Vázquez-González and Barðdal (Forthcoming, p. 27) consider the concept of creation to be source ("urheimat") of beneficiaries and assign it a central role among ditransitives in Proto-Germanic.

Importantly, the benefaction events denoted by the DOC in standard PDE are restricted to recipient-benefaction. That is, the PDE benefactive DOC cannot be used to express events in which a participant benefits from an action without receiving anything (Van Valin & LaPolla, 1997; Kittilä, 2005; cf. also Colleman, 2010a, 2010b). Rather, an action is carried out instead of the beneficiary, i.e. "someone is substituting for the beneficiary as the agent of the profiled event" (Kittilä, 2005, p. 273). Such events are accordingly typically referred to as "substitutive" or "deputative" benefaction (as well as "true", "pure" or "plain" benefaction, cf. also Newman, 1996, p. 220). We will refer to "substitutive" benefaction in this paper, although this term is not ideal: if I open the door for someone, this may be instead of, or substituting for the person, or it may be for their benefit in general (e.g. to indicate politeness). Examples for substitutive benefaction in standard PDE are given in (6)–(8). In these sentences, the agent performs an action on behalf of another participant; in contrast to cases like *Mary baked John a cake*, there is no (intended) transfer of an item from the agent to the recipient.

(6) a. * Can you *hold* **me** <u>the door</u>, please.
     b. Can you *hold* <u>the door</u> **for me**, please.

(7) a. * Sue *fixed* **Bill** <u>the radiator</u>.
     b. Sue *fixed* <u>the radiator</u> **for Bill**. (Colleman, 2010b, p. 225)

(8) a. * The teacher *parked* **me** <u>the car</u>.
     b. The teacher *parked* <u>the car</u> **for me**. (Kittilä, 2005, p. 273)

The DOC uses in (6), (7), and (8a) are rare in PDE; instead, events of this type are most commonly encoded by a *for*-POC (see (6), (7), and (8b)). This "intended reception constraint" is generally quite robust in standard PDE (Colleman, 2010a, p. 194; also Goldberg, 2002; Nisbet, 2005). However, it is to some extent fuzzy, since "whether a given event can be construed as involving intended causation of reception is a matter of degree rather than kind" (Colleman, 2010a, p. 195). This is shown in Allerton (1978, p. 25), who finds that there is a cline in speakers' acceptance of DOC uses of substitutive benefaction, ranging from higher acceptability scores for instances like *Could you iron me these shirts* to relatively low scores for *Open me the door* (cf. also Fellbaum, 2005 on attestations of such uses in natural language). Furthermore, the strength of the constraint varies considerably across both genres and dialects. For instance, it has been reported that substitutive benefaction DOCs are acceptable in Yorkshire English (Petyt, 1985, p. 236; referred to in Colleman, 2010b).

The synchronic variation just outlined is indicative of historical change; the DOC could readily be used to denote events of substitutive benefaction in earlier stages of English. Although already quite infrequent in Middle English, however,

examples of such uses can still be found in 18th and 19th century English, as in (9). This shows that the loss of this particular sub-sense from the DOC, and thus the establishment of the intended reception constraint, proceeded rather slowly (Colleman & De Clerck, 2011; Zehentner, 2019).

(9)   a.   and the young Benedictine *holding* **him** <u>the torch</u> as he wrote
(Sterne 1767; Colleman & De Clerck, 2011, p. 196)
      b.   He would expect his wife […] to *open* **him** <u>the door</u>, to reach him a chair
(The Sporting Magazine, January 1819: 164;
Colleman & De Clerck, 2011, p. 196)

Today, benefactive verbs are typically paraphrased by a prepositional pattern involving *for*, with verbs of substitutive benefaction occurring almost exclusively in this alternative construction. The fact that they thus differ from "regular" ditransitives in not alternating with a *to*-POC has led some to treat benefactives as a category entirely separate from the DOC (e.g. Kay, 1996, 2005). Although we do not follow this proposal in this paper but view the benefactive DOC as one of the various sub-constructions linked to the more general DOC schema, the presence of this second alternation relationship needs explanation.

Theijssen et al. (2010) have investigated the factors conditioning the choice of DOC over *for*-POC in varieties of English. Their study shows that in a corpus of British English (ICE-GB), the benefactive alternation is (1) generally considerably less frequent than the dative alternation, and (2) is guided by similar semantic/ discourse-pragmatic factors as the dative alternation, such as animacy or pronominality, although the distinctions seem to be slightly less clear-cut in this case (Theijssen et al., 2010, p. 128). However, and interestingly, the *for*-prepositional pattern accounts for a much higher percentage of instances than the (benefactive) DOC in their dataset (about 70% *for*-POC), while the exact opposite seems to hold for the dative alternation in the 20th century (Wolk et al., 2013, p. 393 found 70% recipient DOC in ARCHER for the period 1900–1949). Since it is not entirely clear whether non-alternating verbs were excluded from Theijssen's data, and not much detail is given on the precise procedures, this might be a methodological issue (even though, as discussed below in Section 5.2, it is confirmed by a subset of our data).

In Goldberg (1995, pp. 90–91), the *to*-POC is viewed as inheriting from a more abstract "caused motion" construction, which also licenses sentences such as *John sent a letter to London*, or *John put the letter on the table*. By contrast, the *for*-pattern is analysed as a combination of the transitive construction together with the "benefactive adjunct construction" (Goldberg, 2002, pp. 333–336, 344–347). Examples such as (10a), which alternates with the DOC "John sent Mary a book", are accordingly taken to form part of a set which includes instances like (10b–c), adapted from Goldberg (2002, p. 331).

(10)   a.   John *sent* <u>a book</u> **for Mary**.
      b.   John *sent* <u>a book</u> **for the library**.
      c.   John *sent* <u>a book</u> **for his mother's sake**.

On this analysis, the *for*-POC differs substantially from the *to*-paraphrase (as well as the DOC) in involving a traditional adjunct rather than an argument. This assumption is based on examples such as (11a–c). In the *for*-POC (11a), an adverb can be inserted between theme and the "adjunct"-recipient, while this is less acceptable in the case of the *to*-POC (11b) and ungrammatical in the DOC (11c), which both involve an "argument"-recipient (cf. also Nisbet, 2005). However, the issue is not discussed at great length anywhere.[7]

(11)   a.   John *bought* <u>a book</u> yesterday **for Mary**.
      b.   �'John *sent* <u>a book</u> yesterday **to Mary**.
      c.   *John *bought/sent* **Mary** yesterday <u>a book</u>.   (Goldberg, 2002, pp. 331, 345)

In this paper, we acknowledge the differences between the two prepositional variants, and also between their historical trajectories (see the sub-section immediately below 3.2), but at the same time view them and their historical development as related to each other.

3.2   Benefactives in Old and Middle English

Regarding the historical development of the benefactive alternation, the DOC was standard in Old English, as pointed out before and as illustrated in (12a b) (e.g. Koopman, 1990; Allen, 1995; De Cuypere, 2015a; Vázquez-González & Barðdal, forthcoming). Although prepositional patterns are attested, they were highly restricted, and it can convincingly be argued that no clear and strong association suggestive of alternation between the two constructional types held at this time.

(12)   a.   *dældon*   <u>heora æhta</u>   **ealle þearfum**
          distributed their belongings all   poor
          '[they] distributed their belongings [to] all the poor people'
                    (c1000, coaelive, ÆLS:54.479; De Cuypere, 2015a, p. 231)
      b.   wolde   **hire** on þære byriʒ <u>bur</u>   *atimbran*
          wished her in this   town a chamber build
          '[it] wished to build itself a chamber in this town'
                (c960?, Anglo Saxon Riddles; Glossary Old English Aerobics,
                                    s.v. *atimbran*)

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7. Note also that the strict division between adjuncts and arguments has since been challenged (cf. e.g. Hoffmann, 2007, 2011). We do not pursue this question further in this paper.

A more systematic connection between the DOC and the dative *to*-POC patterns has been shown to have emerged in Middle English (McFadden, 2002; Zehentner, 2018, 2019). In this period (approximately 1100–1500), the prepositional pattern appeared with increasingly more ditransitive verbs, including the most prototypical ditransitives, namely transfer verbs (13).

(13)   &   ʒeue **to ioseph** […] <u>hap</u>
    and give to Joseph   happiness
    'and [you] gave […] happiness to Joseph'

<div align="right">(c1225, CMJULIA, 119.390; PPCME2)</div>

This development took place against the background of a concomitant and general rise around this time of PP-patterns at the expense of pre-existing, more nominal construction types (e.g. Mustanoja, 1960; McFadden, 2002). Furthermore, the establishment of the dative alternation coincides with an overall move towards more analytic means of expression and other broader changes in the linguistic system, including the loss of case marking and an increasing rigidification of word order (Visser, 1963; Mitchell, 1985; Allen, 1995, 2006; De Cuypere, 2015a, 2015b). The latter development is also reflected in the ordering of objects with ditransitives. While both theme-recipient and recipient-theme patterns were still flexible in this regard in earlier times – as indicated by Examples (12a–b) above – the DOC today typically features recipient-theme order (*John gave Mary a book*).[8] The opposite order is preferred with the *to*-POC (*John gave a book to Mary*). This change mainly took place within Middle English, or shortly after (McFadden, 2002; Zehentner, 2019).

In contrast to the dative alternation, there is no clear evidence for the emergence of the benefactive alternation in Middle English data, as verbs of creation or obtainment are found with a variety of different PP-patterns even at the end of the period (Zehentner, 2019). This is shown in the Middle English examples below, where benefactive (creation) verbs are used in DOCs (14a), (15a), (16a) and prepositional constructions involving *to, for* and *on*, respectively (14b), (15b), and (16b).

(14)   a.   and *bylde* **hem** <u>a synagogue</u>
          'and build them a synagogue'   (c1400, CMWYCSER,366.2483; PPCME2)
       b.   Salamon *bildide* <u>a noble hous</u> **to himself**
          'Salomon built a noble house TO himself'

<div align="right">(c1388, CMPURVEY,I,12.477; PPCME2)</div>

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8. There is considerable variation concerning this constraint in patterns with two pronominal objects. The order in *She gave me it* is, for example, attested in some British dialects (e.g. Gerwin, 2014).

(15) a. icc *hafe* **hemm** *wrohht* <u>tiss</u> <u>boc</u>   To þeȝȝre sawle need
      I   have them   worked this book to their   soul's need
      'I have made them this book for their soul's need'

<div align="right">(c1200, CMORM,DED.L143.38; PPCME2)</div>

   b. God *haþ wrouȝt* **for him** <u>meny</u> <u>a</u> <u>faire</u> <u>miracle</u>
      God has worked for him many a fair   miracle
      'God has often made great miracles FOR him'

<div align="right">(c1400, CMBRUT3,101.3058; PPCME2)</div>

(16) a. he **ous** *ssepþ*   <u>oure</u> <u>corounes</u> <u>of</u> <u>blisse</u>
      he us   shapes our   crowns   of bliss
      'he makes us our crowns of bliss'

<div align="right">(1340, CMAYENBI,116.2240; PPCME2)</div>

   b. <u>ðat</u> <u>gode</u> <u>imiend</u>   ðe   godd *hafde iscapen* **on ðe**
      that good memory that god   has   shapen on you
      'that good memory that god had created ON you'

<div align="right">(c1200, CMVICES1,23.252; PPCME2)</div>

The variability illustrated in the PP-patterns here suggests that even though the *for*-POC was available for benefactive verbs, they were not categorically linked to this particular preposition, even in the final stages of Middle English. This leads us to hypothesise that the rise of the benefactive alternation, i.e. the association between benefactive DOC and *for*-POC as an independently represented link, was a later development, most likely pertaining to the Early Modern English period. As pointed out above, a further change affecting parts of the alternation is the emergence of the "intended reception" constraint, which causes verbs of substitutive benefaction to be (largely) disallowed in the DOC.

In Section 5, we turn to modelling the development of the network of (benefactive) ditransitives, based on a quantitative investigation. Before doing so, however, we first comment on the data and methodology used for our study.

4. Data and methodology for a corpus-based study of benefactives in Early Modern English

The methodological basis of the investigation of the rise of the benefactive alternation is provided by a quantitative study of ditransitive patterns in a corpus of EModE. Although the changes are gradual and statistical rather than categorical, we nevertheless assume that this period sets the course for the present-day situation. A closer look at Late Modern English and PDE benefactives is still needed to confirm the hypothesis and yield a fuller picture.

The study draws on data from two historical corpora of English. The *Penn-Helsinki Parsed Corpus of Early Modern English* (PPCEME Release 3; Kroch, Santorini & Delfs, 2004) was used for a preliminary investigation of verb types found in benefactive patterns. This corpus consists of about 1.7 million words and includes 448 texts written between 1500 and 1720. The corpus of *Early English Books Online* (EEBO; Davies, 2017) was then employed for a more wide-ranging study of the relevant constructions. The EEBO, only recently made broadly available, is an extensive database comprising over 755 million words in more than 25,000 texts. Assembled by the Text Creation Partnership as part of the SAMUELS project, it covers the time span of 1470 to 1700, the period generally known as EModE.

In a first step, we compiled a list of benefactive verbs on the basis of three different approaches: we compared and combined the PDE verb set given in Levin (1993, p. 48) with the verbs identified as benefactives in Zehentner's (2019) dataset of Middle English ditransitives, but also conducted a pilot study on the syntactically annotated versions of the PPCEME files for instances of the preposition *for* with two objects by means of the software *CorpusSearch* (Randall, 2009). This enabled us to detect additional benefactive verbs which were not present in the Middle English data or not captured by Levin's list for Present Day English. We did not impose a frequency threshold for the individual verbs, meaning that all verbs occurring at least once in the specified pattern and expressing benefactive semantics were included. The final inventory of 215 verbs then served as the input for a more large-scale study of benefactive ditransitive patterns as attested in the EEBO, meaning that we subjected the verbs to further investigation for their occurrence in either a DOC, a *for*-POC or a *to*-POC in this larger corpus of Early Modern English. The decision to include *to*-POC uses in addition to instances of *for*-POCs was motivated by the availability of both patterns for benefactives in Middle English illustrated in Section 3.2. We deemed focussing on *for*-POCs only as too constrained and not conducive to answering the main aims of the paper: our approach allowed us to address the question how far the dative alternation and the benefactive alternation interacted at this period in time.

Due to the overall very high frequency of the relevant verbs in the EEBO corpus, the final search was restricted quite heavily a priori. Specifically, the second step involved extracting the following three specific patterns from EEBO:

a. DOC: verb (all forms) + pronoun + article + noun (e.g. *baked him a cake*)
b. *for*-POC: verb (all forms) + article + noun + *for* + pronoun (e.g. *baked a cake for him*)
c. *to*-POC: verb (all forms) + article + noun + *to* + pronoun (e.g. *baked a cake to him*).

The instances extracted were manually inspected for false positives, and irrelevant uses discarded. The main reason for proceeding in this way was the fact that, while the size of the EEBO invites quantitative studies in general, it is not parsed for syntactic information. Taking the unfiltered EEBO data as a starting point and attempting to extract all uses of the verbs in relevant patterns accordingly proved largely unfeasible.

However, there is a number of issues with the procedure adopted. First, prepositions other than *to* or *for* might have been available for these verbs in the period in question (cf. *on* in (16b) above). Even within this set, the data is skewed towards *for* at the expense of *to* since (benefactive) verbs exclusively or predominantly used with *to* were not captured. Second, the search strings employed to extract data from the EEBO introduce a further bias. This is because it has repeatedly been shown that pronominality of the objects is a decisive factor in the choice of DOC over prepositional patterns – combinations of NP-themes and pronominal recipients are typically strongly associated with the DOC but disfavour the PP-patterns. As presented below, this is also reflected in the findings. Although this issue is evidently problematic when it comes to determining the precise relationship between the DOC and the prepositional constructions, we nevertheless believe it is a valid approach in that the distribution of *for*-POC versus *to*-POC should not be affected by it, and in that it made the investigation more practicable. Also, the method still allows us to investigate which verbs are particularly drawn towards either construction. It has been found that with PDE ditransitives, individual verbs exhibit significant differences in the choice of one variant over the other. Such verb-specific biases can be detected by means of mixed-effects regression modelling (e.g. Bresnan et al., 2007; Bresnan & Ford, 2010) and also by using the tool of "distinctive collexeme analysis" (Gries, 2014). This method "identifies lexemes that exhibit a strong preference for one member of the pair as opposed to the other, and thus makes it possible to identify subtle distributional differences between the members of such a pair" (Gries & Stefanowitsch, 2004, p. 97). For instance, Gries and Stefanowitsch (2004, pp. 106–107) find that in the case of the PDE dative alternation, verbs such as *give, offer, show, tell*, or *teach* most frequently select for the DOC, while the verbs most clearly associated with the *to*-POC include *bring, pass, take* as well as *pay, sell*, and "supply". Following this approach, we applied the method to the EModE data; by dividing the dataset into 4 sub-periods of 50 years each and performing the same analyses for each of these, we are able to identify whether any changes in verb-specific tendencies took place within the period.

To validate and double-check our results, we finally zoomed in on a much smaller set of ten verbs which are classified as benefactive verbs in Levin (1993, p. 48), namely *build, buy, design, find, get, make, obtain, open, prepare*, and *sing*. More specifically, we took a random sample of 500 tokens per verb from the EEBO

and coded the instances according to the type of construction used, filtering out the non-ditransitive occurrences and comparing them to those of DOC and prepositional patterns.

5.   Findings of the corpus study

In this section, we present the main findings of the investigation in the EEBO corpus of the entire set of potentially benefactive verbs (5.1) and of the set of the ten selected verbs (5.2).

5.1   All verbs

When looking at the results of all verbs taken together, the first thing to observe is that there seems to be very little change overall within the time period in question. As can be seen in Figure 1, the DOC stably accounts for about 80 to 90 per cent of tokens in all decades, while both prepositional patterns are much less frequent.[9] A signed-rank correlation test (Kendall's tau; cf. Hilpert & Gries, 2009) reveals that the changes in proportional frequencies over time are non-significant, with $p > 0.05$ in all cases (DOC: $\tau = 0.22$, $p = 0.16$; *for*-POC: $\tau = 0.09$, $p = 0.57$; *to*-POC: $\tau = -0.19$, $p = 0.23$).

A similar picture (not reproduced here) presents itself when only those verbs that truly alternate between DOC and *for*-POC are included, i.e. when the *to*-POC and verbs only alternating between the DOC and this variant, are excluded from the dataset. As in the overall distribution, the fraction of the *for*-POC in this case falls from approximately 9 to about 5 per cent over the course of the period; however, the change is again not significant ($\tau = (-)0.067$, $p = 0.68$).

As already pointed out, the general predominance of the DOC can be explained at least in part by the methodological approach taken, and the results may not be entirely representative of the actual distribution when non-pronominal recipients are investigated as well. Nevertheless, the complete absence of change is remarkable here, as it indicates that the DOC and the prepositional patterns had already entered a stable relationship by the beginning of the period. This is

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9. These data contrast with the figures shown in Theijssen et al.'s (2010) study of the PDE benefactive alternation, where the *for*-pattern is prevalent in a 70/30 distribution. This is likely the result of methodological differences: while the initial data extraction process was similar in both approaches, we did not exclude any instances from the dataset but took all attestations of the selected verbs in the three patterns into account. By contrast, Theijssen et al. (2010, p. 118) manually reduced their DOC data to a great extent, only retaining those instances with a clear benefactive meaning.
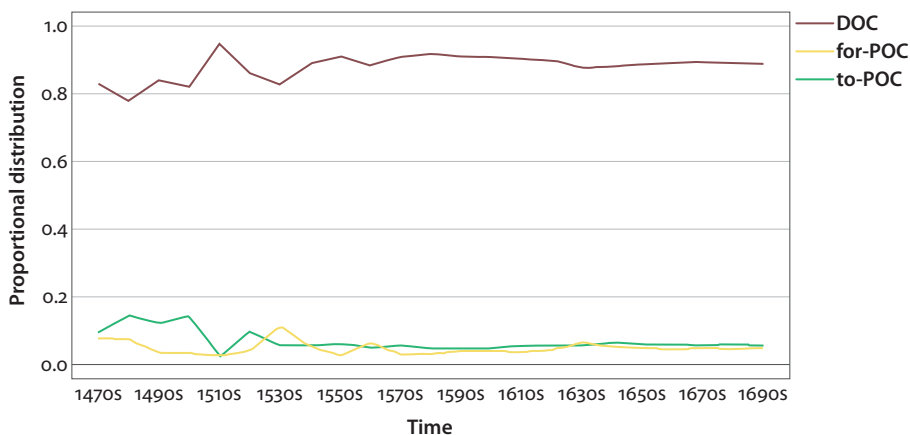
Figure 1. Proportional distribution of DOC, *for*-POC and *to*-POC in EEBO, all benefactive verbs

perfectly in line with Zehentner's (2018, 2019) results on the dative alternation, which show that by the end of Middle English, the DOC and the *to*-POC had essentially reached the distributional state still exhibited in PDE. That is, the overall distribution of DOC versus any prepositional pattern is not subject to much change after Middle English.

Still, the findings are somewhat surprising, as we could expect at least a slight decrease in the proportion of DOCs due to the growing loss of verbs of substitutive benefaction from this pattern in favour of PP-constructions, more specifically the *for*-POC. It has to be pointed out, however, that occurrences of substitutive benefaction are generally rare (in Middle English already, and also in later stages), meaning that changes in their behaviour may not be clearly visible in the data. This assumption is also supported by a closer look at individual verbs typically considered to express substitutive benefaction. For example, the verb *open* is attested quite frequently in ditransitive structures in the corpus ($N = 469$). In a few cases, it is substitutive (17a), but in most cases, examples do not denote non-transfer benefaction. Instead, the verb is often used as a synonym for the communication verbs *show* or *tell*, as illustrated in (17b), and accordingly follows the main trend.

(17)   a.   no man *wou'd open* **me** <u>the door</u>   (1695; EEBO)
        b.   and prepare seriously to *open* **me** <u>the true sentiments of your heart</u>
                                                                           (1683; EEBO)

Although the overall development of DOC vs. POC is, as shown, very stable within EModE, it is interesting to investigate the relationship between the two prepositional paraphrases in more detail. Hypothesising that the establishment of the benefactive alternation took place in the EModE period, we anticipate seeing

some change in the proportional distribution of the two prepositional variants over time. This is at least to some extent borne out by the data. As depicted in Figure 2, there is again no significant change in relative frequency of the patterns over time ($\tau = (-)0.178$, $p = 0.25$). What is nevertheless striking about the results is that the earlier decades are characterised by substantial fluctuation, with the percentage of the *for*-POC ranging from 20 to over 65 in individual decades. (This fluctuation importantly also pertains to individual verbs in the earlier periods; cf. the examples in (20)). In the 17th century data, by contrast, the distribution seems to stabilise.
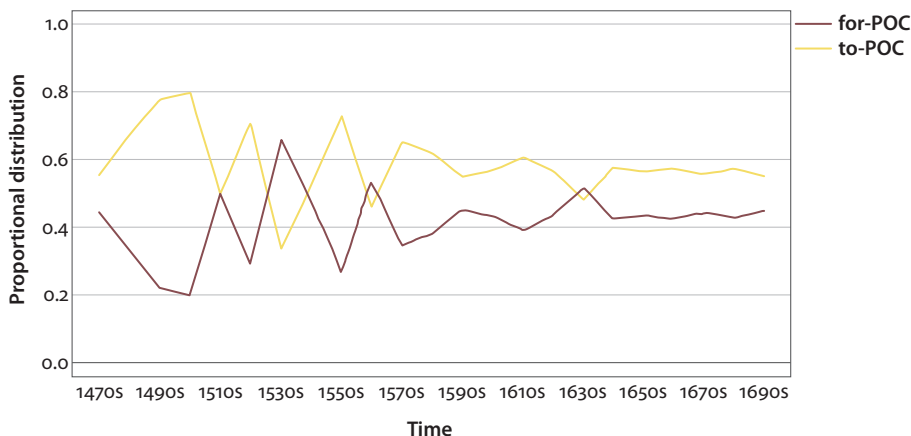
Figure 2. Proportional distribution of *for*-POC vs. *to*-POC in EEBO, all benefactive verbs

As will be discussed below, we interpret this stabilisation from the late 16th century onwards as the development of a sharper division between uses paraphraseable with *to* and those alternating with a *for*-POC, and thus ultimately as the beginning of the entrenchment of the benefactive alternation as a representation stored separately from the ditransitive (dative) alternation.[10] Verbs which could express both a benefactive and a regular ditransitive meaning, such as *open* in Examples (17a) vs. (17b), become increasingly restricted to one of these, which also impacts the choice of patterns they occur in. For example, in the case of *open*, we find that it very rarely expresses "showing" or "telling" in PDE anymore and is almost exclusively used in a benefactive *for*-POC (rather than a DOC or *to*-POC).

Moving on to the results of distinctive collexeme analyses carried out on the verb data, some interesting insights can be gained. As explained in Section 4, the database was sub-divided into four periods of 50 years each for this purpose,

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10. For discussion of identifying entrenchment in historical work, see Schmid and Mantlik (2015); furthermore Barðdal and Gildea (2015), among others, on the notion of entrenchment in Diachronic Construction Grammar.

enabling us to better detect any potential changes in verb-specific preferences over time. Due to the nature of the data extraction process, only pair-wise comparisons could be made, meaning that we investigated the choice between DOC and *for*-POC, and *for*-POC and *to*-POC, separately, instead of performing a multiple collexeme analysis of all three patterns.[11]

The outcome of this investigation of the choice between the constructions is given in the tables in Appendix 1–2. The rightmost column indicates how strong the association of a specific verb to either the DOC or the *for*-POC is (specified in the column labelled "pref.occur"). Note that values of above 3 for collocational strength correspond to a high significance level ($p < 0.001$), coll.strength > 2 indicates a medium significance level ($p < 0.01$), and scores of between 2 and 1.30103 are significant at a $p < 0.05$ level. ("inf" means "infinite" and thus indicates a very small p-value). Verbs not showing a statistically significant attraction to either construction are excluded from the tables in the Appendix but are referred to in the text.

A first conspicuous finding is that the number of verb types preferred with the DOC is consistently lower than that of verb types associated with the *for*-POC. Table 1 summarises the number of verb types strongly attracted to either the DOC or the *for*-POC in the total of attested benefactive verbs: for example, in the first half of the 16th century, 5 verbs clearly correlate with DOC usage, while 7 verbs prefer the *for*-POC. The remaining verb types (out of the total of 68 verbs in this period) are neutral; they do not show any predilection for either pattern.

Table 1. Number of V types preferred with DOC and *for*-POC in 4 sub-periods of EEBO

Period	VPrefDOC	VPref*for*-POC	Total
1500–49	5	7	68
1550–99	8	27	114
1600–49	14	47	133
1650–99	17	68	151

Over time, the number of verb types connected to the *for*-POC greatly increases and expands. That is, the verb types added to the inventory of benefactives are

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11. For distinctive collexeme analyses between two alternatives, either raw lists of all tokens or edited lists with frequencies can be used; analyses of more than two variants only work on the former (at least with the script provided by Gries, 2014). Since our data consist of frequency lists derived directly from EEBO, we resorted to two-way comparisons. We also ran collexeme analyses across periods within the individual constructions, as suggested by a reviewer: for reasons of space, and since these analyses did not add substantial additional insights, the results are not presented in this paper.

more often attracted to the *for*-POC rather than the DOC. It is of course clear that these results may be to some extent skewed by our study design. Still, we take this outcome to be indicative of *for* becoming more distinctly represented as an alternative (or even an exclusive) strategy for the set of benefactive verbs as a whole, even though this may not be as clearly reflected in the relative token frequency distribution of the patterns.

The data also show that while there is some stability in the verb-specific tendencies, there is significant change over time. The stability is in the presence and high collocational strength of *give, show, tell, send* in the column for benefactives with DOC preference, and presence of *make, take, lay, allege, prepare, offer* and *have* in the column for benefactives with *for*-POC preference. However, what can mainly be seen is change. Over time, benefactives with preference for DOC increasingly show ties with verbs of communication and cognition (e.g. *ask, prove*), transfer (*bring*) and even underspecified *do* (cf. *do someone a favour*). In general, these are rarely used with a benefactive meaning, although occasional examples can be found (also justifying their inclusion in the dataset in the first place), as in (18):

(18)   hee is discharged, and needs not *bring* <u>a bullocke</u> **for himselfe** (1627; EEBO)

While the *for*-POC is from the beginning closely associated with semantically underspecified verbs such as *make* or *take*, which frequently occur in so-called light verb constructions, their openness makes them less prototypical members of the group (cf. also Stefanowitsch, 2006, p. 65). By contrast, the *for*-POC emerges over time as strongly connected to benefactive transfer verbs such as *prepare* or *get* (also e.g. *forge* or *weave* as verbs of creation, and performance verbs like *play and sing*) as well as verbs often denoting substitutive benefaction (e.g. *bear, die*). Examples of such uses are given in (19a–d). These tendencies only seem to strengthen between the first sub-period and the last period.

(19)   a.   can god *prepare* <u>a table</u> **for vs** in the Wildernesse?   (1619; EEBO)
      b.   matrons were appointed to *weave* <u>a garment</u> **for the goddess**

                                                   (1697; EEBO)
      c.   as to *sing* <u>a requiem</u> **for the dead**   (1661; EEBO)
      d.   though thou shouldest euery day *die* <u>a death</u> **for him**   (1609; EEBO)

Interestingly, the one verb that initially was preferred with DOC and later came to be associated with *for*-POC is *get*, a verb of (benefactive) transfer. We again view this as support for the assumption that the *for*-POC emerged as a viable and strong alternative for prototypical verbs of benefactive transfer.

Turning now to the relationship between verbs with *for*-POC and *to*-POC, presented in Appendix 2, we find variation in the ratio of verb-types associated with one or the other, as shown in Table 2.

Table 2. Number of V types preferred with *for*-POC and *to*-POC in 4 sub-periods of EEBO

Period	VPref*for*-POC	VPref*to*-DOC	Total
1500–49	3	5	29
1550–99	10	8	79
1600–49	11	18	116
1650–99	40	27	136

In the earlier periods, there is a great deal of variation, with both prepositions occurring in very similar contexts (illustrated by the following instances of the verb *make* (20a–d)).[12]

(20) a. this is the palays that thomas *hath made* **for thy brother**   (1483; EEBO)
  b. that ther *was made* **to him** a temple whiche endured after   (1477; EEBO)
  c. and *did do make* **for him** a fayr bayne [bath] / wherin she put these herbes   (1477; EEBO)
  d. broughte the damoyselle and the lityll chylde in to his hous / and *made* **to them** a good fire   (1474; EEBO)

By contrast, the *to*-POC in later periods is mainly associated with directional verbs (e.g. *bring, pull, reach*) and verbs which foreground the transfer event, as in (21).

(21) a. not to bewail them, or *bring* a remedy **to them**   (1693; EEBO)
  b. manlius torquatus, at supper, *reaching* a cake **to one of his guests**   (1673; EEBO)

Verbs of preparation or obtainment (e.g. *find, get, obtain, procure, purchase*, among many others) show increasingly strong preferences for the *for*-POC. Some representative examples are provided in (22).

(22) a. and we *shall* soone *find* a place **for them**   (1604; EEBO)
  b. because he *had not obtained* a peace **for them**   (1700; EEBO)
  c. *purchased* a house **for himselfe and his successors**   (1601; EEBO)

Furthermore, the analysis shows that the fraction of verbs which are not closely associated with either one or the other pattern decreases over time. In the 16th century, about three quarters of the verb types freely alternate between the two PP-patterns, whereas in the 17th century, only half of the verbs remain highly variable.

In sum, despite certain limitations of the investigated data, a few observations can be made. Most importantly, the relationship between the DOC and the

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12. These examples differ in word order and were not, in fact, part of the sample investigated; they are given to illustrate the general picture, since they feature the same verb with very similar meanings in the earliest EEBO decades.

PP-paraphrases is stable throughout the period. The crystallisation of the *for*-POC as an alternative to a specific sub-set of ditransitive verbs, however, can be located in the later stages of this period, when the variation between *for* and *to* became more restricted. In the following sub-section, we test and cross-check this claim with 10 typical benefactive verbs and their patterns of occurrence in a random sample of 500 tokens each.

5.2   Selected benefactive verbs

We start with an overview of the distribution of all ten verbs (*build, buy, design, find, get, make, obtain, open, prepare, sing*) taken together. Here, we first find that ditransitive uses of the selected verbs are comparatively rare, while transitive and/ or intransitive uses abound ("other" in Figure 3).[13] This is relevant for our present purposes because benefactives seem to differ from "regular" ditransitives in this respect. In PDE, prototypical transfer-verbs like *give* reportedly show a clear and strong correlation with ditransitive patterns at the expense of other uses, although there is of course considerable variation, and the additional patterns should not be discounted (Mukherjee, 2005; Stefanowitsch, 2006). This has also been shown to hold for earlier stages (Wolk et al., 2013). Benefactives, on the other hand, seem to be less closely associated with the members of the benefactive alternation in EModE and presumably in still PDE. Instead, they mainly show non-ditransitive uses (taking up between 80 and 100% throughout time).
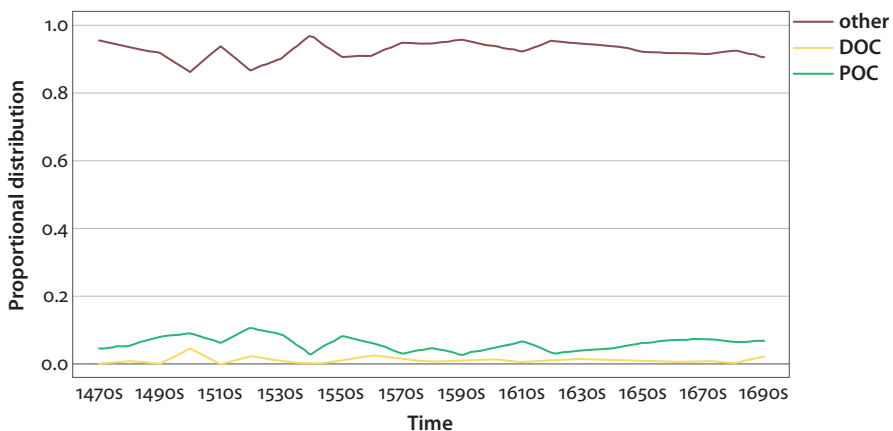
Figure 3.   Proportional distribution of ditransitive and other patterns with 10 selected benefactive verbs in EEBO (*build, buy, design, find, get, make, obtain, open, prepare, sing*)

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13.   Changes in the distributions over time are non-significant (Kendall's tau – other: $\tau = -0.01$, $p = 0.96$; DOC: $\tau = 0.08$, $p = 0.62$; POC: $\tau = -0.02$, $p = 0.92$).

Figure 4 elaborates on Figure 3 and zooms in on uses of benefactive verbs with two overt objects only, i.e. disregards the "other" uses included above (Section 5.1). The results demonstrate that contrary to what was presented in the preceding section for the sample including all verbs (see Figure 1), PP-patterns dominate over DOC uses in this set. Any changes over time concerning this distribution are non-significant (Kendall rank correlation; $\tau = (-)0.13$, $p = 0.41$). The preference for POCs is more pronounced with some of the verbs included, most strikingly with *open, obtain, prepare, sing and make*, where the POC accounts for over 80 per cent in the entire sample. At least for the first two of these, this is expected, as these verbs are restricted to the *for*-POC in PDE. However, the bias towards prepositional constructions is found with all verbs. The smallest fraction of POCs is still more than 50 per cent. Interestingly, the divergence of these results from the broader findings above corresponds to the findings of Theijssen et al.'s (2010) study on the benefactive alternation in PDE mentioned above in Section 3.1. On the other hand, the sample of 500 examples for each of the 4 periods for the 10 verbs is very small. We conclude that with more prototypically benefactive verbs, the prepositional uses may be stronger than with verb types more peripheral to this basic sense. Furthermore, the results may reflect the fact that verbs of substitutive benefaction (represented here by "open") are increasingly ousted from the DOC, and instead, speakers opt for near-categorical use in the *for*-POC, skewing the results in favour of the latter.
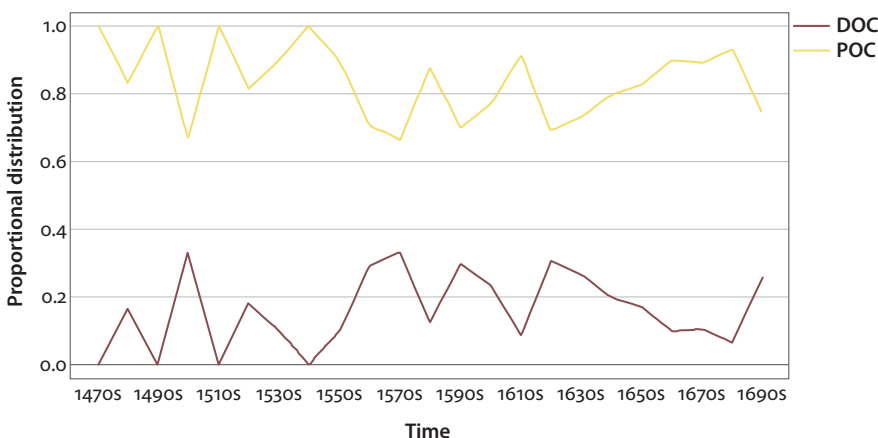
Figure 4. Proportional distribution of DOC vs. POC with 10 selected benefactive verbs in EEBO (*build, buy, design, find, get, make, obtain, open, prepare, sing*)

Finally, an investigation of the specific types of prepositional patterns available for the respective verbs shows that in addition to *to* and *for*, a number of other prepositions is present as well – this includes *unto* and *toward(s)* as well as *on*

and *upon*. Subsuming variants of *to and on* in two groups, respectively, and examining changes in their relative frequency distribution over time, *for* emerges as the clear winner (see Figure 5). This variant considerably increases over time ($\tau = 0.73$, $p < 0.001$). In the case of *(up)on*-POCs, the fluctuation seen initially quickly decreases; the overall change is only marginally significant ($\tau = -0.31$, $p = 0.057$). The *to*-POCs (and variations thereof) persist for a longer time, but their proportion similarly falls during the 17th century ($\tau = -0.41$, $p < 0.01$). These changes support the assumption that with central benefactive verbs, the *for*-POC is increasingly established as the main alternant to the DOC.
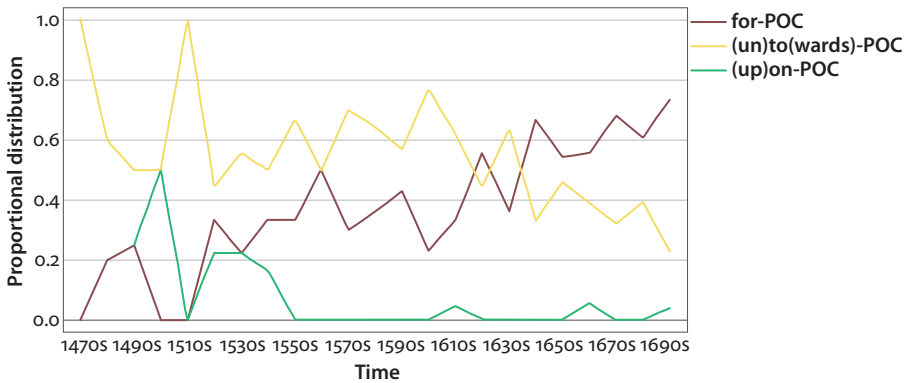
Figure 5. Proportional distribution of different PP-patterns with 10 selected benefactive verbs in EEBO

To sum up, what the findings of the quantitative study indicate, despite certain noise in the methodology, is first, that for benefactives, prepositional patterns and the DOC stably co-existed in EModE, even though the precise power relations might differ between individual verbs and sub-groups of the verb set. Specifically, DOC uses with verbs of substitutive benefaction are increasingly lost and are overtaken by prepositional uses; in general, the (prototypical) benefactive DOC seems to become less entrenched over time. Second, the major changes that take place with benefactive verbs in this period occur within the PP-paraphrases, as *to*-POC and *for*-POC initially stand in relatively free variation but increasingly come to diverge from each other. Ultimately, this leads to the situation found in PDE, where there is still some variability and fuzziness, but the *for*-POC is more systematically associated with verbs of benefactive transfer than the *to*-POC. In the following, we model these changes from a constructional network perspective, with a focus on horizontal relations between constructions on the same level of schematicity.

6. Constructional networks in the history of English

6.1 Modelling the emergence of the English benefactive alternation

We have essentially distinguished between two main stages: stage I corresponds to Middle English through to 16th century EModE, while stage II covers later EModE (17th century).

In the first stage, an abstract DOC sanctions a range of sub-constructions, including actual transfer, communication, and benefactive or intended transfer as well as more peripheral, less productive senses such as blocked transfer. This situation is illustrated in Figure 6. Importantly, the DOC construction has already narrowed considerably by late Middle English, having become more and more restricted to a basic transfer meaning. Verbs of dispossession (e.g. *steal, rob*) or malefaction (e.g. *cut, shorten, or break*), which could be used in Old English and continued to be used in the DOC in early Middle English, have ceased almost entirely to be used in DOC by this time. Nevertheless, the construction is still not as semantically restricted as today, since at this point, instances such as the above-mentioned *the teacher parked me the car* are still occasionally attested. DOC patterns expressing substitutive benefaction, without any transfer involved, accordingly continue to be represented and linked to the abstract DOC, even if less strongly than other verb class patterns. (The weaker links are indicated by the broken vertical line between the DOC schema and the sub-construction DOC "subst. benefaction" as well as by the broken horizontal lines between this sub-construction and the others. Likewise, the broken outline of DOC ("subst. benef.") points to the weakening of the sub-construction itself). We take "weakening" and "strengthening" of both constructions and constructional links to essentially correspond to a decrease or increase in neuronal activation and cognitive entrenchment (which may be reflected in a decrease or increase in schematicity and productivity; cf. e.g. Hilpert, 2018, pp. 26, 30–31; Barðdal & Gildea, 2015).[14] In our corpus data, this is manifest in a decrease or increase in type and/or token frequency.

Figure 7 depicts that, in addition to exhibiting vertical relations to its more fully specified sub-constructions, the Middle English DOC schema has already

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14. The precise relation and interaction between weakening of (sub-)constructions and constructional links is subject to discussion, as pointed out by a reviewer: it can be questioned whether the weakening of a construction is necessarily accompanied by a weakening in its links to other constructions, and vice versa. In this paper, since we take weakening and strengthening to primarily consist of a decrease or increase in activation, we assume, however, that there should indeed be a connection – if a pattern is activated less and less, it will also come to be less clearly associated with other patterns, as the links are not activated as frequently either. Still, there is clearly need for further specifications here.
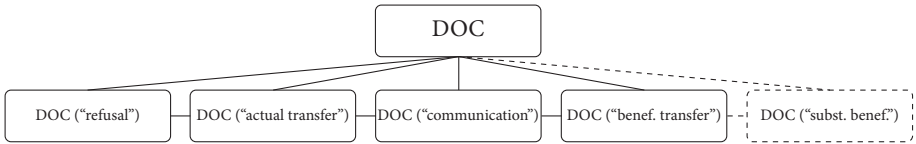
Figure 6. Network of the DOC schema at the outset of Stage I (late Middle English/ early EModE)

entered a relatively stable state of co-existence with the *to*-POC, which is itself licensed by a schema joining a prepositional structure with a meaning of "caused motion".[15] Not only do horizontal relations hold between the more substantive verb-class specific DOCs and their *to*-paraphrases (e.g. the prototypical, highly entrenched sub-schemas expressing "actual transfer" in Figure 7), but horizontal connections have also emerged at a higher level in the network. That is, speakers at this point presumably recognise more abstract DOCs and *to*-POCs as being systematically associated, in that a range of verbs and verb classes regularly alternate between the two patterns.
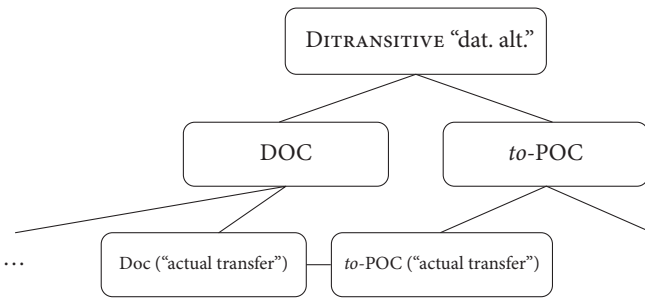
Figure 7. Network of DOC and *to*-POC allostructions at the outset of Stage I (late Middle English/ early EModE)

Following Perek's (2012, 2015) conceptualisation of the dative alternation in PDE, we hypothesise that this has already led to the formation of a generalisation over the correspondence relationships, i.e. the constructionalisation of a highly underspecified "ditransitive" or "dative alternation" constructeme. The resulting network, represented in Figure 7, accordingly shows constructions of various levels of schematicity and horizontal links between them. As illustrated by "actual transfer" in the figure, in this network, the *to*-POC is vertically linked to more specified sub-constructions just like the DOC.

In addition, there is a sub-schema of *to*-POCs expressing "benefactive transfer". On the one hand, the verb class-specific pattern is horizontally linked to the

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15. As mentioned above, this schema ultimately also sanctions instances such as *John put the book on the table* or *John loaded hay onto the wagon*.

corresponding DOC (see Figure 8). On the other hand, it also has connections to a second prepositional paraphrase involving *for*, which is likewise horizontally related to the DOC sub-construction. By contrast to the *to*-POC, which is sanctioned by a more abstract *to*-pattern (and ultimately a schema evoking a general sense of "caused motion"), the *for*-POC inherits from a schematic "benefactive adjunct" construction. By virtue of this, it also connects to the *for*-pattern used with verbs of substitutive benefaction. This sub-schema of the PP-pattern for "substitutive benefaction" connects to a sub-schema of the DOC with overlapping semantics. However, these links, as well as the DOC sub-construction "subst. benef." itself, are increasingly becoming weaker, possibly due to speakers adapting to the specialisation of the DOC to a basic transfer-meaning and to its very strong association to the *to*-POC (cf. Zehentner, 2018, 2019). The increasing marginalisation of both the sub-construction and the link is indicated by broken lines in the figure. Note that visual representations of this kind quickly get quite complex, and the distinction between vertical and horizontal links is difficult to uphold. Even so, the relevant point is that at this stage, no schematic pattern has yet formed over the *for*-POC and the DOC for the specific verb class of "benefactive transfer". This stands in contrast to the DOC and the *to*-POC "ditransitive" verbs, where such an abstraction had already constructionalised, as discussed in connection with Figure 7 and also included here.[16]
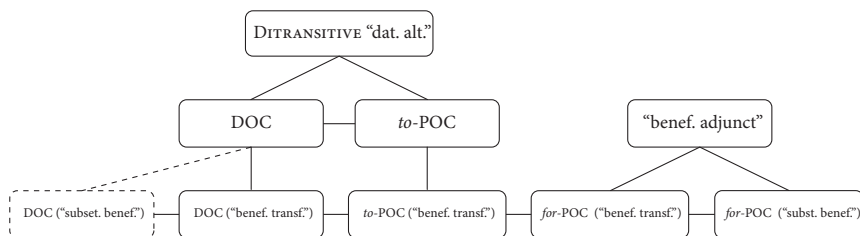
Figure 8.   Network of benefactive transfer verbs (late Middle English/early EModE)

In a last and crucial step which ultimately enables stage II, the links between the benefactive transfer-DOC and the *for*-POC strengthen considerably (i.e. become more entrenched). This happens at the expense of the benefactive transfer *to*-POC: the prepositional variants compete against each other for the same function (expression with benefactive transfer verbs), but any potential benefits from being associated with the DOC (such as an incipient alternation-based productivity along the lines of Perek, 2015) are higher for the *for*-POC. The results of this development become visible in the second century covered by the data, when *for* starts to crystallise as the sole (or at least more salient and text frequent) alternant

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16.   For ease of reading, none of the sister DOC sub-constructions in Figure 6 are represented here.

for benefactive verbs. This constitutes the beginning of stage II and is depicted in Figure 9. Here, the *to*-sub-construction fades and the links between it and the DOC and *for*-POC, respectively, are weakened, while ties between the latter are reinforced. Eventually, the *for*-POC comes to be perceived as the main (prepositional) variant for most benefactive verbs; it comes to be more and more clearly and systematically associated with verbs expressing benefactive transfer.
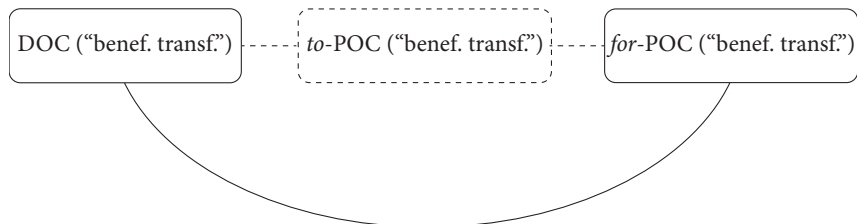
Figure 9. Network of benefactive verbs in Stage II (later Early Modern English)

This new configuration in turn gradually leads to the emergence of a more abstract benefactive alternation schema, which only specifies those features shared by both the benefactive DOC and the *for*-POC. The emergent links are indicated by double arrows in Figure 10; they contrast with the normal lines on the left of the figure representing already established, resident links and constructions.
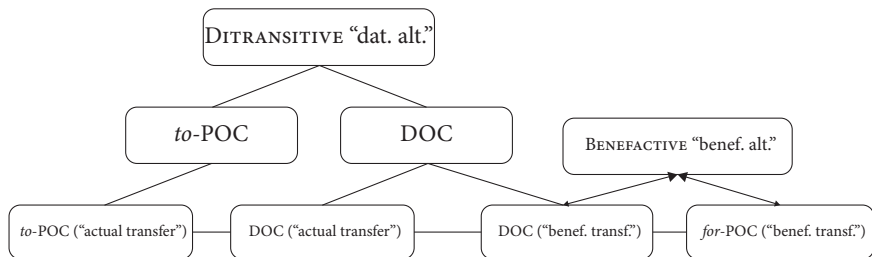
Figure 10. Network of dative alternation and benefactive alternation (later Early Modern English)

The newly constructionalising independently stored alternation construction is similar to that proposed for the dative alternation but is assumed to be located on a lower level in the network, as represented in the figure. This is motivated by the fact that the DOC involved in this alternation relationship is itself a sub-construction to the more general DOC (see Figures 6 and 8), occurring with a particular verb class. Even though the benefactive DOC is used with a range of more specific senses such as obtainment, preparation or performance, these are still less abstract than the broader verb classes subsumed by the DOC schema. It is conceivable that the new BENEFACTIVE alternation construction is connected to the even more abstract DITRANSITIVE (dative) alternation, in that the establishment of the former

may have been (to some extent) driven by analogy to the latter. More precisely, we can speculate that the presence of an abstract alternation schema for DOC and *to*-POC may cause or at least reinforce a similar alternation generalisation to emerge with benefactives.

Figure 10 represents the postulated situation at the end of Early Modern English. During Late Modern English and Present Day English, there was a further strengthening of the horizontal link between the allostructions, and consequently the further entrenchment of the benefactive alternation constructeme. Nevertheless, this schema is still less productive and entrenched than the dative alternation one today, and there is evidence that the functional divergence exhibited by the members of the dative alternation is not as clear and systematic in this case (cf. Theijssen et al., 2010).[17] More research, specifically corpus investigations as well as psycholinguistic/experimental studies on the benefactive alternation in PDE and its similarities or differences to the dative alternation in recent times, are needed to back up these assumptions.

In the following section, we briefly return to our initial question of what the benefits of adding horizontal links to a Diachronic Construction Grammar model are, relating this to some open issues in the history of the benefactive alternation.

6.2   The value of postulating horizontal links

Traugott (2018, p. 20) states that "horizontal network relationships supplement 'vertical' inheritance hierarchies and give a more nuanced view of relationships among constructions than do vertical models alone". In this paper, we suggest that adding horizontal relations to constructional networks may also have explanatory value, both on a synchronic and a diachronic level. There is tentative support for the former in that priming effects – as well as instances of analogical extension – seem to be triggered by both formal and functional overlaps between constructions. Concerning the latter, we argue that horizontal links may enable us to provide a plausible scenario for the following issues, among others:

First, the emergence and/or presence of horizontal links is taken to be a driving factor behind the constructionalisation of higher-level, alternation-based generalisations such as the dative alternation or the benefactive alternation, the independent representation of which is supported by experimental data as presented in e.g. Perek (2012, 2015). Although horizontal relations do not necessarily lead to such abstractions, they may presumably emerge when associations are very strong. Becoming associated also means increased competition between the constructions. One outcome of competition is the loss of one variant (typically the

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17.   But see Tagliamonte (2018) for potentially contradictory results.

older one). Another outcome is for the alternation relation to become entrenched and for variation to persist. We suggest that horizontal relations may present a crucial step in the development of a co-existence, division of labour-situation, as evidenced by the two alternations under discussion.

Second, horizontal links as well as constructemes may help us to explain certain idiosyncrasies in the history of the patterns. For example, the structure of the network of benefactive verbs may account for the very drawn-out and gradual rise of the intended reception constraint as well as its fuzzy nature in PDE. Even though the sub-sense of substitutive benefaction is mostly not used with DOC in Standard English (e.g. *open me the door, *park me the car), such instances are still acceptable in certain dialects, as mentioned above in Section 3.1. Rather than assume that non-standard uses like these represent historical artefacts or that speakers retain historical knowledge about these verbs, we hypothesise that their occurrences may also be motivated by their being (weakly) connected to the DOC by virtue of their strong horizontal relations to the benefactive transfer for-POC. The semantic overlap between these types of benefactive events – in the sense of evoking situations that are advantageous to a participant – may trigger occasional coercion effects. This idea relates to and extends Perek's (2015) notion of alternation-based productivity referring to "*a paradigmatic analogy* between an existing use of a verb in a given allostruction and a productive use of that verb in another allostruction" (Perek, 2015, p. 169; original emphasis). Encountering an instance of *open* in a *for*-pattern (e.g. in sentences such as *Can you open the door for me*?), speakers may not only recognise that these uses are related to *for*-POC patterns with verbs of benefactive transfer, but may also analogise to the alternation relation that holds with other verbs between the *for*-POC and the benefactive DOC (as alluded to above). Occasional occurrences of *open* in the DOC could accordingly be counted as evidence for both formal and functional analogical extension in language use. Evidently, this will need to be tested in future research. Nevertheless, we believe that Construction Grammar accounts in general, and Diachronic Construction Grammar accounts in particular, can profit from combining the concepts of horizontal links and allostructional models with those of taxonomic, vertical links. In general, we hope to have shown that approaching alternations and their history in terms of constructional networks can yield interesting insights.

7.   Conclusion

In this paper, we have aimed to present an account of a less well-known aspect of the English dative alternation, namely the benefactive alternation. The scenario we have suggested is both more comprehensive and more nuanced than what has

been provided so far. The empirical analysis is based on findings of benefactive verbs occurring in several patterns in Early Modern English, a period which has to date not been explored in connection with the benefactive. We have investigated occurrences of such verbs in the EEBO corpus and have used the results of this study to model the history of the English benefactive alternation. We have approached the history of the phenomenon from a Construction Grammar perspective which makes use of specific predictions about the structure of the constructional networks involved, most importantly the existence of horizontal links between constructions at the same level of schematicity, in addition to vertical links connecting patterns at different levels of abstractness. Such horizontal relations hold both between formally equivalent constructions which are slightly different in meaning as well as between formally distinct, yet semantically overlapping constructions (i.e. variants in syntactic alternations). We have argued that applying such an extended notion of constructional networks to diachronic investigations is beneficial and allows us to sketch historical developments in a more plausible way. Main points in our discussion have concerned the crystallisation of *for* as the standard or prototypical alternant for benefactive verbs as well as the establishment of a benefactive alternation constructeme, similar to the underspecified dative alternation schema which connects the allostructions of the DOC and *to*-pattern.

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Appendix 1. Collexemes distinguishing between the DOC and the *for*-POC in 4 sub-periods of EEBO

Period	Verbs	Pref.	Coll.str.
1500–1549	*give*	DOC	15.89
	show	DOC	5.02
	tell	DOC	3.09
	send	DOC	1.67
	get	DOC	1.3
	make	FOR	18.56
	lay	FOR	12.26
	take	FOR	3.37
	allege	FOR	3.29
	prepare	FOR	3.27
	kill	FOR	1.73
	have	FOR	1.52

Period	Verbs	Pref.	Coll.str.
1550–1599	*give*	DOC	58.18
	show	DOC	13.66
	tell	DOC	5.17
	send	DOC	3.43
	offer	DOC	2.11
	bring	DOC	1.89
	do	DOC	1.46
	set	DOC	1.39
	lay	FOR	37.12
	take	FOR	14.16
	prepare	FOR	13.91
	have	FOR	11.62
	allege	FOR	10.78
	make	FOR	8.25
	find	FOR	4.94
	devise	FOR	4.85
	pay	FOR	4.11
	abide	FOR	3.56
	open	FOR	3.24
	use	FOR	3.12

(*continued*)

Period	Verbs	Pref.	Coll.str.
	praise	FOR	2.77
	search	FOR	2.77
	speak	FOR	2.77
	kill	FOR	2.45
	leave	FOR	2.28
	reserve	FOR	2.01
	provide	FOR	1.91
	frame	FOR	1.83
	obtain	FOR	1.8
	erect	FOR	1.64
	say	FOR	1.5
	call	FOR	1.38
	exact	FOR	1.38
	forge	FOR	1.38
	weave	FOR	1.38

Period	Verbs	Pref.	Coll.str.
1600–1649	*give*	DOC	232.55
	show	DOC	39.24
	tell	DOC	20.73
	send	DOC	7.61
	do	DOC	4.95
	bring	DOC	4.01
	allow	DOC	3.99
	ask	DOC	3.61
	offer	DOC	2.35
	set	DOC	2.04
	present	DOC	1.73
	owe	DOC	1.7
	reach	DOC	1.63
	prescribe	DOC	1.61
	prepare	FOR	108.34
	have	FOR	70.72
	lay	FOR	53.24
	make	FOR	22.13
	receive	FOR	21.73
	provide	FOR	21.01
	open	FOR	15.05

Period	Verbs	Pref.	Coll.str.
	take	FOR	14.37
	reserve	FOR	12.88
	keep	FOR	9.43
	find	FOR	9.09
	erect	FOR	9.03
	care	FOR	7.73
	bless	FOR	7.7
	obtain	FOR	7
	speak	FOR	6.5
	seek	FOR	6.35
	perform	FOR	6.32
	spin	FOR	5.68
	institute	FOR	5.16
	want	FOR	5.15
	pay	FOR	5.06
	frame	FOR	4.88
	devise	FOR	4.47
	die	FOR	3.86
	work	FOR	3.47
	order	FOR	3.28
	search	FOR	3.28
	propose	FOR	3.14
	play	FOR	3.01
	praise	FOR	2.9
	beat	FOR	2.76
	break	FOR	2.61
	cast	FOR	2.53
	use	FOR	2.46
	allege	FOR	2.39
	dig	FOR	2.2
	decree	FOR	2.11
	say	FOR	2.11
	purchase	FOR	2.02
	cut	FOR	1.78
	furnish	FOR	1.68
	conclude	FOR	1.67
	require	FOR	1.62
	kill	FOR	1.58

(*continued*)

Period	Verbs	Pref.	Coll.str.
	procure	FOR	1.48
	sing	FOR	1.33

Period	Verbs	Pref.	Coll.str.
1650–1699	*give*	DOC	Inf
	show	DOC	94.45
	tell	DOC	64.57
	bring	DOC	18.04
	do	DOC	15.46
	allow	DOC	14.57
	send	DOC	12.64
	save	DOC	9.55
	offer	DOC	8.84
	ask	DOC	8.05
	leave	DOC	4.87
	owe	DOC	3.84
	set	DOC	3.61
	present	DOC	2.83
	gain	DOC	2.56
	reach	DOC	2.16
	prove	DOC	1.82
	have	FOR	Inf
	prepare	FOR	259.5
	lay	FOR	123.81
	make	FOR	83.23
	provide	FOR	58.09
	take	FOR	41.1
	obtain	FOR	34.91
	open	FOR	30.53
	erect	FOR	20.05
	find	FOR	19.84
	receive	FOR	19.44
	work	FOR	17.67
	dig	FOR	15.28
	keep	FOR	12.95
	conceive	FOR	12.92
	die	FOR	12.89
	purchase	FOR	12.38

Period	Verbs	Pref.	Coll.str.
	preserve	FOR	12.21
	seek	FOR	10.67
	accept	FOR	10.62
	institute	FOR	9.9
	want	FOR	9.9
	reserve	FOR	9.47
	choose	FOR	9.23
	desire	FOR	8.84
	search	FOR	8.7
	bless	FOR	8.11
	care	FOR	7.73
	manage	FOR	7.73
	perform	FOR	7.73
	require	FOR	7.51
	break	FOR	6.65
	bear	FOR	6.57
	frame	FOR	5.79
	compose	FOR	5.17
	clear	FOR	5.16
	found	FOR	5.16
	pay	FOR	5.15
	praise	FOR	5.14
	blow	FOR	4.47
	imply	FOR	4.02
	play	FOR	3.98
	suffer	FOR	3.95
	cast	FOR	3.7
	devise	FOR	3.67
	say	FOR	3.38
	plead	FOR	3.28
	use	FOR	3.16
	procure	FOR	3.01
	draw	FOR	2.99
	carry	FOR	2.94
	secure	FOR	2.79
	know	FOR	2.77
	form	FOR	2.76
	get	FOR	2.73

(*continued*)

Period	Verbs	Pref.	Coll.str.
	decide	FOR	2.58
	exact	FOR	2.58
	speak	FOR	2.42
	fix	FOR	2.34
	roll	FOR	2.12
	conclude	FOR	2.06
	design	FOR	2.06
	blame	FOR	2.04
	ordain	FOR	1.96
	build	FOR	1.83
	read	FOR	1.78
	light	FOR	1.37
	appoint	FOR	1.36

Appendix 2. Collexemes distinguishing between the *for*-POC and the *to*-POC in 4 sub-periods of EEBO

Period	Verbs	Pref.	Coll.str.
1500–1549	*make*	FOR	7.78
	lay	FOR	3.36
	prepare	FOR	1.39
	say	TO	4.91
	have	TO	4.58
	give	TO	3.95
	open	TO	1.35
	write	TO	1.35

Period	Verbs	Pref.	Coll.str.
1550–1599	*make*	FOR	11.63
	lay	FOR	7.92
	prepare	FOR	4.91
	find	FOR	3.96
	allege	FOR	3.35
	provide	FOR	2.23
	pay	FOR	2.02
	devise	FOR	1.48

Period	Verbs	Pref.	Coll.str.
	kill	FOR	1.48
	build	FOR	1.36
	give	TO	13.73
	send	TO	5.34
	say	TO	4.95
	have	TO	3.78
	draw	TO	3.17
	call	TO	2.14
	write	TO	2.1
	pick	TO	1.46

Period	Verbs	Pref.	Coll.str.
1600–1649	*prepare*	FOR	41.88
	make	FOR	23.63
	provide	FOR	16.69
	find	FOR	6.47
	lay	FOR	6.31
	receive	FOR	6.26
	pay	FOR	4.95
	seek	FOR	2.94
	bless	FOR	2.75
	buy	FOR	2.4
	care	FOR	2.06
	give	TO	51.99
	send	TO	17.07
	call	TO	9.59
	bring	TO	9.01
	show	TO	7.54
	prove	TO	7.1
	say	TO	6.86
	leave	TO	4.71
	write	TO	3.79
	have	TO	3.17
	draw	TO	3.1
	present	TO	2.82
	read	TO	2.23
	tie	TO	2.11
	break	TO	1.41

(*continued*)

Period	Verbs	Pref.	Coll.str.
	prefer	TO	1.32
	pull	TO	1.32
	reach	TO	1.32

Period	Verbs	Pref.	Coll.str.
1650–1699	*prepare*	FOR	93.2
	make	FOR	39.37
	provide	FOR	39.1
	lay	FOR	29.62
	have	FOR	14.24
	procure	FOR	10.41
	obtain	FOR	8.95
	purchase	FOR	8.31
	find	FOR	8.18
	choose	FOR	7.39
	get	FOR	7.34
	seek	FOR	5.98
	work	FOR	5.47
	conceive	FOR	4.96
	dig	FOR	4.93
	ask	FOR	4.57
	appoint	FOR	4.51
	receive	FOR	3.86
	keep	FOR	3.71
	institute	FOR	3.17
	buy	FOR	3.02
	search	FOR	2.81
	suffer	FOR	2.46
	preserve	FOR	2.44
	desire	FOR	2.43
	accept	FOR	2.39
	die	FOR	2.15
	care	FOR	2.11
	manage	FOR	2.11
	play	FOR	1.87
	build	FOR	1.83
	praise	FOR	1.77
	found	FOR	1.76

Period	Verbs	Pref.	Coll.str.
	conclude	FOR	1.48
	frame	FOR	1.48
	ordain	FOR	1.47
	order	FOR	1.47
	blow	FOR	1.41
	form	FOR	1.41
	do	FOR	1.3
	give	TO	79.48
	send	TO	55.25
	say	TO	44.36
	bring	TO	26.03
	prove	TO	24.6
	call	TO	19.32
	write	TO	17.72
	present	TO	13.56
	speak	TO	12.97
	leave	TO	12.06
	read	TO	8.03
	propose	TO	7.77
	draw	TO	7.67
	owe	TO	5.13
	show	TO	4.74
	offer	TO	4.28
	tie	TO	3.33
	open	TO	2.85
	secure	TO	2.65
	prefer	TO	2.3
	sing	TO	2.3
	repeat	TO	2.05
	derive	TO	1.79
	carry	TO	1.68
	pull	TO	1.54
	prescribe	TO	1.37
	break	TO	1.33

Allostructions, homostructions or a constructional family?

Changes in the network of secondary predicate constructions in Middle English

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The network of prepositional secondary predicate constructions has undergone massive changes throughout the history of English. While in Old English forms marked with *to* (e.g. *crown someone as king*) used to dominate, forms marked with *as* dominate in Present-Day English (e.g. *crown someone as king*). The present paper studies the changes in the network of such constructions marked with *as*, *for*, *into*, and *to* in the Middle English period by analysing changes in frequency and semantic similarity. A corpus study in the PPCME2 was conducted, based on a Distributional Semantic Model. The results indicate a sudden turning point in the early Middle English period whereby *to*-marked forms quickly lost their importance. In addition to providing insights into the (changing) nature of polysemic links and allostructions, the description of constructions copied from Anglo-Norman introduces a language contact component to the framework of Diachronic Construction Grammar.

Keywords: secondary predication, Middle English, modal expressions, distributional semantics, language contact

1. Introduction

The present chapter investigates the network of prepositional secondary predicate constructions (PREP-SPCs), as illustrated in Example (1), and its development in the Middle English (ME) period.[1]

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(1) a. *This is why we **elected him as president***.
             (COCA: NEWS SanFranChron 2011, Davies, 2008)
     b. *They **took him for a madman***.   (COCA: FIC NewYorker, 2006)
     c. *Instead of **turning stone to carbon dioxide**, we can **turn carbon dioxide
         into stone**, locking it away forever in the concrete foundations of our cities.*
             (COCA: MAG PopScience, 2010)

The constructional network interconnecting these constructions changed drastically in the course of this period, and the aim of this study is to offer insights into the nature of constructional links and the ways in which they change. More specifically, it will shed light on the relations between secondary predicate constructions marked by the markers *as*, *for*, *into*, and *to* and the changes they have undergone are probed with regard to the following: (1) polysemic links between constructions sharing the same marker but having varying meanings, (2) the potential of constructions with different markers but similar meanings being allostructions, and (3) the introduction of a language contact component to the framework of Diachronic Construction Grammar by treating constructions introduced via language contact as "homostructions", i.e. constructions with homonymic links to pre-existing native constructions.

The chapter is organised as follows: Section 2 discusses secondary predicate constructions (henceforth SPCs) and reviews various characteristics that have been ascribed to these constructions in the literature (2.1). After suggesting a network of secondary predicate constructions for Present-Day English (PDE), the section moves on to prepositional secondary predicate constructions and their diachronic development from Old English (OE) to PDE (2.2). In Section 3, the implications of SPCs and their development in ME for the framework of Diachronic Construction Grammar (DCxG) are discussed, specifically with regard to possible allostructional, polysemic and homonymic links. Section 4 describes the methodology used for the empirical analysis using a Distributional Semantic Model (cf. Perek & Hilpert, 2017) based on data from the *Penn-Helsinki Parsed Corpus of Middle English* (henceforth PPCME2, Kroch & Taylor, 2000). The empirical results are presented in Section 5, outlining frequency developments within the ME period (5.1) and the potential implications of French-based constructions being introduced alongside lexical verbs (5.2), followed by semantic differences between various prepositional secondary predicate constructions (5.3). Section 6 interprets

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the empirical results with regard to open questions related to the (changing) nature of polysemic, allostructional and homonymic links. The chapter is concluded by Section 7, which summarises the findings, offers an outlook on further research, and provides answers to the open questions listed in the opening chapter of the present volume.

2. Secondary predicate constructions in Present-Day English and in the history of English

This section describes secondary predicate constructions (SPCs) in general, then turns to a specific subtype of SPCs, namely PREP-SPCs. This is followed by an account of their diachronic development in the history of English.

2.1 Characterisation of secondary predicate constructions in Present-Day English

SPCs consist of a first predicative relation between a verb (V) and a noun phrase (NP) and a second predicative relation between the aforementioned NP and a further phrase, as shown in Example (2).

(2) *His confidence was the reason the village warriors [elected]$_V$ [him]$_{NP}$ [their leader]$_{NP}$.*   (COCA, FIC Bk:ShadowsInCave 2010)

SPCs have received a variety of labels in the literature, such as "Object(ive) Complement" (e.g. Quirk, Greenbaum, Leech, & Svartvik, 1985, pp. 54–55; Visser, 2002, pp. 550–552), "Predicative Adjunct"(e.g. Visser, 2002, pp. 552–553), "Predicative Complement" (e.g. Huddleston & Pullum, 2002, pp. 217–218; Levin, 1993, pp. 180–185), "Secondary Predicate (Construction)" (e.g. Verkerk, 2009; D'hoedt & Cuyckens, 2017), or "Small Clause" (e.g. Los, 2005, pp. 64–65). These labels often correspond to definitions with varying scopes, suggesting that SPCs represent a range of constructions with different forms and meanings rather than a single construction. The concept of a "constructional family" (Goldberg & Jackendoff, 2004, pp. 535–536) is useful for the description of SPCs, as individual constructions can be grouped via the common "family trait", i.e. the secondary predicate relation between the NP and a further phrase.

The family of SPCs exhibits variation in terms of meaning as well as structure. The expressed meaning of the secondary predicative relation varies, as its semantics can correspond to the copula *become*, yielding a resultative construction, as in Example (3), but also to the copula *be*, whereby it describes the state of the NP, yielding a depictive construction, as in Example (4). A different way to categorise

resultatives and depictives is to view the former as a state caused by the main event, as opposed to a state that is necessarily simultaneous with the main event (Verkerk, 2009, p. 116).[2]

(3) a. *Then one of the gunmen **shot him dead** and left.*
                                     (COCA, NEWS: Washington Post, 2006)
     b. *Mary Jane (Nuccio) Cozzi, a fifth-grader who **escaped the fire unharmed**, recalled, […].*   (COCA, NEWS: Chicago Sun-Times, 1996)

(4) a. *Switch to artificial sweeteners, or **drink your coffee black**.*
                                     (COCA, MAG: Prevention, 2003)
     b. *No, I never ever **went to bed hungry** and I'm proud of it, too.*
                                     (COCA, FIC: Bamboozled, 2000)

A further distinction regarding meaning can be seen when contrasting sentences (a) and (b) in Examples (3) and (4). This distinction relates to the NP whose state is described by the secondary predicate relation. This NP, also called the "controller" (Verkerk, 2009, p. 116), can either be the object, as in (3a) and (4a), or the subject, as in (3b) and (4b). This distinction has been labelled "Subject-oriented" versus "Object-oriented" (Huddleston & Pullum, 2002, p. 217; Verkerk, 2009, p. 117) or "complex-intransitive" versus "complex-transitive" (Huddleston & Pullum, 2002, p. 217).[3]

It is important to note that the term "secondary" may be misleading as it does not necessarily imply that the two predications can be listed separately. Compare Examples (5) and (6):

(5) a. *We customized the gears and **made the wheels super light**.*
                                     (COCA, NEWS: St Louis Post_Dispatch, 2012)
     b. *Although he did not attend West Point, his peers **elected him general**.*
                                     (NOW: US Huffington Post 16-07-01, Davies, 2013)
     c. *First, as the probability that records will be in error increases, the optimal decision rule **classifies more records as erroneous**.*
                                     (COCA: ACAD InfoSystems, 1991)

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2. Verkerk (2009) also distinguishes a third type of secondary predication called "manner predication", as in "Jake walked slowly", in which the secondary predication describes the event expressed as the main predicate rather than one of its participants (2009, pp. 115–116). The present chapter maintains a focus on what Verkerk calls "participant-oriented" secondary predicates (2009), i.e. depictives and resultatives.

3. In a similar vein, Levin (1993) categorises verbs with predicative complements into eight sub-groups, of which two are distinguished as being subject-oriented, in contrast to the other six which are object-oriented (1993, pp. 181–185).

d.   *He rose through the ranks of the rightist Likud Party to hold a series of Cabinet posts before parliament **selected him to be president** in 2000.*
(COCA: NEWS AssocPress, 2010)

(6)   *Sedat Koc **made his parents proud** last week.*
(COCA, NEWS: Christian Science Monitor, 1991)

While one can list the predications separately in Example (5), e.g. "we made the wheels" and "the wheels are super light" in (5a), the same cannot be said for Example (6) where the predications "*Sedat Koc made his parents" and "his parents became proud" cannot function independently. Visser (2002) makes this distinction explicit by drawing a distinction between "object(ive) complements" and "predicative adjuncts". Object(ive) complements simply denote the state, condition, or capacity of the object, as in "they sent him *ambassador* to Spain" (2002, pp. 550–552). In contrast, predicative adjuncts are part of the predicate and affect the meaning of the verb, as for example in "John made me happy" in which the verb "make" differs from its meaning in sentences such as "John made this table". The object "me" in "John made me happy" is not object only to the verb "make", but rather to the group "make happy" as a whole (2002, pp. 552–553).

The formal structural contrasts between the various sentences in Example (5) exhibit how the phrase engaging in a predicate relation with the NP may occur in various forms, such as an adjectival phrase (AdjP) as in (5a), another NP as in (5b), a prepositional phrase (PP) as in (5c), or a verb phrase (VP) as in (5d). This phrase has variously been labeled "predicand" (Huddleston & Pullum, 2002, p. 217) or "X-Phrase" (D'hoedt & Cuyckens, 2017, p. 16). The label X-Phrase (XP) is used in the present chapter as it reflects the indeterminate nature of this phrase.

The variability exhibited by the XP has been described as the *as*-alternation (Levin, 1993, pp. 78–79), as shown in Example (7). In such cases, the XP occurring as a bare NP yields the zero-SPC, whereas the XP occurring as a PP, in the form of a ["as" + NP] sequence, yields the *as*-SPC. Depending on the argument structure of the verb involved in the SPC, the alternating pattern may differ (Levin, 1993, pp. 181–185), as shown in Example (8). In such cases, the XP can occur in the form of a bare NP as before, but also as VP, more specifically an infinitival copular clause rather than a prepositional phrase introduced by *as*.

(7)   a.   *The president **appointed Smith press secretary**.*   (Levin, 1993, p. 78)
      b.   *The president **appointed Smith as press secretary**.*

(8)   a.   *The president **declared Smith press secretary**.*   (Levin, 1993, p. 183)
      b.   *The president **declared Smith to be press secretary**.*

In addition to *as*, PP realizations of XP can also involve other markers, namely *for*, *into*, and *to*.[4] These four PP realizations are henceforth summed up as PREP-SPCs.

(9) *The soldier **took him for dead** and left him there. Six hours later a rescue helicopter picked him up along with the bodies of his friends. He was nearly dead.* (COCA, FIC: Triquarterly, 1995)

(10) *Dough: **Grind peanuts into flour** in a food processor.* (COCA, MAG: Redbook, 2010)

(11) *"She **burned my firewood to ashes** before I could sell it," Adam recalls.* (COCA, MAG: Newsweek, 2011)

However, these constructions are not equivalent to the *as*-SPC given that they do not alternate with the zero-SPC and appear to be subject to semantic restrictions. The *for*-SPC, shown in Example (9), possesses an "error connotation" in the predication (D'hoedt, 2017, pp. 276–277), meaning that the predicative relation between the NP and XP is assumed by the agent of the matrix clause, but may be counterfactual. The *into*-SPC and *to*-SPC, shown in Examples (10) and (11), appear to be limited to a resultative reading implying a total, if not destructive, physical transformation.

2.2 Diachronic developments of prepositional secondary predicate constructions in the history of English

As was just mentioned in Section 2.1, the *as*-SPC is the most productive of the PREP-SPCs and the only variant that can alternate with the zero-SPC in PDE, whereas the remaining PREP-SPCs, i.e. the *for*-, *into*-, and *to*-SPCs, are less productive and more restricted in their semantic scope. The network of PREP-SPCs has changed significantly throughout the history of the English language. Visser (2002, pp. 586–595) describes the *for*- and *to*-SPCs as largely dominant until Early Modern English (EModE), whereas the *as*-SPC was rare in ME and EModE, only to become the dominant variant in PDE (2002, p. 586).[5] He further lists a *swa swa*

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4. Strictly speaking, *as* is usually classified as a conjunction or an adverb. In the context of SPCs however, it functions in similar ways to the other markers *for*, *into*, and *to*, which warrants its classification as a preposition.

5. Visser (2002) makes no mention of the *into*-SPC, whose first attestation is in the ME period (c1250) according to the OED (*OED Online*, 2018, "into, *prep.* and *adj.*"). This is confirmed in the PPCME2 with a similar earliest attestation date (a1225).

variant found in some OE texts (2002, p. 587).[6] Mitchell (1985) notes that in OE, SPCs marked with *for* and *swa (swa)* are "rivals" of the *to* variant, which he describes as characteristic of OE (1985, p. 451).

When looking at attestations of the *for-*, *into-*, and *to*-SPCs in OE and ME, as shown in Examples (12) to (14), we can observe that the constructions have not only changed with regard to their (relative) frequency distribution, but also in terms of their semantics. The ME *for*-SPC does not carry any "error connotation", while the OE/ME *into-* and *to*-SPCs do not seem to be restricted to physical alterations yet.

(12) *Þe   ich   hald-e,   healent, ba   **for** feader & **for** freond*
     2sg.obl 1sg.nom hold-1sg.prs, saviour, both for father and for friend
     'I regard you, Saviour, both as a father and as a friend'
      (MED, "for (prep.)" [c1225(?c1200) St.Marg.(1) (Bod 34) 18/36], McSparran et al., 2001)

(13) *and anoynt-ide Dauith **in to** king of Israel*
     and anoint-pst David in to king of Israel
     'and [all Israel gathered in Hebron] anointed David as king of Israel'
                                               (PPCME2, CMPURVEY,I,10.350)

(14) *Hēr man hālg-ode   Ælfēhg   **tō** arcebiscope*
     here one   hallow-pst Ælfheah to archbishop
     'In this year Ælfheah was consecrated archbishop'
       (BTASD, 'hálgian' [Chr. 1006; Erl. 138, 2 : 1050], Bosworth, Toller, Christ, & Tichý, 2010)

3. Allostructions, polysemy and homostructions in the network of secondary predicate constructions

From the perspective of Construction Grammar (CxG), the semantic differences outlined for PDE in Section 2.1 suggest that *as-*, *for-*, *into-*, and *to*-SPCs constitute distinct constructions, whereby the *as*-SPC conveys a more general meaning of stative or resultative predication between NP and XP, whereas the remaining PREP-SPCs possess the narrower meanings just described.[7]

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6. Considering that the form *as* is "the result of the progressive phonetic reduction of Old English *eall swa*, which originated as an intensification of *so*[OE *swa*]" (*OED Online*, 2018, "as, adv. and conj."), one can posit that the *as*-SPC already existed as a minority construction in OE.

7. Note that the present chapter consciously adopts a very broad definition of SPCs in order to probe the relations between the various constructions that make up the constructional family of SPCs.

Given its complexity, the family of SPCs outlined above provides fertile ground for the discussion of the nature of networks, nodes, and links in the framework of CxG. For instance, the semantic overlap between the *into*-SPC and the *to*-SPC raises the question whether these constructions could be considered as "allostructions", a term coined by Cappelle (2006) to describe "variant structural realizations of a construction that is left partially underspecified" (2006, p. 18). By analogy to allophones and allomorphs being different realizations of phonemes and morphemes respectively, the *into*- and *to*-SPCs are linked via a common "supercategory" (2006, p. 19), also called a "constructeme" (Perek, 2015, p. 153). In this case, the constructeme of the *into*- and *to*-SPCs is located on a higher level of schematicity, given that its prepositional slot is underspecified, and its semantic content corresponds to the common semantic characteristics of the *into*- and *to*-SPCs. The allostructions themselves, i.e. the actual *into*- and *to*-SPCs, are located at a lower level of schematicity, given that their prepositional slot is specified. Their semantic contents correspond to the content they inherit from their shared constructeme as well as potential subtle differences that may distinguish them from one another.

Further, the possibility of some SPCs to have a depictive or resultative predication between controller and XP begs the question whether these distinct readings warrant the postulation of separate constructions. Given the identical structure but varying meanings, the link between such constructions could be conceptualised as "polysemic" (Traugott & Trousdale, 2013, p. 92). Polysemy being defined as a single form having multiple meanings that are semantically related, typically on historical grounds, an alternative approach to polysemic links between constructions is to assume a single construction with related constructional meanings. This application of the concept of polysemy, as used in lexical semantics, can be justified by the fact that constructions are, in essence, larger "lexical" units (Croft, 2003, p. 54).

Assuming polysemic (links between) constructions may not always be adequate for analysing constructions which share a common form but have different meanings. This can be illustrated by the similarity between the Double Object Construction (DOC) and the zero-SPC with XP taking the form of a NP. Levin (1993, p. 79) notes that the formal similarity between these two constructions is only superficial and therefore requires different analyses. A look at these constructions as they appeared in Old English (OE), as shown in Examples (15) and (16), highlights why the term "polysemic" may be ill-suited.

(15) *He   het   **hine**   mildheortnys*
      3SG.NOM call\PST 3SG.ACC mercy[NOM]
      'He called him mercy'   (YCOE, coaelhom,+AHom_16:227.2360,
                                                Taylor, Warner, Pintzuk, & Beths, 2003)

(16)　*Agif*　　　**him**　*þas*　　*cart-an*
　　　give.back.IMP 3SG.DAT DEM.ACC.F paper-ACC.SG
　　　'Return him this paper'　　　　　　(YCOE, coaelive,+ALS_[Basil]:561.854)

While the two constructions were distinct with regard to form as well as meaning in OE, the subsequent decline of the English case system results in both constructions having the form [V + NP + NP] in PDE. This decline includes the loss of distinction between nominative and oblique cases for nouns, as well as the collapse of the accusative and dative cases into an oblique case for personal pronouns, as evidenced by the accusative "hine" and the dative "him" both being rendered as "him" in PDE in Examples (15) and (16). For such constructions sharing a common form "by accident", I propose the term "homostructions", which implies a homonymic relation between the constructions. In lexical semantics, homonymy is defined as the phenomenon by which multiple lexical units share a common form but have different meanings and origins. Extending the concept of homonymy to constructions enables a distinction from polysemic relations, in that the different meanings in a homonymic relation are not semantically related. Rather, unrelated meanings are solely linked via the merging of their respective forms. In a similar vein to the distinction made between polysemy and homonymy in lexical semantics, the concept of polysemic relations is then reserved for multiple meanings that share a common origin.

The concept of homostructions relates not only to language-internal developments, such as the merging of the forms of the DOC and the zero-SPC with XP taking the form of a NP, as discussed above. Just as in lexical semantics, homonymy can also be caused by items introduced via language contact that share their form, but not their meaning, with native items. In the present chapter, the concept of homostructions is introduced mainly in order to integrate language contact within a DCxG framework. This approach is described in further detail later in this section.

A preliminary and tentative sketch of constructions and their relations within the family of SPCs is shown in Figure 1. Constructions listed within the same vertical box have potential polysemous links, whereas constructions listed within the same horizontal box – when having the same characteristics as outlined in the legend – are potential allostructions. Potential homonymic links to constructions that are not SPCs are also listed, which suggests that the network of SPCs may extend beyond the bounds of the constructional family. It is worth mentioning that the distinction between polysemic and homonymic links may not be as straightforward as an intra-familial and inter-familial contrast. For example, D'hoedt and Cuyckens (2017) make a compelling argument describing the emergence of the *as*-SPC from the similative construction via a process of constructionalization, as defined by Traugott and Trousdale (2013, pp. 22–23), triggered by ambiguity.

As such, the inter-familial link between the *as*-SPC and the similative construction may be polysemic rather than homonymic.
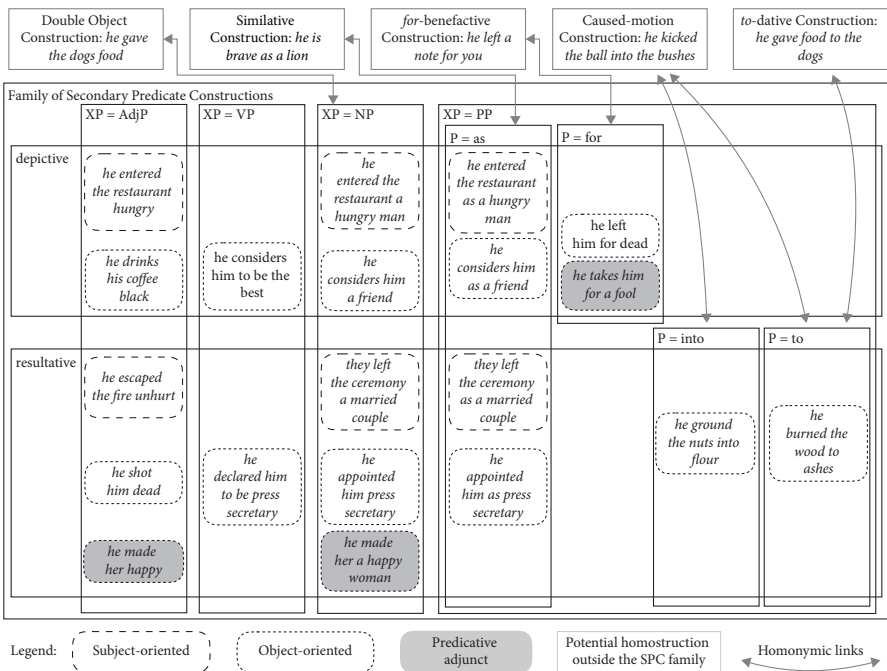
Figure 1. Preliminary sketch of SPCs and their relations in PDE

Given that a precise characterisation of the entire network of SPCs would be far too ambitious for the present chapter, the focus of the remainder of the chapter will be on those SPCs for which the XP is realised as a PP, namely the *as*-, *for*-, *into*-, and *to*-SPCs, hence referred to as PREP-SPCs. More specifically, the investigation centres around the development of PREP-SPCs in the Middle English (ME) period for the reasons described in the following section.

Given the substantial changes in meaning and productivity in the network of PREP-SPCs from OE to PDE, previously outlined in Section 2.2, an investigation of how such changes occurred can yield insights into the dynamic of network relations. For instance, the rise in prominence of the *as*-SPC at the expense of the hitherto dominant *for*- and *to*-SPCs raises questions relating to the stability of form–meaning relations. For example, it may be conceivable that PREP-SPCs, that were at one time clearly semantically distinct, underwent a passing "allostructional phase" in which semantic contrasts were minimal. After this phase, more substantial semantic distinctions may have been reinstated, albeit in a different configuration than before the allostructional phase.

A further point of interest lies in the language contact situation with Anglo-Norman (AN), an insular variety of Old French, following the Norman Invasion of 1066 until approx. 1500.[8] In addition to the well-known fact that English copied a wealth of lexical material from AN, the intensity of language contact led to AN exerting an influence on ME that went beyond the copying of lexical material but also included grammatical features (Trips & Stein, 2018, 2019).[9] As it turns out, AN featured a set of PREP-SPCs that exhibit parallels to English PREP-SPCs, as shown in Examples (17) to (20).

(17) *le   queu bref fust   **chaleng-é   come** faus*
ART which writ be\3SG.PST challenge-PTCP as   false
'The said writ was challenged to be false.'

(AND, 'chalenger' [Becket 1864], Trotter, 2006a)

(18) *Unkes **pur** chivaler failli   […] Ne fui   **pruv-é***
never for knight disloyal […] NEG be\1SG.PST prove-PTCP
'Never was I proven/shown to be a disloyal knight.'

(AND "prover[1]", S Edm Pass ANTS 503)

(19) *alienacioun […] ne **chaunge** my ceo qe fuit   fraunc almoigne **en***
alienation […] NEG change NEG DET REL be\3SG.PST free   tenure   into
lay   fee
secular fief
'Alienation[=transfer of property] does not change what used to be
free[=clerical] tenure into a secular fief.' (AND "changer", YBB Ed II xvi 159)

(20) *Mielz vaut   feiblement rimoi-er   Q' ester **prov-é**   **a** mençongier*
better be.worth weakly   rhyme-INF than be   prove-PTCP to liar
'It is better to rhyme badly than to be proven a liar.'

(AND "prover[1]", Dial Greg SATF 3530)

Assuming that verbs may not only be copied from AN to ME as individual lexical units, but also as part of larger constructions, investigating potential copying of the

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8. This variety of Old French has traditionally been labelled "Anglo-Norman", but the term "Anglo-French" has been proposed to better capture its insular character due to which it was no longer bound to the French of Normandy. While the author prefers the newer term, the traditional term is used in the present chapter to stay in alignment with the cited resources such as the *Anglo-Norman Dictionary* (Trotter, 2006a) and the *Anglo-Norman Online Hub* (Trotter, 2006b).

9. The term "copying" is preferred over the more traditional term "borrowing" due to conceptual problems with the latter: the donor language is not deprived of any linguistic material it supposedly "lends", nor is this material necessarily identical in the donor and recipient languages, whereas the concept of "copying" allows for non-identicality of original and copied material (see Johanson, 2002, pp. 287–288).

AN PREP-SPCs, as shown in Examples (17) to (20), may provide insights into how language contact can be modelled within the DCxG framework. Given that the issue of language contact has only rarely been addressed within this framework, with a few exceptions such as Colleman (2016) and Höder (2018), of which the latter will be discussed below, these insights may give momentum to the inclusion of language contact in the DCxG framework. In the constructions at hand, the lexical verbs may have been copied from AN to ME, whereas the AN prepositional SPC-markers *comme*, *p(o)ur*, *en*, and *a* may have been rendered in ME as *as*, *for*, *into*, and *to* respectively via grammatical replication, defined as the kind of linguistic transfer which involves "[m]eanings (including grammatical meanings or functions) or combinations of meanings" (Heine & Kuteva, 2005, p. 2) but not form. This would then result in four AN-based PREP-SPCs that are homonymous with the pre-existing native PREP-SPCs, which raises questions as to what impact the appearance of homostructions within a constructional family may have on the pre-existing constructions. Do homostructions remain semantically distinct and identifiable via the verbs they involve, i.e. verbs copied from AN or native ME verbs, or do they eventually merge?[10]

The approach by Höder (2018) to integrate CxG and language contact, called "Diasystematic Construction Grammar" (DSCxG), analyses language-specificity as a semantic property of a construction, more specifically as part of its pragmatic meaning in multilingual speech communities.[11] A distinction is made between "idioconstructions" (short for "idiosyncratic constructions"), which are language-specific, and "diaconstructions" (short for "diasystematic constructions"), which lack language-specificity and are therefore semantically more schematic (2018, p. 51). A possible type of change, called "pro-diasystematic change", corresponds to a reduction in constructional language-specificity when a set of idioconstructions merges into a diaconstruction with fewer pragmatic restrictions (2018, p. 60). An example of such a pro-diasystematic change is provided by Höder (2018, pp. 60–62), whereby bilingual speakers of Danish and German in South Schleswig use a Nominal Benefactive Construction in their variety of Danish, which however does not occur in Standard Danish. Prior to the change, there are separate benefactive idioconstructions: on the one hand, the Nominal Benefactive Construction, which

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10. The term "native ME verbs" is used to refer to any verbs not copied from AN, and therefore also includes verbs that were previously copied from other languages such as Old Norse. However, this admittedly superficial classification of native verbs should be sufficient for the purpose of the present study as it allows a distinction between the pre-existing and copied PREP-SPCs.

11. Höder (2018) employs the abbreviation "DCxG" for "Diasystematic Construction Grammar". The abbreviation is modified here to avoid confusion with the abbreviation used for "Diachronic Construction Grammar".

is idiosyncratic to German, as in *Pia öffnet ihm* ('Pia opens him (the door)'); on the other hand, the Prepositional Benefactive Construction, which is idiosyncratic to Danish, as in *Pia åbner for ham* ('Pia opens (the door) for him'). Subsequently, pragmatic bleaching occurs in the Nominal Benefactive Construction, meaning that it is no longer restricted to German and therefore becomes a diaconstruction. Following this, the constructional network is reorganised so that the Nominal Benefactive Construction can be filled with lexical material from either language, resulting in sentences such as *Pia åbner ham*, with the consequence that both benefactive constructions can coexist in the local variety of Danish. The results of the empirical analysis undertaken in this chapter will be interpreted from the perspective of DSCxG to determine how copying resulting in homostructions can be modelled within this framework.

4.   Empirical analysis: Methodology

In order to investigate the developments of PREP-SPCs in ME empirically, the *Penn-Helsinki Parsed Corpus of Middle English* (Kroch & Taylor, 2000, henceforth PPCME2) was used. The corpus contains approximately 1.2 million words and distinguishes four sub-periods of ME: M1 (1150–1250), M2 (1250–1350), M3 (1350–1420), M4 (1420–1500).[12] In terms of annotation, the corpus is tagged for parts of speech and syntactically parsed. A further layer of annotation that lemmatises lexical verbs and distinguishes them by their etymology as French-based versus native (Percillier, 2016, 2018) was applied to the corpus by the author.

The query to extract PREP-SPCs from the corpus made use of *CorpusSearch* (Randall, 2010) and looked for verbs that occurred with a PP not tagged as an adverbial, headed by *as*, *for*, *into*, or *to*, including their spelling variants.[13] The query yielded 17,578 hits. Given that the tagging of adverbials was not undertaken systematically in the corpus, such cases, alongside PPs marking *to*-datives, benefactives, and similatives, had to be excluded manually. This resulted in 1,089

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12. Additional sub-sets for which the composition period is distinct from the manuscript period (e.g. M24) or the composition period is unknown (e.g. MX1) were incorporated in the main sub-periods based on their manuscript date.

13. Spelling variants for *as* include *has*, *alswo*, *also*, *alsa*, *alswa*, *alse*, *als*, *ase*, and *os*; spelling variants for *for* include *vor*, *ver*, *fer*, and *fur*; spelling variants for *into* include *ynto* and *in-to*; spelling variants for *to* include *two*, *tu*, *te*, *tho*, *ta*, *tol*, *onto*, *on-to*, *unto*, *un-to*, *vnto*, and *vn-to*. The last six variants are included as the OED describes *unto* as a variant of *to* (OED Online, 2018, *unto, prep. and conj.*). PDE *onto* did not appear until after the ME period (OED Online, 2018, *on to, prep. and adj.*) and is therefore treated as a spelling variant of *unto*.

tokens of PREP-SPCs. In the course of this manual verification, valid tokens were annotated for the lemma of the participating verb, the observed prepositional marker, depictive versus resultative meaning, the status as participant complement versus predicative adjunct, and the syntactic role of the controller.

The following marginal cases were excluded from the data. Seven tokens were marked via two prepositional markers, as showcased in Example (21), i.e. five cases of *as for*, and one case of *as of* and *as to* each. As it was doubtful under which PREP-SPC such marginal cases should be subsumed, they were excluded from the analysis. A further type of marginal case related to the syntactic role of the controller. In seven cases, the XP stands in predication with the main event rather than with one of the participants, as shown in Example (22), where *mede* ('punishment') describes the hanging event. In two cases, the XP stands in predication with an NP within a PP adverbial, as shown in Example (23). Lastly, two cases displayed predication between the XP and an indirect object, as shown in Example (24). Following the exclusion of these marginal cases, the number of PREP-SPCS included in the analysis was reduced to 1,071 tokens.

(21) *þou   schalt wilne to resseyue gladli al maner tribulacioun-s and*
      2SG.NOM shall wish to receive gladly all manner tribulation-PL and
      *disses-is **as for** a   greet cunfort*
      disease-PL as for ART great comfort
      'you shall wish to gladly receive all types of tribulations and diseases as a
      great comfort'   (PPCME2, CMHILTON,9.55)

(22) *& heoue-ð   hire   on heh up; Swa þt ha   hong-i*
      and heave-3SG.PRS 3SG.F.OBL on high up; so   that 3SG.F.NOM hang-SBJV.SG
      to mede   of hire   hoker-es.
      to punishment of 3SG.F.POSS taunt-PL
      'and heaves her high up, so that she should hang as punishment for her
      taunts'   (PPCME2, CMMARGA,84.471)

(23) *and translate it   to Chestre **as to a syker place**.*
      and translate 3SG.N to Chester as to a secure place
      'and [they] transported it[=St. Werburgh's body] to Chester as a safe place'
                                                (PPCME2, CMPOLYCH,VI,367.2677)

(24) *And þerefore all þe   fissch-es of the see come-n to **make-n   him***
      and therefore all ART fish-PL of ART sea come-PL to make-INF 3SG.M.OBL
      homage as the most noble &   excellent kyng of the world.
      homage as ART most noble and excellent king of ART world
      'And therefore all the fish of the see come to make him homage as the most
      noble and excellent king of the world'   (PPCME2, CMMANDEV,128.3108)

In order to assess semantic differences between various PREP-SPCs as well as diachronic semantic changes within individual SPCs, a distributional semantic approach has been used, the advantage being that it is data-driven and does not require the annotation of semantic classes, which relies on the intuition of the annotator(s) (Perek & Hilpert, 2017, p. 499). To build a distributional semantic model (DSM) of ME verbs, the method outlined by Perek and Hilpert (2017, pp. 496–502) was used, performing a collocate search for collocates of lexical verbs within a two-word window.[14]

As previously mentioned, the annotation of the PPCME2 was augmented with an additional annotation layer that provides verb lemma information. This, however, does not include lemma information for nouns, adjectives, and adverbs, which have to be lemmatised in order to obtain a DSM of ME verbs. To do so, potential spelling variants of noun, adjective, and adverb forms that were returned by the collocate search were matched automatically and then lemmatised manually. All forms with a token frequency of ten or more were assigned a lemma, and this figure serves as the threshold for the number of collocates to be included in the model. This resulted in a co-occurrence matrix of 334 verb lemmas and 1,082 collocate lemmas.

The co-occurrence frequencies of verbs and their collocates were then turned into Positive Pointwise Mutual Information (PPMI) scores using the *DISSECT* toolkit (Dinu, Pham, & Baroni, 2013), which turn the frequencies into association measures. A further transformation aimed at reducing the number of dimensions in the matrix by using Singular Value Decomposition (SVD), also via the *DISSECT* toolkit. This reduced the matrix from 1,082 columns to 30 columns by removing redundant information and concentrating on the most informative aspects. The semantic characteristics of a construction in a given period are then estimated via a so-called period vector, which represents a semantic average of the construction at hand within a given period (Perek & Hilpert, 2017, pp. 500–502).

The main goal of the method described by Perek and Hilpert (2017) is to subject a construction's period vectors to a variability-based neighbour clustering (VNC) algorithm (Gries & Hilpert, 2008), which divides diachronic corpus data into time periods based on the linguistic phenomenon under investigation.

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14. Perek and Hilpert (2017) describe their method based on data from the *Corpus of Historical American English* (COHA, Davies, 2010), which contains approximately 400 million words. They apply frequency thresholds of at least 1,000 tokens for the verbs to be included in the model and further restrict the collocates to the 10,000 most frequent nouns, verbs, adjectives, and adverbs, so as to obtain enough distributional data to make meaningful comparisons between verbs (Perek & Hilpert, 2017, pp. 496–497). Given the much smaller size of the PPCME2, it is preferable to choose a lower frequency threshold, or if this does not yield sufficient distributional data, to abstain from any frequency thresholds (Florent Perek, personal communication).

For the corpus and linguistic phenomena at hand, the question would then be whether the various PREP-SPCs develop in phases corresponding to the ME sub-periods suggested by the compilers of the PPCME2, i.e. M1-M4, or whether a different temporal categorisation provides a more accurate representation of the development of these constructions. This is usually achieved by clustering smaller temporal intervals, such as decades. However, this approach may not be applicable to the corpus at hand, as any reorganisation of the corpus data into different temporal units, even larger ones such as 50-year periods, results in drastic coverage gaps compared to the established sub-periods.[15]

It is therefore preferable to leave the question of optimal periodisation aside and instead use the semantic information contained in period vectors to investigate semantic differences between PREP-SPCs within a given period. This is achieved by comparing the period vectors of the various PREP-SPCs within a given period via a hierarchical agglomerative clustering algorithm. Changes in the clusters from one period to another would suggest changes in the semantic distinctions among the PREP-SPCs.

In order to probe the nature of links between constructions, period vectors were generated for every combination of marker (*as*, *for*, *into*, *to*), controller (subject or object), predication (depictive or resultative), and verb etymology (native or French-based) within every period, provided that each combination produced more than a single token. These period vectors were then clustered via hierarchical agglomerative clustering.[16]

5.   Empirical analysis: Results

The present section presents the results of the empirical investigation, first by looking at observable frequency developments, then by commenting on the occurrence of PREP-SPCs with French-based verbs, and finally by describing semantic differences.

5.1   Changes in frequency

Changes in the frequency of PREP-SPCs throughout the ME period, shown in Figure 2, represent a drastic reorganisation of the network. The pattern observed

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15. The addition of further ME texts would therefore be highly beneficial. Work on mapping the method used to lemmatise verbs in the PPCME2 to other ME corpora is currently under way.

16. Using the "varclus" function from the *Hmisc* package (Harrell Jr & Dupont, 2018) in *R* (R Core Team, 2018).
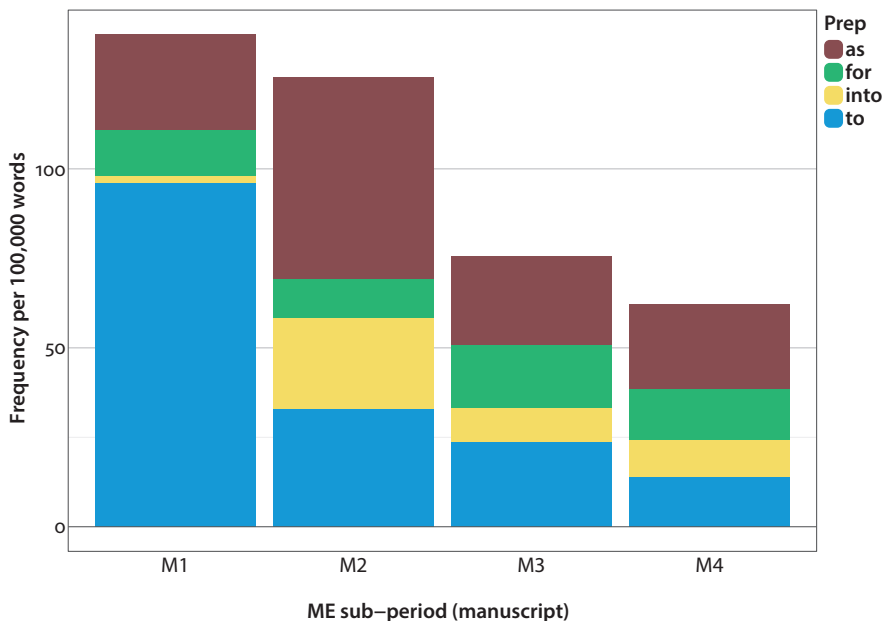
Figure 2. Normalised frequencies of PREP-SPCs by ME sub-period

for M1 corresponds to the pattern described for OE by Mitchell (1985, p. 451), namely a clear dominance of the *to*-SPC with the *as-* and *for*-SPCs acting as minor "rivals". As such, the pattern observed can be seen as a continuation of the constructional network said to be typical of OE. This configuration however changes drastically from M1 to M2, as the frequency of *to*-SPC plummets to approximately a third of its former value. The transition from M1 to M2 is also characterised by the temporary rise of the *as-* and *into*-SPCs. Generally speaking, the ME period represents an overall decline of PREP-SPCs.

The sudden decline of the *to*-SPC in terms of frequency also corresponds to a reduction in its semantic scope, as shown in Figure 3.[17] Whereas it could be resultative as well as depictive in M1, the *to*-SPC all but loses its depictive function in the following periods. The construction also virtually loses its subject-oriented

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[17]. The reduction of the *to*-SPC evidently raises questions as to its causes. In addition to the rapid but temporary rise of the *as-* and *into*-SPCs in M2, the rise of further constructions which may have influenced the *to*-SPC, and PREP-SPCs in general, deserves attention. For example, D'hoedt (2017, p. 114) reports a rise of the zero-SPC from OE to ME to more than a doubling of frequency from 142.5 to 336.3 tokens per 100,000 words. A further construction gaining importance in the ME period is the *to*-dative. Zehentner (2018, pp. 158–160) reports an increase in the proportion of *to*-datives in relation to DOCs from M1 to M2, which also coincides with the reduction of the *to*-SPC. It is therefore conceivable that the rise of multiple constructions, some of them potential allostructions, some of them homostructions, exerted pressure on the *to*-SPC.

usage, although this was already a marginal function to begin with. It is worth noting that the other PREP-SPCs do not undergo such drastic changes in their semantic scope, with the exception of a temporary peak for the *as*-SPC in M2, whereby it gains in resultative and object-oriented uses.
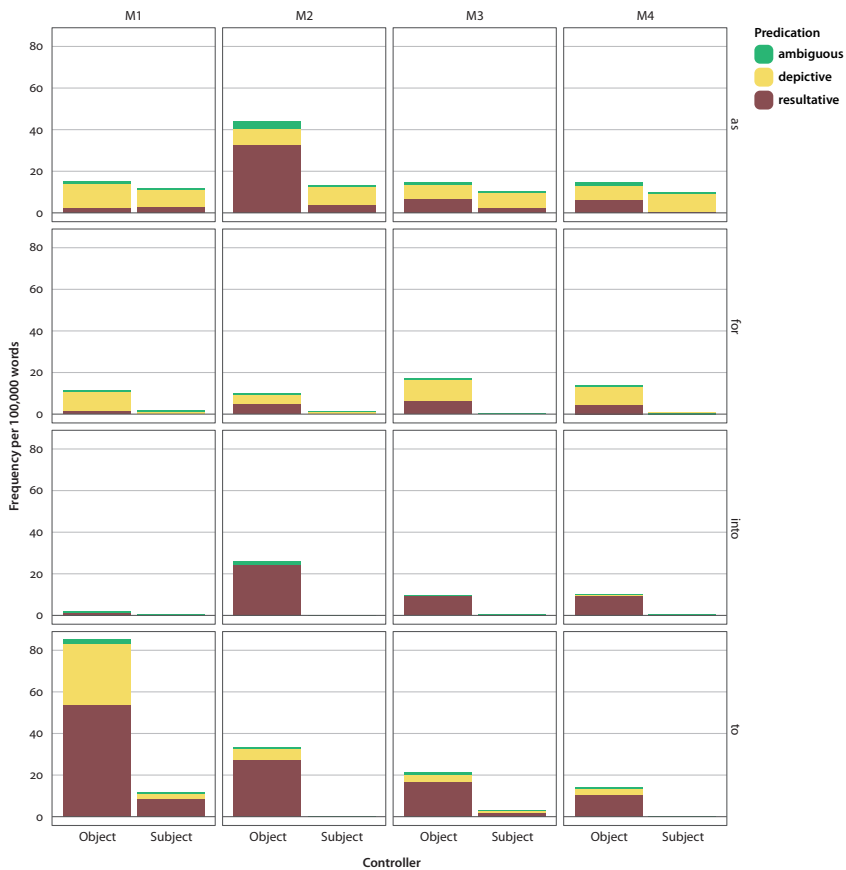
Figure 3. Normalised frequencies of PREP-SPCs per ME-subperiod distinguishing predication types and controllers

5.2   The rise of French-based verbs

The ME period saw a large influx of lexical material from AN. An interesting question from a DCxG viewpoint is whether this also extends to the influx of new constructions from the donor language, as shown in Examples (25)–(28), which match Examples (17)–(20) in terms of lexical verbs and (replicated) PREP-SPC markers. An overview of PREP-SPCs involving French-based verbs (FBVs) is shown in Figure 4.

(25) *and **chaleng-ed** him **as** a member of þe Cherch*
and challenge-PST 3SG.OBL as ART member of ART Church
'[All the bishops rose up] and challenged him as a member of the Church.'
(CMCAPCHR,149.3489)

(26) *Þe witnesse ne **pruuie** ham **for** ualse*
ART witness NEG prove 3PL.OBL for false
'The witness does not prove them to be false.' (CMANCRIW-1,II.56.544)

(27) *Oure Lord God schulde **change** euerlestyng peyne **into** the peyne of*
1SG.POSS lord God should change everlasting pain into ART pain of
purgatorye
purgatory
'Our Lord should change everlasting pain into the pain of purgatory.'
(CMREYNES,268.514)

(28) *Ha were-n i-fond-ed & þurch þe fondinge*
3PL.NOM be\PST-PL PTCP-try-PTCP and through ART trial
***i-pruu-et** to treowe champiun-s*
PTCP-prove-PTCP to true champion-PL
'They were tried and through the trial proven to be true champions.'
(CMANCRIW-1,II.174.2425)
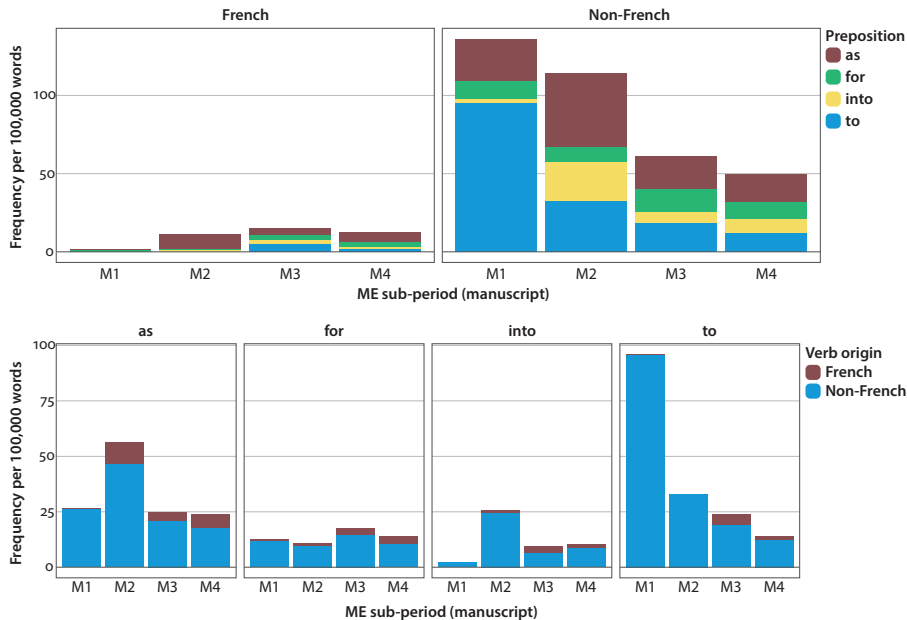
Figure 4. Development of PREP-SPCs involving French-based verbs

The frequency of PREP-SPCs with FBVs is clearly lower than that of constructions with native verbs, which is not surprising given that FBVs in general are rarer and are only beginning to enter the English language. What is noteworthy, however, is that PREP-SPCs involving FBVs do not seem to be affected by the overall decline observed for PREP-SPCs. Instead, their frequencies grow at a rate comparable to FBVs in general (Fisher's Exact Test, $p = 0.1359$, n.s., see Table 1), which speaks in favour of their being distinct constructions.

Table 1. Token count of PREP-SPCs with FBVs per ME sub-period

Category	M1	M2	M3	M4
PREP-SPCs with FBVs	4	11	60	51
Total FBVs	762	2,617	10,445	6,258
Total word count	284,345	93,914	407,640	408,464

The question whether PREP-SPCs with FBVs are merely native constructions using newly introduced verbs, or rather new constructions replicated from AN, can be tackled by probing for semantic differences among constructs that one would expect to behave similarly, e.g. object-oriented depictive *as*-SPC occurring with native verbs, and the same configuration occurring with FBVs.[18] Such an approach is described in the following section.

5.3 Development of semantic differences

As previously described in Section 4, period vectors were clustered via hierarchical agglomerative clustering, with proximity within the resulting dendrograms being indicative of semantic proximity. The basic assumption of this approach is that each construct is an individual construction unless demonstrated otherwise. Clusters showing proximity between constructions with the same semantic characteristics but different markers would support the concept of allostructions. For the concept of polysemy, the assumption is that a given PREP-SPC should display semantically distinct meanings, i.e. meanings that are comparatively distant in the dendrogram. Furthermore, the clustering of constructions with FBVs as separate from constructions with native verbs sharing the same characteristics would support the idea of replicated homostructions. The dendrograms displaying hierarchical clusters for each ME sub-period are shown in Figure 5.

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18. The term "constructs" is used to label form–meaning configurations for which it is yet to be determined whether they are part of a single construction or instead constitute distinct constructions.
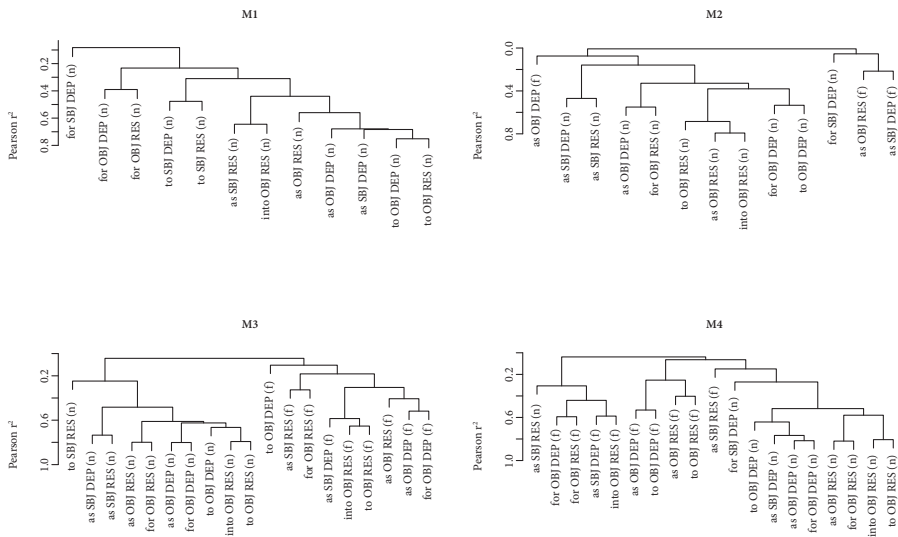
Figure 5. Dendrograms of hierarchical agglomerative clustering based on semantic similarities for each ME sub-period (SBJ = subject-oriented, OBJ = object-oriented, DEP = depictive, RES = resultative, (n) = native verbs, (f) = French-based verbs)

The most apparent distinction that can be discerned from Figure 5 is the clear division between constructions involving native verbs on the one hand, and FBVs on the other hand in M3, the first sub-period in which all markers are attested with FBVs. This strongly suggests that constructs involving FBVs are separate French-based constructions. The distinction between homostructions appears to wane only slowly, as M4 largely maintains the native versus French-based contrast. This warrants further investigation into the development of French-based PREP-SPCs in EModE to see how long replicated homostructions can maintain their status.

A further phenomenon that can be observed in Figure 5 has to do with the relations between the pairs of closest meanings grouped together at the lowest end of each dendrogram. Throughout the sub-periods of ME, PREP-SPCs appear to group semantically, either according to the form of the prepositional marker, or according to the predicative relation. Different syntactic roles for the controller (SBJ/OBJ) only cluster rarely in such groupings.[19] A summary of paired groups per period is given in Table 2.

The summary given in Table 2 reveals a shift from M1, where more immediate clusters occur by form than by predication type, to M3, where the opposite holds true. M2 can be seen as a transition phase for the reversal that occurs from M1 to M3. M4 largely maintains the pattern from M3 in a slightly weaker form.

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19. Exactly once per period and always within a common etymological group (n/f).

Table 2. Summary of immediate groupings by form or predication type for each ME sub-period

Period	Grouping type	Group	Total
M1	Form	*for* OBJ RES – *for* OBJ DEP (n)	3
		to SBJ DEP – *to* SBJ RES (n)	
		to OBJ DEP – *to* OBJ RES (n)	
	Predication	*as* SBJ RES – *into* OBJ RES (n)	1
M2	Form	*as* SBJ RES – *as* SBJ DEP (n)	2
		as OBJ RES – *as* SBJ DEP (f)	
	Predication	*as* OBJ RES – *into* OBJ RES (n)	2
		for OBJ DEP – *to* OBJ DEP (n)	
M3	Form	*as* SBJ DEP – *as* SBJ RES (n)	1
	Predication	*as* OBJ RES – *for* OBJ RES (n)	6
		as OBJ DEP – *for* OBJ DEP (n)	
		into OBJ RES – *to* OBJ RES (n)	
		as OBJ RES – *for* OBJ RES (f)	
		into OBJ RES- *to* OBJ RES (f)	
		as OBJ DEP – *for* OBJ DEP (f)	
M4	Form	*for* OBJ DEP – *for* OBJ RES (f)	1
	Predication	*as* OBJ DEP – *for* OBJ DEP (n)	5
		as OBJ RES – *for* OBJ RES (n)	
		into OBJ RES – *to* OBJ RES (n)	
		as OBJ DEP – *to* OBJ DEP (f)	
		as OBJ RES – *to* OBJ RES (f)	

6.   Changes in the network of prepositional secondary predicates constructions

The present section investigates developments among PREP-SPCs in order to provide insights into the relations within the network of PREP-SPCs. Based on the distinctions introduced in Section 3 (sketched for PDE in Figure 1) and on the empirical results presented in Section 5, questions arise about the nature of potential (changing) polysemic, allostructional, and homonymic links.

The first question relates to the possibility of polysemic constructions, i.e. constructions with multiple meanings. This is mostly relevant for the *as*-SPC, as it is the only PREP-SPC that displays subject-oriented uses in addition to object-oriented uses in PDE, whereas the other PREP-SPCs are limited to object-oriented

uses. Furthermore, it is also the only PREP-SPC that expresses depictive as well as resultative meanings, while the *for*-SPC is limited to depictive meanings and the *into-* and *to*-SPCs are limited to resultative meanings. When observing frequency developments in the ME period, as shown in Figure 3, we can conclude that the M1 sub-period shows a different configuration in that the question of polysemy is also relevant to the *to*-SPC, but subsequent developments in ME already veer towards the PDE patterns. In M1, both the *as-* and the *to*-SPCs exhibit a noteworthy amount of subject-oriented and object-oriented uses. At that stage, the *to*-SPC also expressed depictive and resultative meanings, while the *as*-SPC was mostly limited to depictive uses. By the end of the ME period, the *as*-SPC was the only PREP-SPC showing both subject-oriented and object-oriented uses in substantial amounts. Additionally, the *as*-SPC increased its share of resultative uses, while the *to*-SPC all but lost its depictive uses.

In order to characterise a given PREP-SPC as polysemous, its various uses should be shown to be semantically distinct. In the dendrograms of hierarchical agglomerative clustering based on semantic similarities shown in Figure 5 (summarised in Table 2), the *to*-SPCs in M1 cluster according to common syntactic roles for the controller. In contrast, *to*-SPCs with varying syntactic roles for the controller are comparatively distant, with subject-oriented *to*-SPCs being semantically closer to object-oriented *for*-SPCs than they are to object-oriented *to*-SPCs. We can conclude that for the *to*-SPC in M1, the change of syntactic role of the controller (SBJ/OBJ) results in greater semantic differences, and the distinction between depictive and resultative uses is comparatively minimal. At the stage when the *to*-SPC is still the dominant PREP-SPC, it can be described as polysemous with regard to subject-oriented and object-oriented meanings. Whether depictive and resultative uses warrant the formulation of further distinct meanings is more difficult to determine, given that their semantic differences are far more subtle. Developments in the ME period led to the loss of the subject-oriented meaning of the *to*-SPC, thereby ending the polysemic status of the *to*-SPC.

Whether the *as*-SPC already developed the polysemy observable for PDE in the ME period is difficult to ascertain given a further development in the ME period, which is related to the second question: whether constructions with common characteristics, such as depictive/resultative or object-oriented/subject-oriented but with different prepositional markers, should be treated as allostructions (i.e. specific realisations) of a more schematic constructeme in which the prepositional marker is unspecified. The summary of immediate groupings by form or predication type given in Table 2 suggests a move from M1, where semantic similarities are mostly based on common form, to a different pattern in M3/M4, where a common predication plays a greater role in semantic similarity than a common form. While this already supports the idea of an "allostructional phase", going

beyond the immediate groupings listed in Table 2 and giving a renewed look at the dendrograms shown in Figure 5 provides even stronger support for this idea. In M4, PREP-SPCs involving native verbs form a larger cluster with "object-oriented" and "resultative" as common characteristics. It is therefore possible to posit an object-oriented resultative PREP-SPC constructeme whose allostructions are more specific realisations in which the underspecified prepositional slot is filled with *as*, *for*, *into*, and *to* respectively.

Given the respective pairings of *as-/for*-SPCS and *into-/to*-SPCs within this cluster, we can raise the possibility of intermediate constructemes. This is motivated by the fact that object-oriented resultative *into-* and *to*-SPC already cluster in M3, and the potential allostruction observable for the same pair in PDE may in fact be the same allostruction. This would mean that an extremely stable object-oriented resultative *into-/to*-SPC constructeme emerged in M3 and survived into PDE. The more schematic object-oriented resultative PREP-SPC constructeme found in M4 may therefore be a transient phenomenon that ultimately waned as the *as-* and *for*-SPCs developed their own distinct patterns, with the *as*-SPC becoming increasingly polysemic and the *for*-SPC changing towards object-oriented depictive meanings.

Another open question relates to the possibility of constructions replicated from AN acting as "homostructions", i.e. constructions sharing common forms but not their meanings and origins, in relation to native constructions. The fact that the frequency of PREP-SPCs involving FBVs seems to be unaffected by the overall decline of PREP-SPCs, as described in Section 4.2, is a first indication that they may constitute a separate group of constructions. Furthermore, Figure 5 shows a very clear semantic divide between PREP-SPCs involving native verbs and FBVs in M3, the first period in which all prepositional markers are attested with FBVs. This strongly suggests that we should treat PREP-SPCs involving FBVs as distinct constructions replicated from AN. These constructions have distinct meanings from the native constructions, and their similarity in form is due to an "accident" of the replication process, which justifies their status as homostructions. It remains to be seen whether the slightly less rigid distinction observed in M4 represents an incipient dissolution of homonymic links, meaning that due to their shared form, native and French-based PREP-SPCs begin to influence each other, eventually merging.

When integrating these findings into the framework of DSCxG (Höder, 2018), as illustrated in Figure 6, the replication of PREP-SPCs from AN into ME can be thought of as a type of pro-diasystematic change. In an initial phase (1), there are separate sets of PREP-SPCs, which are idioconstructions restricted to either AN or ME.[20] In phase (2), the copying of PREP-SPCs from AN to ME corresponds to

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20. The notations $\langle C_{AN} \rangle$ and $\langle C_{ME} \rangle$ used to indicate language-specificity to AN and ME respectively are adapted from Höder (2018, p. 49), where the abbreviation formatted in subscript

pragmatic bleaching from a DSCxG perspective. This change has consequences for the constructional network, which is reorganised in phase (3). As erstwhile purely AN constructions are becoming diasystematic, they can be filled with lexical material from ME, which results in homonymic links with native constructions which happen to share a common form. However, these homostructions still constitute separate constructions with distinct meanings, as suggested by the clear semantic division between constructions involving native verbs on the one hand, and FBVs on the other hand in M3, as shown in Figure 5. This semantic contrast is also the tell-tale sign that copied FBVs did not simply integrate into native ME PREP-SPCs, but that entire constructions were copied. The bond between FBVs and former AN constructions raises interesting questions as to whether the verbs and the constructions they are associated with were copied together, or whether two instances of copying occurred. The homonymic link between the diaconstruction and the idioconstruction also raises questions about the internal network of diaconstructions. Are diaconstructions hierarchically organised as a schematic supercategory, under which less schematic, language-specific intermediate constructions, such as "V NP a XP" and "V NP to XP", are positioned? This hypothetical node would be located at the connection point of the constructions and their homonymic link shown in phase (3) of Figure 6. If not, should one place homonymic links directly between diaconstructions and idioconstructions, even though they are positioned at different levels of schematicity?

The distinction between homostructions may be upheld by speakers' knowledge of the construction copied from AN as being diasystematic, whereas the native ME construction is still language-specific. This changes in a subsequent reorganisation phase (4) as a consequence of the decline of AN, which ceased to function as a medium of instruction and as a language for various official and professional settings in the generations following the Black Death (Ingham, 2012, pp. 27–37). As the speech community is no longer multilingual, language-specificity or lack thereof is no longer relevant, and therefore, not stored as part of a construction's pragmatic meaning. This results in a levelling of the homostructions in terms of language-specificity, as they are now both restricted to ME by default. The loosening of semantic contrasts in M4, as suggested by Figure 5, may be a consequence of this. As already stated earlier in this section, it remains to be seen whether this development marks the beginning of a merger of both constructions.

Only the investigation of further developments in the EModE period may provide a satisfactory answer to this open question. The same can be said for other contrasts between ME and PDE outlined above, such as the development of polysemy for the *as*-SPC and the semantic narrowing of the *for*-SPC. The question

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marks the communicative setting associated with a particular language.
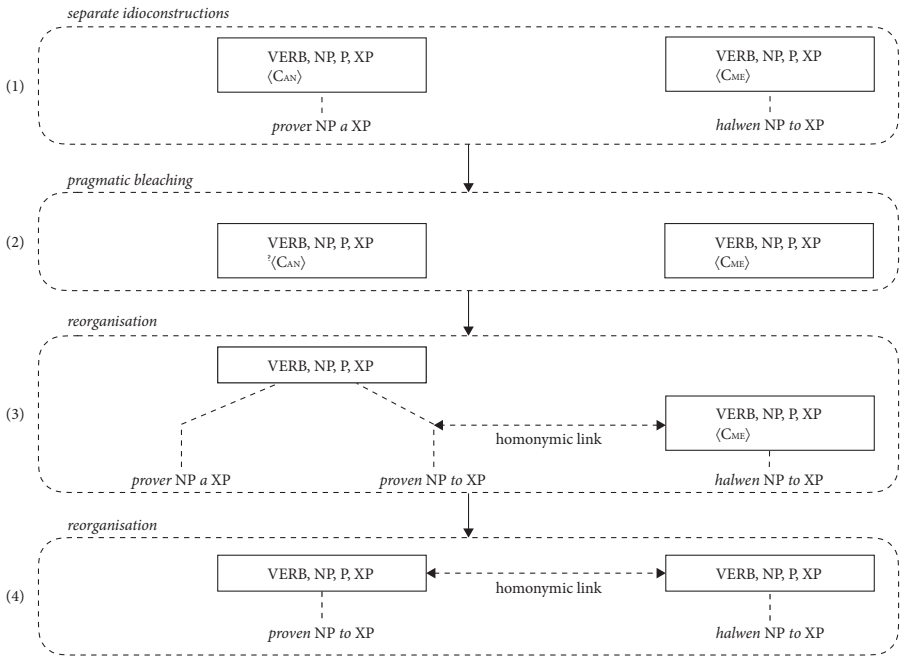
Figure 6. Illustration of the copying of AN PREP-SPCs into ME as a pro-diasystematic change

whether the allostructional relation between the *into-* and *to-*SPCs observed in PDE dates back to late ME can also be tested by probing developments in EModE.

7.   Conclusion

The present chapter has discussed the development of PREP-SPCs in the ME period within the framework of DCxG. The two main points of interest in the study were (1) the transition from the OE distributional pattern, where the *to-*SPC was the dominant form, to the PDE pattern, where the *as-*SPC has largely replaced the *to-*SPC, and (2) the prospect of language contact with AN introducing new constructions, in this case via replication, to the network of PREP-SPCs, which then function as homonymic counterparts, or homostructions, to the native constructions.

Regarding the first point, the transition was found to occur very early and suddenly in the ME period, with a sharp drop of the *to-*SPC from M1 to M2. The ME period represents an overall drop in the frequency of PREP-SPCs in general. The cause of this decline of PREP-SPCs and the *to-*SPC in particular deserves further investigation. One possible cause lies in competition from other constructions

within the network of SPCs, such as the zero-SPC, which gained in importance from M1 to M2, or homostructions that lie outside the immediate constructional family, such as the *to*-dative, which also gained importance from M1 to M2. In terms of semantic developments, this transition corresponds to a potential "allostructional phase", where PREP-SPCs with different markers but common predication types appear to be closest, the *as*- and *for*-SPCs on the one hand and the *into*- and *to*-SPCs in particular. This suggests that the possible allostructional relation between the *into*- and *to*-SPCs in PDE may date back to this transition, whereas the subsequent development of the *as*-SPC as the dominant form and the semantic restriction of the *for*-SPC must have occurred at a later stage.

The findings from the second point of interest, with a focus on language contact, suggest that entire constructions may be copied from one language to another. In the case at hand, lexical verbs from AN were copied alongside PREP-SPCs, whereby the prepositional secondary predication marker was replicated rather than copied. This raises important questions for integrating language contact into the DCxG framework. Firstly, what enables constructional copying as opposed to purely lexical copying in a language contact situation, and secondly, what aspects of the construction are carried over from the donor language? The present chapter only relied on dictionary citations to establish the existence of PREP-SPCs marked by *comme*, *p(o)ur*, *en*, and *a* in AN, which is obviously not sufficient. An empirical study of the network of PREP-SPCs in AN, for example based on the text sources of the *Anglo-Norm Hub* (Trotter, 2006b), would provide insights into what aspects of the construction in the donor language were copied to the target language.

The findings offered in the present chapter relate most directly to the open question number 4 listed in the opening chapter of the present volume, i.e. the theoretical status of allostructions, homostructions, and constructional families. The concept of allostructions was found to be relevant not only for the *into*- and *to*-SPCs in PDE, but also for developments in the late ME period, where reduced semantic contrasts between the various PREP-SPCs may have facilitated the transition from the OE configuration, still prevalent in M1, where the *to*-SPC was the dominant PREP-SPC, to the PDE pattern where the *as*-SPC is dominant. The concept of homostructions was introduced in the present chapter to provide an alternative to polysemic constructions, given that constructions sharing a common form may not necessarily have a common origin, nor do their distinct meanings have to be semantically related. This concept proved helpful in modelling language contact with AN, where PREP-SPCs were replicated into ME, resulting in a set of PREP-SPCs that were formally similar but unrelated to pre-existing native PREP-SPCs. The concept of a constructional family proved vital in grouping the various SPCs together, given that in spite of their differences, whether formal (zero-SPCs,

various PREP-SPCs, VP-SPCs) or semantic (subject- versus object-oriented, depictive versus resultative), a shared common characteristic exists, namely the feature of a secondary predication.

These partial answers to question 4 also relate to question 3, i.e. the nature of connections that exist between the nodes in a network. The present chapter investigated allostructional, homostructional, as well as polysemic links. Allostructions involve horizontal links between the specific realisations as well as vertical links between the specific allostructions and the more schematic constructeme. The investigation of the development of PREP-SPCs in the ME period raised the possibility of multiple layers in the allostruction-constructeme relation in the M4 subperiod, with a schematic object-oriented resultative PREP-SPCs which dominates two less schematic *as/for* and *into/to* intermediate constructemes, which in turn each dominates the individual allostructions with a given specific prepositional marker. It remains to be seen how stable such an allostructional configuration can be by probing further developments in the EModE period. Determining the nature of homostructional links proves difficult to describe in terms of hierarchical dimensions such as horizontal or vertical, given that the relation caused by a shared form is "accidental" in such cases, whether caused by language-internal developments, such as phonological or morphological changes, or the introduction of new unrelated constructions via reduplication in language contact situations. Perhaps homostructional links should be viewed as transversal at the time of their appearance, and the question as to how speakers may (or may not) integrate homostructions into more coherent network relations over time remains intriguing and worth pursuing.

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Converging variations and the emergence of horizontal links

To-contraction in American English

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The guiding question of this paper is how (horizontal) connections are established when new items enter the network of constructions. It presents a quantitative, corpus-based study of the development of *to*-contraction (e.g. *want to > wanna*) in American English since the 19th century. From a plethora of earlier forms, *gonna, wanna* and *gotta* emerge, first as representations of phonetic reduction, but in time claiming their place as newly emerged, separate nodes in the constructional network. As their frequency increases, their usage patterns (relative to the full form) become increasingly similar. I propose that this marks the emergence of a horizontal link, which can be described as an emerging "metaconstruction". The study discusses the status of these forms as either phonetic variants, potential allostructions, or independent form–meaning pairings, and provides first-hand evidence for emergent connections via mechanisms of analogy in language. Moreover, it makes an argument that (changing) usage patterns reflect (changing) constructional links and degrees of entrenchment.

Keywords: modal expressions, horizontal links, analogy, metaconstruction, contraction

1. Introduction: Horizontal links and the emergence of schemata

In Construction Grammar, it is assumed that constructions are the building blocks of language, from the highest to the lowest level of abstraction; grammar is seen as "a dynamic network of interconnected signs" (Diessel, 2015, p. 297; cf. Langacker, 2000; Goldberg, 2006). A network consists of nodes (constructions) and links that connect the nodes. Thus, the fabric of grammar is made up of the links between constructions. The main type of link appears to be the "instantiation" link which identifies a given construction as an instance of another, more

schematic construction (Goldberg, 2006; Traugott, 2007). The lower-level construction "inherits" the features of the higher-level construction; the higher-level construction constitutes a generalization over its instances. With instantiation/inheritance relations alone, the resulting network would be a strictly hierarchical taxonomy, a system of classes and subclasses.

However, if we consider the richness and variability of language, there must also be "horizontal" links between constructions on the same level of abstraction (cf. Traugott & Trousdale, 2013, p. 62). One of the guiding questions that Smirnova and Sommerer (this volume, p.3) put forward in the introduction to this volume is what kinds of connections – both vertical and horizontal – exist between nodes (Question 3). The question is most pertinent when it comes to spelling out horizontal connections in the network of constructions.

Various ideas have been put forward as to where horizontal links come into play. Goldberg (1995, p. 91), for example, proposes a "synonymy link" for constructions that are related by meaning but differ in their formal and distributional properties (such as the ditransitive and the prepositional double-object constructions). Van de Velde (2014, p. 150) sees syntactic alternations as connected by "horizontal relations of contrast" – they are recognized as variants, and the different forms come with different aspects of meaning. Recognition of different constructions as variants is also the central idea in Cappelle's (2006) notion of "allostructions". Allostructions, however, are not seen as directly linked horizontally but as alternative instantiations of a higher-level "supercategory". Perek (2012) provides evidence that such alternation-based generalizations are indeed represented in language users' mental grammars.[1] These generalizations "are based on semantic similarities between formally distinct constructions and capture the fact that a given event type may be expressed in various ways" (Perek, 2012, p. 608), which in fact corresponds to the classic linguistic variable (e.g. Labov, 2004, p. 7, "alternative ways of saying the same thing").

Diessel (2015) presents a description of horizontal links based on syntactic and semantic priming and suggests that "structures with similar forms and meanings are associated with each other like lexical expressions with similar phonetic and semantic features in the mental lexicon" (Diessel, 2015, p. 307). In a similar vein, Schmid (2015, p. 7) discusses "paradigmatic associations", which "link associations triggered by processing the forms or meanings of linguistic elements to potential alternative associations". This apparently comprises any connection between elements on the same level of abstraction, including instantiations of the same construction, as well as any association based on form or meaning. Thus,

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1. Perek (2012) describes these generalizations as categories ("constructemes"), but considers the possibility of defining them as horizontal (synonymy) links.

variants of a linguistic variable are paradigmatically associated, and so are constructions of similar form.

In addition, connections and generalizations can also be established between different sets of constructions: Leino and Östman (2005) propose "metaconstructions", which are generalizations over constructions that "capture systematic similarities and differences which occur between several *pairs* of constructions" (p. 207, emphasis in original). I will return to this concept in the discussion of variations between semi-modal contractions and full forms.

In sum, usage-based approaches to (construction) grammar acknowledge that horizontal associations exist as elements of language users' grammatical competence (as evidenced, e.g., by priming effects and variational patterns). Synchronic descriptions of the constructional network need to consider what kinds of links are conventional and how they contribute to the language system (e.g. through coactivation/priming, functional differentiation of variants, or forming schematic patterns).

The diachronic strand of Construction Grammar (DCxG) is concerned with how constructional networks change over time, mostly focusing on how new nodes and links emerge through analogization and neoanalysis (if this is taken broadly as any re-structuring of any part of the network). Since horizontal links of various kinds are part of the constructional network, and perhaps a more important part than has been hitherto acknowledged, their creation and their strengthening or weakening over time should be given more attention in constructional approaches to language change. This research desideratum has recently been put forward, e.g. by Hilpert (2018).

The present study offers an account that identifies horizontal links through quantitative usage patterns, and suggests that the formation of a new schema is accompanied by changes in both vertical (instantiation and inheritance) and horizontal, associative links. It presents a quantitative view of *to*-contraction in American written English, based on the *Corpus of Historical American English* (COHA, Davis, 2010-). The analysis comprises, firstly, the frequency development of non-standard representations, particularly of the forms *gonna, wanna* and *gotta*, and secondly, the determinants of their variation with full forms and how these change over time.

The paper is structured as follows: Section 2 briefly introduces the constructional pattern of *to*-infinitive verb complements and presents a constructional view of *to*-contraction; this view provides a framework for questions regarding a contraction's status as a node in the network and connections between different contracted forms. Section 3 presents corpus data to outline the history of written representations of *to*-contraction; it shows that many forms appear as ad hoc phenomena, while only *gonna, gotta* and *wanna* gain wider currency. In Section 4,

the variations of *gonna, gotta* and *wanna* with their full forms are analyzed diachronically in scripted dialogue data. The results are discussed in Section 5, considering the place and function of the contractions in the system and how these change; this leads to a proposed scenario of an emerging analogical pattern. Section 6 concludes with some general points on nodes and links from a usage-based perspective.

2. *To*-infinitives and contractions

Complementation of verbs with a *to*-infinitive is frequent in English, and perhaps most prominent with so-called "semi-modals" such as *have to* V_{inf}, *be going to* V_{inf}, *used to* V_{inf} (cf. Biber et al., 1999, p. 484). While these items are highly idiomatic and grammaticalized, the general structural pattern V *to* V_{inf} constitutes a schematic construction (cf. Egan, 2008a, b).[2] The first V-slot of this construction can be filled by any verb of mental state, emotion or stance (*love, like, hate, prefer, expect*, etc.) or verbs that refer to the status of an activity in some other way (*begin, continue, cease, remember, attempt*, etc.). The semantic import of this construction is summarized by Egan (2008b, p. 99) as follows: "a situation, viewed as a whole, is profiled as the more/most likely of two or more alternatives in some specified domain." The "situation" is expressed by the *to*-infinitive verb phrase; the matrix verbs specifies the "domain", e.g. a projected future, a temporal restriction or the subject's disposition.[3] Thus, the V *to* V_{inf} construction has a modality-like meaning in a broad sense, as defined by Palmer (2001, p. 1): "[m]odality is concerned with the status of the proposition that describes the event". In V *to* V_{inf} the event is described by the infinitive verb phrase while the first (finite) verb contributes the modality. This certainly rings with Bolinger's (1980, p. 297) remark that "the moment a verb is given an infinitive complement, that verb starts down the road of auxiliariness". While the V *to* V_{inf} construction comprises items that are highly grammaticalized (*going to, have (got) to, used to*), it can also produce new types, for example with *fancy* and *dislike* (1–2; examples from COCA, Davies 2008-).

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2. The schema V *to* V_{inf} is not congruent with any *to*-infinitive – it is restricted to cases where the *to*-infinitive and the matrix verb share the same subject (cf. Egan, 2008b, p. 26), and also excludes purposive adjuncts as in *I'll run to get some milk*.

3. While one can subdivide this general meaning, e.g. into "forward-looking" and "general" (Egan, 2008b, p. 97), the purpose here is to demonstrate that a unified definition of the construction's semantics is possible (see Lorenz & Tizón-Couto, forthcoming, for a more detailed discussion). Note also that Egan (2008b, p. 96) explicitly includes matrix verbs such as *fail* and *forget* which encode "the non-realisation of an *expected* situation" (emphasis in original).

(1) *As the doctor had said, at her advanced age, why not give her whatever she* <u>*fancied to eat*</u>*?*   (COCA FIC: Bk: MurderSuspicion)

(2) *But for those who* <u>*dislike to join*</u> *larger parties, the self-guiding nature trails are admirable.*   (COCA MAG: NatlParks)

In some high-frequency types of the construction, the infinitive marker *to* may undergo contraction with the preceding verb. Formal discussions of *to*-contraction list forms such as *wanna, gonna, usta, hafta, gotta, oughta, supposta/ sposta, tryna, needa* (cf. Pullum, 1997; Krug, 2000, p. 211; Broadbent & Sifaki, 2013). A Construction Grammar approach has to ask what schematic relations pertain between full and contracted forms as well as between contractions. Is, say, *wanna* simply an instance of *want to*? Or do the contractions form a constructional schema of their own?

Boas (2004) offers an analysis of *wanna* as a "mini-construction", that is, "a specified lexical construction [...] that pairs a specific meaning [...] with a specific phonological and syntactic form" (p. 487). By this definition, *wanna* is a construction in its own right, a pairing of form and meaning. However, it is strongly tied to *want to*, from which it "inherits all of its linguistic specifications" (p. 485), that is, its semantics and syntactic context. The specific meaning associated with *wanna* is its pragmatic value of "colloquial style"; its phonological form is characterized by elision of /t/ and a final schwa (/wɒnə/ as opposed to /wɔnt tʊ/).

This analysis can plausibly be extended to other *to*-contractions such as *gonna, gotta*. They would then be instantiations of their respective full forms with the added feature of colloquialness. The relation between them would be one of taxonomic classification, in that they share membership in the V *to* V$_{inf}$ construction.

This raises three questions. Firstly, is the dependency of contractions on the full forms really as described, and is it the same for all of them (even if we include, say, *needa, usta* or perhaps *happenda*)? Secondly, given the similarity in form (lenited or deleted /t/, final schwa) between the contractions, should we assume direct, horizontal links between them? Thirdly, if we postulate horizontal links, are these just accidental connections or do they constitute a schema (and again, would this schema extend to less common forms like *needa* or *happenda*)? These questions will be addressed on the diachronic dimension. Thus, we need to consider whether (and which) contractions over time come to serve as lexical variants rather than inheriting their features from the full forms. That is, does the status of *wanna* shift from "mini-construction" to an allostruction of *want to*? Crucially, as these contractions are historically young, we can observe what kinds of horizontal links or schematic patterns emerge between them as they become parts of the network.

These diachronic research objectives concern gradual shifts of conventions in a speech community: the gradual emergence of categories, and the gradual

strengthening or weakening of connections between items. The study presented here is based on the assumption that constructional links, and in particular their degree of entrenchment and conventionality, are reflected in usage patterns. They can be identified and measured by studying frequencies and variational constraints in corpora. Other cases of contraction have been convincingly analyzed in this vein, by taking increasing frequency as an indicator of an emerging constructional node, whose divergence from the source form then shows in diverging usage preferences (Nesselhauf, 2014, on *'ll*; Daugs, forthcoming, on *can't, won't* and *'d*). Therefore, the present paper takes a quantitative, corpus-based approach; it examines the frequency development of *to*-contractions in American English, and focuses on the variation of contractions and full forms in the 20th century.

3. Corpus study 1: The history of non-conventional *to*-contraction

The history of *to*-contraction begins in the mid-1800s. At that time, various spellings are used in American fiction writing to convey a reduced pronunciation of *to* in V *to* V_{inf} sequences. A relatively common early form is *ter*, as in Examples (3)–(6). These non-standard spellings typically represent the slang of uneducated speakers.[4]

(3) *[…] he'll have a berth good as any nigger <u>ought ter</u> ask for.*
                                 (Stowe, H. B. (1852). *Uncle Tom's Cabin*)

(4) *[…] but I've seen Mas'r, and I <u>begin ter</u> feel sort o' reconciled to the Lord's will now.*   (Stowe, H. B. (1852). *Uncle Tom's Cabin*)

(5) *"What be wantin' now, lads?" he cried, gruffly; "we be in a hurry to get off!" "But you must wait a few minutes," said Ned, "for we want to come aboard, skipper. We can't run a mile for nothing, and before breakfast too." "S'pose I shall <u>hev ter</u>!" grumbled Ben,*   (Gaylord, G. (1867). *Culm Rock*)

(6) *I ain't <u>goin' ter</u> rest, nor ter give yaou' n yer father no rest nuther, till yer find aout what all this yere means.*   (Dillaye, I. (1887). *Ramona*)

The Corpus of Historical American English (COHA, Davies, 2010-) was used to find such instances of *to*-reduction. Searches were carried out for the spellings *ter, ta, tuh, tu, te, de* and *a* (as a separate word or attached to the preceding word) in V *to* V_{inf} constructions, i.e. preceded by a verb and followed by an infinitive

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4. In the examples, the speakers are: a slave trader described as "a low man who is trying to elbow his way upward in the world" (3); a black slave (4); a skipper of a trade boat (5); an elderly Southern woman (6).

verb or a sentence boundary (as in (5)). Some of these forms are illustrated in Examples (7)–(8). Additional searches concerned specific forms such as *gawn* (for *going to* (9)), *hadda, haffa* (for *have to* (10)), *tryna* (for *trying to* (11)). The search procedure included manual inspection of potential tokens through the keyword-in-context output.

(7) *I just saved fifteen thousand I was <u>gonta</u> throw' way like sand in a rathole.*
<div align="right">(COHA Play:WitchingHour (1907))</div>

(8) *Yuh been good to me, an' I'd <u>hate tuh</u> know anything happened.*
<div align="right">(COHA Fic: ChumsInDixie (1912))</div>

(9) *Oho ho, Mr. Junior! Know what? He <u>gawn</u> shoot us! Shoot us!*
<div align="right">(COHA Fic: GoldenApples (1949))</div>

(10) *You cumm home now, liddle cogsugger worm. Or me god <u>haffa</u> punish you….*
<div align="right">(COHA Mov: Cell (2000))</div>

(11) *They're <u>tryna</u> marry you, son*   (COHA Fic: ThirdGeneration (1954))

Note that this data set does not include the variants *gonna, wanna* and *gotta* – these will be treated separately due to their special development. The data for non-standard forms of V *to* V_{inf} comprise 4132 tokens of 64 different matrix verbs. 97% of these are from the "fiction" section. 83.7% are forms in which <t> is still present, suggesting a reduction of only the final vowel, while 16.3% also omit <t> (see Examples (9)–(11)) above). The frequency development of the non-conventional spellings is presented in Figure 1, measured in tokens per 1 million words per decade.

The peak in the 1880s is especially due to two books (out of forty-seven) from that decade, *Bricks Without Straw* (Albion W. Tourgee, 1880) and *Nights With Uncle Remus* (Joel Chandler Harris, 1883), which make heavy use of slang by non-standard spellings and which together contribute 59% of the data in this decade. It may therefore be in part an artifact of corpus composition. Even if this was smoothened out, the curve can be described as an initial increase over the 19th century and stabilization at a slightly lower level in the 1900s. Thus, non-standard representations of *to*-reduction (beside *gonna, wanna, gotta*) have a continuing presence in American English writing. They are not restricted to a particular set of items, occurring with 64 different verbs overall. It is interesting, then, to see which verbs take such reduced *to*-complements at what time. The most frequent verbs in the set overall are *ought* (22.9%), *going* (21.1%), *want* (21.0%), *have* (9.7%), *got* (4.6%), *used* (4.0%) and *try(ing)* (3.9%). Figure 2 shows the developments of the three most frequent types.

'to'-reduction in 'V to Vinf'
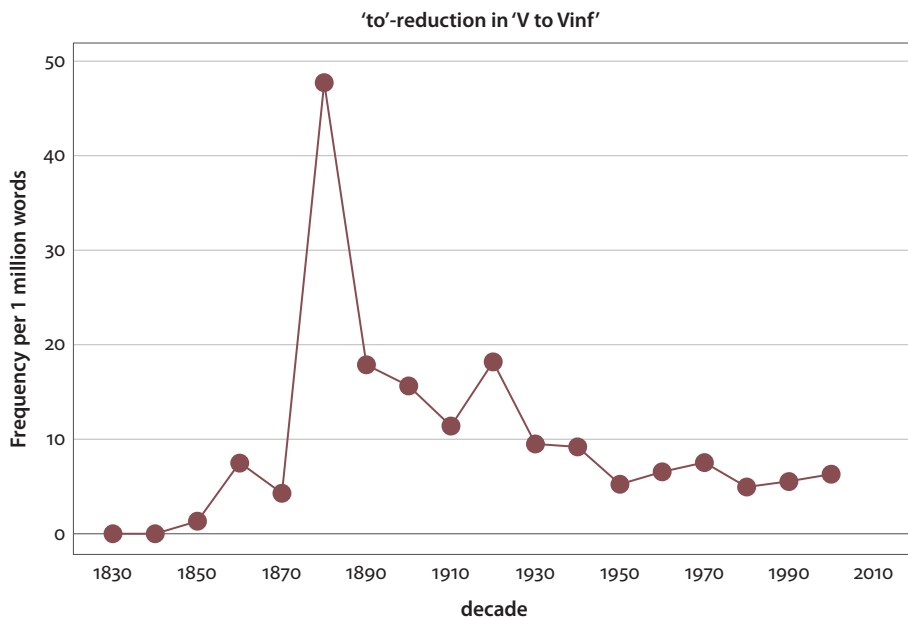
Figure 1. Frequency of non-conventional *to*-reduction in writing
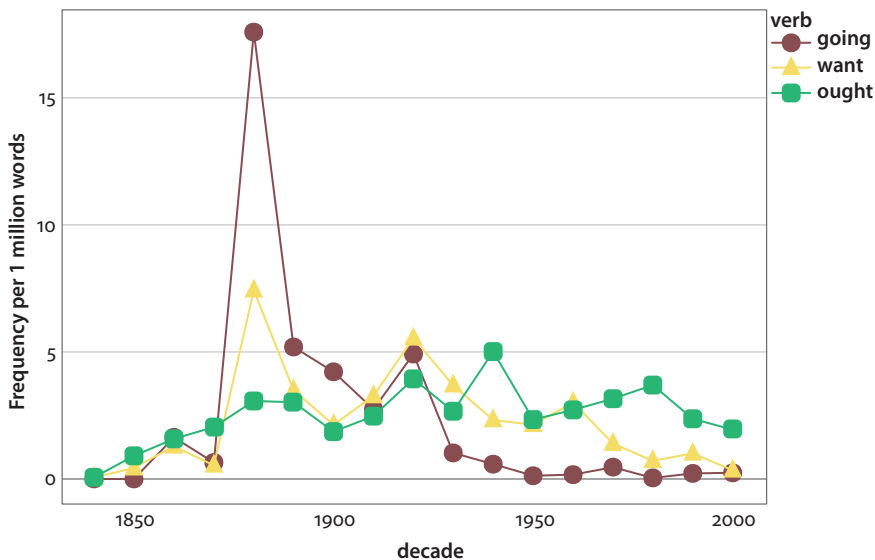
Figure 2. Frequencies of non-conventional *to*-reduction with *going, want* and *ought*

In the 19th century, *going, want* and *ought* all feature prominently with reduced forms of *to*. The share of *going* declines in the early 1900s, *want* follows about thirty years later – recall that this decline concerns forms like *goin ter, gwine ter, want ter* and *wanta*. Adding the forms *gonna* and *wanna* – see Figure 3 – we see

that their rise is concomitant with the decline of the other forms. Beginning to increase around 1910, the frequency of *gonna, wanna* and *gotta* soon eclipses that of all other representations of *to*-reduction. Thus, from the beginning of the 20th century, these specific forms not only replace forms like *goin' ter, want ter/wanta* or *got ter*, but take a frequency development that goes far beyond replacement. For *ought*, the frequency of reduced variants remains stable (Figure 2), but neither *ought ter* nor *oughta* follows the upward trend of *gonna/wanna/gotta*.
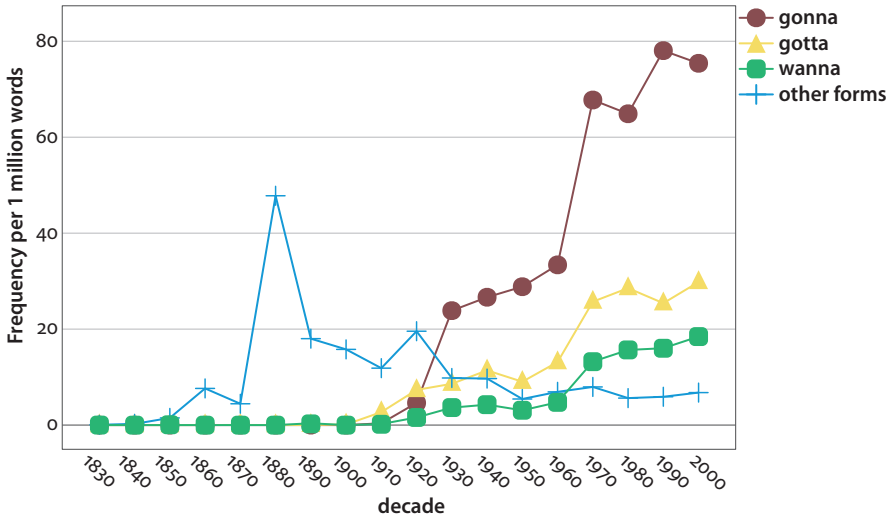
Figure 3. Frequencies of *gonna, wanna* and *gotta* compared to other forms of *to*-reduction

What this shows is that for three semi-modal items – *going to, want to* and *got to* – a specific contracted variant has crystallized from the fray of non-standard forms. This is not observed for any other type of the V *to* V_{inf} construction, although candidates would have been available. The stalled development of *oughta*, for example, may be due to the overall decline of *ought to* (cf. Mair & Leech, 2006, p. 327); in terms of relative frequency (reduced forms vs. full form), the share of *oughta* does increase, quite possibly in analogy to *gotta* and *gonna*. However, the development in absolute frequency of occurrence does not speak for the entrenchment and diffusion of *oughta* as an item. In the 1940s, *oughta* has a frequency of 4.35 tokens per million, *wanna* has 4.27 per million at that time. By the 2000s, occurrence of *wanna* has increased to 18.47 per million, while *oughta* is at 1.59 per million. It looks as though around the 1960s or 1970s, *wanna* joins the ranks of *gonna* and *gotta* as a conventional(izing) item; apparently, *oughta* has missed that boat.

All this says nothing yet about the variation of reduced and full forms, which is of particular interest in the case of reduced forms that clearly take a hold in

usage, i.e. *gonna, gotta* and *wanna*. The remainder of this paper is concerned with changes regarding these three items and their full forms in the 20th century, that is, the variations *going to* vs *gonna, got to* vs *gotta* and *want to* vs *wanna*.

4.   Corpus study 2: Determinants of variation of contracted and full forms in the 20th century

Reduced forms and contractions are obviously rooted in spoken language; their non-canonical representations in writing are typically used in direct speech. The analysis to follow therefore focuses on the most speech-like genres available in the COHA corpus, i.e. source texts labeled as "Drama" and "Movie" from the subcorpus "Fiction". These genres comprise stage plays and movie scripts, that is, scripted dialogue, and fall into the category that Culpeper and Kytö (2010, p. 17) label "speech-purposed": writing that "strive[s], at least in part, to be mimetic of spoken interaction". For the relevant time span, 1910–2005, the COHA provides 11 million words of Drama (i.e. stage plays) and 6.2 million from movie scripts. From this subcorpus all tokens of *going to, gonna, got to, gotta, want to*, and *wanna* that instantiate a semi-modal use were extracted.[5] The resulting data set comprises 35,545 tokens.[6]

There is a striking increase in use of the contracted forms between 1960 and 1970, as already visible in Figure 3 above (which includes the entire corpus rather than the speech-purposed subset). This shows also in the relative frequencies in the Drama and Movie data as a simultaneous upsurge of all three contractions in the 1960s, and rather little increase before or after. The relative frequencies per decade are presented in Figure 4.

We may speculate as to why there is such a drastic change at that particular time. Certainly, the 1960s were a time of breaking with old conventions on many levels, and this may have helped promote more vernacular styles in theater and movie productions, as well as perhaps a less rigid editing of vernacular forms. Freudinger (2017) finds a rapid increase of the forms *shoulda, coulda, woulda* in the COHA corpus at around the same time; this may suggest a general push for colloquialization, i.e. "the tendency for written language to adopt features associated

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5. Since the focus is on the variation of full forms and contractions, the specific properties of each construction are not given special consideration (e.g. the presence or absence of auxiliary HAVE with *got to/gotta*, cf. Mair, 2014); the inflected forms *wants to* and *wanted to* are not in variation with *wanna* and therefore not included.

6. This data set is an updated and cleaned-up version of the data reported in Lorenz (2013, p. 116ff).
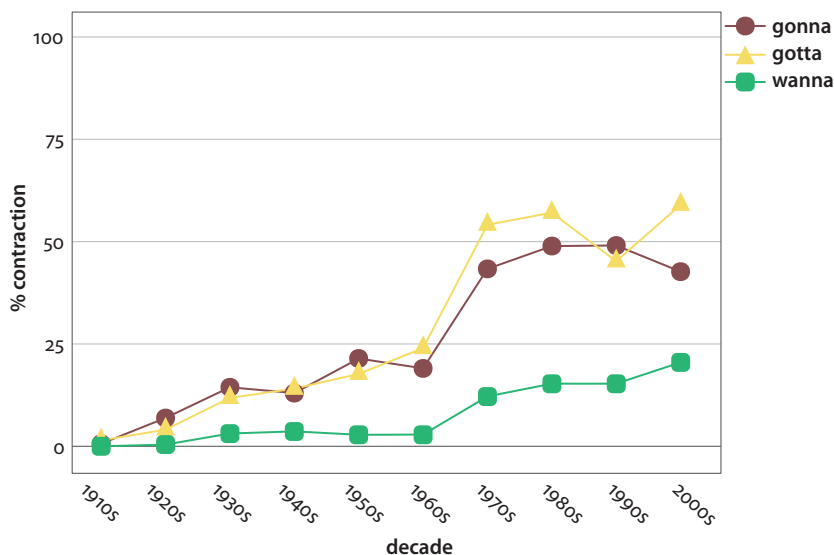
Figure 4. Share of contractions in scripted dialogue in COHA

with spoken language" (Mair & Leech, 2006, p. 336), in the 1960s/1970s. It should be noted, however, that the contractions' rise is not merely at the expense of the respective full forms – the full forms' absolute frequencies remain largely stable throughout the century (see Lorenz, 2013, p. 123–129 for detail). This independent development can be seen as an indication of the contractions' advancing emancipation from the full forms.

It may thus be expected that this frequency shift comes with changes in the constructional representation of the contractions. In order to assess this, the data are divided into two time periods – an "early" period 1910–1969 and a "late" period 1970–2005.[7]

The overall share of the contracted variants in the time from 1910 to 1969 is 9.2% compared to 36.4% in the time since 1970. Table 1 summarizes the data for each variation by time period.

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7. This split into two time periods is also obtained by variability-based neighbor clustering (Gries & Hilpert, 2008) of the frequencies (cf. Lorenz, 2013, p. 119). It is obvious that some detail gets lost by treating "time" as a categorical rather than continuous variable. The advantage is that the time periods can be compared more easily and do not require linear effects for statistical modeling.

Table 1. Variation of full forms and *to*-contraction in the 20th century

	'early' (1910–1969)	% contraction	'late' (1970–2005)	% contraction
going to	7,577	12.99%	4,376	46.35%
gonna	1,131		3,780	
got to	3,047	12.32%	1,224	53.62%
gotta	428		1,415	
want to	6,395	2.35%	5,091	15.40%
wanna	154		927	
Total	**18,732**	**9.14%**	**16,813**	**36.41%**

4.1   Determinants of variation

Given the increasing use of three contracted forms – *gonna, gotta, wanna* – in written representations of spoken language, we will now consider how their usage is in variation with that of the full forms. Contracted forms are more colloquial and rooted in spoken language and articulatory reduction, the full forms represent the more established, neutral variant. With this in mind, the alternations are analyzed along two strata. These are the degree of entrenchment of the contractions on the one hand, and their degree of conventionalization on the other, to be understood broadly in the sense of Schmid (2015).[8] If a contracted form emerges as a node in the system, the development is twofold.

There is, firstly, a cognitive-systemic level: what kinds of variants are there in the abstract mental representation of linguistic items? In speech, deviant phonetic forms can occur any time by accident, reduced pronunciation variants can be chosen (and recognized), and lexical variants are available even when no reduction is warranted. In written (even written-to-be-spoken) material, we must assume that whatever we find is at least a conscious rendering of a distinct pronunciation variant (including accent features of a character). The question then is whether, e.g., *wanna* is represented as a reduction of *want to* or as an independent item. This is, of course, not evident from corpus data but can be inferred indirectly by examining whether contractions rather occur in contexts where reductions can be expected (thus being treated as reduced pronunciation variants) or also in

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8. Schmid (2015, p. 10) defines entrenchment as a "continuous routinization and re-organization of associations, depending on exposure to and frequency of identical or similar processing events, subject to the exigencies of the social environment"; the definition of conventionalization is "the continuous mutual coordination and matching of communicative knowledge and practices, subject to the exigencies of the entrenchment processes taking place in individual minds".

contexts where that is not the case (thus being treated as lexical variants). I will call this level the degree of entrenchment.

Secondly, there is a socio-pragmatic level: as contractions become more common, how is their use determined by colloquial features of the context, genre and register (cf. Schmid, 2015, p. 18)? These features give evidence of the communicative function of a contracted variant, to what extent it indexes non-standard speech styles, slang or colloquialness. This level gauges the conventionalization of contracted items.

Perhaps these two dimensions cannot be neatly separated, neither conceptually nor empirically. However, they are not equivalent, and they provide useful coordinates for analyzing the variations at hand. Both entrenchment and conventionalization are gradient and cannot be measured precisely, but both can be approximated by looking at a set of factors that relate to them.

4.1.1   *Variables measuring the degree of entrenchment*

As explicated above, the degree of entrenchment does not show directly in corpus data. It is approximated here by three variables that indicate to what extent a contraction is used as a reduced sub-variant or an independent item. These are sentence type, ellipsis and sentence length.

Sentence type.   Different expressions of modality in English have previously been found to show preferences for different sentence types (Jankowski, 2004, p. 91; Tagliamonte & D'Arcy, 2007, p. 61f.; Torres Cacoullos & Walker, 2009, p. 343ff.). Three sentence types are distinguished here: "affirmative", "question" and "negative". Reduced forms are often initially favored by fixed rhetorical patterns, which may lead to preferences regarding sentence type. It is to be expected that highly entrenched items are less restricted in their grammatical context.

Ellipsis.   Another aspect of the linguistic co-text that may have an influence is ellipsis of the following verb. The variants may occur at the end of a phrase, with the V_{inf} complement omitted, as in (Examples 12a–b).

(12)   a.   *It's a free country. I can eat pizza if I <u>want to.</u>*   (COHA Play: YellowEyes)
        b.   *You mean you can't or you mean you don't <u>wanna?</u>*

(COHA Mov: Footloose)

In speech, phonetic reduction is known to be less likely at phrase ends or before pauses (cf. Bell et al., 2003). Therefore, contraction should be disfavored in this context if it is phonetically motivated, but equally likely if it is an entrenched lexical choice.

Sentence length.   Sentence length is used as a measure of complexity, with longer sentences representing more complex structures. According to Rohdenburg's

(1996, p. 149) "complexity principle", "more explicit grammatical alternatives tend to be preferred in cognitively more complex environments", a hypothesis that has since been shown to hold in various cases (e.g. Mondorf, 2009; Kaatari, 2016; and see the list in Rohdenburg, 2016, p. 464). If contractions are perceived as reduced forms, they are less explicit variants and expected to occur in less complex environments (i.e. shorter sentences). This effect will not hold if there are alternatives at an equal level. Sentence length is measured by the number of words in a sentence, and implemented as a relative score by z-standardization, by type and time period.[9] It should be noted that sentence length (and complexity) may also correlate with the level of formality of an utterance; it could then be seen as a measure of conventionalization as well as entrenchment. While I will continue to apply the entrenchment perspective, it will be seen that both interpretations are possible.

4.1.2 *Variables measuring the degree of conventionalization*

The degree of conventionalization, i.e. the admittance of contractions into more standard-like or more formal contexts, is measured by two variables regarding register and genre.

Register: Latin-based collocate. In the present data, there is no direct way of deriving factors such as the speech situation or the characters' social relations. An indirect measure of register is therefore employed, based on the assumption that words of Latinate origin tend to indicate a more elevated or formal register than words with Germanic roots. An item was coded as "Latin" if the verb following the target item contains a Latinate affix such as *de-, dis-, in-, -ify, -ize*, etc. (Examples 13a–b). If the following word is *be*, this was extended to the next word, in order to also capture passives and predicative adjectives (Example 14).

(13) a. *Excuse me, but are we <u>going to discuss</u> my paper? And the department?*
                                        (COHA Play: GirlWonder)
     b. *Nobody <u>gonna rehabilitate</u> you! You rehabilitate yourself, y'understand?*
                                        (COHA Play: BabesInBighouse)

(14) *I'm holding an office given me by my fellow citizens – and it's <u>got to be respected</u>.*   (COHA Play: JustRemindYou)

Genre: Movie vs Drama. Since the data are extracted from both movie scripts and stage plays, this distinction is also taken up as a factor. It may be assumed that movies aim to represent spoken language more faithfully, while stage plays are constrained by the setting for which they are intended, i.e. live performances

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9. Drama and movie scripts in COHA are marked by relatively shorter sentences than other genres (Rudnicka, 2018). The mean sentence length in the present data set is 10.17 words.

in a theater. Moreover, the focus in movie production is on the audiovisual product (the movie), whereas for stage plays it is usually the written text that will be published and distributed. Thus, the category "Movie" can be considered the more colloquial genre, that is, more open to features of casual speech than "Drama".

4.1.3   *Variables relating to both entrenchment and conventionalization*

As entrenchment and conventionalization cannot be completely separated empirically, two variables – "attraction" and grammatical subject – are taken as potential indicators of both.

Attraction.   "Attraction" is an association measure that simply denotes the relative frequency of a given collexeme in a construction (cf. Schmid, 2000, p. 54).[10] For the present purpose, the construction is one of the three types (*going to, got to, want to*), irrespective of whether the full or contracted form is used. The collexeme is the verb in the V_{inf} slot. Since lexical frequencies may change over time, attraction is measured separately in the two time periods. As highly frequent contexts facilitate reduction, a high attraction value would favor contractions if they are used as weakly entrenched reduced forms. It will be seen, however, that this measure also captures cooccurrence with low-frequency specialized vocabulary, which relates to conventionalization.

Linguistic context: Subject.   The grammatical subject can serve as a proxy for the type of modality expressed by a modal item (cf. Jankowski, 2004; Poplack & Malvar, 2007; Torres Cacoullos & Walker, 2009), assuming that third person subjects tend to correlate with epistemic modality, and first and second person subjects with root modality (cf. Larreya, 2009). In particular, motivations internal to the subject, such as volition and intention, are most likely to be present with first person subjects (cf. Torres Cacoullos & Walker, 2009, p. 331f.). Subject types can therefore indicate whether a contraction specializes on a specific function. The factor is implemented as "1st person", "2nd person", "3rd person", and a category "omitted" for sentences in which the grammatical subject is not overtly present (Example 15).

(15)   *He's been betting his head from the gun. <u>Gotta</u> have kings.*

(COHA Mov: CoolHandLuke)

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10. Collostructional attraction has been operationalized in various ways (see Levshina, 2016, p. 244ff. and Gries, 2015, p. 94ff. for overviews). The "attraction as relative frequency" method employed here is not balanced against the verbs' absolute frequencies, that is, verbs that are highly frequent overall will also show strong attraction to *going to, got to* and *want to*. Thus, it measures whether, for example, contractions are more likely in highly frequent sequences (since such sequences promote reduction in speech).

As subject omission is a feature of colloquial speech and non-conventional in writing, this level relates to the item's degree of conventionalization.

4.2 Modeling the data

In order to assess how the constructions are connected and how the constructional network changes, we need to analyze the data for: (1) the pattern of variation in each pair of full form and contraction; (2) how these patterns differ between the pairs; (3) how these patterns change over time; and (4) how the differences between the pairs change over time.

To this end, the data are analyzed with a deductive logistic regression model with "variant" (full form vs contraction) as the dependent variable.[11] The independent variables are the factors listed above, and "time" and "type" are moderator variables; "time" refers to the two time periods, and "type" to the three variational pairs (*going to/gonna, got to/gotta, want to/wanna*). This means that interactions with each of these variables are tested, as well as the three-way-interactions with both of them. The methodological details of this approach are not the primary focus of this paper – for other examples of operationalizing change as interaction with time, see Hinrichs and Szmrecsanyi (2007), Wolk et al. (2013), Rosemeyer (2016). The relevant motivation is that it provides a measure for all the points in (1) – (4) above: the effect of each factor of variation, its difference across types, its change across time periods, and the change in the differences. Thus, the variational patterns, their differences and changes can be quantified.

4.3 Results

The logistic regression model is kept "maximal", including all the variables listed above as well as all interactions with "time" and "type". This model provides an estimate of each effect and its variance, including the interactions. Non-significant interaction effects are of interest as they indicate similarity between constructions (variable "type") or stability over time (variable "time"). The model's accuracy is high ($C = .803$, $D_{xy} = .605$) and it passes model criticism.[12]

The results will here be presented selectively by the estimates of the most relevant effects. The complete logistic regression model can be found in the

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11. The R package "rms" (Harrell, 2017) was used to fit the model as well as for the validation tests.

12. Hosmer-Lemeshow-Cessie goodness of fit test: $z = .786$, $p = .432$; no signs of problematic multicollinearity (variance inflation factors < 4); optimism through overfitting is small (corrected Dxy = .599, optimism = .0039 in model validation by resampling (backward, 100 trials)).

Appendix. The effect plots in Figures 5 and 6 present the effect estimates derived from the model coefficients.[13] They are to be read as follows. The effects in the early period are shown on the left, those in the late period are on the right of each graph. The points mark the coefficients (as labeled on the y-axis); values above the zero line indicate a favoring effect for contraction, values below zero indicate a disfavoring effect. The error bars (95% confidence intervals) show the reliability of effects. When the error bar crosses zero, the effect is deemed statistically non-significant but may nonetheless be of interest; likewise, differences are statistically non-significant if one point (coefficient) is within the range of the other's error bar (confidence interval). Thus, the graphs visualize the strength of each individual effect, the differences within each time period, and the changes from the "early" to the "late" period.

Figure 5 shows the results for the three variables measuring the contractions' degree of entrenchment: the effects of increasing sentence length (upper left-hand panel), of ellipsis of V_{inf} (upper right-hand panel), and of sentence type (negative, lower left panel; interrogative, lower right panel).

Longer sentences (i.e. more complex environments) are associated with the full forms in the early period. This effect is significantly stronger on *wanna*, while it doesn't hold for *gotta*. In the late period, the disfavoring of contractions in longer sentences is mitigated and, importantly, the differences between the types become smaller. With respect to the "complexity principle" (Rohdenburg, 1996), this means that at least *gonna* and *wanna* are initially perceived as less explicit than their full forms, and therefore avoided in complex structures (i.e. long sentences). This tendency decreases, which suggests that their status as less explicit variants is changing. Moreover, while at first the strength of the effect of complexity differs widely between the items, these differences become much smaller as the contractions become more established.

Ellipsis of the infinitive verb correlates with a lower contraction rate in the early period. This effect seems to be weaker on *want to* but the difference is not statistically significant. Towards the late period, the effect disappears in both *going to* and *got to*, such that contractions are no longer disfavored at the end of a phrase (and even slightly favored for *going to*). Thus, the contracted forms spread into the syntactically more demanding context of "stranding". However, *wanna* takes the opposite direction and becomes clearly disfavored in these contexts.[14]

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13. In the model, the main effects refer to *gonna* in the early period, the interaction effects indicate the respective differences from that. The estimates in the graphs are arrived at by adding up the relevant coefficients (of main and interaction effects).

14. It is possible that the share of *wanna* is undermined by the third option of omitting *to*: *You can eat pizza if you want to/wanna/want.*
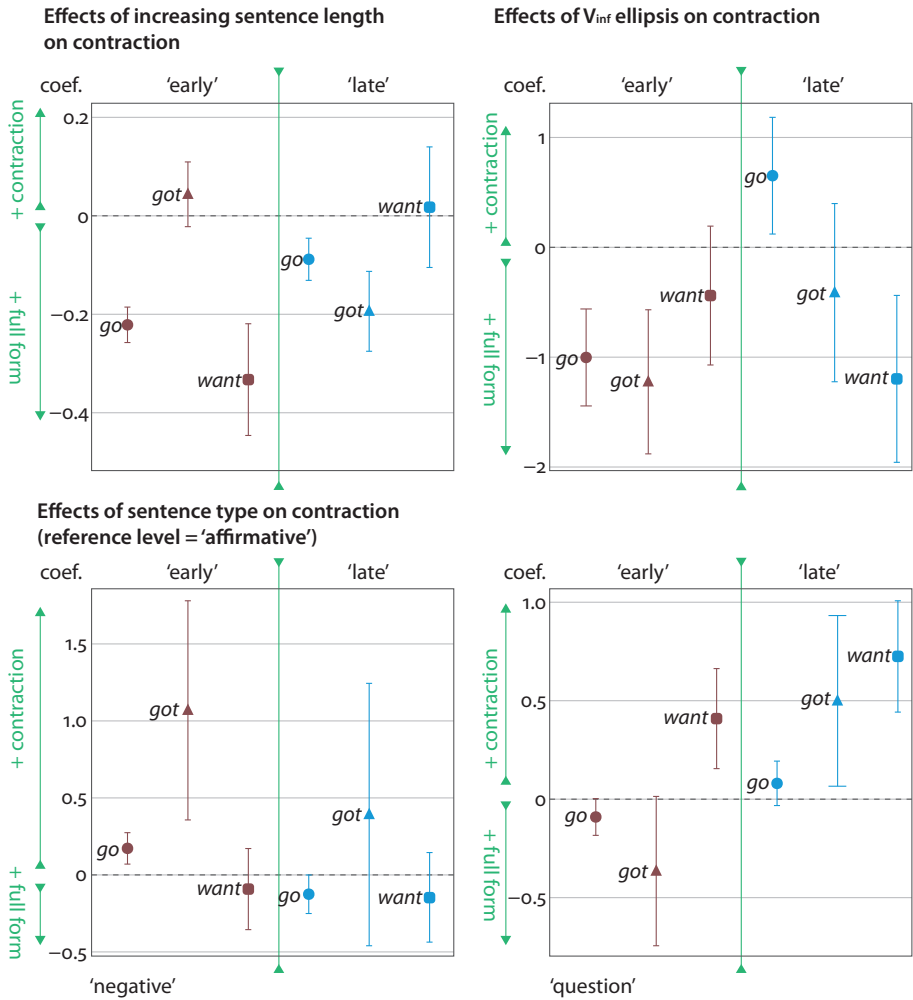
Figure 5. Estimated effects relating to degree of entrenchment

Less is to be made of the occurrence in different sentence types. A slight favoring effect of *gonna* and *gotta* in negative sentences subsides in the late period (although negation with *got to/gotta* is too rare to detect any reliable trends (*n* = 35)). Questions don't show any clear effect with either *going to* or *got to*, but favor *wanna* throughout.

Turning now to the factors that relate to the contractions' degree of conventionalization, Figure 6 summarizes the effects of genre, Latinate collocates, subject omission and collocational attraction.

Regarding genre, the contractions clearly have a wider currency in movie scripts than in stage plays. This effect is initially much stronger on *wanna* and
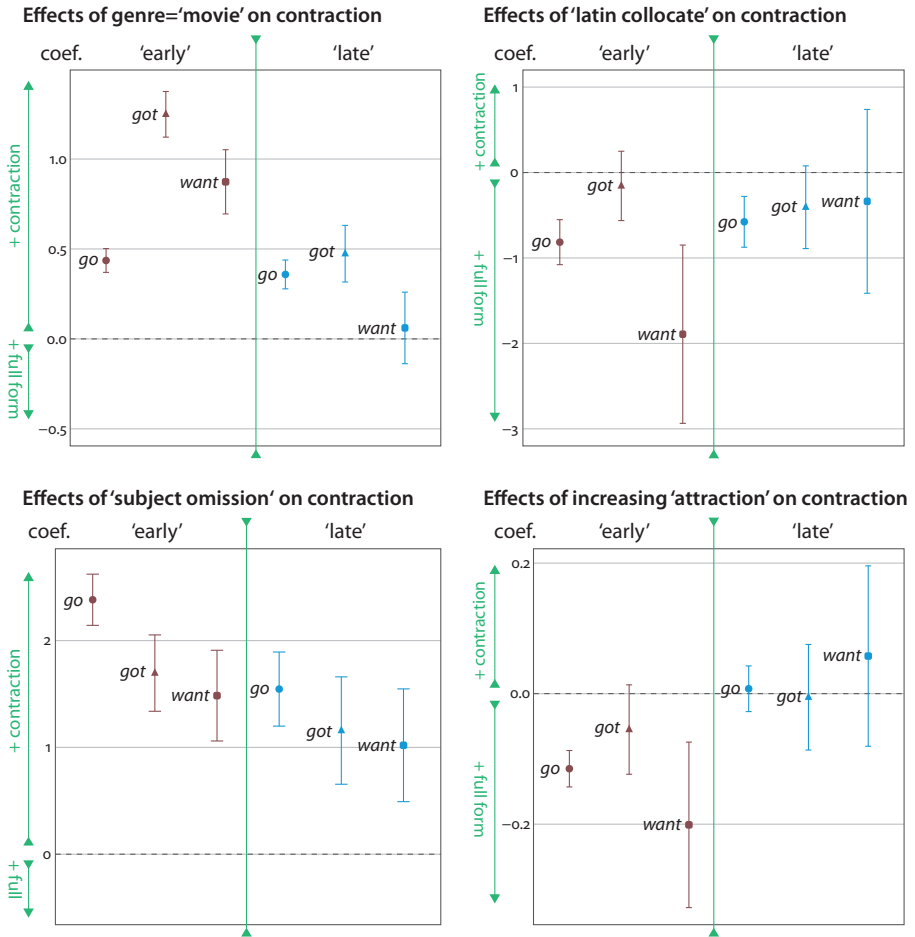
Figure 6. Estimated effects relating to degree of conventionalization

gotta, but these differences are leveled out over time. The general preference still holds in the late period, but its strength has become equal across items.

The contractions are disfavored with Latinate collocates, that is, by proxy, in more formal registers. While this effect is never very strong, it abides in the late period. None of the differences between types are statistically significant, however, to the extent that there are differences, these are decreasing. Thus, the contractions are associated with less formal registers, and the strength of this association is increasingly the same across items.

In contexts of subject omission, all three contractions are favored throughout, though the effect recedes over time. In the early period it is also markedly stronger with *gonna*, and this difference is leveled out in the late period. The contractions

thus remain associated with other spoken-language features, with the differences between them decreasing.

Attraction shows a negative effect on contraction in the early period, that is, contracted forms are disfavored with frequent collexemes. This appears to be due to the occurrence of relatively many rare verbs with the contractions, which are often representations of slang or non-standard pronunciation (see Examples (16a–b). In the late period, this effect no longer holds. Thus, if the slang usage of contractions is the correct explanation, then the change shows that the contractions have lost this connotation over time. Moreover, the effect of attraction on the three types becomes more similar (though the differences do not reach statistical significance even in the early period).

(16) a. *if I don't get some air, I'm <u>gonna flake out</u>*. (COHA Mov: FrenchLineThe)
      b. *But foist I'm <u>gonna ketch</u> de guy who snitched*.   (COHA Play: DeadEnd)

In sum, the factors affecting the use of contractions are diverse and change in different ways. There is no straightforward general direction of change, but a broad tendency towards increasing similarity of effects can be discerned (yet not without exceptions). The findings are discussed from a constructional perspective in the next section.

5.   Discussion

The variables in this study have been employed to measure the relation between a full and a contracted form. Some of these refer to the status of contraction as reduced form and its degree of entrenchment: is the shorter form avoided in positions where reduction would not usually occur (here, at the end of a phrase), is it treated as less explicit than the full form (here, occurring in shorter sentences), is it tied to certain sequences (subject) or frequent collocations (attraction)? Others refer to the contractions' status in usage and their degree of conventionalization: are they associated with features of colloquial speech (subject omission, non-standard verbs with a low attraction value), are they restricted by register or style choices (Latin collocate) or by the wider usage context (genre)?

The regression model provided measures of how the relation to the full form differs between different contractions, and how these relations changed over time. Some general trends could be observed. Where there are effects that point to the status of contractions as phonetic reduction, these tend to recede. In particular, the contractions gain in perceived explicitness (as shown by the variable "sentence length") and functional and contextual versatility (especially occurrence at the end of a phrase, but also sentence and subject type). These results show that the

contractions' entrenchment as nodes in the network has been strengthened, and their hierarchical relation to the respective full form has been weakened. Some differences remain, however. The trend is clearest with *gonna*, while especially *gotta* shows some diverging developments (on sentence length and with 3rd person subjects [see Appendix]).

Effects related to register, style and context mostly remain present in the late period, albeit on a lower level (with the exception of "attraction", whose effect is completely leveled). It seems that the contractions are no longer used to indicate the slang or accent of specific speakers, but instead as markers of a generally informal speech register.

Moreover, for all the variables that we can associate with register or style choices, the effects on contraction rates become very similar, not just in terms of favoring or disfavoring the contraction, but in terms of strength of the effect. (Note that this holds also for "sentence length", if it is to be interpreted as an indicator of formality.) This indicates that the degree of informality and colloquialness associated with, e.g., *wanna* as opposed to *want to*, has come to be matched with that of *gonna* as opposed to *going to*. There appears to be an emerging analogy between the usage strategies of *gonna, gotta* and *wanna*. The variations are converging.

It should be noted also that the individual changes are not parallel. As an example of parallel changes, Hilpert (2013, p. 87ff.) observes that the possessive pronouns *mine/my* and *thine/thy* undergo similar developments from Middle English to Early Modern English and concludes that they "belong to the same overarching construction throughout the observed time span" (p. 109). The present case appears to be different. The shift towards contracted forms is not general to the V *to* V$_{inf}$ construction but restricted to three specific forms; and these forms, *gonna, gotta, wanna*, show different usage preferences from each other in the beginning, which change in different ways. The outcome of these changes, however, is a greater similarity of usage patterns. Thus, while we cannot posit a "contraction construction" in the early twentieth century, the contracted items increasingly converge to a constructional pattern.

5.1 Contractions in the constructional network and the emergence of horizontal links

If we want to sketch the empirical findings in terms of a constructional network, I argue that the result is not a simple constructional change, and not merely the appearance of a new category. Instead, we observe a continuous reconfiguration of nodes and links. I propose that it proceeds through the diachronic stages sketched in Figure 7. The development consists of several gradual, interrelated processes:

- The forms *gonna, gotta* and *wanna* become frequent to a degree that is not found in other forms of *to*-reduction; this emancipates them from their source forms (cf. Lorenz, 2013), i.e. they are perceived as separate items rather than phonetically reduced variants of *going to / want to / got to*. This is a "construction split" (Karlsson, 2018), in that the contracted forms have split off from their parent constructions and appear as nodes in the network.[15] This is symbolized in Figure 7 by boxes for the nodes and the change from "pronunciation variant" to "lexical variant".
- With this, they start forming an abstract pattern based on their functional and phonetic similarity (symbolized by the line around them). This is schema extraction in a broad sense: "the commonality inherent in multiple experiences is reinforced and attains some kind of cognitive status" (Langacker, 2000, p. 7). The crucial aspect is the increasing association strength between the contracted forms rather than whether or at what point there is a distinct "contraction construction".
- As contraction and full form are in variation, their relation is increasingly systematic and decreasingly hierarchical (symbolized by the diagonal two-way arrows in stage III).

The emerging pattern of contractions is tied into the network of related constructions, such that the variations between contraction and full form become consistent across items (symbolized by the horizontal arrows at stage III, which now connect pairs of constructions rather than individual nodes). This analogy between variational patterns is seen especially in a semantic-pragmatic aspect, namely the degree and the way in which the contractions express colloquialness relative to the full forms. There is, then, a link not just between items but between variational pairs.

Connections that occur at levels other than individual nodes in the network have rarely been considered in Construction Grammar; for the present volume, Smirnova and Sommerer (this volume, p. 3) posit the question of how to model "the reconfiguration of node-external linking" (Question 5). In the case presented here, the schema that emerges from the converging variations fits the description of a "metaconstruction" (Leino & Östman, 2005). A metaconstruction is a generalization over relations between constructions, such that, in Figure 8, "*construction i* and *construction ii* are in the same kind of relationship to each other as are *construction iii* and *construction iv*, and the same holds for *construction v* and

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15. "Split" and "appearance" may sound like abrupt changes, but the developments are decidedly gradual; Karlsson (2018, p. 305) defines "construction split" as "a pragmatics-driven gradual development involving reinterpretation, accumulation of discourse exemplars, and gradual activation of novel constructions, with no singular event of reanalysis of covert structures".

Stage I: 19th century

schematic

$$\boxed{\text{V } \textit{to } \text{V}_{\text{inf}}}$$

specific

$$\boxed{\text{BE } \textit{going to } \text{V}_{\text{inf}}} \quad \boxed{\textit{want to } \text{V}_{\text{inf}}} \quad \boxed{\text{(HAVE) } \textit{got to } \text{V}_{\text{inf}}} \quad \boxed{...}$$
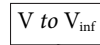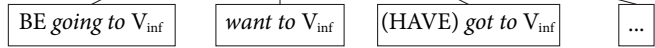
pronunciation variants   [gʊnə]   [wʊnə]   [gʊɾə]
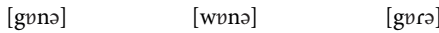
Stage II: Early 20th century

schematic

$$\boxed{\text{V } \textit{to } \text{V}_{\text{inf}}}$$

specific

$$\boxed{\text{BE } \textit{going to } \text{V}_{\text{inf}}} \quad \boxed{\textit{want to } \text{V}_{\text{inf}}} \quad \boxed{\text{(HAVE) } \textit{got to } \text{V}_{\text{inf}}}$$
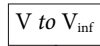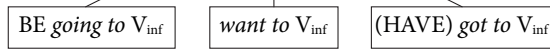
(pronunciation) variants   /gʊnə/ ◄┈┈► /wʊnə/ ◄┈┈► /gʊɾə/
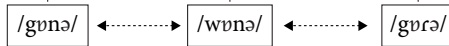
Stage III: Late 20th century

schematic

$$\boxed{\text{V } \textit{to } \text{V}_{\text{inf}}}$$

specific

$$\boxed{\text{BE } \textit{going to } \text{V}_{\text{inf}}} \quad \boxed{\textit{want to } \text{V}_{\text{inf}}} \quad \boxed{\text{(HAVE) } \textit{got to } \text{V}_{\text{inf}}}$$

lexical variants   /gʊnə/   /wʊnə/   /gʊɾə/
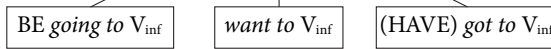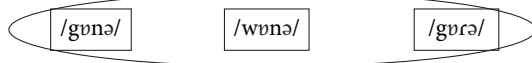
Figure 7. Sketch of the development of contracted variants

construction vi as well. This relationship will include systematic similarities and differences of form, as well as a systematic semantic relatedness" (Leino & Östman, 2005, p. 207, italics in original). Thus, it is a constructional formulation of the concept also known as "proportional analogy" (cf. Blevins & Blevins, 2009, p. 2).
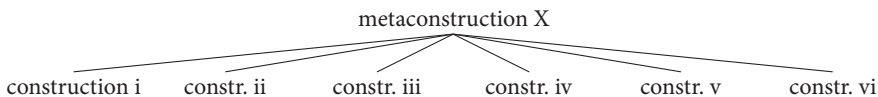
Figure 8. Metaconstruction (Leino & Östman, 2005, p. 207)

In spite of the appearance in Figure 8, a metaconstruction is not a node on a higher taxonomic level but simply a formulation of analogy relations, that is, a paradigmatic association, or horizontal link. The metaconstruction that describes *to*-contraction is represented in Figure 9.
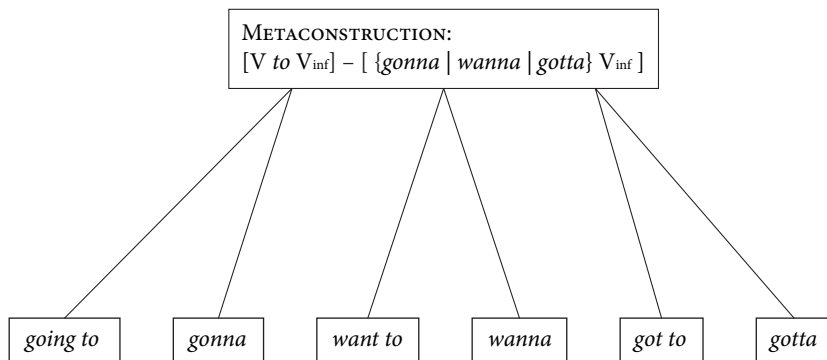
Figure 9. The metaconstruction connecting V *to* V$_{inf}$ full forms and contractions

The metaconstruction captures the formal similarity between *gonna, wanna* and *gotta*, as well as their parallel semantic-pragmatic relation to the full forms. Because the metaconstruction refers to grammatical alternations, it implies the nature of, e.g., *going to* and *gonna* as near-synonymous variants. This view differs slightly from an allostructional account, as the variants need not be instantiations of a higher-level "supercategory" (cf. Cappelle, 2006, p. 19). Instead, the systematicity of the variations is captured on the horizontal plane by the metaconstructional link, without recourse to higher levels of abstraction.[16] The observed variational patterns are the product of (emerging) paradigmatic associations and analogical relations.

This account also goes beyond "contrastive links" which may hold between a full form and a contraction as "closely-related constructions, which are distinguished from one another in the values they have for a set of features" (Van de Velde, 2014, p. 154f.), because this link only defines one variation, not a set of related variations, as is the case here. Similarly, while the contractions themselves are in a schematic

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16. In my view, allostructions and a metaconstruction may well coexist for the same variations, even in a single speaker's mental representation – this would be formally redundant, but probably cognitively realistic.

relation, it seems that the associative link is not so much between the individual items but between the pairs of full form and contraction. Thus, the metaconstruction is to be seen as an associative link that defines the analogical status of the contractions relative to the full forms. This patterning has emerged gradually as the contractions became increasingly entrenched as independent items.

6.   Conclusion

This study has presented a case of how new nodes are integrated into the system by mechanisms of analogy. It has shown the gradual emergence of horizontal links and schematicity in the constructional network of (American) English. Taking a step back from the particular case at hand, I will conclude on a few more general points.

The study was carried out in a quantitative, data-heavy fashion. It has relied not so much on the individual attestations of forms but on their frequency and usage in certain contexts. This approach rests on the assumption that speakers' knowledge of grammar also includes probabilistic information and frequency-driven processes. This is in line with the tenets of usage-based Construction Grammar(s), namely that constructions and links emerge through usage and are strengthened through repetition (e.g. Langacker, 2000; Bybee, 2013; Hilpert, 2013). A perhaps stronger claim is that the status of nodes and links in the network can be empirically established on a quantitative basis. Constructions and their relations are characterized not only by categorical features but also by how they are affected by factors of usage. In the present case, a metaconstruction is postulated based on the increasing similarity of variational patterns. Speakers adapt their usage preferences in a variation to make them match other variations perceived as similar. Again, this is plausible from a usage-based perspective, assuming that speakers intuitively keep tally of usage events including contextual detail. Moreover, it suggests that there is an inherent bias to create consistent patterns, i.e. to establish links between similar items, or sets of items. Such links are not merely a recognition of similarity but are activated in usage and affect the features of an item or variation. Since the emerging pattern is based on (proportional) analogy, this implies that analogical reasoning can be a directing force in constructional change. The importance of analogical reasoning has recently (re-)gained prominence in diachronic linguistic research (e.g. Fischer, 2010; De Smet & Fischer, 2017; Sommerer, this volume).

Finally, this study has placed greater focus on links, especially horizontal links, than on nodes in the network. This may seem unnecessary if the "constructicon" is seen mainly as an ordered taxonomy of form–meaning pairings. It is, however, a necessity if constructions are seen as more dynamic entities. Croft (2005, p. 274) defines constructions as conventional symbolic units, i.e. "an entrenched

routine ('unit'), that is generally used in the speech community ('conventional'), and involves a pairing of form and meaning ('symbolic')". As entrenchment and conventionality are matters of degree, the representation of a form–meaning pair in the network is also gradient; and we may add that it depends also on its associations with other items, both vertical and horizontal.

Horizontal links are more than a "nice-to-have" add-on to linguists' formalizations of constructional systems. In cognitive terms, horizontal links are a formulation of the basic human ability to detect similarities and create analogy (cf. Gentner, 2003; Tomasello, 2003). They can represent any associative connection that language users make based on semantic or formal similarity or variation, between items or categories, and they can vary in strength. Such connections are increasingly given prominence in models of grammar as a (constructional) network (see Diessel, 2019, for a state-of-the-art report). It follows that associative connections are an essential element of how grammatical patterns emerge and develop, in the individual as well as in long-term language change. This is a common theme of several papers in this collection, in spite of the differences in formulation: similarities between "sister nodes" in a constructional family (Sommerer, this volume), "constructeme" plus horizontal links at a lower level (Zehentner & Traugott, this volume), multiple levels of "constructemes" (Percillier, this volume), "homostructions" (ibid.), paradigmatic and syntagmatic relatedness (Budts & Petré, this volume), and "metaconstructions" (this paper). It remains to be seen whether some of this terminology can be unified. At present, all of these concepts appear useful in accounting for different phenomena, and they rather serve to highlight the richness of the representation of language structures in the human mind.

Diachronic Construction Grammar is well positioned to provide fine-grained insights into diachronic developments in language if it can identify such links and associations empirically. The present study is intended to make a contribution to this endeavor.

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Appendix. Logistic regression model

Obs. 35545 – full 27710 – contraction 7835

d.f. = 65

$C = 0.803$, $Dxy = 0.605$

Null deviance: 37496 on 35544 d.f.
Residual deviance: 29819 on 35479 d.f.

	Coef	S.E.	Wald Z	p
Intercept	−2,19	0,06	−35,80	<0.001
time=late	1,80	0,07	24,21	<0.001
type=got	−0,33	0,11	−2,90	0,004
type=want	−2,21	0,18	−12,61	<0.001
sentlength_z	−0,22	0,04	−6,14	<0.001
latin=latin	−0,82	0,26	−3,10	0,002
genre=movie	0,44	0,07	6,59	<0.001
subject=2ndPerson	−0,04	0,09	−0,39	0,695
subject=3rdPerson	0,31	0,08	4,11	<0.001

subject=none	2,38	0,24	9,94	<0.001
V_ellipsis=ellipsis	−0,95	0,43	−2,22	0,026
attraction[1]	−0,12	0,03	−4,12	<0.001
sentence_type=negation	0,17	0,10	1,78	0,075
sentence_type=question	−0,11	0,09	−1,25	0,211
time=late*type=got	0,69	0,14	4,87	<0.001
time=late*type=want	0,68	0,19	3,51	0,000
time=late*sentlength_z	0,13	0,04	3,11	0,002
type=got*sentlength_z	0,26	0,07	4,03	<0.001
type=want*sentlength_z	−0,11	0,11	−0,98	0,327
time=late*latin=latin	0,24	0,30	0,80	0,423
type=got*latin=latin	0,66	0,41	1,62	0,105
type=want*latin=latin	−1,08	1,04	−1,03	0,302
time=late*genre=movie	−0,08	0,08	−0,97	0,333
type=got*genre=movie	0,81	0,13	6,41	<0.001
type=want*genre=movie	0,44	0,18	2,45	0,014
time=late*subject=2ndPerson	0,25	0,11	25	0,024
time=late*subject=3rdPerson	−0,24	0,09	−2,60	0,009
time=late*subject=none	−0,84	0,35	−2,41	0,016
type=got*subject=2ndPerson	0,10	0,15	0,66	0,512
type=want*subject=2ndPerson	0,47	0,24	1,97	0,049
type=got*subject=3rdPerson	−0,65	0,19	−3,48	0,001
type=want*subject=3rdPerson	−0,14	0,35	−0,40	0,688
type=got*subject=none	−0,69	0,36	−1,92	0,055
type=want*subject=none	−0,90	0,42	−2,11	0,035
time=late*V_ellipsis=ellipsis	1,60	0,51	3,11	0,002
type=got*V_ellipsis=ellipsis	−0,21	0,63	−0,34	0,735
type=want*V_ellipsis=ellipsis	0,54	0,61	0,89	0,373
time=late*attraction[1]	0,12	0,04	3,50	0,001
type=got*attraction[1]	0,06	0,07	0,88	0,381
type=want*attraction[1]	−0,09	0,13	−0,68	0,498
time=late*sentence_type=negation	−0,29	0,12	−2,38	0,017
time=late*sentence_type=question	0,17	0,11	1,51	0,130
type=got*sentence_type=negation	0,86	0,68	1,26	0,208
type=want*sentence_type=negation	−0,25	0,25	−1,01	0,315

(*continued*)

type=got*sentence_type=question	−0,27	0,37	−0,73	0,468
type=want*sentence_type=question	0,49	0,25	1,97	0,049
time=late*type=got*sentlength_z	−0,37	0,08	−4,57	<0.001
time=late*type=want*sentlength_z	0,22	0,12	1,77	0,076
time=late*type=got*latin=latin	−0,49	0,48	−1,01	0,314
time=late*type=want*latin=latin	1,32	1,08	1,22	0,221
time=late*type=got*genre=movie	−0,70	0,16	−4,43	<0.001
time=late*type=want*genre=movie	−0,73	0,20	−3,69	0,000
time=late*type=got*subject=2ndPerson	−0,38	0,19	−2,04	0,042
time=late*type=want*subject=2ndPerson	−0,51	0,27	−1,92	0,055
time=late*type=got*subject=3rdPerson	0,08	0,23	0,34	0,735
time=late*type=want*subject=3rdPerson	−0,27	0,38	−0,71	0,479
time=late*type=got*subject=none	0,30	0,50	0,59	0,553
time=late*type=want*subject=none	0,37	0,53	0,70	0,482
time=late*type=got*V_ellipsis=ellipsis	−0,81	0,78	−1,04	0,299
time=late*type=want*V_ellipsis=ellipsis	−2,33	0,73	−3,17	0,002
time=late*type=got*attraction[1]	−0,07	0,08	−0,90	0,367
time=late*type=want*attraction[1]	0,14	0,14	0,99	0,324
time=late*type=got*sentence_type=negation	−0,36	0,82	−0,44	0,657
time=late*type=want*sentence_type=negation	0,24	0,28	0,84	0,400
time=late*type=got*sentence_type=question	0,68	0,43	1,60	0,110
time=late*type=want*sentence_type=question	0,14	0,28	0,51	0,607

Beyond existing models

Paradigms lost – paradigms regained

Paradigms as hyper-constructions

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Based on Diewald (2009, 2015a, 2017), it is claimed that the notion of paradigm needs to be introduced into constructional accounts, as otherwise the essence of grammaticalization cannot be properly captured in construction grammar. It is suggested to define grammatical paradigms as a new node type, a "hyper-construction", which represents the categorical, non-gradient specifics of grammatical meaning. This line of argumentation is supported by a discussion of changes in the German and English modality, tense, determiner, and number paradigms. Independent arguments for the psychological reality of paradigms come from the study of implicational relations in inflectional morphology and diachronic phenomena such as layering, suppletion, and paradigm pressure.

Keywords: paradigm, paradigmatic relation, paradigmaticization, grammaticalization, grammatical category, gradience, hyper-construction, constructional link, constructional network, inheritance

1. Introduction

The place of paradigms in grammaticalization is uncontested, while in constructional approaches the notion of paradigm is often marginalized or even lost. This paper discusses the theoretical status of the notion of paradigm and its place in construction grammar. It suggests the reconceptualization of the notion of paradigm as a distinct, complex type of construction – a "hyper-construction" – and its integration as a new node type into the theoretical framework and descriptive toolkit of construction grammar. It is argued that otherwise the results of changes involving grammaticalization cannot be captured adequately in their semiotic and functional specificity. Taking up concepts laid out in Diewald (2009, 2015a, 2017), the paper provides a redefinition of the traditional concept of paradigm in constructional terms, i.e. as a hyper-construction highlighting the categorical,

non-gradient specifics of grammatical categories. This is done by specifying the intra-paradigmatic vertical and horizontal relations as in themselves meaningful. Vertical relations represent the hierarchical order within a paradigm, e.g. the relation between a zero-marked member (say nominative in the category of CASE) and a marked subordinate member (say accusative, genitive etc.). Horizontal relations represent the oppositions between sister cells within one horizontal layer in a paradigm, e.g. dative as opposed to accusative. Thus, the meaning/function of each filler construction in each paradigmatic cell is defined in terms of its vertical and horizontal positioning in the hyper-construction. In other words, the hyper-construction is an aggregate of a defined and ordered number of indexical relations between all paradigm members/cells (cf. Sections 2.3 and 5 for further specification). The guiding assumptions underlying the argumentation in this paper are the following:

a.   Paradigms are important generalizations.
b.   Paradigms are part of speaker knowledge.
c.   Paradigms are motivating forces in the diachronic process of grammaticalization.

Evidence for the relevance and psychological reality of paradigms is adduced from investigations of implicational relations in inflectional morphology, constructional descriptions of bound morphology, and from the study of diachronic phenomena accompanying grammaticalization such as layering, suppletion, and paradigm pressure.

The paper is structured as follows: Section 2 clarifies some basic terminological issues and delimitations. Section 3 is about gradience and categorical distinctions, especially about the crucial fact that grammaticalization cannot be conceptualized as a gradient phenomenon only, i.e. it cannot be modelled by installing clines and scales alone. Instead, grammaticalization involves a fundamental change of the semiotic status of the entity concerned as it becomes part of a paradigm with its categorically defined, indexical relations. Section 4 surveys the current treatment of grammatical meaning and paradigmatic knowledge in constructional approaches. The notion of paradigms as constructions is expounded in Section 5, and supported by observations from various fields of research concerning the existence of paradigms in language (Section 6).

2. Terminological clarifications

2.1 Grammaticalization versus grammatical change

It is crucial to understand that the term "grammaticalization" is not identical to "grammatical change". In many constructional approaches the term "grammatical change" subsumes a much larger range of phenomena than grammaticalization proper. For example, Hilpert and Mair (2015) employ it to describe what might be called the area of interest of diachronic construction grammar. For them the term "grammatical change" broadly refers to any kind of linguistic change as long as changing form–meaning associations are involved. Thus, "grammatical change" includes anything except phonological change or change which comes about due to sociolinguistic developments like language contact. Typical instances for grammatical change which are not grammaticalization are (1) changes in the productivity of a particular pattern in word formation like the rise and decline of the productivity of the French loan derivative *-ment* in English (Hilpert, 2013; Hilpert & Mair, 2015), or, (2) the substitution of the consonant in the 3rd person singular inflectional suffix *-th* by *-s* in English. Hilpert and Mair (2015) are fully aware that this broad conception of grammatical change has to be distinguished from grammaticalization defined in the narrow sense. However, their focus is on constructional issues and therefore, they do not develop criteria for separating grammaticalization proper from grammatical change in general.

In the context of this paper, which claims that the formation of paradigms is the distinctive and unique criterion separating grammaticalization from other types of change, it is important to keep in mind the division of different types of change. As the following quotes show, the necessity to heed these distinctions has been formulated before in several places in grammaticalization literature:

> We may note in passing that there is a tendency in the literature to use grammaticalization as a cover term for all kinds of grammatical change, including simple reanalyses, analogical levelings and contact-induced changes. In this way, the concept *grammaticalization* looses [sic] all theoretical significance and becomes simply a synonym for *grammatical change*.   (Himmelmann, 2004, p. 39)

> It [the chosen concept] also delimits grammaticalization against a couple of other processes that change the grammatical system or create new grammatical structure […]. Here it suffices to note that it is unwise to elevate grammaticalization to the status of "creation of grammar" *per se*. This necessarily renders the concept wide and heterogeneous, with the consequence that it becomes less apt to generate falsifiable empirical generalizations and to be integrated into an articulated theory of language change and language activity.   (Lehmann, 2004, p. 155)

The terminological commitment to a narrow interpretation of "grammaticalization" is the basis for another important clarification.

2.2 Grammaticalization versus constructionalization and constructional change

At the same time, grammaticalization is not identical with "constructionalization" or "constructional change". Traugott and Trousdale (2013) draw the following distinctions between constructional changes and constructionalization: The former ones are seen as "changes in meaning or form alone that affect individual constructions"; constructionalization, on the other hand, is defined as "changes that result in form$_{new}$-meaning$_{new}$ pairings after a series of small-step constructional changes" (2013, p. 44; cf. also Traugott, 2014, 2015).

Traugott (2014, p. 89) specifies constructional changes as "changes to features of constructions, such as semantics (e.g. *wif* 'woman' > 'married woman') or morphophonology (e.g. *had* > *'d*). Such changes precede or follow constructionalization". Obviously, constructional change is a summarizing label of semantic and phonological changes of various subtypes, all of which have been known in diachronic linguistics to occur independently as well as in grammaticalization processes.

In a considerate and detailed reflection, Noel (2007) points out that not only constructional change but also constructionalization, i.e. the rise of a new construction (be it schematic or not), is a prerequisite of grammaticalization but not identical to it. His examples for constructionalizations which are not grammaticalization are (1) the forming of adverbials etc. from syntagmatic strings containing several erstwhile independent items (pluri-word sequences), i.e. cases of univerbation or lexicalization in one sense of the term, (2) the rise, semantic specification and increased productivity of particular – quasi idiomatic – constructions, like the *way*-construction as in *she smiled her way through the crowds*, and (3) shifts in the specialization and productivity of a particular argument structure pattern, like dative objects in French.

In short, the rise of a new construction, constructionalization, results in adding a new sign (the new construction) to the sign inventory (constructicon) of a language, and this process happens and is defined independently and irrespective of functional aspects. Grammaticalization, on the other hand, is defined functionally, more precisely, it constitutes a change of the semiotic status of the entity concerned: a particular syntagmatic string (i.e. a sign/construction of indifferent size) acquires a new function as a member of a paradigm and changes its semiotic status from lexical to grammatical. This will be argued for in more detail in the next section.

2.3   Paradigmatization as a crucial feature of grammaticalization

Grammaticalization has been defined as "[…] a diachronic process by which an individual linguistic item (of indeterminate size) in a synchronic layer at a particular point in time (t_0) is subject to change which turns it into a more grammatical sign at a later point in time (t_1)" (Diewald, 2015b, p. 231).

In the past decades, a large body of linguistic work has accrued defining the essential features of grammar and grammatical items as opposed to lexical items (cf. e.g. Lehmann, 2015 [1982]; Bybee, Perkins & Pagliuca, 1994; Radtke, 1998; Leiss, 1992; Diewald, 1999, 2010). The essence of these efforts may be summarized as follows: grammatical meaning is indexical; it is organized in closed paradigms, which are obligatorily expressed. The three features of grammar, i.e. its indexicality, paradigmatic organization and obligatoriness, can be taken to be the spell-out of what Lehmann calls the "loss of autonomy", and the gist of grammaticalization. This is expressed in the meanwhile classic quote: "Grammaticalization of a linguistic sign is a process in which it loses in autonomy by becoming subject to constraints of the linguistic system" (Lehmann, 2004, p. 155).

An issue worth noting here is Lehmann's distinction between innovation, on the one hand, and renovation and reinforcement, on the other (Lehmann, 2015 [1982], p. 22ff.). Innovation is the creation of a new paradigm or a new paradigmatic cell, i.e. a grammatical opposition that did not exist in the predecessor of that language. An example for innovation of a new paradigm is the rise of the definite article in languages like German and English. The rise of the future tense in German, on the other hand, is an instance of innovation of a new paradigmatic distinction in the already existing paradigm of tense. In contrast to innovation, renovation and reinforcement are modifications in an already existing grammatical distinction. Renovation refers to cases when a new item (a new expression) is recruited for an already existing function (e.g. English *going to* as a new marker for the old function of "future tense", expressed by *shall* and *will*). Reinforcement means the strengthening of an existing form by the addition of new, supportive linguistic material (e.g. the Pre-Latin pronoun **is* 'that (one)' is reinforced in Latin to *iste* 'that one on your side', Lehmann, 2015 [1982], p. 25.).

While a number of diagnostic procedures and tools have been developed to measure relative degrees of grammaticalization in comparable items (e.g. Hopper, 1991; Heine, 2003, p. 579), the most comprehensive typology is found in Lehmann's grammaticalization parameters. In order to measure the degree of grammaticalization (the loss of autonomy), six parameters, which are gained from applying the criteria of weight, cohesion, and variability to the paradigmatic and syntagmatic axis respectively, are distinguished as shown in Table 1. The minus sign behind a parameter label indicates that this feature is reduced in grammaticalization, the

plus sign indicates that this feature is increased in grammaticalization. The terms in italics are Lehmann's names for the diachronic processes involved.

Table 1. Grammaticalization parameters adapted from Lehmann (1985, p. 306)

	Paradigmatic	Syntagmatic
Weight	(1) integrity (−) *phonetic/ semantic attrition*	(2) structural scope (−) *condensation*
Cohesion	(3) paradigmaticity (+) *paradigmaticization*	(4) bondedness (+) *coalescence*
Variability	(5) paradigmatic variability (−) *obligatorification*	(6) syntagmatic variability (−) *Fixation*

As can be seen, the formation of paradigms figures prominently in Lehmann's parameters: the two parameters primarily concerned with it are parameter 3 and parameter 5 (shaded in Table 1). Lehmann gives the following definition, contrasting paradigmaticity (i.e. parameter 3) with its opposite, paradigmatic variability (i.e. parameter 5):

> The cohesion of a sign with other signs in a paradigm will be called its PARADIGMATICITY, that is, the degree to which it enters a paradigm, is integrated into it and dependent on it. […] The PARADIGMATIC VARIABILITY of a sign is the possibility of using other signs in its stead or of omitting it altogether.
>
> (Lehmann, 2015 [1982], p. 131)

The third parameter is the focus of attention here: Increasing paradigmaticity, i.e. increasing cohesion between the relevant items on the paradigmatic axis, is the central feature of grammaticalization. Paradigms are the target of any grammaticalization process. The more grammaticalized an item is, the more it is integrated into a paradigm. For example, in German voice distinctions, *werden* as a passive auxiliary is more grammaticalized than *bekommen* as a passive auxiliary: the former is much more integrated into the verbal paradigm of voice than the latter. This is attested by the fact (among other things) that the opposition between active and *werden* passive is pervasive in German for the vast majority of non-stative verbs; it is not restricted to transitive verbs/constructions, cf. *man lacht* 'they laugh' – *da wird gelacht* 'there is laughing'. This very high integration into the verbal paradigm is not observable in *bekommen* as a passive auxiliary.

As already mentioned, the term "paradigm" is used here in a way that deviates to some degree from traditional concepts. This will be discussed in Section 5, so a short definition must suffice at this point: A paradigm is seen as a complex, holistic construction of interdependent paradigmatic cells which are constructions

themselves. Its meaning/function is constituted by the sum total of all its inherent relations among the individual cells and their hierarchies.

In principle, a paradigm does not have restrictions as to the morphological shape of the units constituting its cells (they may be affixes or much larger syntagmatic entities), nor does it – by definition – constrain the number of its internal distinctions, with the important exception that it must comprise of at least two members. Otherwise, there would not exist an opposition between paradigm members, and thus no paradigm in the first place.[1]

Having delimited grammaticalization against more general concepts, and defined it as the formation of a paradigm, we can turn to the notion of "gradience" and its role in synchronic variation and diachronic change associated with grammaticalization.

3.   Gradience and categorical distinctions

Grammaticalization studies as well as construction grammar approaches have emphasized the notion of gradience as central for the description of linguistic structure and linguistic change. In particular, lexical and grammatical signs/constructions are known to be historically connected by infinitely fine-grained clines of intermediate stages. Nonetheless, grammaticalization theory rests on an *a priori* categorical distinction between grammar and lexicon.

While the diachronic process of grammaticalization definitely requires change in terms of clines, its result, a paradigm (or its modification by a new member), cannot be described or defined in terms of multiple small-step variation alone. Therefore, we need to disentangle the relations between gradience and categorical distinctions, we need to look at the interplay of these two notions and take up the question of how to determine potential cut-off points.

The notion of "gradience" captures gliding, transitional, small-step variation, i.e. freely changing combinations of similarities and differences between linguistic items. The term "cline" (or "scale" or "path"), playing a major role in grammaticalization studies, refers to more than gradience; it indicates an ordered succession among all instances under consideration. It implies serialization motivated by some feature(s) whose variation is interpreted as incremental or directional (e.g. increasing phonologically reduction, increasing abstractness etc.).

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1. Notwithstanding the principal openness as to the number of internal oppositions, there is, of course, a range of empirically attested typical sizes of paradigms (similar to the situation in phonological systems).

As to categorical distinctions and discrete entities, we have to take care of two aspects: (1) discerning between mere variations of the instances of one linguistic item as opposed to the creation of a new linguistic item/sign, i.e. the rise of two distinct linguistic items, and (2) the integration of a new, distinct item into a paradigm as part of its internal structure, i.e. the process of paradigmaticization, and its consequences concerning the internal architecture of the paradigm, i.e. its representation of fixed distinctions within a grammatical category.[2] The latter process is the decisive criterion in grammaticalization, the former one, the creation of a distinct semiotic entity, is a prerequisite to it and therefore, has to be looked at as well.

Turning to gradience and clines first, a well-known depiction of their relevance in grammaticalization is the general cline suggested by Givón (1979, p. 209) and developed further by Lehmann (2015, p. 15) and Hopper and Traugott (2003, p. 7). As can be easily seen, it combines functional and formal aspects:

free lexeme > function word > clitic > inflection > zero

This scale has been the model for a great number of refinements and applications to individual categories and individual markers. A famous one is the grammaticalization path for future grams evolving from movement-verbs, like the *going-to* future in English, which has been shown to proceed gradually and continuously via an unlimited number of intermediate (formally and/or semantically ambiguous) stages (cf. e.g. Bybee, Perkins & Pagliuca, 1994, p. 240).

This type of gradience is omnipresent in grammaticalizing changes (and of course not only in them). Moreover, it likewise applies to diachrony and synchrony. It can be tracked in the diachronic development of grammaticalization processes that have been active for a period of time, and it can be observed in any single synchronic layers when variations in form and/or meaning can be assigned to different stages in a grammaticalization cline.

An example for the synchronic perspective, i.e. the co-existence of variants with different degrees of grammaticalization, is the verb *verdienen* in its various complementation constructions ("construction" used in a pre-theoretical way here) in 20th century German. This is illustrated by Examples (1) to (8) below, which show the verb *verdienen* with nominal complements as well as with infinitive complements (Diewald, Dekalo & Czicza, to appear). Even this small selection of instances of a rather narrowly defined syntactic structure displays a great amount of variation. The nominal complements vary as to morphological make-up and

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2. Note that this problem – analyzing a paradigm as a discrete category – pertains to cases of innovation, i.e. the first appearance of a new paradigm or a new paradigm member, as well as to the modification of an existing paradigm (cell) by renovation and reinforcement.

semantics (full noun phrases, correlate pronouns, concrete or abstract nouns, nominalizations etc., compare (1), (2), (3), (4), and (6) for these features). The different shades of meaning to be attributed to *verdienen* in (1) to (8) comprise 'earn', 'deserve', 'be worth', 'should', 'ought to', 'must'. Syntactic variations include (among other things) the presence of the correlate *es* in the matrix clause (4), (6)), variation in the type of infinitive in the complement, i.e. simple infinitive, passive infinitive etc. (cp. (4) to (8)), and in the realization of the subject of *verdienen* in terms of morphology and semantics (e.g. human referent vs. propositional nominal, cp. (2) to (5)). Furthermore, as can be seen in the English translations, many instances are ambiguous and/or underspecified by the linguistic features contained in the items themselves, and thus many receive alternative interpretations.

(1)   *In kleineren Orten verdient der Arbeiter durchschnittlich 600 Pesos.*
'In smaller villages a worker earns 600 pesos on average'

(DWDS Die Zeit (13.03.1970))

(2)   *Außerdem haben wir uns eine Zigarre verdient.*
'And besides, we have earned ourselves a smoke'

(DWDS: Lebert, B. (1999), 133)

(3)   *Aber ihr mögt darüber sagen, was ihr wollt, er verdient doch Respekt.*
'You may say whatever you want, he still deserves respect'

(DWDS: Enzensberger, H. M. (1972), 61)

(4)   *Dieser Ausspruch Schopenhauers verdient es, der Vergessenheit entrissen zu werden.*
'This sentence by Schopenhauer deserves to be/is worth being/should be saved from oblivion'

(DWDS: Rechenberg, P. (1994[1991]). Was ist Informatik?
München: Hanser, 290)

(5)   *Endlich verdient noch die Wechselwirkung zwischen den Estern und dem Ammoniak erwähnt zu werden.*
'Finally, the interplay between ester and ammonia should/must be mentioned'

(DWDS: Fischer, E. (1906). Einleitung. In ders., Untersuchungen über Aminosäuren, Polypeptide und Proteine. Berlin: Springer, 1553)

(6)   *Die Einleitung des Wiener Sozialisten Engelbert Pernerstorfer verdient es, in aller Ausführlichkeit zu Wort zu kommen.*
'The introduction of the Vienna socialist Engelbert Pernerstorfer deserves to/should/ ought to be presented in great detail'

(DWDS: Kurz, R. (1999). Schwarzbuch Kapitalismus.
Frankfurt a. M.: Eichborn, 352)

(7) *Es gibt Stellen darin, die klassisch zu werden verdienen, die in ein Lesebuch gehören,[…].*
'It contains passages which are worth becoming/should become/ought to become classic, which need to appear in any reader'
(Auerbach, E. (1959 [1946]). Mimesis. Bern: Francke, 476)

(8) *Ein so Elender verdiene nicht zu leben.*
'Such a miserable one should not/ought not to live'
(DWDS: Klepper, J. (1962). 522)

Unsurprisingly, the combinations of formal and semantic features found in the data result in variability in several directions or dimensions, which again allows for alternative arrangements concerning different scales. Nevertheless, it is no accident that the order of presentation of these examples inherently implies a particular type of cline concerning their respective degrees of grammaticalization. While Examples (1) to (3) show *verdienen* as a lexical verb with a noun phrase complement in the accusative, the infinitival complement found in (4) to (8) points to a small, initial step of *verdienen* towards auxiliarization. Again, the variation of meaning of *verdienen*, progressing roughly from 'earn' to 'should/ought to' in (1) to (8), indicates the development of a lexical action verb in a transitive construction into a verb with clearly deontic meaning (always with wide-scope interpretation) in an infinitival construction. In short, the arrangement of synchronic data chosen here implies the grammaticalization path of a deontic modal construction on the rise.

For one thing, this stipulation of succession in terms of a grammaticalization cline is justified by diachronic knowledge of the verb *verdienen* and statistical investigation of the 20th century data in terms of collostructional factors (Diewald, Dekalo & Czicza, to appear), both of which meet expectations provided by Lehmann's grammaticalization parameters. Furthermore, we may note that this provisional cline matches with typical crosslinguistically established grammaticalization paths for deontic modal verbs/constructions (Diewald, Dekalo & Czicza, to appear).

With this background, it is legitimate to assume that the synchronic data of *verdienen* & complementation can be ordered according to three discrete stages of grammaticalization associated with defined context types that *mutatis mutandis* are constitutive elements of grammaticalization paths in general (cf. Diewald, 2006):

Stage I.   Is evidenced by Examples (1) to (3). It refers to the preconditions for grammaticalization, i.e. the lexical source construction of *verdienen* & nominal complement in the accusative, whereby the complements belong to various types and the meaning of *verdienen* oscillates between

'earn' and 'deserve'. In these instances, the accusative complement encodes a concrete or abstract entity that is the benefit of some activity associated with, but not necessarily carried out by the human subject.

Stage II.   Is reflected in examples like (4) and (6). This stage, the critical context, is defined by multiple opacity, and thus triggers reinterpretation in the direction of more grammatical meaning. In (4) and (6) we observe the ambiguity between original lexical meanings ('deserve' or more abstract 'be worth') and clearly deontic meanings ('should', 'ought to', 'must').

Stage III.   Constitutes the isolating context for the new meaning. As can be seen in (5), (7), and (8), the lexical meaning is no longer accessible and the new wide-scope deontic meaning appears as a distinct meaning separated from and independent of the meaning of the lexical source. The new, more grammaticalized meaning has become isolated in a particular context, leading to the establishment of an opposition between the old meaning and the new meaning in their respective isolating contexts. By this, the verb *verdienen* becomes truly polysemous, with one context allowing only for lexical interpretation, and another context only for the new interpretation in terms of a more grammaticalized modal construction.

By assigning instances of one synchronic layer to either stage I or stage III, we claim a categorical distinction between the two meanings/functions of the verb *verdienen* (depending on specific context). By establishing stage II, which is defined by ambiguity (multiple opacity), we acknowledge gradience between the endpoints of the two meanings.

This very condensed description of *verdienen* has illustrated the interplay of gradience and categorical distinctness along the following lines:

First, from a synchronic angle, there is an infinitely fine-grained field of observed linguistic instantiations, which in diachronic (developmental) perspective may be perceived as a cline ordered in terms of increasing approximation towards a grammaticalized construction.

Second, there is a clear categorical distinction in the "endpoints" of the scale between two meanings/functions (in terms of the semiotic integrity of individual items). These two meanings/functions are mutually exclusive in the respective isolating contexts.

Third, from the background of knowledge on grammaticalization of modal auxiliary constructions we can hypothesize that *verdienen* & infinitive in its isolating context, where it expresses wide-scope deontic modality, is a candidate for integration into the existing paradigm of modal constructions in German.

But obviously this development has not yet taken place: *verdienen* in present-day German is not yet integrated into the system of modal verbs (e.g. it does not display epistemic meaning etc.), and of course, there is no guarantee that it will proceed on this path of grammaticalization. That is, this example cannot be used to illustrate the categorical distinctness of a paradigm and the function as a cell in a paradigm (fourth stage of grammaticalization, cf. Diewald, 2009, 2017). In order to demonstrate this last and most important aspect of categorical meaning, namely the fact that a new member changes the whole paradigm, we have to turn to a well-known grammaticalization process that has been active for a long period of time.

This is the change affecting the tense paradigm from Old High German (OHG) to New High German (NHG) that was brought about by the rise of the *werden* & infinitive construction as a possible future marker (cf. Diewald & Wischer, 2013). The OHG tense paradigm was constituted by two members, the present and the preterite. These paradigmatic tense distinctions are illustrated with the verbs *machōn* 'to make', 'to do', *geban* 'to give', *werdan* 'become' in the 1. person singular indicative:

Present:	*(ih) machōm/-ōn*	*(ih) gibu*	*(ih) wirdu*
Preterite:	*(ih) machōta*	*(ic) gab*	*(ih) ward*

This system changed into a three-fold distinction between present, preterite and future (leaving aside further distinctions for ease of illustration). Thus, the NHG paradigmatic tense distinctions with the same verb forms are:

Present:	*ich mache*	*ich gebe*	*ich werde*
Preterite:	*ich machte*	*ich gab*	*ich wurde*
Future:	*ich werde machen*	*ich werde geben*	*ich werde werden*

The verb *werden* in the future construction turned from a lexical verb into an auxiliary. While this development was gradual (roughly starting in the 13th century, cf. Diewald & Habermann, 2005, p. 232), the categorical distinctions between lexical *werden* and the future auxiliary construction become visible when comparing the "endpoints". (9) illustrates the OHG (9th century) usage of *werdan* as a full verb with the meaning 'become', 'turn into', 'happen', 'appear'. (10) gives an early example of *werden* & infinitive as a future marker from the Early New High German period (16th c.). (11) presents a NHG example for the integration of the new item into the tense paradigm.

(9) *Inti **uuerdent** zeichan in sunnun inti in manen intin sterron.* (Tatian, 145, 15)[3]
Et erunt signa in solæ et luna et in stellis.
‚Und es erscheinen Zeichen in Sonne, Mond und Sternen.'
'And there will be signs in the sun and the moon and the stars.'

(10) *wer an mich glaubt / d' **wirt leben** / ob er gleich stuerb / Vnd wer da lebt /vnd
glaubet an mich / der **wirt** nimmermehr **sterben*** (VD, 79–21ff.)[4]
'He that believes in me, yet shall he live, though he would die. And whoever
lives and believes in me shall never die.'

(11) *Der Bund **wird** im laufenden Jahr rund 80 Milliarden Euro neue Schulden
machen – so viel wie nie zuvor.* (18.05.2010 *Süddeutsche.de*)
'The federal state will take on new debts of about € 80 billion in the running
year – so many as never before.'

Since the 16th century, German has acquired the option of a grammaticalized
future tense with the future marking construction *werden* & infinitive. Thus, the
construction *wird machen* entertains oppositions to other members of the tense
paradigm, e.g. the present *macht*, or the preterite *machte*. By this development,
the architecture of the tense paradigm has changed in itself: while in Old High
German we observe an opposition between the present as the temporally non-dis-
tant (= origo-inclusive) value and the preterite as the temporally distant (= origo-
exclusive) value, the rise of the future tense leads to an additional opposition in
the distant section, i.e. the opposition between preterite (distant, origo-exclusive,
past) and future (distant, origo-exclusive, future/prediction). Both distant tempo-
ral values are in opposition to each other as well as in opposition to the present
tense, which is the unmarked value and the zero-point of the whole paradigm and
all of its oppositions (compare Tables 7 and 8 in Section 5.3 for further details).

Concluding this section, we may note: Grammatical paradigms are the target
of grammaticalization processes. They are complex constructions integrating each
individual cell into a whole. The incorporation of a linguistic item into a para-
digm, i.e. the process of grammaticalization, cannot be captured by the notions of
gradience or clines only, but by the acknowledgement of categorical distinctions
on several levels.

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3. Tatian = Sievers, E. (Hg.). (1966 [1872]). Tatian. Lateinisch und altdeutsch. Mit ausführlichem
Glossar. Paderborn: Schöningh. (Bibliothek der ältesten deutschen Literatur-Denkmäler, 5).

4. VD = Veit, D. (1972). Etliche Schrifften für den gemeinen man / von vunterricht Christlicher
lehr vnd leben / vnnd zum trost der engstigen gewissen. Nürnberg 1548. Herausgegeben und
mit einer Einleitung versehen von O. Reichmann. Assen: Gorcum (Quellen & Forschungen zur
Erbauungsliteratur des späten Mittelalters u. der frühen Neuzeit, 5).

In the next section, we have to look at the treatment of these distinctions in constructional approaches, pursuing the question how constructional models conceptualize grammatical meaning, grammatical markers, and grammatical paradigms.

4. Paradigms lost: The status of paradigms in constructional models

Critical reflection on the current treatment of grammatical paradigms in constructional approaches leads to the impression that observations of multiple gradience and gradual changes in meaning and function have ousted the equally important observation that meanings – in particular grammatical meanings – are constituted by semantic and functional oppositions. It must be stated that the notion of paradigm has been lost in most constructional approaches, as has a clear conception of grammatical meaning.

Aiming at more discrimination of this general verdict, we may separate constructional work into three groups with respect to the attention that is given to grammatical categories and grammatical paradigms.[5] First, in many proposals concerning synchronic description (e.g. Goldberg, 1995, 2006; Croft, 2001), the annotation of paradigmatic organization and/or knowledge is rudimentary and inconsistent. Second, in many diachronic constructional conceptualizations of grammaticalization, the integration of new markers into a paradigm is completely overlooked. For example, Trousdale (2014), though focusing on grammaticalization in construction grammar as the central issue, completely ignores paradigms, as do Traugott and Trousdale (2013), where "paradigm" is not even listed in the index of subjects. In both publications, grammaticalization is described as the constructionalization of a gram, which is assigned the label "procedural" and merely defined as being i. more productive, ii. more schematic, and iii. less compositional than its source construction (see later for details). Third, there have been proposals from diachronic as well as synchronic angles that display some awareness of the fact that grammatical paradigms need to be taken into consideration at some point. This acknowledgement, however, in most cases is implicit and not directly addressed as an important issue. Studies belonging into this third group are e.g. Van de Velde (2014), making use of a specific interpretation of horizontal links to take care of grammatical meaning, and Boas (2014), who employs the introduction of indices to mark paradigmatic relations (see later).

The following critical remarks focus on the question how grammatical meaning, grammatical categories, and grammatical items are taken care of in some current constructional approaches, and whether the notion of paradigm plays a

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5. I would like to thank a congenial reviewer for drawing my attention to this.

role in the listings of construction types (Tables 2 to 5). They do not aim at a full discussion of the approaches chosen, but center on the issues relevant to this paper.

Generally, the assumption that it is "constructions all the way down" together with concomitant concepts like "inheritance" very often seem to be considered sufficient for describing and explaining most phenomena in language. The motto "constructions all the way down" originates in Goldberg's (1995, 2006) formulation of the central idea of all constructional approaches:

> All levels of grammatical analysis involve constructions: learned pairings of form with semantic or discourse functions, including morphemes or words, idioms, partially lexically filled and fully general phrasal patterns.   (Goldberg, 2006, p. 5)

It is claimed that this notion of constructions has pervasive explanatory power for any linguistic structure including grammatical categories, which in the following quote are not mentioned, but presumable are included in the class of "basic, regular patterns":

> Thus, constructions exist in every language. They are essential to an effective account of both unusual or especially complex patterns and they may be invoked to account for the basic, regular patterns of language as well.   (Goldberg, 2006, p. 9)

Though it is not claimed that the types of constructions specified in the quote are the only essential relations in language, the omission of a discussion of paradigms, i.e. the organization of grammatical meaning, severely hampers the understanding of the nature of grammatical categories. This assessment can be substantiated by a look at the list of examples of constructions varying in size and complexity in Table 2.

Table 2. Construction types in Goldberg (2006, p. 5)

Morpheme	e.g. *pre-, -ing*
Word	e.g. *avocado, anaconda, and*
Complex word	e.g. *daredevil* […]
Complex word (partially filled)	e.g. [N-*s*] (for regular plurals)
Idiom (filled)	e.g. *going great guns* […]
Idioms (partially filled)	e.g. *jog* \<someone's\> *memory* […]
Covariational Conditional	The Xer the Yer (e.g. *the more you think about it, the less you understand*)
Ditransitive (double object)	Subj V Obj1 Obj2 (e.g. *he gave her a fish taco, he baked her a muffin*)
Passive	Subj aux VP_{pp} $PrepPhr_{by}$ (e.g. *the armadillo was hit by a car*)

Goldberg's definition and exemplification has become a kind of common denominator in constructional studies (cf. Kay & Fillmore, 1999, pp. 2–3; Croft, 2001, pp. 18–19, 261; Michaelis, 2004, p. 8; Fried & Östman, 2004; Hilpert, 2013, p. 459).

Similar to Goldberg, Croft (2001, p. 17) suggests subdividing the "syntax-lexicon continuum" by the construction types illustrated in Table 3 (cf. also Croft, 2013).

Table 3. Construction types in Croft (2001, p. 17)

Construction type	*Traditional name*	*Examples*
Complex and (mostly) schematic	syntax	[sbj *be*-tns verb-*en by* obl]
Complex and (mostly) specific	idiom	*pull*-tns np-´*s leg*
Complex but bound	morphology	[noun-*s*], [verb-tns]
Atomic and schematic	syntactic category	[dem], [adj]
Atomic and specific	word/lexicon	[*this*], [*green*]

The two pairs of distinctive feature, i.e. (1) atomic vs. complex and (2) specific vs. schematic, which are taken up in Traugott and Trousdale (2013), are defined as follows: the opposition between atomic vs. complex refers to the syntagmatic axis and distinguishes mono-morphemic constructions from pluri-morphemic ones, i.e. those which are "made up of analyzable chunks" (Traugott & Trousdale, 2013, p. 11). The pair specific (= substantive in Traugott & Trousdale, 2013) vs. schematic refers to the degree of abstractness and generality of a construction in terms of the "degree of phonological specificity". Morphemes like *red*, or *-s* are subsumed under specific/substantive, while schematic constructions comprise category labels like "modal verb" or "N" as well as syntactic constructions like SAI = "subject-auxiliary inversion" (Traugott & Trousdale, 2013, p. 13).

Croft briefly comments on the necessity to add information on inflection to some constructions without discussing the issue further. The term "paradigm" is not listed in the "index of constructions, categories and features", nor is "inflection"; however, both appear in the index of subjects. Lehmann's grammaticalization parameter of paradigmaticization is mentioned by Croft in the following quote: "Essentially, the semantic change by which a root comes to be used only in contrast to a small number of other forms in paradigmatic contrast is the loss of information content, which we take to be a defining characteristic of affix status" (Croft, 2001, p. 270). Here, paradigmaticization is interpreted only in terms of formal, i.e. morpho-phonological reduction, which is not what this parameter is meant to account for.

As neither inflection nor distinctive grammatical meanings or functions are discussed at any lengths, the question arises what is actually meant by labels like "tns" in Table 3, which appears in the combinations verb-tns, *pull*-tns, and

be-TNS. Obviously, the label "TNS" represents a schematic construction, but its usage remains completely inconclusive. Does it stand for the grammatical category TENSE with all its distinctive cells? Or does it stand for a particular cell expressing the notion of a particular deictic time relation, e.g. "past"?

In the first case, i.e. if the label "TNS" is meant to represent the whole tense paradigm with all its distinctions, the label comprises several formally and semantically different constructions indicating deictic time in a grammaticalized way. In this case, the schematic construction "TNS" includes all regular and irregular present and past tense forms, as well as all periphrastic verbal constructions like the perfect or any of the variants of the future category. The example in row 3, column 3 points towards that interpretation: "*pull*-TNS NP-'*s leg*" obviously is meant as a schematic format where *pull*-TNS refers to any tense marking of the verb, i.e. *pull, pulled, have pulled, will pull* etc.

The specification in row 4, column 1, on the other hand, i.e. "complex but bound", leads to a different conclusion, namely that "TNS", as in "[VERB-TNS]" in column 4, row 3, is restricted to past tense allomorphs, i.e. regular verb & -*ed* constructions and – maybe – irregular verb forms like *wrote, sprang, went*. But this latter point again we cannot be sure of, because irregular verb forms might be treated not as complex constructions but as atomic ones in the model. In this context, it should be noted that the term "bound" pops up in the description of the construction type in row 4, without a definition or a terminological counterpart (e.g. "unbound" or "free"). The specification of a construction type as "complex <u>but</u> bound" points to the fact that the organization of grammatical meaning in inflectional paradigms has just not been taken into account as an issue of any importance.

It is quite obvious that the notion of "grammatical paradigm" in the design of construction types is (inadvertently) presupposed, but intransparent and not sufficiently explained. This leads to a number of open questions and deficiencies in the model, among them inconclusive usages of labels like "TNS". The same applies to other grammatical categories, like person, mood, or aspect, as well as to relations of concord, none of which is taken care of in an adequate manner.

Traugott and Trousdale (2013) do explicitly address the issue of grammatical functions/meanings as opposed to lexical functions/meanings by introducing a third pair of distinction in addition to Croft's ATOMIC vs. COMPLEX and SPECIFIC vs. SCHEMATIC distinctions. This third distinction is called CONTENTFUL vs. PROCEDURAL. Furthermore, the authors introduce an intermediate stage for all three parameters, which is motivated by word formation patterns like *enjoyment* (V-*ment*) or idiomatic constructions like *what´s X doing Y* as in *what´s that fly doing in my soup?*. Thus, the model for construction types of Traugott and Trousdale, 2013 combines three attributes and three values for each attribute as in Table 4.

Table 4. Attributes and examples of constructions in Traugott and Trousdale (2013, p. 13)

Dimensions of constructions			
Size	Atomic	Complex	Intermediate
	red, -s	*pull strings, on top of*	*Bonfire*
Specificity	Substantive	Schematic	Intermediate
	dropout, -dom	N, SAI	V-*ment*
Concept	Contentful	Procedural	Intermediate
	red, N	*-s*, SAI	*way*-construction

The distinction CONTENTFUL VS. PROCEDURAL, which refers to meaning and function respectively, is supposed to replace the distinction between lexicon and grammar when taking a synchronic as well as a diachronic perspective. Grammatical signs receive the label "procedural", while lexical signs are characterized as "contentful". The terms are defined as follows:

> "Contentful" material can be used referentially; on the formal dimension it is associated with the schematic categories N, V, and ADJ. "Procedural" material has abstract meaning that signals linguistic relations, perspectives and deictic orientation […]. (Traugott & Trousdale, 2013, p. 12)[6]

This distinction, however, does not discriminate between grammatical and lexical meaning: While tense, as it is represented in the English verbal system, probably would be classified as "procedural", temporal adverbs like *then* or *lately*, or nouns like *duration* or *time* would probably be called "contentful". Although this classification seems sound, it must be stated that it is not based on meaning distinctions – tense markers being as referential or deictic as temporal adverbials like *then, today* etc.

Instead, it is the question of paradigmatic integration that makes the difference between grammatical encoding of temporal distinctions and lexical encoding of temporal distinctions. The crucial difference, of course, is found in the fact that grammatical distinctions are paradigmatically organized, while lexical ones are not. In the case of temporal distinctions (in languages like English and German), this has several significant consequences. First, tense markers are obligatorily expressed in every finite verb by language internal rules (in languages like English

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6. The diachronic process of grammaticalization is relabeled as "grammatical constructionalization" and defined as follows: "Grammatical constructionalization is the development through a series of small-step changes of a form$_{new}$-meaning$_{new}$ sign that is (mostly) procedural in function. A grammatical sign cues how the speaker conceptualizes relationships between referents within the clause(s), and how the addressee is to interpret the clause(s)" (Traugott & Trousdale, 2013, p. 147). This conception of grammaticalization and grammar falls back behind what has been reached in grammaticalization research.

and German), while there is no obligation (no rule) whatsoever to use a temporal adverbial or noun in any particular context. Second, there are linguistic contexts where a particular member of the paradigm has to be used or where a particular member of the paradigm cannot be used (e.g. rules of the *consecutio temporum* in reported speech etc.); there are no such rules for lexical temporal expressions. Third, the number of tense distinctions in the grammatical paradigm is strictly limited and fixed (even the fuzzy edges of the category can be named and listed as a set of known problematic cases); the number of temporal adverbials or nouns is unknown and unlimited. Fourth, the tense distinctions of the tense paradigm are abstract, and by definition indexical; lexical temporal items usually have a much richer meaning and need not be indexical (cf. Diewald, 1991 for an extended investigation of the different types of indexicality of grammatical categories as opposed to lexical items). These fundamental distinctions between grammatical items and lexical items apply to further semantic-functional domains beyond temporality (e.g. the distinction between plural markers and collective nouns, between epistemic adverbials and verbal mood, between articles and demonstrative adjectives or adverbs). In short, categorical distinction between grammatical vs. lexical items cannot be resolved by a vague semantic distinction like the one suggested by the terms "procedural" vs. "contentful" (also cf. Noël, 2007, p. 13; Givón, 1998, pp. 52–54).

The schema in Table 4 is claimed to provide a uniform and conclusive classification for the whole constructicon of a language. From the above discussion of grammatical paradigms, gradience, and categorical distinction, it should have become clear that these distinctions are not sufficient, as they do not provide an answer to the question of what to do with grammatical paradigms (for an extensive discussion of Traugott and Trousdale, 2013 see Diewald, 2015a).

Boas (2014) aims at devising a new grammar of German on a constructional basis ("eine neuartige Grammatik des Deutschen auf der Basis der Konstruktionsgrammatik zu schaffen", p. 53), and therefore is more aware of the necessity to better integrate grammatical meaning. His list of constructicon formats given in Table 5 is much longer and more explicit concerning grammatical items than other suggestions.

For example, Table 5 contains constructions like the "Subj V" construction (row 2, column 2) which is meant to take care of the feature of agreement between subject and finite verb. Several inflectional and grammatical categories/constructions are mentioned, even though selectively. Missing are e.g. the TAM-categories of verbal constructions, nominal categories like case, definiteness etc. Furthermore, as in other constructional papers, there is no specification of paradigmatic choices and allomorphic realizations.

Table 5. List of construction types in Boas (2014, p. 54)

Konstruktion	Form (mit Beispiel)
Subjekt-Prädikat (Kongruenz)	Subj V (z.B. *Lena und Sophia schlafen.*)
Vorgangspassiv	Subj Aux (PP) Vpart (z.B. *Die Pizza wurde (von Fritz) gegessen.*)
Doppelobjektkonstruktion	Subj V Obj1 Obj2 (z.B. *Emmi kochte Lili eine Suppe.*)
Resultativkonstruktion	Subj V Obj ResP (z.B. *Sie hustete die Serviette vom Tisch.*)
Funktionsverbgefüge	[NP [in [N]] V] (z.B. *Endlich kam der Stein ins Rollen*)
"offenes" Idiom	[N und N] (z.B. *Er nahm Hut und Stock und ging*)
Komplexes Wort	[N-pl] (z.B. *Kinder, Pizzen, Bräuche*, etc.)
Idiom	die Kurve kratzen (z.B. *Um 23 Uhr kratzten wir die Kurve.*)
Wort	z.B. *Erdbeere, kriechen, wohl, teuer, neben*
Morphem	z.B. *-heit/-keit/-ig-keit, anti- be-,…*

Nevertheless, Boas indirectly acknowledges the inevitability of paradigms. In a discussion on passive constructions in German, he suggests the introduction of indices between constructions, their "sister constructions", "mother constructions" and "daughter constructions", within the format of the construction itself – and not outside it as an inheritance link. This clearly is a step in the direction of acknowledging a paradigm as a kind of higher order construction that has stable connections to a fixed number of coordinate, superordinate, and subordinate constructions (see next section). These promising hints, however, are not worked out in detail, and there is no mention of the question how classic paradigms like case, definiteness, tense etc. should be treated.

Summarizing this brief and selective review of the treatment of grammatical categories and grammatical paradigms in constructional approaches, the following has to be stated: no – or almost no – attention is given to the organization of grammatical information and grammatical categories, i.e. to paradigms in general and to inflectional and intransparent grammatical morphology in particular. Some suggestions seem to assume that grammatical meanings are unimportant or given in an *a priori* manner. Some insinuate that grammatical meaning can be tackled in the same way as lexical meaning without loss. Some, though perceiving that

grammatical meaning is indispensable and distinct from lexical meaning, still do not give it the necessary attention and explicit description.

It seems that in the important and successful endeavor to take care of idioms, fringes, in-betweens etc. (which was the initial spark for construction grammar), the very backbone of linguistic structure has been ignored or even forgotten. However, for a full account of language, its grammatical regularities, its categories, and paradigms have to be investigated and described. If the claim of full coverage of all linguistic structure(s) in a language is upheld in constructional models, grammatical paradigms have to be taken into account as a special type of constructions.

The following section argues for paradigms as a distinct type of construction that cannot be properly rendered by standard means of constructional formalization (e.g. vertical or horizontal links) but needs to be analyzed in its specific function first.

5.   Paradigms regained: Integrating paradigmatic knowledge into the constructicon

The term "paradigm" is polysemous and has been used with various different meanings. Thus, before discussing a constructional conceptualization of paradigmatic knowledge in 5.3, some clarification is necessary concerning two points: (1) the distinction between paradigm and paradigmatic relation (5.1), and (2) the possible syntagmatic extension, i.e. the size of the construction (e.g. morpheme, periphrasis or longer syntagmatic string) that is allowed for an entity to count as a member of a paradigm (5.2).

5.1   Paradigm ≠ paradigmatic relation

It has been stressed by several scholars that we need to discriminate between paradigmatic relations and paradigms (cf. e.g. Werner, 1994, p. 11 and Seiler, 1967, p. 53). The term "paradigmatic relations" refers to a much broader concept than does the term "paradigm". Paradigmatic relations (= "associative relations", de Saussure, 1983/1916, p. 121) constitute "substitution classes" on all levels of linguistic structure, that is, they operate on the phonemic level as well as on all higher levels of linguistic structure.

Paradigmatic relations leave the number of potential fillers of a paradigmatic slot unspecified and do not provide internal structuring, e.g. subcategories, number of distinctions etc. for them. Consequently, when talking about paradigmatic relations, no distinction can be drawn between infinite sets of choices (open classes) and finite sets of choices (closed classes). Constructional concepts of network

associations, like inheritance links and horizontal links, refer to paradigmatic relations in this sense (cf. Bybee, 2010, p. 33; Goldberg, 1995, p. 67; Michaelis & Lambrecht, 1996, p. 216f.). Inheritance relations refer to vertical, i.e. hierarchical ordering with the subordinate/lower/more specific construction taking over (inheriting) features of the superordinate/higher/more schematic construction and at the same time carrying more features than the superordinate one (or combining features of several superordinate constructions). The effect of inheritance relations has been formulated by Goldberg as follows (cf. also Goldberg, 2006, p. 13; Van de Velde, 2014, p. 145; Sommerer, 2018, p. 139f.):

> It is argued that constructions form a network and are linked by inheritance relations which motivate many of the properties of particular constructions. The inheritance network lets us capture generalizations across constructions while at the same time allowing for subregularities and exceptions.
>
> (Goldberg, 1995, p. 67)

The taxonomic relationship of inheritance links is established by some common feature, i.e. some similarity of the superordinate and the subordinate item. This similarity may pertain to any linguistic level, e.g. phonological, morphological, syntactic, semantic, and pragmatic features (or combinations thereof).[7] In these relations, the higher level does not exert any restriction concerning the types of features constituting the specification of the lower level(s), nor is the number of sisters on one level or the number of lower levels restricted in any way by the higher node(s). Moreover, in vertical inheritance relations, the function/meaning of the higher node is not influenced by the ramifications below it.

Thus, inheritance relations (vertical links) can be conceived as paradigmatic relations in the sense specified above (i.e. as associative relations), but they do not have the relevant properties constituting a paradigm, and therefore are not sufficient to specify the function of grammatical categories (more precisely, the representations of grammatical categories that are encoded in the paradigms of a language).

More recently, horizontal links, i.e. links between constructions on one level of specificity (sister nodes), have attracted attention (cf. Sommerer, 2018, pp. 141–144; Smirnova & Sommerer, introduction to this volume). Van de Velde (2014, p. 149) suggests envisaging horizontal links between sister nodes as the place to represent "syntactic paradigms", i.e. "set[s] of alternating forms with

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7. Goldberg (1995, p. 74) is very explicit about this, stating that "inheritance is simply a way of stating partial generalizations" and that the "[complete mode of inheritance] […] is designed to capture purely taxonomic relations and constraints".

related meaning differences".[8] This is illustrated by the three syntactically relevant positions of the finite verb in Dutch clauses, i.e. V1, V2, and V-final. These three options are claimed "to form a 'paradigm'" and to be "related to each other by horizontal links". Page 150 illustrates this by a figure rendered here as Figure 1 in a modified way (i.e. without examples).
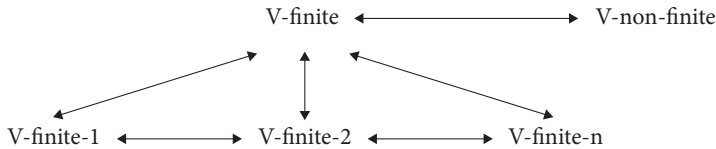
Figure 1. Positions of the finite verb in Dutch (Van de Velde, 2014, p. 150, modified)

As can be seen, the figure establishes a level between two sisters called "V-finite" and "V-nonfinite" which are connected by a horizontal link. The "V-finite" node is assumed to have three subordinate nodes, all of them inheriting its finite features and each of them specifying one of the three positions "V-finite-1", "V-finite-2", and "V-finite-n" (for V-final). These three sister nodes, too, are connected by horizontal links. Without discussing the details of these horizontal connections suggested, the following comment must suffice. The author is right in arguing that the three positions of the finite verb constitute oppositions and a syntactic paradigm discriminating three functional domains of a finite clause. However, the distinction between these positions obviously requires a syntagmatic string of more than one item. Thus, the finite verb (which by definition is a single-word construction) cannot constitute the superordinate node of this syntactic (positional) distinction as Figure 1 suggests. The oppositions of the placement of the finite verb (V1, V2, and V-final) would need a larger format, i.e. some constructional conception of a "finite clause" as a paradigm (which defines the function/meaning of the category "finite clause" and which specifies that the three members of the paradigm constitute a closed set of distinctive constructions, represented by defined combinations of positional and functional information). As far as I can see, there are no hints pointing in this direction. Taking this into account, Figure 1 provides just a kind of visual mnemonic of possible syntactic positions finite verbs may occur in.

On the other hand, the very features that constitute the finiteness of a "finite verb", i.e. its inflection as to the categories of person and number (which in German are more prominent than in Dutch) are suppressed. The construction "V-finite"

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8. Similar suggestions concerning the paradigmatic nature of horizontal links are made in Budts & Petré (this volume); the authors show how "increasingly powerful ties […] between constructions tighten their paradigmatic relations" (p. 559f.). As the authors refrain from defining their notion of "paradigm" beyond stating that it is a schematic construction, it remains unclear whether a paradigm is conceived as more than an open-ended list of paradigmatic relations.

is a grammatical paradigm with a closed set of strict oppositions. The choice of a specific value/paradigm member is determined by higher order paradigms (concord with subject) and must be expressed in any finite verb, no matter which syntactic position it occurs in (V1, V2, and V-final).

Of course, when focusing on the syntax of clauses, these features may be backgrounded, but in a discussion of paradigmatic relations of the *finite verb* in a constructional network that starts with the distinction between finite and non-finite as the top level, one might assume that the defining features of finiteness would deserve some attention. Finite verb constructions are specified as to the grammatical categories of person and number and definitely qualify as subordinate sister constructions in a hyper-construction (a paradigm) encoding finiteness. Within this paradigm, some of their intra-paradigmatic relations can be conceived as horizontal links between sister nodes (e.g. singular vs. plural for all three persons). The distinct syntactic positions of the finite verb, on the other hand, and their functions on the clause level, do not seem to qualify as paradigmatic oppositions within the domain of the finite verb itself (i.e. as constructions connected by horizontal links *below* the node of the finite verb).[9] Thus, while Van de Velde's study puts forward inspiring ideas concerning the representation of "syntactic paradigms" in constructional networks, it also shows that a clear conception of the general semiotic and functional characteristics of grammatical paradigm is a prerequisite for accounting for them consistently.

Summing up this section: in paradigmatic relations, the number of possible substitutes and their meaning is not confined in any way, except that they must fit the relevant slot (show the relevant similarity). In these relations, there is no categorical meaning which would be conclusively specified by a fixed number of paradigmatic cells with mutually constricted meanings.[10] It is this type of relations that is addressed by inheritance links and by horizontal links as they are presently discussed in literature. A paradigm, on the other hand, is not just a compilation of inheritance links and/or horizontal links but a complex sign defined by its function, i.e. the grammatical = indexical marking of a particular domain (e.g. case,

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9. On principle, the same considerations apply to other examples discussed in Van de Velde, 2014.

10. As has been pointed out above, also paradigms change, and of course, paradigms gain and lose members, which means there are fuzzy edges and unstable candidates in paradigms as well (otherwise the term grammaticalization as a dynamic diachronic process would be meaningless). However, when describing a paradigm at a synchronic layer, it will always be possible to identify its functional domain and its core oppositions/members. Potential new members will appear at the fringe (e.g. the double perfect in German) as will members that are at the point of becoming obsolete (e.g. the dual number in the history of Germanic languages).

or finiteness in verbs). This function implies a distinctly defined and (at the core) close set of paradigm cells. The meaning/function of the paradigm is the sum total of its ordered vertical and horizontal positions and relations.

5.2   The syntagmatic extension of paradigms

Very often, the term paradigm is understood in its traditional way, as exclusively referring to inflectional paradigms, like German case, Latin tense etc. Although inflectional paradigms may be seen as prototypical for the organization of grammatical categories (at least in Indo-European languages), this conception is far too narrow. We need to account for periphrastic forms, i.e. phrasal constructions, and discuss their potential membership and position in paradigms (cf. Haspelmath, 2000, p. 663) and for syntactic constructions of an even larger extension, e.g. clause or utterance types.

The integration of periphrastic forms into the description of verbal paradigms has a certain tradition for languages like German and English. Approaches in construction morphology have made this explicit by treating periphrastic realizations of paradigm cells – like the perfect in English – as constructions parallel to inflectional ones (cf. Booij, 2016, p. 443).[11] Accordingly, periphrastic tense constructions like German perfect and pluperfect forms, e.g. *hat gelacht, ist gegangen; hatte gelacht, war gegangen*, are treated as regular members of the verbal tense paradigm, even though they are not realized by inflection or stem variation like the past tense (*lachte, ging*) but are built by complex constructions with remarkably different syntagmatic length, and – in German – even different auxiliaries, namely forms of *haben* ('have') and *sein* ('be') for perfect and pluperfect.

While paradigms containing periphrastic forms next to inflectional ones are accepted by many scholars, larger formats are hardly considered as regular paradigm members. Some authors, however, do recognize them, as is documented by the following quote:

> In this perspective, it appears legitimate to extend the notion of periphrasis even further to semantic categories which are never expressed by monolectic forms, but which show a sufficiently high degree of grammaticalization to be described as part of the verbal paradigm rather than only in the syntax […].
>
> (Haspelmath, 2000, p. 663)

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11. Booij defines constructional schemata for periphrastic forms like the perfect as "constructional idiom[s]" because they contain "both a lexically filled slot, and an open slot for the lexical verb!" (2016, p. 443).

This position is compatible with the notion of "latent grammar" suggested by Kaznelson, 1974,[12] or the concept of "hidden complexity" applied in Bisang (2014, p. 129).

An example for a sentential realization of paradigm members is the class of modal particle in German. Modal particles form a grammatical category with several sub-paradigms, e.g. for declaratives, directives, interrogatives. This paradigm is not realized by inflection or periphrasis but by distinctions realized purely syntactically: the paradigmatic values are expressed by oppositions in multi-item strings of sentence/utterance length. By the use of a modal particle, the speaker marks the proposition of the host utterance as given, as communicatively presupposed (though unexpressed). It appears as a non-initial, i.e. as a second or reactive, turn in a dialogic structure (for details cf. Diewald, 2015b).

The following examples illustrate systematic oppositions in the sub-paradigm of interrogatives, with utterance (12) representing the unmarked question, (13) and (14) two questions marked with *denn* and *etwa* respectively:

(12)   *Ist das Ø eine anerkannte Studie?*
        'Is this an acknowledged study?'

(13)   *Ist das **denn** eine anerkannte Studie?*
        'Is this an acknowledged study?'

(14)   *Ist das **etwa** eine anerkannte Studie?*
        'Is this an acknowledged study?'

The paradigmatic opposition marking a question as "non-reactive" (no modal particle) versus "reactive" (insertion of a modal particle) is realized by the full sentential construction. Table 6 illustrates the oppositions between the unmarked and marked questions as well as the semantic distinctions between the two questions particles *denn* and *etwa*, which are sister cells in the marked section (cf. Section 5.3 for remarks on notation).

In short, although paradigms gravitate towards formal regularity and are often expressed by word internal oppositions, i.e. inflection etc., this is not an obligatory feature. As paradigms are often fed by heterogeneous sources via grammaticalization, they may integrate different morphological shapes and may be expressed by strings of different syntagmatic extension.

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12. Cf. e.g. Kaznelson (1974, p. 98): "Die latente Grammatik sind die grammatischen Signale, die in den syntaktischen Verbindungen und in der Semantik der Wörter impliziert sind" ['Latent grammar consists of those grammatical signals which are implicated by the syntactic connections and the meanings of the words']; see also Leiss (2000, p. 5f.).

Table 6. Interrogative sub-paradigm of modal particles

Interrogative sentences	
Zero Value: [−reactive]	**Marked Values: [+reactive]**
question without a MP:	feature for all MPs: [+reactive]
	(realized by the insertion of an MP)
no sequencing information	*denn*:
concerning the preceding turn	distinctive feature of *denn* in questions: [+consecutive]
	*Ist das **denn** eine anerkannte Studie?*
	'Is this DENN an acknowledged study?'
Ist das Ø eine anerkannte Studie?	*etwa*:
'Is this an acknowledged study?'	distinctive feature of *etwa* in questions: [+preferred
	negative answer]
	*Ist das **etwa** eine anerkannte Studie?*
	'Is this ETWA an acknowledged study?'

5.3   The paradigm as a holistic entity / a hyper-construction

This paragraph provides a first outline of how the notion of paradigm as a specific type of construction (which is not identical to simple paradigmatic relations like inheritance links or horizontal links) might be integrated in constructional approaches.

The description of a paradigm as a holistic entity is not new in linguistics, as is obvious from the following quote by de Saussure: "The whole has value only through its parts, and the parts have value by virtue of their place in the whole" (de Saussure, 1983/1916, p. 128; see also Ackermann, Blevins & Malouf, 2009, p. 59). In modern morphological theory, Booij contents that „[j]ust like word formation schemas, inflectional schemas possess holistic properties" (2016, p. 440).

As a holistic entity, a *gestalt*, a paradigm is a construction whose function and meaning are defined by the specific number and constellation of its components. Its components mutually define each other's values, which are anchored in an inherent indexical structure: the unmarked value represents the categorical zero point of the paradigm. Its marked members point back to the zero point or to the superordinate paradigm member (anchoring); at the same time each paradigmatic cell specifies its individual distance from the categorical zero point as well as from sister nodes (distinctive meaning). Each cell has a specific intra-paradigmatic positional meaning that is derived from the constellation of the paradigm as a whole. Due to the fact that each paradigmatic cell is a construction in itself, the whole paradigm is a hyper-construction, i.e. a construction formed by constructions.

It should be noted that this conception is essentially different from open conceptions like networks (cf. Section 5.1). It comes close to what in Booij (2016) is called a "second order schema". A second-order schema "is a schema of schemas"

which denotes paradigmatic relationships, i.e. correspondences among pairs of constructions, like implicational relations and proportional analogies between inflection classes and in derivational morphology (cf. Booij, 2016, p. 435). Examples for second order schemas presented in Booij (2016) are analogies between sets of items in word formation, e.g. the relations between *altru-ism/altru-ist* and *aut-ism/aut-ist* etc., and proportional analogies of singular and plural forms among different inflection classes. The latter example is commented as follows: "[t]he correlation between singular and plural forms is expressed by a second order schema, a combination of the schemas [of singular and plural]" (Booij, 2016, p. 439f.).

While this paper is not primarily concerned with notational details, it should be obvious that the conception of a hyper-construction, i.e. a fixed set of constructional choices to be inserted at a particular point in a larger construction whenever the relevant category is addressed, can be easily integrated into constructional models wherever needed (cf. the lists of construction types in the last section). For example, whenever a construction includes a tensed verb, the hyper-construction (of the grammatical category) TENSE is evoked together with the restriction that but one of its paradigmatic cells has to be chosen. In short, the hyper-construction is embedded where needed as a complex sign with internal differentiation. In this way, ambiguities and inconsistencies as discussed in relation to the list of construction types suggested e.g. by Croft (2001) in Section 4 (cf. Table 3) can be resolved.

The amount of information necessary to specify such a hyper-construction and all relevant distinctions concerning semantic, formal, and positional specifications can be rendered in the form of a table. It should be noted, however, that the following tables present just lists of this information. The tables are not meant to render the complete constructional architecture with its vertical and horizontal hierarchies and oppositions. As such, they would have to specify, among other things, that the origo-inclusive item, in addition to being in opposition to all origo-exclusive cells, typically fulfills the function of the categorical zero-point, i.e. that it represents the most inclusive (highest) node of the category itself, functionally identifiable as the unmarked value.[13]

Table 7 exemplifies what types of information are indispensable for the representation of paradigms as hyper-construction, using the tense distinctions in OHG as mentioned in Section 3 (for earlier versions of schemata for paradigms cf. Diewald, 2009, p. 455ff.; Diewald, 2010; Diewald & Smirnova, 2010, p. 155ff.).

The header contains the general information on the paradigm as a whole: (1) the category/ paradigm label, which is usually named after the common semantic

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13. For the deictic foundation of the architecture of grammatical categories cf. Diewald (1999, pp. 167–248). The elaboration of the representation of paradigms as hyper-constructions in a format customary in constructional approaches is not in the scope of this paper.

Table 7. Relevant features of the grammatical paradigm of tense in OHG as a hyper-construction

Category label:	Tense marker	
Formal characteristics:	Modifies the main verb	
Category meaning:	Temporal location of the described event as related to speech time	
Category name:	PRESENT	PRETERITE
Semantic oppositions within the paradigm:	origo-inclusive	origo-exclusive
Distinctive values of individual members:	non-distant	distant/past
Formal realizations:	finite verb: – unmarked	finite verb with allomorphic variation: – inflection – ablaut – other stem variation

basis of a paradigm: here the category tense, (2) the abstract formal characteristic of the members of the category, i.e. the abstract structural properties of its participating constructions, and (3) the common semantic feature constituting the general meaning/function of the whole paradigm: temporal location of the described event as related to the speech time.

The columns below the header specify the relevant information for each construction, i.e. for each paradigmatic cell in the paradigm. While the paradigmatic cell with the category name PRESENT has one formal realization only, the paradigmatic cell for the PRETERITE specifies a number of allomorphic variations of the verb: inflectional morpheme (e.g. the German preterit affix *-te*) or ablaut (*schreibe – schrieb*).

As we have seen in Section 3, a further tense distinction was added to the paradigm by the rise of the *werden* & infinitive construction as a future marker that took place between OHG and NHG. This led to a change in the configuration of the paradigm of a whole, cf. Table 8.[14]

By the rise of the *werden*-future, a new cell in the origo-exclusive section is introduced. It is important to note that every verb in German has access to this distinction, and every finite verbal construction (in the indicative) has to expresses one temporal value, i.e. the category of tense is obligatory. A finite verb has either a present or a past temporal value, and in case a speaker of German wants to express the meaning of unconditioned prediction, i.e. pure future, explicitly, they will use the *werden* & infinitive construction.

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14. The description of the development of the tense paradigm in German is incomplete as further periphrastic tenses are not discussed; it is intended for illustration only.

Table 8. Relevant features of the grammatical paradigm of tense in NHG as a hyper-construction

Category label:	Tense marker		
Formal characteristics:	Modifies the main verb		
Category meaning:	Temporal location of the described event as related to speech time		
Category name:	**PRESENT**	**PRETERITE**	**FUTURE I**
Semantic oppositions within the paradigm:	origo-inclusive		origo-exclusive
Distinctive values of individual members:	non-distant	distant 'past'	distant 'future'
Formal realizations:	finite verb – unmarked	finite verb – inflection – ablaut – other stem variation	periphrastic constr. – *werden* (finite) & infinitive

6. Observations concerning the existence of paradigms in language

This section presents observations in three fields, namely the issue of implicational relations, the diachronic processes of suppletion and layering, and the impact of paradigm pressure, which provide additional evidence that the concept of paradigm is motivated by linguistic facts and is not only a descriptive device.

6.1 Implicational relations

Research in the field of inflectional morphology has made it clear that the interrelations between inflected forms in highly irregular inflectional systems reflect the internal, cognitive organization of these interrelations and thus the psychological status of paradigms (Ackerman, Blevins & Malouf, 2009, p. 62). This becomes evident in what Ackerman, Blevins and Malouf (2009, p. 54) address as the "paradigm cell filling problem": given that in highly inflecting languages direct exposure to all possible forms is unconceivable, "native command of the [highly inflecting] languages must involve the ability to generalize beyond direct experience" (55). This ability is based on implicational relations, i.e. knowledge of an "implicational structure that binds cells of a paradigm into a cohesive whole" (Blevins, 2015, p. 94).[15]

Implicational relations between paradigms are instances of what Paul (1920) called proportional analogy. Proportional analogy operates on a defined abstract

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15. See also Jackendoff & Audring (2016) for a slightly different, but compatible approach.

paradigm construction with a defined number, hierarchical order and function of paradigmatic cells. It ensures that there is (1) *equivalence of individual cells* across inflection classes, i.e. cell 1 in class I corresponds in its semiotic value exactly to cell 1 in class II, and (2) *equivalence of relational structure* across inflection classes, i.e. the relation between cell 1 and cell 2 in class I corresponds in its semiotic value exactly to the relation between cell 1 and cell 2 in class II.

For example: if native speakers of German are asked to name the common semantic and morphological feature of the nouns: *Fotos* 'fotos', *Bilder* 'pictures', *Taschen* 'bags', *Mäntel* 'coats', they will typically state that all these items are plural forms of German count nouns.[16]

This observation points to underlying speaker knowledge concerning the paradigmatic organization of number in count nouns. This knowledge includes that

a.   the forms quoted are plural forms
b.   there are corresponding singulars to each of them
c.   there is no further number distinctions in these nouns (no dual etc.)
d.   all plural allomorphs express the same grammatical meaning ("more than one entity of the type expressed by the stem of the noun")
e.   the opposition plural versus singular is analogous in every pair, i.e. *Fotos – Foto* corresponds to *Bilder – Bild* etc.

In short, number in count nouns in German is highly grammaticalized and represented as a grammatical paradigm, and the speakers have active knowledge of its structure. This is a very strong indication of the psychological reality of paradigms as holistic hyper-constructions.

6.2   Layering and suppletion

In the diachronic process of paradigmaticization (cf. Section 2.3), the restructuring of paradigms may lead to situations which have been dubbed "layering" and "suppletion". These are investigated in the following.

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16. The observation that this type of knowledge is active and accessible in native speakers of German can be checked easily by interviews; cf. also, in Section 5.3, the remarks on "second order schemas" as discussed by Booij (2016). Experimental studies on adult speaker knowledge and acquisition are discussed in Wegener (2016). Plural allomorphs may be treated as "allostructions" indicating "plurality" (cf. Cappelle, 2006 for the term "allostruction"). This, however, is not enough to either confirm or refute the status of number as a grammatical paradigm in count nouns. A general construction meaning "plurality" with an open number of "allostructions" could not, for example, exclude collective nouns like *Gebirge, Geflügel, Gebüsch* etc. which are morphologically singular and do not have plural forms.

The term 'layering" was introduced by Hopper (1991) as a general principle of grammaticalization: "Within a functional domain, new layers are continually emerging. As this happens, the older layers are not necessarily discarded, but remain to coexist with and interact with the newer layers" (Hopper, 1991, p. 22). Layering creates different ways of expressing the same grammatical meaning, i.e. it creates allomorphic variation in particular cells. An example is the realization of past tense in German and English. It displays layering of several morphological processes (ablaut, affixation), all of which produce forms that converge in the same meaning.

A further step in the process of layering is the functional collapsing of the preterite and the perfect for the expression of past tense in some varieties of German: the perfect has lost its resultative meaning and is used as a construction marking simple deictic past tense, thus having become functionally equivalent to the older preterite (realized by affixation and ablaut).

Without an underlying knowledge of paradigmatic oppositions and corresponding proportional analogies, speakers would not be able to interpret completely different coding techniques as representations of the same meaning/function.

While layering can lead to the expression of one paradigmatic cell by different constructional formats, suppletion is the patch work formation of a paradigm with items derived from different, non-related roots. This morphologically extreme procedure is a further case in point.

Typical examples for suppletion are the past tense form *went* for the verb *go* in English or the comparative form *better* of the positive form *good/well*. Suppletion is a case of morphological irregularity which is by no means extraordinary. It is particularly common in verbs of very high frequency, for example basic verbs like *go, be, have*, etc. The following table shows the paradigm of the German verb *sein* 'be':

Table 9. Suppletive paradigm of the verb *sein* 'be' in NHG (cf. Nübling, 2000, p. 298f.)

	Präsens	**Präteritum**	**Konjunktiv I**	**Konjunktiv II**
Singular	1 bin	1 war	1 sei	1 wäre
	2 bi-st	2 war-st	2 seist	2 wärst
	3 is-t (is)	3 war	3 sei	3 wäre
Plural	1 sind (sin)	1 war-en	1 sei-en	1 wär-en
	2 sei-d	2 war-t	2 sei-d	2 wär-t
	3 sind (sin)	3 war-en	3 sei-en	3 wär-en
Infinitiv	sei-n			
Partizip Perfekt	ge- wes-en			

The paradigm of the verb *sein* is composed from at least three Indo-European roots: **es-* accounting for NHG *ist, sind, seid*, **bhu-* for NHG *bin, bist*, and **wes-* for NHG *war, gewesen*. That is, while the preterite is completely built by forms deriving from *wesan*, in the present the two IE roots **es-* and **bhu-* mix up in a quite irregular way. In cases of suppletion, i.e. total formal dissociation of cells in a functional paradigm, the psychological reality of paradigms is particularly obvious.

6.3   Paradigm pressure

While layering and suppletion address the way in which individual paradigmatic cells are represented by linguistic forms, "paradigm pressure" refers to the structure of a paradigm as such, to its assumed symmetry and to potential gaps in that symmetry. The term "paradigm pressure" is used by Bauer (2001, p. 71) for processes of word formation. It concerns the observation that a linguistic item often changes in a direction that is determined by other items similar to it, whereby these similar items form a pattern that provides a kind of target structure or an "attractor set" for the item undergoing change. This also applies to cases of grammaticalization. It has been observed that more grammaticalized members influence the development of less grammaticalized items: they determine in which cell a "slower" item finally ends up (cf. Diewald, 1999 on the diachronic restructuring of the paradigm in modal verbs).

Paradigm pressure can be found in the system of nominal determiners in regional varieties (Low German) and child language (Harnisch, 2006, p. 399f.). In Standard German, the indefinite article in the plural is formally unmarked, i.e. morphologically Ø, as in:

(15)   *Der Clown hat Ø Schuhe an*
       'The clown is wearing shoes'

(16)   *Da kamen Ø Leute*
       'There were people coming along'

Thus, the system of nominal determiners in Standard German can be illustrated as in Table 10 (Harnisch, 2006):

Table 10. System of determiners in NGH (cf. Harnisch, 2006)

	Singular	Plural
Definite	*der/die/das*	*die* (*die Schuhe* 'the shoes', *die Leute* 'the people')
Indefinite	*ein/-e*	Ø (*Schuhe* 'shoes', *Leute* 'people')

As Harnisch points out, this gap in the formal expression of the indefinite plural obviously exerts paradigm pressure in the system of nominal determiners in regional varieties and in child language (2006, p. 399f.). He shows that the attributive pronoun *welche* (plural) 'which', 'what' is redefined as *indefinite article* (plural) in child language (cf. (17)) as well as in variants of Low German (cf. (18)):

(17)   *Der Clown hat welche Schuhe an*
       ,Der Clown hat   Schuhe an'
       'The clown is wearing shoes'

(18)   *Dor kaamt welke Lüd*
       ,Da kamen   Leute'
       'There were people coming along'

The paradigm of nominal determiners in these regional varieties thus takes the following shape:

Table 11. Adapted system of determiners in some varieties of NHG (cf. Harnisch, 2006)

	Singular	Plural
Definite	*der/die/das*	*die*
Indefinite	*ein/-e*	*welche*
		(*welche Schuhe* 'shoes', *welche Leute* 'people')

As the table shows, the accidental gap in the paradigm of determiners has been closed by a new expression for this notionally relevant paradigmatic cell (see Sommerer, 2018, pp. 299–302 for a similar development of the indefiniteness marker *some* in the history of English).

The three phenomena briefly discussed in this section support the claim that paradigms are a special type of construction not reducible to an arbitrary accumulation of vertical and/or horizontal relations. Without reference to paradigms, the phenomena discussed in this section could not be consistently accounted for.

7.   Conclusion

It has been argued that the notion of paradigm is indispensable if the entire structure of a language, in particular its grammatical organization, is to be encompassed by linguistic description. This is the position in grammaticalization theory and in morphological theories, and it is confirmed by several linguistic phenomena and observations of change.

Drawing on existing notions like second order schemas, this paper has argued for the introduction of the notion of paradigm as a holistic entity, a hyper-construction into constructional models. It has been shown that the conception of a paradigm cannot be substituted by any other constructional device, e.g. schematic constructions. While schematic constructions like N, ADJ, or SAI etc. participate in open paradigmatic, i.e. associative relations, hyper-constructions like CASE, PERSON or TNS represent their grammatical paradigms with all subordinate constructions (the paradigmatic cells). They represent the holistic semiotic entity of a functionally and formally defined set of (mutually restricted) choices, which constitutes a paradigm.

Arguing for the introduction of the concept of paradigm as a special type of construction calls for consequences in the design of network relations and nodes in constructional models. A paradigm definitely has to be conceived of as a special node type, which is not reducible to a mere convergence of vertical and/or horizontal links. It is a node that in itself is complex as (1) it embeds an ordered hierarchical system of individual constructions (nodes), and as (2) it is a node whose meaning is the sum total of these embedded relations. A paradigm node is embedded into other construction (nodes) wherever its function/meaning is called for. To my knowledge, the concept of embedding has not been made use of in the design of constructional networks, so this might be seen as a novel suggestion concerning the more technical details of representing constructional networks.

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Putting connections centre stage in diachronic Construction Grammar

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Construction Grammar conceptualizes language as a hierarchically organized network of constructions, defined as conventional pairings of form and meaning. Importantly, constructions are interlinked: vertical links connect lower-level constructions with their higher-level parents; horizontal links connect sister constructions on the same level. While the importance of vertical connections is well-established, horizontal connections have received only little attention in the theoretical literature so far. The power of horizontal connections stems from their ability to express syntagmatic and paradigmatic relations. By means of two classic case studies, we will show how shifts in similarity relations, that derive from shared horizontal connections down to the utterance level, enable changes in paradigmatic affiliations to constructions higher-up in the network. Our first case study relates the emergence of a new construction, [BE *going to* INF], to the co-occurrence of its three constituent constructions in specific contexts that were favourable to a holistic interpretation. The second case study describes how a shared set of strong syntagmatic connections strengthened the paradigmatic ties between periphrastic DO and the modal auxiliaries, ultimately causing periphrastic DO to break free from its lexical origins and fully adopt its new role as auxiliary. Generally, while constructional nodes cannot be reduced to horizontal connections between forms and/or meanings, knowing the nature of such connections is essential to a full understanding of both the emergence of new constructions as well as the consolidation of existing ones.

Keywords: constructional network, vertical links, horizontal links, paradigmatic relations, emergence of constructions, English, *be going to*, modal auxiliaries, verbs, Periphrastic do, Artificial Neural Networks

1.   Introduction

One of the basic tenets in Construction Grammar is the idea that constructions are conventionalized pairings of form and meaning that are organized as nodes in a hierarchical network. Any form–meaning pair is considered a construction, ranging from single words to abstract schemas. The nodes are connected to each other by means of various types of links. One such type is the inheritance link which connects a higher-level, schematic construction with a lower-level, more substantive construction that inherits both formal and functional properties from its higher-level ancestor. For example, it is an inheritance link that connects the partially substantive construction GIVE [someone] [something] to the more schematic ditransitive construction. Such inheritance links are instances of vertical relations (Diessel, 2015, p. 297): they hold between elements on different levels of the hierarchy. Vertical links have been acknowledged ever since the early days of Construction Grammar as central to the idea of language knowledge as a network of constructions (see Goldberg, 1995, pp. 72–81 and references therein; Kay & Fillmore, 1999). Horizontal links also exist, between constructions when they co-occur in actual utterances, or between constructions that are members of the same higher-level constructional schema. These horizontal counterparts have generally received less attention in constructionist theorizing and even less so in Diachronic Construction Grammar (notable exceptions are Van de Velde, 2014 and various papers in Barðdal et al., 2015; e.g. Colleman, 2015; Sommerer, 2015; Torrent, 2015 – though less explicitly). The constructional network also comprises syntagmatic knowledge of co-occurrence relations between constructions. This type of knowledge is well-known from research on collocates and, specifically within Construction Grammar, collostructions (Gries & Stefanowitsch, 2004). However, collocates or collostructions are only one type of syntagmatic relation. Syntagmatic relations between constructions beyond the relation of construction and slot-filler have received little attention in the constructionist literature.

In this paper, we would like to scrutinize the roles that are played by various types of links other than vertical inheritance links in shaping the properties and history of a constructicon. We draw particular attention to the syntagmatic and paradigmatic relatedness between constructions and to how these dimensions interact with the vertical-horizontal axis. We present two case studies that both operationalize the notions of syntagmatic and paradigmatic relatedness through various horizontal form/meaning connections, each in its own way. The first case study deals with the very emergence of the construction [BE *going to* INF] (an instance of what Traugott and Trousdale (2013) call grammatical constructionalization), and quantifies shifts in syntagmatic associations between constructions in order to show how a new construction may emerge out of such changes. The

second, largely data-driven, case study investigates the role of horizontal connections with the modal auxiliaries in the development of periphrastic DO towards a schematic auxiliary verb construction. The two case studies serve the theoretical purpose of showing how constructionalization and paradigm formation follow similar pathways. In the first, increased perception of relatedness (or similarity)[1] between syntagmatic combinations of constructions leads to the emergence of [BE *going to* INF] with holistic semantics out of previous compositional [BE [GO]*ing*] [*to* INF]. In the second, increased perception of similarity between [DO INF] and, for instance, [WILL INF] leads to the inclusion of [DO INF] into the fully schematic auxiliary verb construction [AUX INF].

The structure of the paper is as follows: Section 2 elaborates on the notion of horizontal links, distinguishing syntagmatic relatedness from paradigmatic relatedness. Section 3 covers the first case study, which consists of the very first steps of the string *be going to* INF towards constructional status (see also Petré, 2019). A close qualitative-quantitative analysis shows that utterances that contain *be Ving, go* and a *to* INF, before they were part of a single [BE *going to* INF] construction, can be unfavourable or favourable to a holistic interpretation of the three constituent constructions. We distinguish two such favourable contexts. When these two favourable utterance types increase in frequency, the syntagmatic relations or horizontal connections between their elements are strengthened. This chunking leads to a holistic interpretation of *be Ving, go* and a *to* INF, and, subsequently, to a higher degree of similarity across the two favourable types. It is this paradigmatic relatedness which at some point brings about neoanalysis and the emergence of a proper construction [BE *going to* INF] marking imminent future as well as causing any remaining utterance types to follow suit. Section 4, our second case study, offers a new take on the well-studied regulation of periphrastic DO which gradually attuned its distributional profile to that of the modal auxiliaries. We chart the syntagmatic relations between the various forms of DO and the modals throughout the 17th century by means of a large-scale distributional analysis. Our results reveal an initial reluctance of *does* (as contrasted to *doth*) to be used periphrastically as well as subtle but systematic differences in the distributional similarities between DO and the different modals individually, differences that are mirrored in the present and past tense alike. Overall, our connection-based approach suggests

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1. Throughout this paper, we use terms such as connections, links, relations, and similarity. Obviously, there is an overlap with the extensive literature on analogy (e.g., Fischer, 2007). We only rarely refer to this term in this paper because the way we operationalize our case studies is primarily inspired by the theory of connectionism (McClelland, 1992, 2015; Bybee & McClelland, 2005). For reasons of space, it is not really possible to indulge into a detailed discussion of this theory either, so we have tried to give an explanation that does not depend on knowledge of either theory too heavily.

that the paradigmatic integration of DO was a similarity-driven, step-wise process, enabled by minor but steady increases in the pairwise associations between the various forms involved.

In the concluding section, we discuss the broader theoretical and operational benefits of a stronger focus on the connections between constructions. As will be clear by now, the biggest benefit comes from the great potential of connection-centered case studies to chart gradual shifts in associatedness of utterances and constructions alike.

2. Connections: Horizontal vs. vertical, syntagmatic vs. paradigmatic

We define links, or connections, in their broadest sense as any type of relation that holds between two constructions. Vertical links basically hold between less abstract and more abstract constructions (or, at the lowest level, between utterances, or constructs, and a construction). The inheritance links mentioned in the introduction are the best-known type of such links. Horizontal links hold between constructions on the same (or at least similar) levels of the constructional hierarchy or, again, at the construct level, between parts of constructs (cf. Diessel, 2015, p. 310; also Norde & Morris, 2018). Importantly, both horizontal and vertical links can be syntagmatic or paradigmatic. Syntagmatic links express how often constructions co-occur, while paradigmatic links indicate how similar constructions are.

Syntagmatic relatedness can be horizontal or vertical. Previous research has indicated that an important part of people's knowledge about language consists of knowing which constructions often co-occur (e.g. Taylor, 2012). Language learners are "intuitive statisticians" (Ellis, 2006). Horizontal syntagmatic relations are natural candidates to express this kind of information: on the lowest level of the constructional hierarchy, horizontal syntagmatic links indicate which constructions co-occur significantly more often than by chance. This forms a natural solution to the issue of where to store collocational information. Collocates are neither uniquely form, nor uniquely function. It therefore makes sense not to force them into either of the two poles but have them reside in the connections between constructions. Strong syntagmatic links would then indicate that two constructions (words as well as multi-word or multi-slot constructions) are combined more often than expected.

Although exemplar- or construct-level co-occurrence is horizontal per definition, syntagmatic links in the constructicon are not necessarily horizontal. For instance, if a construct such as "a bunch of bananas" is common in English, this does not only imply that all tokens in this construct are syntagmatically linked at

exemplar level, but also that the partly schematic construction "a bunch of X" is strongly syntagmatically linked to the fully lexical construction "bananas". To the extent that two different levels of abstraction are involved here, such a link might be called a vertical syntagmatic link. An example for illustration's sake related to our second case study would be the link between something like [DO NOT INF] and [SING], based on recurrent utterances containing "do not sing".

Alternatively, there are connections that express the degree of *paradigmatic relatedness* between constructions.[2] Paradigmatic relatedness covers both syntactic and semantic relations. Semantic relations include for example synonymy and antonymy. Syntactic relatedness holds, for instance, between all plural nouns. What unites these links is that they establish paradigms: they indicate that there exists a particular dimension, semantic or syntactic, along which the connected elements are similar. For example, the two constructions illustrated by the constructs *the boy gave milk to the cat* and *the boy gave the cat milk*, known as the dative alternation, have a strong paradigmatic link in the sense that they are (in this case at least) alternative expressions for the same meaning. Just like with syntagmatic links, the paradigmatic function is not exclusive to horizontal links. Vertical paradigmatic links express paradigmatic relations by their very nature: a higher level construction groups lower level constructions. The abstract auxiliary construction [AUX INF], for instance, groups the various individual auxiliaries [CAN INF], [WILL INF], which together constitute the paradigm of auxiliaries, headed by their schematic parent. The difference is, however, that horizontal links operate between two members of the same paradigm, while vertical links capture relations between the "head" of a paradigm and one of "its children".

3. Connections in grammatical constructionalization: [BE *going to* INF]

3.1 Timing of the change in the literature

The first case study comprises the emergence of a construction [BE *going to* INF] "be about to" out of pre-existing materials. The prospective function of this construction is more grammatical (procedural) than its source material, which makes

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2. The paradigmatic links we describe can be seen as constitutive of paradigmatic relations rather than full-fledged paradigms (cf. Diewald, this volume). Overall, Diewald's notion of paradigms as dedicated hyperconstructions is compatible with our take on the interplay between paradigmatic and syntagmatic relations. Whereas Diewald's paper focuses on the endpoint of paradigmatic change, i.e. the representation of existing paradigms in Construction Grammar, we emphasise the role of shifting syntagmatic relations in the emergence of these paradigmatic hyperconstructions.

this development an instance of what Traugott and Trousdale (2013) have called grammatical constructionalization. The objective of this section is to quantify the role of connections in the history of [BE *going to* INF] in the time when constructionalization first occurs. Special attention will go to what have been called "bridging contexts", specific contexts (or, in our terms, horizontal syntagmatic relations) "giving rise to an inference in favour of a new meaning" so that the "target meaning [is] foregrounded" (Heine, 2002, p. 86). Diewald (2006) speaks of "untypical contexts".[3] We will show that the contexts that are at stake in the run-up to the emergence of [BE *going to* INF] are in fact not untypical initially, but by increasingly deprofiling (or backgrounding) certain aspects of the lexical source material become untypical along the way, and as such provide an opening for constructionalization that is then imitated by other contexts. The literature on [BE *going to* INF] is very rich (among others, Danchev & Kytö, 1994; Hilpert, 2008; Disney, 2009; Traugott, 2012a, b, 2015; Traugott & Trousdale, 2013; Budts & Petré, 2016; Petré, 2016, 2019; Petré & Van de Velde, 2018), but this aspect has not yet been addressed. As background to our analysis, we first start with the gist of what is already known about the pre-1700 development.

The source pattern of [BE *going to* INF] was a fully compositional combination of a progressive construction, the lexical construction [GO], and a purposive non-finite clause. To the extent that this combination was entrenched, there were strong syntagmatic connections between the component constructions. The combination may be represented in construction grammar formalization as in (1), or as [BE [GO]*ing*] [*to* INF] for short. In the remainder of this paper, this notation will be used for the pre-constructionalization stage as well as when we want to be agnostic on the constructional status of [BE *going to* INF].

(1)   [[BE V*ing*] ↔ [ongoing activity]] + [[GO] ↔ ['go']] + [[*to* INF] ↔ [intended activity]]

A proper [BE *going to* INF]-construction first emerges when this combination acquired holistic semantic and formal properties of its own. Formally, [BE [GO]*ing*] acquired the characteristics of an auxiliary [BE *going …*], and the purposive adjunct [*to* INF] was neoanalysed as the complement of this auxiliary ([BE *going to* INF]). In the following centuries, the *going* and *to* underwent further bonding and reduction, giving rise to stranded forms (*They asked me to work for them but I'm not going to*) as well as the contraction [*gonna* INF]. Semantically, futurity was semanticized and became the primary meaning of the construction.

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3. Diewald also distinguishes "critical contexts", which in her view only exist during the innovation period and disappear after the job is done. We do not believe such transient critical contexts, however, are always required, and they are not in evidence in our case study.

A key diagnostic of this shift whereby futurity was holistically assigned to *going* and *to* INF combined is its expansion to situations where motion is no longer at stake. The new construction [BE *going to* INF] remained initially restricted to imminent or "relative" future (Traugott, 2015, p. 67). Metalinguistic evidence suggests that it became conventionalized between 1620–1640 (Petré & Van de Velde, 2018, pp. 875–878).

The auxiliary construction may be said to become formally visible, or actualized, with the appearance of sentences where *go* no longer has a subject of its own, but instead appears with dummy *there* and is notionally catered for by the subject of the infinitive (cf. Traugott, 2015, p. 69). One of the earliest examples is given in (2). (For other early instances, see Petré & Van de Velde, 2018, p. 880, dated 1694; Petré, 2019, dated 1701; Traugott, 2015, p. 69, dated 1725.)

(2)   *Divers poor Authors are at present extreme busy …, which looks as if there was going to be another Subscription.*
    (1720. *Weekly Journal or Saturday's Post*, issue 84, July 9. *17th–18th Century Burney Collection Newspapers*)

In the next sections, we will provide distributional evidence that the prospective [BE *going to* INF] construction came into being around 1620 and had conventionalized by about 1640, in agreement with the timing found in the metalinguistic evidence reported in the literature. Interestingly, the occurrence of sentences such as (2) postdates this evidence by about three quarters of a century. After the analysis, we briefly discuss how a frequency-sensitive, connection-driven approach may also explain why the formal evidence of the novel construction is attested so much later.

3.2   Empirical study: Operationalization & methodology

Novel items, in linguistics and elsewhere, are by definition quite rare, and this is no different with prospective [BE *going to* INF]. To accommodate for the relatively low initial frequency of the construction, we make use of big data drawn from the transcriptions provided by EEBO-TCP (*Early English Books Online*-text creation partnership) which in total cover more than 1.5 billion words of British English between 1477–1700 (cf. http://eebo.chadwyck.com/ and http://www.textcreation-partnership.org/). This first case study primarily draws its data from EEBOCorp 1.0, a 525-million-word selection from EEBO-TCP (Petré, 2013). To enhance the robustness of the earliest periods, additional data were extracted for the years before 1640 from the remainder of the EEBO-TCP database, mining approximately another 250 million words. After filtering out noise, we retrieved a total of 3,887

instances of [BE [GO]*ing*] [*to* INF]/ [BE *going to* INF] from our corpus.[4] While this may seem like a liberal amount, most of the results are from the end of the seventeenth century, with only 214 instances dating from before 1600. To maximize the information in the little data there is, it is essential to carefully analyze each data point for relevant features. At the same time, to make a case for the role of frequency of similar co-textual features, it is also essential to find a way to quantify the features at stake. The assumption we are testing here is that changing connections may lead to the creation and further unfolding of the construction as a cognitive schema. Therefore, it is important to identify shifts in (the frequency of) both form and meaning that resulted from shifting distributional properties. To this purpose, we identified a number of patterns in which key functional shifts occurred. We then scored each instance of each pattern according to its semantic purport and contrasted these with the scores of instances outside the pattern. The more the new holistic prospective function of emerging [BE *going to* INF] is profiled (see Langacker, 2009, p. 66 for the concept of profile shift), or, conversely, some of the semantic content of the lexical source meaning is deprofiled (recedes in the background), the higher the score that was assigned.

We made use of a ternary scoring system. Wherever original semantic features are still profiled, and the new function is not emergent, a score of 0 is assigned. Wherever some deprofiling is involved, a score of 1 is assigned. Cases where a certain semantic feature is lost entirely, or where the new function is fully profiled, receive a score of 2.[5] As part of another study (Petré & Van de Velde, 2018), to which we refer for further details, about 11% of all instances were annotated by a second annotator (Freek Van de Velde). Conflicting decisions were discussed until consensus was reached on how to interpret each of the possible clues. The underlying aim of this holistic scoring system is to assess the influence of changing syntagmatic relations between the component parts of [BE [GO]*ing*] [*to* INF] internally, and beyond, between these parts and other constructions that together provide a favourable context for constructionalisation. Identifying the degree of (de)profiling can typically only be done by looking at or even beyond the entire sentence.[6]

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4. We searched for *going* with all known spelling variants, and then semi-automatically filtered for instances that were progressive and had a [*to* INF]. No context window was set, as it is crucial to get exhaustive results.

5. For examples, see Section 3.2.

6. Given this setup, it is not really feasible to apply data-driven methods such as the ANNs used for the next case study. Taking into account much more collocational information, such methods are very data-hungry. Unless specifically preprocessed, they also gloss over certain types of input noise (e.g., homonyms, spelling mistakes), which further increases the required data size for robust results. In addition, the classification proposed here often depends on

To test for significant trends in the frequency of higher (de)profiling in various co-textual patterns, we make use of Kendall's tau-b correlation test (using the R package, R Core Team, 2013). This test can be used for trend analysis by measuring correlations between lower or higher ranks of items to earlier and later periods (Agresti, 2010, p. 196). The test is suitable for dealing with ordinal variables (as in the case of our scoring system) and is non-parametric, meaning that it is not assumed that the data reflect a single global mathematical function (of change). This test provides a p-value as well as an effect size (referred to as tau-b) which ranges between −1 and 1, where 0 means "no trend whatsoever", and −1 and 1 represent a maximal downward or upward trend of a certain feature (from 0 to 100%).

3.3   Semantic shifts in syntagmatic patterns

We focus on the co-occurrence of the source pattern [BE [GO]*ing*] [*to* INF] with two additional constructions, respectively topicalization and passives.[7] The source pattern is assumed to be fully lexical and conveys an instance of "ongoing controlled motion with a purpose". The target construction conveys a statement about the immediate future, either planned or predicted. Each of the two co-textual constructions primarily (though not exclusively) facilitates the loss of a source semantic component or the emergence of a target semantic component: topicalization deprofiles motion, while passives deprofile the source component of control.

3.3.1   *Topicalization*
Topicalization of arguments or adjuncts belonging to the infinitival clause has been occasionally discussed in studies on auxiliation (Krug, 2000, p. 97 on English *have (got) to*; Hilpert & Koops, 2008, p. 250 on Swedish *sitta*). The most common case of topicalization is that of relativization, but the phenomenon also includes obligatory fronting of question words. Topicalization of an element that belongs functionally to the [*to* INF]-phrase (most commonly the object of the infinitive) played an important role in bringing about the change from [BE [GO]*ing*] [*to* INF] to [BE *going to* INF]. The addition of a topicalization construction to [BE [GO]*ing*] [*to* INF] amounts to an extra syntagmatic relation coming into play, which sets off this more complex combination against non-topicalized instances of [BE [GO]*ing*] [*to* INF], with potentially different trajectories of change as a result. Specifically,

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subtle semantic interpretations residing in the co-text above the typical collocational window used in such methods.

7. Petré (2019) discusses a third relevant co-text, that of present-tense assertions. This third pattern will not be discussed here because of difficulties in contrasting its relevant property (that of prediction) with the past tense.

by emphasizing a part of the imminent action encoded by the infinival phrase, topicalization invites the interpretation that the expression is primarily about that imminent action, while backgrounding the motion itself. The earliest example of topicalization, in (3), already illustrates this. It is about Nicholas Duke of Lorraine, who dies while preparing for marriage to Lady Mary of Bourgondy. The focus is on the intended marriage. Nothing points to motion, though motion is plausible, as the groom had to travel from Lorraine to Burgundy where the wedding would have taken place.

(3) *Lady Mary of Bourgondy […], whom he was going to marrie when death […] preuented him.*   (1585)

The backgrounding of motion can be cancelled by the addition of an explicit goal argument, as in (4), where the honour with which the "him" will be received is topicalized, but at the same time motion is still profiled by the presence of the goal *out*. However, such instances are highly exceptional, and constitute only 13 out of a total of 791 topicalized instances, or 1.6%.

(4) *… so he might auoyde that honour, where with they were goeing out to receiue him.*   (1631)

The relative share of topicalized as compared to non-topicalized instances of [BE [GO]*ing*] [*to* INF] increases rapidly in the 17th century, from a mere 0.9% pre-1600 (two instances) to a full quarter of all instances of [BE [GO]*ing*] [*to* INF]/[BE *going to* INF] in the period 1680–1700. Crucially, this increase constitutes some kind of feedback loop which reinforces the deprofiling of motion up to the point at which it is entirely lost. An early instance is (5). By the 1630s, no-motion uses have become predominant.

(5) *May you be prosperous, and speed no worse than these haue done, whose story I am now going to set downe.*   (1626)

To examine whether the syntagmatic relation between topicalization and [BE [GO]*ing*] [*to* INF] played a significant role in the constructionalization of [BE *going to* INF], we have analysed and scored all instances with regard to the foregrounding of motion. Motion was considered foregrounded (in which case a deprofiling score of 0 was assigned) if one of the following was explicitly expressed as part of the *going*-clause: a goal (*going to town to buy meat*), a source (*going away from home to find a fortune*), a trajectory (*going along the coast to enter the port of Manilla*), or any accompanying moving entities (*was going with a few horsemen to enter Pisa*). Motion was considered backgrounded (score of 1) if it was clear from the wider co-text that there was motion, but this was not made explicit at the sentence level, or if it was impossible to determine whether there was motion or not. Cases such

as (5) where it is certain that motion is lost are assigned a score of 2. The scoring system is conservative, as this score was only assigned if it is impossible to read motion into the example. For instance, in (6), the messenger Cleopatra is about to send back had just delivered her a message, so may be assumed to be present. Still, it is not impossible that a seventeenth century language user pictures the messenger as waiting in a different room where Cleopatra needs to go to first, and therefore this sentence was assigned a score of 1.

(6) *Cleopatra was going to send the Messenger back again with word that he [prince Alexander] should stay a while for her, when Queen Candace … entreated her to send for him.*   (1659)

Figure 1 visualizes the course taken by topicalized and non-topicalized instances by taking the mean of these scores for all data points within 20-year bins each time. We excluded all passivized instances, our second special pattern discussed below in Section 3.3.2. In the next section, we will include both patterns together.
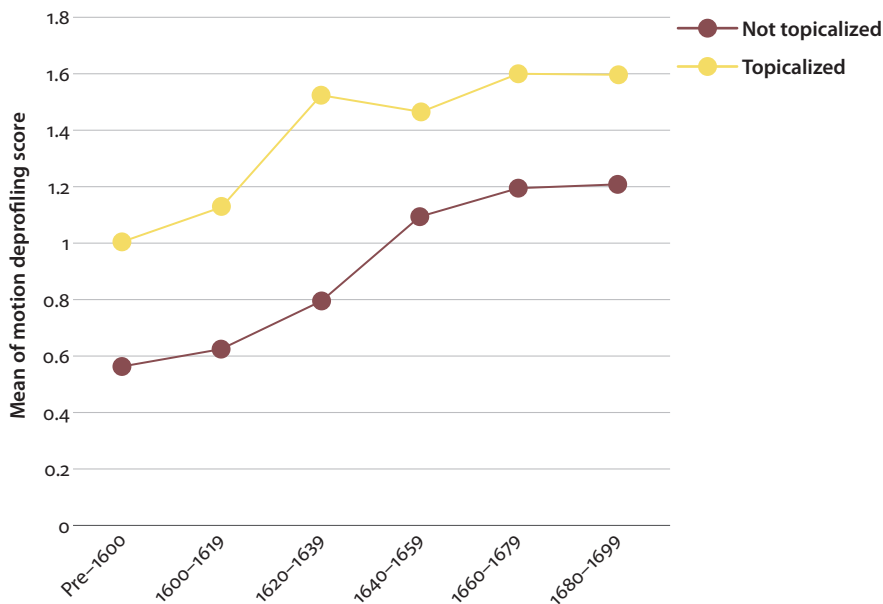
Figure 1. Motion backgrounding in topicalized and non-topicalized instances of [BE [GO]*ing*] [*to* INF]/ [BE *going to* INF]

There are two main observations that can be made. First, topicalized instances take the lead in the shift towards non-motion uses. Second, non-topicalized instances follow suit and catch up, in the end showing less distance from topicalized instances than in the beginning. Note that we are averaging over ordinal variables here, which is not allowed according to statistical rigor. We have still opted for this

visualization as it visually supports the Kendall's tau-b results given below, which essentially lead to the same interpretation. It must be kept in mind, though, that "true distance" is not faithfully represented here. Yet, this is not expected to change anything about the main observation, namely that topicalized instances take the lead in the shift towards non-motion uses.[8]

A Kendall's tau-b test based on these scores tells that the increase in the relative share of topicalized instances where motion is lost constitutes a weak upward trend (effect size [tau-b] = .05, $p = 0.09$). The weakness of this trend is clearly due to motion backgrounding already hitting a ceiling in the period 1620–1639. What is particularly remarkable, is that whereas up to 1620 there is only one topicalized instance where motion was clearly lacking,[9] motionless instances have already become the majority in 1620–1639. Separate Kendall's tau-b tests correlating transitions between pairs of periods to an increase in deprofiling scores further reveals that the only significant change occurs precisely between periods 1600–1619 and 1620–1639 (effect size [tau-b] = 0.32, $p = 0.054$).[10] As appears from Figure 1, non-topicalized instances also show a higher average degree of deprofiling motion in the course of the seventeenth century. In fact, the overall trend is highly significant ($p < 0.001$) and stronger (tau-b = .23) than with topicalized instances. The first significant increase occurs in the same transition from 1600–1619 to 1620–1639 ($p = 0.01$). However, the effect size is less than half that of the topicalized instances (.14), implying that the non-topicalized environment is not as progressive as the

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8. See e.g. Göb et al. (2007) for an overview of when arithmetic averages may be successfully applied to Likert scales, as well as alternatives (which we will not pursue here).

9. This is an outlier dating from 1605 reading "taking with his pawes a little childe which he was going to devoure, if hee had not …". It is a translation from a French work published earlier the same year (the original reads "il auoit prins auecque ses pattes vn enfant, qu'il alloit deuorer, s'il n'…", 'he had taken with his paws a child, which he was going to eat/would have eaten, if not …' (Le Loyer, 1605, p. 140). The second instance is from 1620 and is also a translation, this time from Spanish. Both Romance languages already had developed a grammaticalized future construction featuring "go" by then. The first non-translated instance is from 1626, after which date they rapidly become more common. The role of contact with Romance languages would be an interesting topic for future research.

10. Note that p-values of the special patterns (topicalization and passives) tend to be less low than similar trends in the non-special instances. This is quite simply the result of them being rarer. In fact, given the relative data sparsity of these special patterns before 1640, the fact that we still get p-values that are significant or approach significance is rather encouraging. We are also aware that it is somewhat unusual to use Kendall's rank correlation test with only two period ranks. The Wilcoxon rank-sum test is arguably a more conventional choice. For the transition between 1600–1619 and 1629–1639, its p-value is very similar to that of Kendall, at 0.057. In general, the p-values of the Wilcoxon test are almost identical to those yielded by Kendall. We therefore prefer Kendall because only this test also produces an effect-size value.

topicalized one, and produces less novel instances where motion is deprofiled or lost. It is only in the subsequent transition, from 1620–1639 to 1640–1659, that non-topicalized instances experience their strongest leap in the deprofiling of motion (.21), catching up with topicalized instances again, and eventually getting even closer to them than was the case originally (hence the stronger overall trend).

3.3.2   *Passives*

The second pattern is the one where [BE [GO]*ing*] [*to* INF] is combined with passive voice. This pattern has already received some attention in the literature (e.g. Hopper & Traugott, 2003, p. 89; Traugott & Trousdale, 2013, pp. 217–220). Petré (2019) provides the first quantitative discussion of how the usage of this pattern shifts in the run-up towards the grammatical constructionalization of [BE *going to* INF]. In the current analysis, we test whether this shift occurs earlier and more strongly than a similar shift in non-passivized [BE [GO]*ing*] [*to* INF]. To chart this shift, we distinguish three categories. In each category the notion of control is progressively deprofiled.

   (a) The first category is the fully lexical use pre-constructionalization. In this use, the subject is both in control of its motion and in control of the planned activity at the destination. The lexical interpretation of going is not at all affected – in fact the use of *be going* is probably motivated because the speaker wants to make clear that motion *is* involved. A clear example is (7).

   (7)   *When Arrius vau~cing himself in the streetes of Constantinople […] was going to the great Church to be restored into the communion and fellowship of the congregation …*   (1587)

Instances of this use received a score of 0.

   (b) The second category is illustrated with a passive example in (8) and an active one in (9). In this use, there is either clearly motion or a motion reading is possible. In either case, the subject is or would be in control of its (possible) motion, yet it is at the same time not in control of the composite action. The effect is that the semantic component of control (or agency) associated with *going* is deprofiled. All such instances were assigned a score of 1.

   (8)   *Iulita […], as shee was going to the stake to be burnt, exhorted wome~, that they should not complaine of the weakenes of nature.*   (1599)

   (9)   *A man falls over a Bridge and is a drowning, another is going to the place of Execution to die.*   (1659)

(c) Examples such as (8), particularly (as is common) when not accompanied by an explicit goal, pave the way for further extension to instances where the subject

is no longer in control at all, and motion is automatically also (most likely) lacking. An instance of this third category is (10). Such instances are scored 2.

(10)   *To be short, you see that my Magazin is going to be taken away from me.*

<div align="right">(1642)</div>

Figure 2 visualizes the increased deprofiling of control in passive and active instances of [BE [GO]*ing*] [*to* INF]. Parallel to Figure 1, topicalized instances are left out of the graph entirely, as their special nature may confound the picture.
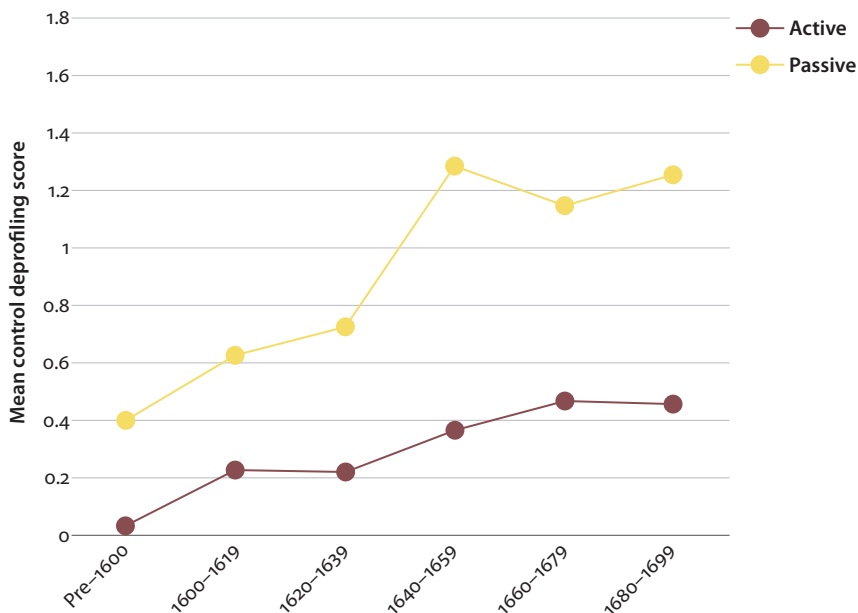
Figure 2. Control backgrounding in active and passive instances of [BE [GO]*ing*] [*to* INF]/ [BE *going to* INF]

The two main visuals that stand out in this graph are the same as in Figure 1. There is an overall increase of deprofiling, in this case of control, and the special patterns, the passive instances, take a leap at some point after which they appear to have reached a ceiling. Again, the visual picture is confirmed by Kendall's correlation tests. The overall increase of categories (b) and (c) is significant both in passives (effect size [tau-b] = .16, $p = 0.003$) and in actives (tau-b = .14, $p < 0.001$). The leap in the passive curve in Figure 1 corresponds to the strongest upward shift, occurring between 1620–1639 and 1640–1659. The effect size of this shift is twice as strong (tau-b = .32) as that of the overall trend with passives, and also fairly significant ($p = 0.016$). What is particularly remarkable is that category (c), where motion and control are both deprofiled, suddenly becomes the predominant one

in the period 1640–1659, leaping from a share of 11% in the preceding period to 48%. This leap is indicative of a qualitative leap associated with the conventionalization of a pattern or, indeed, the emergence of a new construction. The timing of the leap, occurring some 20 years after the breakthrough of the loss of motion in topicalized instances, suggests that the development in the passive was accelerated by what happened with topicalization. Still, the consistency of the trend means that passives already start developing internally from before 1600. It seems reasonable to assume that the passive helped [BE *going to* INF] in establishing a function of prediction beyond that based on activities controlled by the agent.

3.4   Interpretation of results: The birth of a construction

The general aim of this study is to show how a quantitative analysis of shifts in various types of connections yields insight in how the constructicon develops. In this first case study, we have provided quantitative evidence that there is a qualitative shift in the syntagmatic relations of pre-constructionalization [BE [GO]*ing*] [*to* INF] with topicalization and passive constructions. These two bridging contexts, unlike what has been claimed by Diewald (2006), are not in fact in any way untypical initially, but go through an internal semantic development precisely because this co-text or co-construction profiles or deprofiles certain semantic components. Importantly, the function or semantic impact of the co-text is not considered to be static itself. Throughout the development it also always slightly changes, as it is precisely because of the co-text that we are able to identify whether or not motion or control was lost. As the co-text that determines the interpretation is generally quite large, the relevant shifts would not be captured by traditional collocational analyses.

The question now is whether the shifts in the two distinct bridging contexts interact among each other and with other instances, causing all to converge in a similar direction, towards the grammatical constructionalization of [BE *going to* INF]. If they do, this is evidence of how horizontal syntagmatic relations feed into paradigm formation. It may be odd to treat [BE *going to* INF] as a paradigm, but in fact it is not fundamentally different from a morphological plural marker such as *-s* in that it has a substantive part to it, with a specific meaning, which can combine with any infinitival phrase (it is what one may call an "open paradigm"). Once the construction [BE *going to* INF] has become a fact, new instances sharing the same surface form will be interpreted as instantiations of that construction, meaning that a paradigmatic relation has been established.

Timing provided a first indication that this is indeed the case. Significant leaps were found at the 1620 boundary for topicalization and at the 1640 boundary for passives. After language users notice that these bridging contexts are being used in a different way, they also start to assimilate other instances, showing that the

syntagmatic relatedness that existed in the shared surface form [BE [GO]*ing*] [*to* INF] is not lost but reinterpreted, with a novel construction as a result. Besides the evidence of a qualitative leap around 1630, there is also evidence that the different patterns are increasingly interconnected.

Qualitative evidence that the bridging contexts cease to be deviant and horizontal paradigmatic relations with other instantiations (now of a general [BE *going to* INF] construction) are restored or reinforced again is found in the introduction of inanimate subjects. Most inanimate subjects are not in control of what is occurring to them, have no intentions, and are incapable of motion. It is remarkable, then, that they occur almost simultaneously in a topicalization context (1629) and in a passive (1630). The first attestation outside these special patterns is in fact earlier and dates from 1616, but it is a clear outlier (perhaps a spontaneous occurrence by an early innovator). The second instance dates from 1636, after which date instances start to occur on a more regular basis. The timing of around 1630 coincides with the acceleration of deprofiling in the passive itself, suggesting that there is a feedback loop here: topicalization fed into the development of passives and vice versa, and they both feed into the remainder of instances.

Overall, the evidence points to a qualitative leap, which might be considered the birth of the construction (the traditional stage of reanalysis) and which grew out of various shifts in horizontal syntagmatic connections. While the focus has been on semantic deprofiling so far, the loss of motion, loss of control, and introduction of inanimates also all point to formal change: in each of them, it is no longer possible to omit the [*to* INF]. The emergence of something new (a construction, a paradigm) is also in line with the overall perspective of language as a complex adaptive system (Beckner et al., 2009). Emergent phenomena are typical of such systems.

Finally, we would like to point out that the dynamics of the horizontal links do not stop after grammatical constructionalization. The emergence of [BE *going to* INF] as an auxiliary construction leads to the further entrenchment of this function. This further entrenchment increases the similarity of [BE *going to* INF] to existing auxiliaries of the future such as *will* or *shall*. The late appearance of structures such as (2) (traditionally referred to as raising constructions) is arguably a natural outcome of the further dynamics of this young construction. Interestingly, if we combine the data from EEBO with those from CLMET 3.0 (De Smet et al., 2011), Table 1 shows that the ratio of instances of raising with [BE *going to* INF] (as compared to all instances) gradually approximates that of its closest correlate in the modal auxiliaries, *will*. We do not have data for *will* from after 1700 but we assume that its ratio of raised instances has stayed more or less stable across time.

Being rare with auxiliaries generally, it is natural for raising only to occur once a certain frequency threshold of auxiliary-like use is reached. From this

Table 1. Ratio of raising with *will* and *be going to* INF

Construction	Period	Ratio
There will be	1500–1700	1/125
There is going to be	1680–1700	1/2000
	1710–1780	1/985
	1850–1920	1/320

perspective, it need not be an indication of the timing of constructionalization it-self. The approximation of raising behaviour is an illustration of how an increased similarity in co-occurrence patterns contributes to the eventual integration of [BE *going to* INF] into a broader paradigm of new auxiliaries that also include *want to* and *have to* (Krug, 2000), a process that is also shown in, among other things, the phonetic reduction to *gonna* (cf. Lorenz, this volume). The next section illustrates a similar post-constructionalization process, that of the gradual approximation of periphrastic DO and the modal auxiliaries. In addition to this parallelism, the role syntagmatic relations play in the constructionalization of [BE *going to* INF] will also be mirrored in the integration of DO in the modal auxiliary paradigm. We come back to this overall similarity between constructionalization and paradigm formation in the concluding discussion section.

4. Connections in paradigm crystallization: DO and the modals

4.1 Analogical attraction

Our second case study investigates the inclusion of DO in the paradigm of modal auxiliaries from 1580 to 1700. The empty English auxiliary DO, known as peri-phrastic DO, is a key feature of English grammar. Today, the construction virtually shares its distribution with the modal auxiliaries, particularly in the so-called NICE-environments (Huddleston, 1976), exemplified in (11)–(14). Whenever no other auxiliary is present, DO has become a semantically empty but grammatically required "operator".

(11) Negation:
      I do/will/shall/must not love you.

(12) a. Inversion (e.g., questions)
          Do/will/shall/must you love me?
      b. Negative questions
          Do/will/shall/must you not love me?

(13)   Coding previously mentioned material:
        So you ate all the cookies, did you?

(14)   Emphasis:
        I dó/wíll/sháll/múst love you! (*I lóve you*)

DO only started to occur in these contexts in the 16th century. Until the end of the Middle English period, DO typically occurred in clusters where the verb still straight-forwardly contributed to the meaning of the clause (cf. Denison's, 1993 overview). From the 16th century onwards, however, more and more uses of DO no longer seemed to contribute to the overall meaning (Ellegård, 1953; Denison, 1993; Garrett, 1998; Van der Auwera & Genee, 2002; Filppula et al., 2008). The period between 1600 and 1800, traditionally termed the regulation stage, witnessed the systematic diffusion of the semantically empty construction in the NICE-environments.

Periphrastic DO spread across these different contexts at different rates. According to Ellegård (1953), DO was present in about 80% of all negative questions (type (12b)) around 1550, but only in 50% of affirmative questions (12a), and a mere 35% of negative declaratives (11). By 1700, these values, while preserving their relative ranking, had dramatically moved up, entering the 80–100% range.

The regulation of DO has been explained in various ways. While the initial (incremental) phase of diffusion has been related to the development of fixed SVO word order (Warner, 1993), the more divergent frequency history of DO after 1600 (e.g., involving a temporary decrease of DO in negative sentences) has been claimed to betray a shift in its development, from being steered by this fixation of SVO to cognitive processing and economy of the system (Kroch, 1989, p. 183) or functional constraints such as signalling sentence type (Hudson, 1997, p. 62).

Warner (1993) suggests that a major cognitive factor was similarity with the modal auxiliaries. The modal auxiliaries and periphrastic DO not only show a striking distributional similarity, they also display a remarkable synchrony in their historical developments. Both maturate as auxiliaries in Early Modern English. An early influential account is Lightfoot's (1979), who argues that the category sud-denly emerged in Early Modern English. The opposite stance is taken by Warner (1993), who emphasizes that a number of formal features that eventually came to set apart the "pre-modals" or "pre-auxiliaries" from full verbs were already around in Old and Middle English. Such features include, for instance, modal semantics, preterite-present morphology, bare infinitival complements and the lack of non-finite forms. In this view, the rise of the auxiliaries in English was gradual rather than cataclysmic and was initiated in Old English instead of Early Modern English (Warner, 1993, pp. 92–93). Both accounts share the idea that Early Modern English is characterized by the sharpening of the (existing) boundaries between full verbs and auxiliaries.

The close timing between the cluster of changes that marked the birth of the modal auxiliaries and the rise of periphrastic DO in questions led to the belief that the rise of periphrastic DO was influenced by the modals: "[t]he coincidence of date here strongly suggests that the development in modals and in DO are interconnected. Any linguistic history must give some account of this interconnection if it is to be convincing" (Warner, 1993, p. 221). Warner describes this interconnection as follows:

> It looks at the first sight as if the connection between the category change of modals and the rise of *do* might be that it involved a reanalysis of *do* as a unitary item expressing tense/mood in the late fifteenth century, when this characteristic in modals became central to a basic-level word class; or if this had already happened, some favouring of *do* because of the word class's new status.
>
> (Warner, 1993, p. 223)

He does not only recognize an influence of the modal auxiliaries on periphrastic DO, he also tentatively hypothesizes that the reverse relation holds as well (pp. 221–222). If the auxiliaries underwent influence from periphrastic DO, that very influence sharpened the divide between modals and full verbs in Early Modern English even further.

Additional evidence for influence from the modal auxiliaries on periphrastic DO is put forward by Denison (1993), who observes that well before the 17th century negative sentences occurred significantly more often with an operator (or auxiliary) than their affirmative counterparts. If modals are likely to be found in negative clauses, perhaps for semantic reasons, it might well be that there arose an association between negatives and auxiliaries, which put additional pressure on the negatives without modal auxiliary. In these contexts, the insertion of periphrastic *do* is an attractive compromise: it obeys the paradigm pressure (cf. Diewald, this volume) to provide the negative clause with an auxiliary and allows it to abstain from modal semantics. For that reason, Denison argues, it might be interesting to investigate the presence or absence of periphrastic DO in contexts where modal auxiliaries are frequent.

The development of DO will be charted in terms of the pairwise cosine similarity (Jurafsky & Martin, 2009, p. 677) with each modal verb individually, both in the present and in the past tense. Pairwise cosine similarity is a standard way of expressing similarity between two (real-valued) vectors. How words are converted into such vectors is explained in Section 4.2. We look into the absolute strength of the cosine similarity for each word pair *within* each corpus period, as well as the degree to which the cosine similarity *changes between* periods. The forms at issue are provided in Table 2:

Table 2. Forms of *do* and the modal auxiliaries

Forms of *do*	Modals	
do	can	could
does	may	might
doth	must	
did	shall	should
	will	would

4.2 Operationalizing paradigm crystallization

4.2.1 *Artificial Neural Networks (ANNs)*

We operationalize the diffusion of periphrastic DO by means of learning algorithms that are inspired by the wiring of the human brain. Such models, currently known as Artificial Neural Networks (ANNs), consist of consecutive layers of processing units (mimicking neurons) connected by weighted links (McLeod et al., 1998). When confronted with a large body of structured data, the algorithms learn to detect salient patterns in the data all by themselves and they model the input they receive as a pattern of activation over those salient patterns. This property is appealing for constructionist language modelling: they define an object (i.e. a construction) as a unique pattern of activation over salient features (i.e. its cooccurrence rate with other constructions) in such a way that the relation between the objects becomes apparent. As such, ANNs operationalize the idea that objects are similar when they exhibit the same distributional features to a similar degree, which makes them well-suited to chart the paradigmatic relations between a group of related constructions.

While the application of Artificial Neural Networks to theoretical linguistic problems is relatively new,[11] ANN-based techniques have become state-of-the-art in a vast variety of data analysis tasks, including natural language processing (for a survey of the ANNs used in sentence modelling, see De Mulder et al., 2015) where they are prototypically used to turn a word's distributional information, as contained in a corpus, into a vector that indicates how the word relates to others. Such vectors are generally referred to as "word embeddings" (Mikolov et al., 2013a, 2013b; Tahmasebi & al, 2018, pp. 14–18).

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11. There have been constructionist experiments with other kinds of distributive representations (Hilpert & Perek, 2015; Hilpert, 2016; Perek, 2016; Perek & Hilpert, 2017; Percillier, this volume). Such representations, based on Positive Pointwise Mutual Interest (PPMI) matrices truncated by means of Singular Value Decomposition, derive from mathematically very distinct origins but are conceptually rather similar to ANN-based representations (Levy & Goldberg, 2014; Dubossarsky et al., 2017).

While the technical details lie beyond the scope of this paper, the conceptual basis of the model is rather intuitive and revolves around the idea that similar words are found in similar environments. If people were asked to complete the sentence "He went home to feed the ___. ", they are likely to come up with "cat" or "dog", or even, though far less likely, "kangaroo", but it is extremely unlikely that they will answer "train", "disturb" or "yellow". Humans are surprisingly good at this kind of task (e.g. Taylor, 2012), what signals that an important aspect of our linguistic skills is the intuitive feeling of which word fits where.

ANN models learn to encode the distributional information in a corpus by repeatedly guessing which word is missing from a given context. In the example above, for instance, the vector representations of "he", "went", "home", "to", "feed" and "the" are fed as input to the network, which converts it to a single vector. This vector is treated as the representation of the missing word, in this case "cat". This intuitively makes sense: if this had been the first time ever that we encountered the word "cat", it would have been natural to define that word solely in terms of its occurrence in that particular context, because that is all information we have. The true power of ANNs emerges only when this procedure is repeated for every occurrence of "cat" in the corpus, each time adjusting the current vector so that it lies closer to the representation of the new context while retaining the traces of the previous contexts that it has seen. After enough iterations, the vectors will stabilize and effectively encode the average of all contexts of "cat" it has been confronted with. Given that similar words occur in similar contexts, their vectors are adjusted in the same fashion and they will eventually grow very similar.

ANNs model distributional information completely automatically for all words at once. Such a holistic approach conveniently treats all words as proper constructions, ensuring that changes in the co-occurrence rate of two words has an impact on the representation of both of them, which naturally avoids the methodological pitfall of tracing the history of just one construction while assuming that the rest of the constructicon remains stable. As a result, they move beyond more widely used collocational measures (e.g. Distinctive Collexeme Analysis (Gries & Stefanowitsch, 2004), (non-truncated) Pointwise Mutual Interest). While such measures merely list the collocates of a construction, and therefore remain largely syntagmatic, ANNs go one step further by inferring the relation between two constructions from similarities in their collocational behaviour. Obviously, this is an attractive property for linguistic research, especially research into constructions that grow distributionally very similar.

4.2.2   *Model design and training*

Data was drawn from the Antigoon corpus, an 800-million-word selection from EEBO-TCP that covers the period 1580 to 1700. Antigoon enriches the

EEBO-TCP-transcriptions with tokenization and spelling normalization (making use of VARD2, cf. Baron & Rayson, 2008). The corpus is divided into six 20-year periods. The first three periods are an exhaustive collection of the corresponding data in EEBO. The last three periods consist of a random sample of EEBO texts, cut off at about 160 million words per period.

Using the CBOW architecture of the open source python library Gensim (Rehurek & Sojka, 2010), we generated 400-dimensional vector representations for all words that occurred at least 5 times in any of the six periods. Each of the six 20-year corpus periods has its own model and the models were trained in chronological order. In order to maximize comparability across periods, every new model was initialized with the parameter settings of the model trained on the data of the previous period. As such, we prevented that the vector representations cannot be compared due to differences in random initializations (cf. Kim et al., 2014).

Even with the noise from the random initialization excluded, it remained hard to tell if a change in the relation between two words reflected a genuine change in the data or was due to the model architecture. In order to tease apart data and model effects, we constructed a baseline corpus that resembles Antigoon in terms of general structure and data but lacks diachronic change (cf. Dubossarsky et al., 2017). The baseline contains six bins, equivalent to Antigoon's six 20-year periods. The texts from each genuine 20-year period in Antigoon were spread evenly over each of the six bins so that each bin contains the same proportion of data from each period. As such, the baseline corpus in its entirety comprises the same texts as Antigoon, but the relation between the subparts is random rather than chronological. Whenever a pair of words varied significantly more[12] in between Antigoon's genuine periods than in between the baseline bins, the change was considered as genuine.

4.3   All-DO control group

The pairwise similarities between the various forms of DO serve as a benchmark to test the reliability of our embeddings. As we know how they relate to each other in terms of (syntactic) distribution, we can exploit them as a control group to assess

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12. The significance measures were calculated on the level of the individual word pair. We trained the models 5 times on the baseline corpus, each time with different random initialisations. For each word pair, we calculated the average and standard deviation of their change in between consecutive baseline bins in those five models. Any change in the distance between a word pair was considered significant if it was larger than its average plus twice its standard deviation, as measured in the baseline corpus.

the accuracy of our embeddings in capturing distributional properties. The graph in Figure 3 below plots the cosine similarity of each word pair in each period.
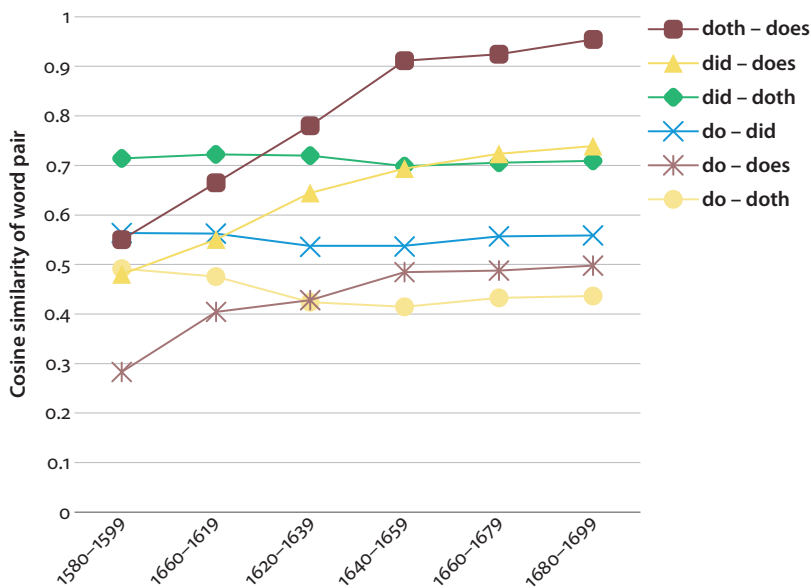
Figure 3. Cosine similarity between forms of DO

As it turns out, the relative order of the similarity scores by the end of the seventeenth century is in line with the actual distributional overlap between the word pairs. The only pair with identical distribution, *does-doth*, scores highest; the two pairs in complementary distribution, *do-does* and *do-doth*, receive the lowest score, while the three pairs with partially overlapping distribution (*did-does, did-doth* and *did-do*) are situated in the middle.

This suggests that the embeddings managed to capture the distributional properties of the words they represent and that it is safe to interpret them as such. In what follows, we look into the relation between the modals and, respectively, *does, doth, did* and *do*. We will first discuss general trends in similarity scores with the models collectively. Afterwards, we will look into the behaviour of the various modals separately.

4.4 Shifting patterns of similarity

Figure 4 provides a summary of the relevant similarity patterns between forms of DO and the modals over time. Significant in- and decreases in similarity are indicated with a full line, while dotted lines represent insignificant changes. As is apparent from graph (a). the pairwise similarities between *does* and the present

tense modals rise significantly until 1660 when they settle in the range of 40–60%. The past tense modals graph b display the same pattern, albeit at a 5% lower similarity rate. The low initial similarity and sudden increase in similarity are fully in line with what we expect of a form that is establishing itself in a paradigm.

Surprisingly however, these results are not replicated in the data for *doth*. The relation between *doth* and the modals not only remains stable, it does so at a remarkably high similarity rate. While it took *does* almost a century to acquire similarity scores in the range of 40–60%, *doth* achieved these scores as early as the 1580s. The early disparity between *does* and *doth* is also visible from the mutual relations in the all-do control group (Figure 3) where all significant increases in similarity stem from word pairs that involve *does*. Especially the pair *does-doth* is revealing: while the s-form was on its way to replace the th-form just like elsewhere in the verbal paradigm, it takes until the 1660s before the two forms settle on a distribution that is truly equivalent. The combined evidence suggests that, at least until 1660, *does* did not replace *doth* in all of its contexts at once and that the main cause of the disparity might well have been the use as operator. *Does* low initial similarity rates with the modal auxiliaries might betray a reluctance to take up operator functions from the start, spreading to purely syntactic uses only between 1580 and 1660, at a time when *doth* had already settled itself comfortably in the paradigm of the modal auxiliaries. With *does* fully accepting its role as operator, the distribution of *doth* and *does* became virtually identical, which paved the way for ousting the outdated *th*-form completely.

This hypothesis that DO is establishing itself as a member of the [AUX INF] construction or paradigm is corroborated by the behaviour of *did*, which predictably differs from the other forms of DO in its elevated similarity rates with past rather than present tense modals. Although significant changes are absent from the relations with *would* and *might*, the similarity with *could* and *should* steadily but modestly increases throughout the seventeenth century. All in all, it looks like *did*, just like *doth,* took a head start and established itself in the paradigm of the auxiliaries well before the 1580s. With *does* gradually taking over, *doth* did not get the opportunity to solidify its relations with the modal auxiliaries anymore. *Did* did, as evidenced by the moderate but steady increase in similarity with modal forms that it had weaker ties with.

One major trend apparent in all graphs is the remarkable symmetry in the similarity of each form of DO with the various modal forms. Not only is the relative order of the modals by and large preserved for all forms of DO, the hierarchy is also symmetrical in present and past tense. In fact, only the relative similarity with *shall/should* was subject to variability. In virtually all cases, DO patterned most like *will/would*, and its similarity with *can/could* outweighed that with *may/might*. The present tense modal displaying the lowest degree of similarity with DO was

a.

b.

doth – past tense modals

c.

did – past tense modals
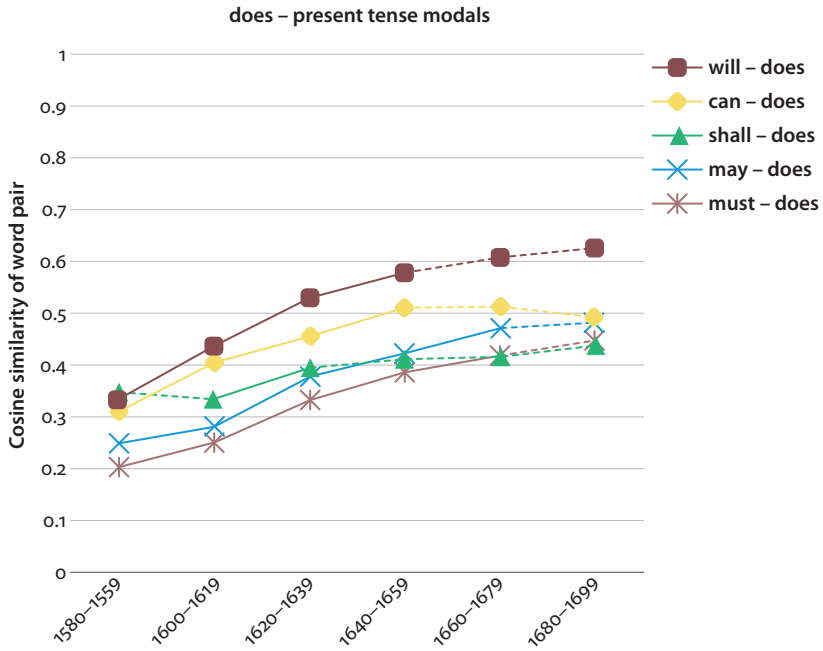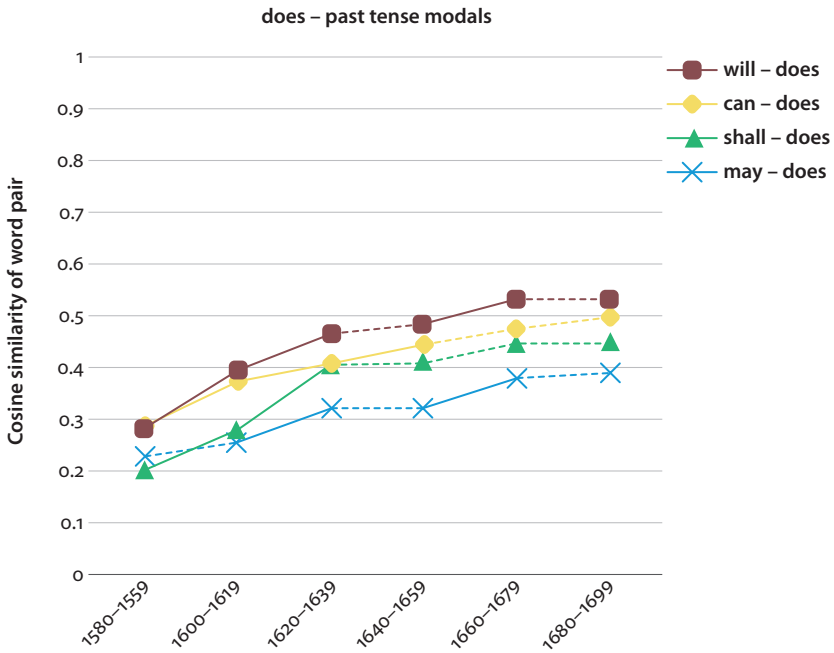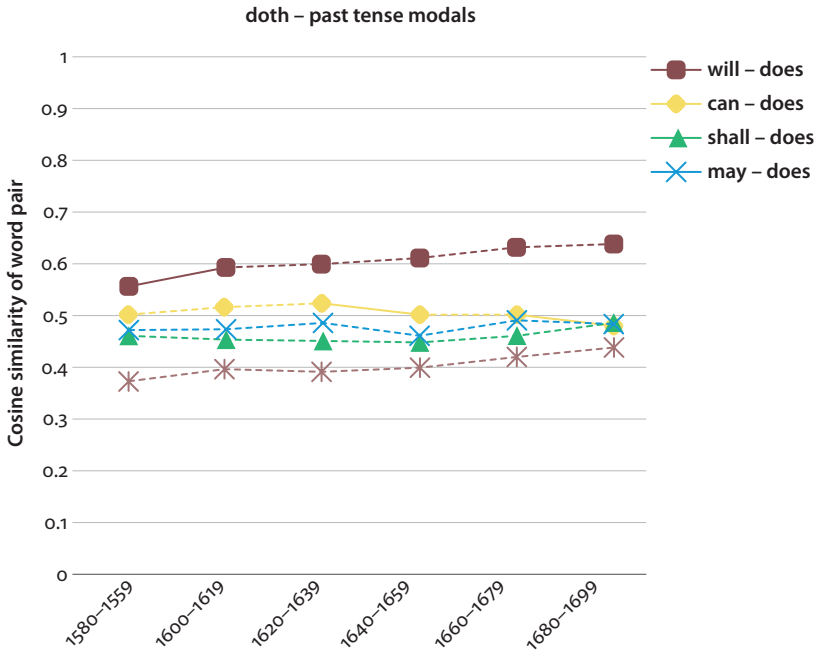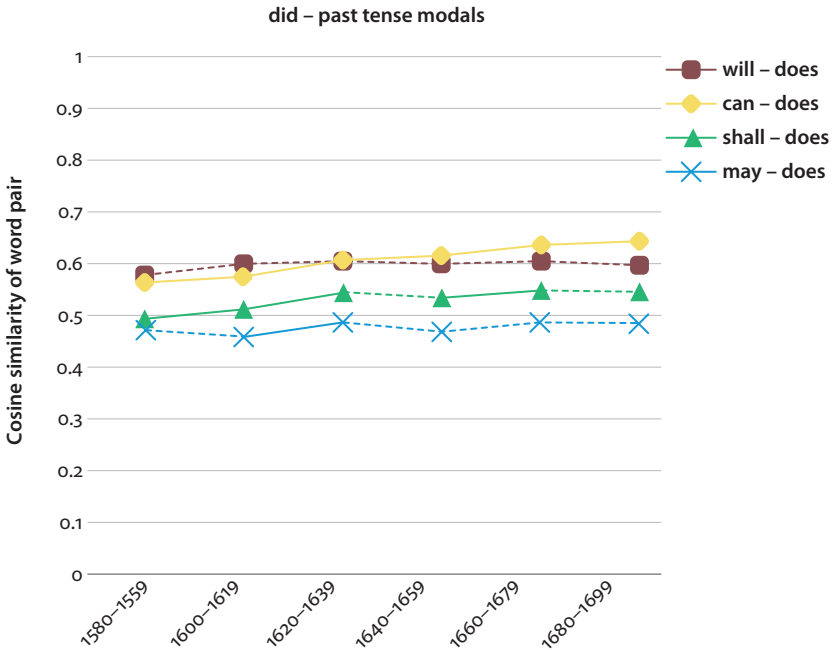
d.

Figure 4. Cosine similarity of forms of DO and forms of modal auxiliaries

systematically *must*. It is telling that *must* is the only modal form that has no past tense equivalent. Bearing on the connectionist assumption that the present and past tense forms of the same modal are strongly linked in people's minds, it is likely that the connection between a present tense modal and a form of DO benefits from a strong past tense connection with the same form, and vice versa. In that respect, *must* might have the weakest ties with DO because it is on its own and cannot rely on a past tense sister to reinforce its connection analogically.

4.5   Interpretation, limitations and future work

Our data-driven analysis of the relations between DO and the modal auxiliaries attempts to chart how syntagmatic connections with other constructions have led to the emergence of a paradigmatic link between DO and the modals, the rationale being that when a form of DO frequently co-occurs with infinitives that are also frequent complements of (one of) the modal auxiliaries, speakers – as intuitive statisticians – will perceive the two forms as similar. This leads to the emergence of a paradigmatic link, which will not only drag the form of DO towards that particular modal, but will also increase the probability that DO establishes similar paradigmatic links with the other auxiliaries. Thanks to the creation of such links – which is a self-enforcing process – DO is reanalysed as an auxiliary, solidified in the emergence of a vertical paradigmatic link with the [AUX INF] construction.

Our data corroborate this hypothesis in two ways. First, they point out that the inclusion of DO in the paradigm of the auxiliaries did not happen for all its forms at once. If the syntactic regulation of DO was the effect of a cataclysmic systemic shift, we would expect all forms of DO to take part in this change equally. Our data clearly indicate that this is not the case: it took periphrastic *does* until at least the middle of the 17th century to catch up with the other two finite uses of DO. This indicates that the shift towards syntactic regulation proceeded on a form-by-form basis, which is an argument in favour of an analogical account of the spread as analogy-driven phenomena are inherently form-specific.

Second, our data point to a remarkably symmetric and systematic difference in the relative similarity between the forms of DO and the various modal auxiliaries. If the inclusion of periphrastic DO in the paradigm of the modal auxiliaries was influenced by distributional analogy with the modal auxiliaries, not all of the modals exerted an equal amount of pressure. The mere fact that DO showed a different degree of distributional overlap with the modals is another indication of the gradualness and form-specific nature of the change. Moreover, the systematic order in which the modals patterned like DO provides us with pointers to the most likely loci of attraction. Potentially, the early distributional similarity between DO and WILL triggered a cascade of minor assimilations, each of which further

increased overlap between DO and WILL, and by extension the other modals, one form at a time, at the cost of the ties with lexical DO.

Obviously, the observations made on the basis of the word embeddings remain only tentative. A major drawback of our approach lies in its restriction to the word type level. The word type level serves its purpose to chart global relations between constructions, but it is not sufficiently fine-grained to explicitly indicate recurrent collocational patterns at the token level. To overcome this issue, we are currently complementing this information with a different design of ANN model – Convolutional Neural Networks (cf. Vanni et al., 2018) – that allows us to estimate the likelihood of every form in each context (cf. Table 3), which in turn will enable us to detect the prototypical usage of and overlap between all forms involved at various points in time, and hence chart the changing affiliations between all forms in the paradigm.

Table 3. The CNN classified both sentences as more likely to contain *doth* than *will*, indicating that contexts like these are a potential locus of perceived distributional similarity between the two forms

Prob. *will*	Prob. *doth*	Context
0.2%	97%	for it WILL evidently teach us the knowledge of god
0.01%	99%	as Solomon DOTH very plainly pronounce

In particular, sentence-based representations can help us solve the question *why* the similarities with the individual modals are so stable. It might bring to light which patterns cause the high degree of distributional overlap between DO and *will/would* as well as why their collocational similarities with *may/might* remain so low. In addition, a sentence-level approach might shed more light on the hypothesis that *does* was reluctant to take on purely grammatical functions initially.

5. Discussion

We have presented two different case studies, one about the emergence of a partly substantive grammatical construction, the other about the integration of DO into the crystallizing fully schematic construction (paradigm) comprising the modal auxiliaries. In each case, we drew attention to the role of various types of connections in these related processes. In this concluding section, we would like to summarize and discuss the theoretical implications of putting connections centre stage for cognitive construction grammar.

A first recurrent observation is that the knowledge of what a construction can be used for is to a high extent derived from knowledge of its co-text (as well as, of

course, its extralinguistic context, but this remains out of sight when dealing with written data). Also, when constructions are used in similar co-texts, we infer from this that they must also be associated in some way or another in people's minds (typically, though not necessarily, below the level of awareness). Only if they are associated, they may be expected to influence each other. Association is in the very least based on this distributional similarity but typically extends to a similarity relationship in terms of function – though other types of association are also possible (cf. association-based mechanisms such as contamination, cf. Pijpops & Van de Velde, 2016; or exaptation, cf. Van de Velde, 2018). The knowledge of such associations may be considered to constitute the paradigmatic dimension of language cognition. Importantly, these similarity relations are not stable. Rather, when a certain degree of similarity is perceived between utterances or constructions, this may have an impact on the production of subsequent utterances in the form of some kind of feedback loop, making new utterances even more similar. This kind of dynamics ties in perfectly with the conception of language as a complex adaptive system (Beckner et al., 2009): self-organizing and ever-adjusting.

The more similar constructions are, the tighter they will be linked at this paradigmatic level. Importantly, we would like to argue that the dynamic relationship between syntagmatic relatedness and paradigmatic relatedness holds at all levels of the constructional hierarchy: words, partly substantive as well as fully schematic constructions. Also, the perception of similarity can exist between patterns that are not, as such, (instances of a single) construction. Our first case study is an illustration of how this principle can account for the birth of the construction [BE *going to* INF] (its grammatical constructionalization, in Traugott and Trousdale's terms). As a construction, [BE *going to* INF] exhibits paradigmatic relations to all individual utterances that instantiate it. It also sets these utterances apart from lexical GO combined with progressive and *to* INF, with which it remains connected at a horizontal level nevertheless (not unlike the traditional polysemy link also discussed in Goldberg (1995, p. 75), although in this case polysemy implies more than mere semantic polysemy but includes formal differentiation as well). Interestingly, in a case such as this where there does not appear to be a pre-existing schema, the point at which the schema emerges can be empirically detected. The quantification of features that deprofile lexical components or profile the grammaticalized function has revealed a significant leap around 1630. The observation of such a leap moreover suggests that the concept of construction as a *sui generis* form–meaning node with its own properties and salience makes sense, and that linguistic knowledge cannot be reduced to connections alone. Put differently, a focus on connections is complementary to the focus on nodes typical of construction grammar. While the conceptualization of constructions as more or less symbolic units is an intuitive way of getting a hold on the complexity of language,

there is the risk of reifying these units to discrete entities, which they are not. Cognitive construction grammar also never claimed this to be the case but has nevertheless sometimes been misguided by such a conceptualization in modelling the constructionist network. Considering construction grammar to be primarily a (non-reductionist) connectionist model can help solving this problem.

The second case study, on the integration of periphrastic DO in the paradigm of modal auxiliaries, also illustrated how increasingly powerful syntagmatic ties (assessed by means of word embeddings) between constructions tighten their paradigmatic relations. In this case, however, this build-up of a paradigmatic association does not lead to a new partly substantive construction. Rather, periphrastic DO became distributionally more and more similar to the modal auxiliaries (and, possibly, also the reverse), as such being integrated more tightly into the already existing paradigm of modal auxiliaries. Regardless of whether such paradigms are treated as regular schematic constructions or dedicated paradigmatic "hyperconstructions" (cf. Diewald, this volume), the paradigmatic relations that eventually come to define them emerge, at least partially, from increasing syntagmatic similarity between their members. While it is hard to compare the different quantifications of this increase in similarity, in the case of DO the increase does not show a clear leap. This we take to reflect the fact that the auxiliary [DO INF] construction was already in place (i.e., reanalysis had already taken place) and already shared much of the distributional properties of the modals in the late 16th century. Yet, at the same time, it still also was tied more strongly to its lexical origin. Its diffusion, then, was a more gradual shift of alliance towards the modal auxiliaries. The added value of the connectionist methodology we have implemented is that this gradual shift can be differentiated for each modal. While further research is required (including moving on from aggregate word-level similarities to more finegrained similarities of word tokens in recurrent sentential or clausal contexts), the word embeddings already revealed a number of interesting observations that have escaped more qualitative analyses. A first interesting observation is that *does* is initially less similar to the modal verbs than its older brother *doth*. This kind of information might have been gained from traditional corpus-based analysis as well, but the data-driven method applied here has the benefit of revealing such facts even if they are not specifically looked for. Other interesting observations include the higher similarity to *will/would* as well as the increase in similarity with *could* and *should* but not the other past tense modals. Future research will have to settle whether or not there is a functional explanation for these observations.

Overall, we hope to have shown how connection-driven analysis can be integrated into construction grammar. Adepts of the theory of connectionism have criticized symbolic theories for their naive rule-based organization (Bates & Elman, 1993; Elman, 2001). Construction grammar, as a monostratal, usage-based

theory, in principle leaves ample room for the role of similarity on top of that of strictly delineated symbols. Nevertheless, the focus in construction grammar has so far often been on how constructions differ from each other. The reasons for this focus are partly to do with the history of linguistic theory. Construction grammar started as a theory centred on idioms. This background inspired the theory to highlight the importance of treating alternating constructions (such as the active and passive or the two realizations of the ditransitive) as independent entities, with a focus on their differences. As a result, while similarity between utterances still received ample attention in constructionist acquisition literature, its role in paradigmatic relations was somewhat neglected. Yet, paradigmatic relations are a natural outcome within a usage-based framework and deserve full attention. Our case studies have shown how a connection-driven perspective can operationalize the notions of similarity and (degree of) paradigmaticity.

Acknowledgments

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This volume brings together ten contributions by leading experts who present their current usage-based research in Diachronic Construction Grammar. All papers contribute to the discussion of how to conceptualize constructional networks best and how to model changes in the constructicon, as for example node creation or loss, node-external reconfiguration of the network or in/decrease in productivity and schematicity. The authors discuss the theoretical status of allostructions, homostructions, constructional families and constructional paradigms. The terminological distinction between constructionalization and constructional change is revisited. It is shown how constructional competition but also general cognitive abilities like analogical thinking and schematization relate to the structure and reorganization of the constructional network. Most contributions focus on the nature of vertical and horizontal links. Finally, contributions to the volume also discuss how existing network models should be enriched or reconceptualized in order to integrate theoretical, psychological and neurological aspects missing so far.

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