

Metalinguistic Discourses

Edited by

Viviane Arigne and
Christiane Rocq-Migette

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INTRODUCTION

VIVIANE ARIGNE
AND CHRISTIANE ROCQ-MIGETTE

Contemporary linguistic research is diverse and uses a great variety of concepts and terms, which pertain to its fields of study (phonology, morphology, syntax, semantics), to its various theoretical trends (Guillaume's psycho-mechanics, generativist, enunciativist, cognitivist trends, etc.) or sub-trends (trace theory, binding theory, construction grammars, cognitive grammars, etc.). Other labels are used to refer to methods or working practices, such as field linguistics, corpus linguistics, automatic treatment of natural languages. All this leads to a proliferation of theoretical terms as well as theoretical discourses and to the consequent fragmentation of knowledge. Starting from this observation, we aimed at conducting an inquiry into the heterogeneity and diversity of linguistic theories, in order to assess their descriptive and explanatory power. A conference on the subject was held at Paris 13 University in October 2012, for which we suggested a number of directions and angles from which to analyse and possibly confront metalinguistic theoretical discourses. The eight contributions presented here constitute the result of this attempt.

The first part is dedicated to formal and theoretical issues. The first and third chapters both deal with the notion of theoretical representations, assessing their validity and the role they may play at the different levels of their hierarchy, while the other two sections analyse the historical contexts of the emergence of the linguistic trends of cognitive linguistics and systemic functional grammar, giving an account of how their respective theoretical stands originated in former linguistic positions or traditions. In "Metalinguistic Discourse and Formal Representation," Jean Pamiès questions the very notion of metalinguistic discourse and observes that a formalized theory can only be confronted to empirical data through some naive theory interpretation, a naive theory providing a conceptual grid indispensable for turning raw observation into data, while a formalized theory captures in artificial language the structure of naive theory. He questions what is understood by formal representation and notational

variant and also analyses the nature of formal symbols, seen as pure ipseity. The author also argues that algebraic and geometricized representations are as complementary as the blind man and the cripple, the former not knowing where he is going and the latter being unable to follow any of the routes he can see. This contribution is a preliminary study meant to prepare further research upon representation in its cognitive, cerebral, semantic and intentional aspects. The second chapter is entitled "Generative Grammar and Cognitive Linguistics: on the History of a Theoretical Split in American linguistics." In this contribution, Jean-Michel Fortis examines the current conflict between generative grammar and cognitive linguistics, the origin of which he sees in the disagreement that opposed generative semantics to the mainstream syntax-centred Chomskyan brand of generative grammar. He analyses the motivations of the semanticist linguistic movement, showing how it paved the way for cognitive linguistics. Three case-studies focusing on linguists Lakoff, Langacker and Talmy explain how these linguists, bereft of any theoretical affiliation following the failure of generative semantics, adopted theoretical stands which constituted the pivotal ideas of cognitive linguistics. In the next chapter, "Metalinguistic enunciative systems. An example: temporality in natural languages," Jean-Pierre Desclés and Zlatka Guentchéva explore the internal structure of the theoretical model of cognitive linguistics. More specifically, they examine the way different levels of metalinguistic representations connect and interact by means of an explicit compiling process. Within the "generalised compilation" hypothesis, metalinguistic representations are seen as intermediate representations between cognitive representations and linguistic expressions. Accordingly, the fundamental commitments of linguistic semantics are to specify the syntax of each metalinguistic level as accurately as possible, to minutely describe the architecture of relations between related levels, as well as to give an account of the modes of translation of the expressions from one level of representation to another. The approach is illustrated by the analysis of the representation of tense and aspect within an enunciative framework, which shows that propositions underlying utterances are not directly expressed by linguistic expressions, as different enunciative operations are taken into account. In chapter four, "From functions to metafunctions: the sources of British functional linguistics," Charles-Henry Morling endeavours to study the genesis of the notion of metafunction put forward by Halliday. Analysing the development of Halliday's work, he places the functionalist turning point of his systemic functional grammar in the two years between 1966 and 1968. He shows that those functions of language Halliday calls metafunctions are indeed

defined on empirical grounds and originate in the more traditional syntactic functions, and cannot therefore be said to be *a priori* categories or to mark any significant theoretical advance. Not acknowledging any real qualitative difference between these syntactic functions and his own metafunctions, Halliday's argumentation firmly established the latter in the empirical tradition of the London school.

The contributions gathered in the second part evaluate the results of a certain number of linguistic studies, putting various theories to the test in the fields of syntax, semantics and discourse analysis. Olivier Simonin analyses some of the conceptual problems raised by linguistic categorization. In a chapter entitled "Gradients, scales and clines," he addresses the questions of tokens which apparently belong to two categories. After summarising the two major models of categorization (the Aristotelian one versus categorization seen as a continuum) he introduces and discusses Aarts' notions of intersective gradience and subjective gradience. Basing his claim on three case-points, he argues that it is possible for two tokens to pertain to two categories. This is providing there is a structural ambiguity between two syntactic interpretations amounting to the same general meaning, or where one interpretation appears to be superimposed onto another. Kate Judge's contribution studies the semantic domain of modality and explores the explanatory power of two commonly opposed theoretical stands on the subject, namely the formal and functional approaches. Under the title "Are possible worlds necessary? Evaluating theories of modality," she pleads for a moderate attitude towards both and warns against focusing too exclusively on either of the two theoretical positions. Her inquiry leads her to remark about the importance of acknowledging the respective dimensions of cognition, sociocultural parameters and pragmatics for a proper understanding of the semantics of modality. Also, possible worlds may not be necessary but should not be too hastily discarded altogether. Being aware of various angles is probably one of the conditions for a better account and a more thorough analysis of the semantic distinctions between root and epistemic meanings or even between evidential and epistemic interpretations. The following chapter is entitled "Irony in two theoretical frameworks: relevance theory and argumentative polyphony theory." Focusing on discourse analysis, Tomonori Okubo draws a comparison between the theoretical frameworks of relevance theory and argumentative polyphony theory, supported by their respective analyses of irony. In this light, it appears that much of what is described in terms of cognitive pragmatics might be better accounted for in linguistic terms, and this probably applies to a greater number of linguistic phenomena than is usually thought.

Polyphony is constitutive of language and it is language itself which commands the tones and textual functions of an utterance at a particular time of utterance. In the last chapter, “Pragmatic vs. enunciative views of spoken English discourse; interpreting the prosody of certain parenthetical ‘comment clauses’,” Steven Schaefer focuses on the contrast between functional or pragmatic and constructivist or “enunciativist” approaches to the prosodic realization of two specific types of comment clause (*I think* and *you know*). Basing his arguments on a prosodic analysis of a selection of spoken corpora, he considers that the pragmatic view often taken in the literature misses the pertinence of the semantic origin of these discourse markers and does not take into account all the aspects due to discourse positioning; he also shows that intonation units do not primarily echo the syntactic structure of language as has been traditionally thought. Taking an utterer-centred approach, he argues that exchanges can be formally construed from the standpoint of abstract enunciative positions taken by the enunciator and co-enunciator as linguistic constructs, subject to modulation in context by prosodic means. This theoretical approach makes it possible to reconsider the concept of epistemic stance. A corpus-based spectrographic analysis of the prosodic realization of several examples shows the pertinence of suprasegmental phenomena which accompany these markers.

This book addresses the complex epistemological issues of metalinguistic discourses, questioning the very theoretical constructs or some fundamental concepts linguistic analyses are built on, at times confronting different theories, at others, analysing the history of their birth and development, or again assessing their explanatory power in the light of empirical linguistic data. This enterprise may result in discarding certain theoretical stances or ways of reasoning; it can also be conducive to a clearer view and a better analysis of what real and indeed deep contradictions may be found between theoretical positions. It may also very well bridge the gap between certain theories so far almost completely impervious to each other, by highlighting similarities of commitments or analysis. This sort of consideration has already been put forward in the literature, notably—were we to mention only two of the theoretical currents which are being scrutinised or put to the test in the present book—regarding cognitive linguistics and utterer-centred, i.e. enunciative, theories.¹ We hope that *Metalinguistic Discourses* can be a step towards this acknowledgement of common aims and a finer understanding of the vocabulary and concepts of theoretical discourses.

CHAPTER ONE

METALINGUISTIC DISCOURSE AND FORMAL REPRESENTATION

JEAN PAMIÈS

Introduction

As understood here, the term ‘metalinguistic discourse’ will be taken to cover all the means the theoretician uses to state what he has to say:

- (a) about the object he has chosen to study (including specific descriptions, generalisations or explanations offered as analysis);
- (b) about the epistemological framework he has elected to guide his investigation (including chosen specific goals, accepted idealisation, or ontological claims for posited entities and constructs); and
- (c) from a reflexive perspective, about the concepts and constructs he uses to achieve his goals.

To find or devise the expressive resources needed, such metalinguistic discourse will typically draw both:

- (i) on natural language vocabulary and syntax (with, if needs be, a profusion of technical jargon vocabulary and phraseology extensions); and
- (ii) on an open class of artifactual diagrams, schemas or formulas, including those of artificial languages or formal systems. Whenever a reflexive consideration of type (c) concerns a type (ii) element and is couched in a formulation using a type (ii) item, we shall say that, on the one hand, the concerned element of type (ii) is treated as pertaining to the (artificial) object-language and, on the other hand, that the type (ii) item used in the reflexive consideration belongs to the (by definition, artificial) meta-language.¹

In the framework of this quite general definition, for reasons of available space, the work presented here is only the first half of a more specific study on the Protean use of the concept of representation in formalised, or at least partially formalised (mainly Chomskyan), linguistic theories. The aim of this over-all study is to shed some light on what holds together (or fails to hold together) the motley conglomeration of intended acceptations for the term in such collocations as ‘formal representation,’ ‘cognitive representation,’ ‘cerebral representation,’ ‘graphic representation,’ ‘scriptural² representation,’ ‘symbolic representation,’ ‘semantic representation’ or ‘intentional³ representation.’

Focussed on the key concept of ‘formal representation,’ the first half we present here is chosen because it can stand on its own feet while laying indispensable foundations for the second. Our guide-line throughout being that in the quest for adequate tools of types (i) and ii), considerations pertaining to (a) and (b) must be viewed as two sides of the same metalinguistic coin and in section 1, we shall dwell on the epistemological framework without which it would make no sense at all to talk about formal representations. In section 2, we shall introduce two basic kinds of formal representations, underscore their dual nature, counter formalist attempts at nipping in the bud any idea of formal ‘representation’, explain what it is that formal representations (each taken as a whole) are representations of, and define ‘notational equivalence’ amongst formal representations. In section 3, we shall concentrate on the representing side of a key sub-part of formal representation, the formal symbol. By first establishing what this representing side cannot be, we will then determine what it actually is, and a few observations will be adduced in support of the claim. In section 4, we shall concentrate on the other side of the (by definition, uninterpreted) formal symbol: that which, as such, it might be a representation of. Thanks to specific type (b) assumptions, we will then show what formal object a symbol *per se* is a representation of, as a result of which process of radical abstraction, and what light this sheds on the dialectics of formalisation and interpretation. In section 5, essential features of the way quantifiers are used are shown not to be a problem after all for the ontological claim made for the formal symbol in the preceding section, a claim for which an elucidation of the unlikely oxymoron ‘variable constant’ is shown to bring support. Finally, reasons are given to conclude that currently entertained acceptations for ‘individual’ and ‘domain of discourse’ are too narrow and too broad, respectively.

So far, consideration of a handful of simple, made-up examples will already have served to illustrate the distinction between naïve and formal

theory and explore the nature and expressive potential of such type (ii) inscriptions as ‘algebraic’⁴ and ‘geometricised’⁵ representations. In addition, the delineation of classes of notational variants among such inscriptions will have begun to raise issues of identity, equivalence and distinction and to re-emphasise the importance of the role of abstract mathematical objects in formalised empirical investigation. However, in section 6, we shall delve more specifically into the arcana of fig. 1-1–20, both to illustrate and comfort already formulated contentions and to work on the compared merits and/or demerits of algebraic and geometricised formal representations.

As a conclusion, after a recapitulation of our essential claims, in a prospective note we shall outline the main features and guiding principles of the sequel to come.

Throughout, we shall try to reduce to reasonable size such technical material as the full definitions and formal underpinnings for fig. 1-1–20, but, in the notes, the interested reader will find more detail, and precise references for the entire paraphernalia.

Finally, we shall use the following internal cross reference conventions:

- (A) from beginning to end of this work, the successive stages of the main overall argumentation (premises, definitions, conclusions or results) will be numbered using bracketed Roman numerals [from (I) to (XL)], with italics for contentions tentatively introduced only to be discarded further as untenable [(VI), (VII), (VIII), (X)], and bold type for claims of greater importance [(I), (II), (V), (XI), (XII), (XIII), (XV), (XIX), (XXI), (XXII), (XXVI), (XXXI), (XXXIII), (XXXIV), (XXV), (XXXVI)];
- (B) within the narrower confines of a particular section or subsection, the successive steps of a sub-argumentation locally buttressing one or more mainstream claims will be numbered using Arabic numerals of various types [for instance, within section 6, steps 1.–20., with intermediate results $\boxed{1}$ – $\boxed{5}$ will be adduced in support of conclusions (XXXV)–(XL)];
- (C) whenever [within a note (e.g. note 8) or from note to associated main text (e.g. note 24)] an otherwise unreferenced English passage in double quotes is coupled with a fully referenced quotation in French, it is to be understood that the former is our translation for the latter.

1. Formalisation: naïve theory, formalised theory, abstraction and empirical content

Our starting point here will be the distinction between naïve and formalised theory.

In the framework of our type (i) and (b) assumptions, a ‘naïve’⁶ (or ‘intuitive’)⁷ theory T_n is by definition an unformalised theory, that is to say a theory resorting almost exclusively to natural language (occasionally with loosely illustrative drawings or schemas⁸) for its expressive tools. In this context, the use of ‘naïve’ echoes a sense of dissatisfaction with the error-inducing imprecision and ambiguity of the former and the uncontrolled intuitive and “[over-]powerful analogical import”⁹ of the latter.

To improve on a theory T_n thus perceived to be “lumbered with too much resort to intuition”¹⁰ and replace it by a ‘formalised theory’ T_f, the formalising strategy is to use an “artificial language”¹¹ AL generated by a “formal system”¹² FS (or “calculus”¹³), “of algebraic type,” the “expressions” of AL comprising the well-formed “formulas” (wwfs) generated by the “production rules” of FS and, among those wwfs, the subset of “theorems” obtainable *via* the “derivation rules”¹⁴ of FS.

While, in T_n, “the meaning of the terms plays an important part in the way they are used and combined”¹⁵ to form larger constructs, one major ‘improvement’ in T_f is meant to be that, in the way the rules of FS apply, ideally¹⁶, any such consideration of how the symbolic material constituting the formulas of LA might be interpreted is “completely eliminated”¹⁷.

“The calculus [operating] thus ‘by transforming formulas according to certain prescribed laws’,”¹⁸ crucially, “in order to transform a [formula] into another, the pre-established rules” of FS apply “regardless of the properties of any entity those symbols might be held to represent,”¹⁹ and it is precisely in this sense that FS can be said to be a “a calculus [...], that is to say a system consisting of nothing but its syntax.”²⁰

On the one hand, then, T_f would be at best a formal, not a formalised theory²¹ if, once achieved the initial formalising move away from T_n, no attempt was made to return from T_f to T_n *via* a process of ‘interpretation’ assigning to each formula or relation of T_f some naïve content expressible in the terms of T_n.²²

And on the other hand, given that, in order to “curb any form of reliance on what is merely felt to be obvious,” the strategy is “to establish a mapping from the content-laden objects of T_n and their relations onto symbolic formulas *per se* devoid of such content,”²³ the move from T_n to T_f is one of abstraction—where ‘abstraction’ is “an operation” which

consists in either “isolat[ing] a property from a certain type of object (concrete or ideal) to consider that property in itself, or in cut[ting] off a property or a relation from one or several objects to retain for consideration what is left after the severing.”²⁴

Hopefully culminating in the full extirpation of “the structural properties” of Tn as “symbolically expressed”²⁵ in Tf, the formalising process may be intended to be partial or complete,²⁶ and the abstracting away from intuitive content a matter of degree²⁷ between the absolutely naïve and the totally abstract.²⁸

Ideally, if it is possible to “demonstrate 1) that each theoretical, intuitive proposition [of Tn] is derivable in [FS] (i.e. has a corresponding theorem²⁹ in FS [of which this proposition is an interpretation, and] 2) that each theorem of FS can be interpreted by a theoretical, intuitive proposition [of Tn],” then the relation between Tf and Tn may be said to be one of “adequation,”³⁰ and “the structural properties” of FS may be held³¹ “indeed to be those of Tn.”³² But with this *proviso* that, in actuality, adequation between a given Tn and some proposed Tf is itself a matter of degree and, for principled reasons can never be proven to be fully established. Essentially because, due to the obvious impossibility for the formalising process to magically transmute the naïve into the formal prior to formalisation, it is in the nature of the case that ampliative (non-demonstrative) inferences only are accessible by way of justification—which of necessity falls short of the called-for demonstration.³³

But the “intuitive naïvety”³⁴ of Tn should not be confused with unsophistication, and the somewhat condescending connotations of the terminology should not obscure the fundamental importance of naïve theory.

In the particular case of empirical science,³⁵ unformalised as it may be, Tn is an indispensable prerequisite to investigation.

Without the mode of questioning and the conceptual grid provided by such a theory, it would simply be impossible to “go beyond appearances.” A naïve theory alone can provide the means to apprehend as data the otherwise overwhelming and intractable flux of raw empirical phenomena and is elaborate enough to conceivably undergo formalisation.³⁶

In other words, empirical data are indispensable intuitive-laden constructs of Tn obtained *via* its selective, oriented conceptualisation and organisation of empirical phenomena. And it is from those constructs, regardless of their intuitive content, that Tf extirpates a structure³⁷ by abstracting away from the structured.

So that, in a nutshell, contrary to their interpretations, as such,

(I)A formalised theory Tf and its constructs have no empirical content,³⁸

and naïve theorising is inescapably the first stage in the formalising process,³⁹ a precondition for further formalisation and interpretation.

Furthermore, the relation between Tn and Tf is one of constant, mutual interaction. On the one hand, FS is commonly devised while ‘thinking ahead’ of some targeted Tn interpretation. So that the specific organisation of the constructs of Tn dictating, as it were, the ‘terms and conditions’ of the tacit formalising contract, this anticipatory concern for successful adequation acts as stimulating goad for on-demand innovative formal imagination—so that Tn has an impact on Tf. And on the other hand, the formal results and demands of Tf in terms of explicitness and precision may suggest or impose for Tn small adjustments or serious re-thinking, if not radical re-consideration⁴⁰—so that Tf has an impact on Tn.

Finally, this constant “oscillation between the naïve and the formal”⁴¹ and mutual feed-back between Tf and Tn is so vital for the dynamics of theoretical change and progress in empirical investigation that, when it is claimed that Tn is the first stage in the formalising process, this does not mean that the naïve theorisation process becomes ‘old hat’ as soon as Tn has served its ancillary purpose in the ascent to the formal spheres of Tf. On the contrary, it needs to be permanently sustained as an ever-renewed and ever-renewing constitutive part of the over-all formalising dialectical process.

2. Formal representations (algebraic and/or geometricised): dual nature, formalist strictures, abstract formal objects and notational variants

In this section, we now turn to what we may learn from a consideration of the made-up examples of fig. 1-1–20⁴² about the kind of notational apparatus that may be used as Tf representations, or ‘formal representations’ FR.

A cursory glance at such FR representations as fig. 1-1, 1-13, 1-14 or 1-10 is enough to show that they are *per se* unintelligible for the lay reader, that there is no guessing for sure what they stand for—in our type (i) and (ii) terms that, unless appropriate ‘deciphering instructions’ DI_{FR} are provided, there is no grasping⁴³ what it is that they are supposed to be the ‘*locus tenens*’ LT_{FR} for. Without such specific instructions, a would-be formal representation FR reduced to just an orphan *locus tenens* (or ‘placeholder’) is no representation at all, nothing but useless graphic junk.

In other words, in a formalised theory, the notations⁴⁴ *per se* are illegible, so that, properly speaking, a formal(ised) representation FR

consists of an ordered pair (notations, deciphering instructions for those notations). In our (i) and (ii) terms,

(II) A formal representation FR is an ordered pair (LT_{FR}, DI_{FR}) .⁴⁵

Focussing now on such FR representations as fig. 1-1, 1-14, 1-13, 1-10, 1-11 and 1-17, what they have in common is that they are ‘algebraic,’ that is to say couched in the standard scriptural notations of ordinary writing and printing, but⁴⁶ drawing on the full distinctive potential of the whole gamut of typographical resources.⁴⁷

It is in the nature of scriptural techniques of notation that a character like, for instance, the letter ‘A’ is to be sharply distinguished from the class of its concrete realisations, the former being one and the latter innumerable many—and (owing to manufacturing imperfection) inevitably materially non-strictly identical. The distinction between abstract character and concrete inscriptions being analogical to the distinction between abstract phoneme and concrete phones, in our type (i) terms we shall draw a distinction between (abstract) ‘grapheme’ and (concrete) ‘inscription’ on some material support.⁴⁸

From which it follows that the *locus tenens* of an algebraic formal representation cannot be an inscription. Otherwise, from one copy of the present article to another, the slightest difference in shade of black in the material realisation on paper⁴⁹ of, say, fig. 1-13 would have to count as resulting in the transmutation of one formal representation into another, reputedly distinct, formal representation. With the absurd consequence that, since such nuances in shade are technically inevitable, no two copies of the present article could ever be held to have been written about the same things.

In other words (without even taking (I) into account), in our type (i) terms,

(III) An algebraic formal representation FR cannot possibly consist of a concrete inscription.

If we now turn to such FR representations as fig. 1-2, 1-3, 1-8, 1-15, 1-16, 1-19 and 1-20, they have in common being ‘geometricised,’⁵⁰ that is to say, by our definition, constructed by resort (commonly, together with ‘algebraic material’⁵¹) to such geometry-like items as points and segments of curves or straight lines), then exactly the same point as (III) can be made, for essentially the same reason. The distinction between (abstract) ‘enriched oriented graph’ and ‘(concrete) inscription’ being, again, analogous to the distinction between ‘abstract phoneme’ and ‘concrete

phone,⁵² it follows, this time, that the *locus tenens* of a geometricised formal representation cannot be an inscription. Otherwise, from one version of the present article to another, the slightest, half a degree difference in the orientation of one segment featuring in, say, fig. 1-2 would again have to count as resulting in the transmutation of one formal representation into another, reputedly distinct, formal representation, just as absurdly with regard to standard notational practice.

In other words (again without even taking (I) into account), in our type (i) terms,

- (IV) A geometricised formal representation FR cannot possibly consist of a concrete inscription,

and, subsuming (III) and (IV) (still without even taking (I) into account):

- (V) A formal representation FR, algebraic and/or geometricised, cannot possibly consist of a concrete inscription.

More importantly, by very much the same token, we may hope to shed some light on the “strong⁵³ formalist” conception of mathematical objects, which claims that

- (VI) “Mathematics consist of an array of concrete symbols.”⁵⁴

The matter is of some importance here, given that, if it could be maintained, (VI) would entail that the whole course we have followed so far is misguided and that it does not make sense to talk of such things as $DI_{FR}(LT_{FR})$ because

- (VII) Formal notations are not representations (scriptural, formal, whatever), since they do not represent mathematical objects at all: they *are* those mathematical objects.

To make sense of the strong formalist claim (VII), one might take it more precisely to mean that

- (VIII) Mathematical/formal objects are nothing but inscriptions.⁵⁵

But such considerations as led to (V) immediately dismiss the suggestion: Since no two material inscriptions can ever be materially strictly identical, it would otherwise follow from (VIII) that in a formal text, nothing could be held as an occurrence of anything because it would

be all tokens and no types,⁵⁶ and that by way of keeping track, it would have to be all *non sequiturs* throughout, since in scatter-brain fashion no two passages could ever be held to be about the same thing. Such implications are so absurd that even the strictest of nominalists⁵⁷ soon had to concede⁵⁸ that

(IX) Mathematical/formal objects cannot possibly consist of inscriptions.

Failing (VIII), to make safer sense of formalist contentions that mathematics are nothing but rule-governed manipulations of notations, a last-ditch option was to try reducing mathematical objects, not to concrete inscriptions, but, in our type (i) and (ii) terms⁵⁹ to abstract orphan *locus tenens* (graphemes and/or or graphs), that is to retreat from (VIII) to

(X) Mathematical objects are nothing but abstract notational types of which concrete inscriptions are tokens.⁶⁰

That way, by reducing the unmanageable myriads of disconnected tokens to a controllable multiplicity of subsuming types, one could hope to dodge the unsolvable difficulties that plagued (VIII).

However, it is our contention that a consideration of such pairs as fig. 1-1, fig. 1-2 is enough to dismiss even this weakened⁶¹ version of (VIII).

To show this, the problem we shall now address is to decide whether such two figures may come to be associated with the same (in whichever way conceived) mathematical object and if so to understand how.

Under formalism, strong or weakened, the answer has to be that there cannot be any such association.

In the case of the strong formalist claim (VIII), because if mathematical objects *are* inscriptions, then, given that no two inscriptions are identical, it follows that, apprehended as concrete inscriptions, fig. 1-1 and fig. 1-2 cannot possibly *be* the same mathematical object (which, under the strong formalist version, would have been the only way for them to be associated with the same mathematical object).

And similarly in the case of the revised formalist claim (X). This time, because if mathematical objects *are* abstract types of which concrete inscriptions are tokens, then, given that there is no conceivable way the concept of 'type' could be so stretched as to have such typographically unmatchable notations as fig. 1-1 and 1-2 count as realisations of the same underlying graphemes and/or graphs, it follows that, when apprehended as the abstract types of which they are tokens, fig. 1-1 and fig. 1-2 cannot possibly *be* the same mathematical object (which, under the revised formalist version, would again have been the only way for them to be

associated with the same mathematical object)—so that the final formalist answer to our problem is to decide that there is no way fig. 1-1 and 1-2 could conceivably be associated with the same mathematical object.

But, crucially, it turns out that what is deemed to be impossible in the formalist framework proves to be easily manageable in the representational framework. As we shall see in the next section, it is quite possible to find ways of associating such notations as fig. 1-1 and fig. 1-2 with exactly the same mathematical object (a ‘canonical tree’) which they have in common to represent.⁶² And, furthermore, we shall argue that this kind of optional notational variation may be counted as a blessing with a rich potential for heuristic insights, formal rigour, inventiveness and imagination.⁶³

From which we will conclude⁶⁴ that the formalist conception of mathematics, if taken seriously, would impose such strictures on the use of mathematical notations as to freeze notational flexibility, stifle formal imagination, and render literally incomprehensible current fruitful representational practices. To sum up:

(XI) The formalist approach to mathematics (strong or weakened) is untenable.

Our representational approach being thus cleared of formalist invalidation, we may now return freely to our notations of note 45 and continue to assume that such entities as ‘ $DI_{FR}(LT_{FR})$ ’ designates do exist, and concentrate on what these entities might be.

We have just seen that a given $DI_{FR}(LT_{FR})$ can neither be the abstract graphemes and/or graphs of the orphan *locus tenens* LT_{FR} , nor any of the infinitely many distinct concrete inscriptions that may potentially be concrete realisations of LT_{FR} .

If we now return to (I), given a formalised theory T_f resorting to a formal representation FR with LT_{FR} as its *locus tenens*, and given the open class⁶⁵ $T_N = \{T_{N1}, T_{N2}, \dots\}$ of the possible naïve interpretations for T_f ,⁶⁶ it follows immediately from (I) that the entity designated by ‘ $DI_{FR}(LT_{FR})$ ’ cannot be any of the naïve constructs of any of the naïve theories of T_N .⁶⁷

But then, the reason why the distinct naïve theories of T_N (each with its specific constructs) are federated as members of one equivalence class is that, by hypothesis, all these naïve theories have in common organising their particular constructs in essentially the same way. So that, at the end of the day, it is this common mode of organisation, or structure⁶⁸ that ‘ $DI_{FR}(LT_{FR})$ ’ designates.

The term ‘structure’ being so far left undefined, given that Tf is supposed to abstract away from the structured, we shall take it that what Tf extirpates is precisely a ‘structure’ in the mathematical sense:⁶⁹

- (XII) As such, a formal representation represents a structure composed of one or more sets together with one or more relations defined on those sets.

Accordingly, we can give a general definition of ‘notational variant’ which we shall use in the next section to sort out fig. 1-1–20 into appropriate equivalence classes: with the notations of note 45,

- (XIII) Two formal representations FR_1 and FR_2 are notational variants of each other *iff* $LT_1 \neq LT_2$ ⁷⁰ and $DI_1(LT_1) = DI_2(LT_2)$.⁷¹

3. The formal symbol as *locus tenens*: abstraction, inscriptions, graphemes and pure distinctiveness

In this section, we shall concentrate on the first of two⁷² issues concerning sub-parts of formal representations.

This issue has to do with the nature as orphan *locus tenens* of a fundamental component of algebraic representations: the ‘letter symbol’ of some (non-committal, as we shall see) ‘naïve’ dictionary definitions.⁷³

So far, we have seen that, as *locus tenens*, a type (ii) formal symbol could not be a material inscription but had to be more abstractly apprehended, as a grapheme. On closer inspection, however, a number of converging observations tend to show that this move from inscription to grapheme may still not be abstract enough.

For instance, when one reads in a classical text-book introduction to Predicate Calculus⁷⁴ that “the choice of the symbol x in $(x) M(x)$ is arbitrary, and the same proposition could equally well be denoted⁷⁵ by $(y)M(y)$, $(z)M(z)$, etc.,” the suspicion dawns that the choice of terms is rather misleading, and that it would be more accurate to consider that in this type of instance the very same symbol can be equally represented either as the grapheme x , or the grapheme y , or the grapheme z , etc. Which means that in the naïve ‘letter symbol’ duet, the letter should play an ancillary part, and the symbol be restored to its far more abstract identity.

This suspicion is borne out by the fact that any uniform distinction-preserving graphemic substitution⁷⁶ for the technical type (ii) symbols of a mathematical demonstration⁷⁷ will not affect its validity, which tends to show that some essential invariant is maintained in spite of the graphemic merry-go-round.

To capitalise on the insight that the grapheme is only half-way in abstraction from concrete inscriptions to properly conceived formal symbols, our suggestion⁷⁸ is to work with a three-fold distinction between ‘symbol’ (of a ‘vocabulary’), ‘grapheme’ (of an ‘alphabet’) and ‘inscription’ (on a material support).

The symbol being given a new definition:

- (XIV) The formal essence of any one of the n ‘formal symbols’ of a finite ‘vocabulary’ V consists in nothing but its radical distinction from any one of the $n-1$ remaining members of V ,⁷⁹

or, in less technical terms,

- (XV) In its formal essence of abstract *locus tenens*, a formal symbol is pure distinctiveness from each of the other members of a vocabulary,

in this definition, the link between symbols, graphemes and inscriptions is that a formal symbol may be graphically represented (*via* ‘scriptural assignment’) by a grapheme, which may in turn be ‘realised’ by (a potentially infinite number of) concrete, material ‘inscriptions.’

From then on, a few pieces of the puzzle may fall into place.

First, if it is a requirement of formalisation to manipulate such tenuous, quintessential place-holders as defined in (XV), then formalisation would just be too mind-boggling a task for the human intellect to accomplish, unless some technique be provided to set anchor into something less evanescent, something materially stable to get a grasp of and come back to at will. Hence to allow selective focussing on and avoid short-term working memory saturation. So much for the need.

By now, it should be clear why graphemic techniques are such precious means of fulfilling that need: by transmuting the unmanageable continuum of inscriptional variation into a small number of discrete character-types, the grapheme is the ideal intercessor to bridge the gap between extreme formal *locus tenens* abstraction and more down-to-earth support for scrutiny and re-examination.

At the same time, it is just as clear why it is of no importance *which* graphemes are picked up for scriptural assignment: all that matters is that one or another set of (bundles of) distinctive graphemic features,⁸⁰ no matter which, be made available to filter out non-distinctive graphic residues and in one way or another legibly discretise the inscriptional material. And this explains why one-to-one distinction-preserving

substitution of one alphabet of graphemes for another is always an open option.⁸¹

Furthermore, all of this is comforted by the way it dovetails with antecedent work by Jack Goody and Sylvain Auroux, which equally support the contention that, without the intellectual technological innovation of (in its very essence, graphemic) alphabetical writing⁸², sustained formal abstract reasoning and computation on entities deprived of intuitive content would have remained beyond the reach of human capacities.⁸³

4. The symbol as a formal object: individuals, radical abstraction, ipseity and Plenitudinous Platonism

The preceding section having dealt with the first, we shall now concentrate on the second of the two issues we wished to address concerning sub-parts of formal representations. This issue has to do with how we can make ontological sense of the formal reduction to pure distinctiveness of the symbol as *locus tenens*.

For this, we shall work on the relations between formal symbols, individuals, formalisation and abstraction, under certain type (b) assumptions.

As a starting point, ignoring counter-claims,⁸⁴ we shall tentatively⁸⁵ subscribe to the ontology of a version of Platonism⁸⁶ (Mark Balaguer's "plenitudinous Platonism," *alias* 'FBP'⁸⁷) which ascribes enduring reality, not only to structures,⁸⁸ but to all conceivable mathematical objects.

The reason for the move is that, under FBP, even though the symbol is not a structure, it may be granted the same ontological status as any other formal object in the plenteous cornucopia of mathematical entities.⁸⁹

To proceed one step further, as the term is currently used in work on formalisation, the 'individuals' relevant to "the context of a particular discussion" are broadly defined as "compris[ing] a set" "[...] called the domain (or universe) of discourse for that discussion [- which] [...] contains everything that we might want to talk about, and [from which] we can arbitrarily exclude [...] things that are irrelevant for the purpose at hand. In a mathematical discussion, for example, the domain of discourse might contain [such individuals as] positive integers, sets of positive integers, collections of such sets," "collections of these collections, etc." "A linguistic discussion might presuppose a domain of discourse containing [such Tn constructs as] words, sentences, phrase markers, grammars, etc., but not, say, motorboats or guitars."⁹⁰ Thus defined, because of its fundamental link with instantiation and quantification in the

Predicate Calculus,⁹¹ the individual plays an important role in logic and mathematics⁹² and is not unrelated to a rich philosophical tradition traceable back to Aristotle, Avicenna and the scholastics.⁹³

Yet one more step, and we may ask, since formalisation is consubstantially linked with abstraction,⁹⁴ what it means to abstract away from an individual and how far one can abstract away from the individual without altogether dissolving it.

Our suggestion then is that

(XVI) Abstracting away from an individual is to apprehend it as deprived of one or more of its attributes,⁹⁵

and that the utmost possible degree of abstraction in the formal apprehension of an individual is attained when it has been deprived of all but one of its attributes, retaining that which makes it be irreducibly itself and no other, i.e. its ‘individual difference,’⁹⁶ or to use what we shall take to be a synonym:

(XVII) When maximally subjected to formal abstraction, an individual is reduced to its sheer ipseity.⁹⁷

Then, to finally to tie the knot between formal symbols, individuals, formalisation and abstraction, we shall suggest that

(XVIII) What, as *locus tenens*, a formal symbol is a place-holder for is pure ipseity,⁹⁸

and, to combine (XV) and (XVII),

(XIX) In its essence as abstract *locus tenens*, the formal symbol is pure distinctiveness; in its essence as abstract formal object, the formal symbol is pure ipseity.

Granted those assumptions, we can make ontological sense of the way formal symbols can be put to remarkably flexible use, and a few more pieces of the puzzle may fall into place.

More precisely, if we accept, under FBP, that, apprehended as a mathematical object, a formal symbol has the status of an individual stripped of all its attributes, reduced to its sheer ipseity (and irretrievably lost-sight-of in any given detail of its original fully-fledged integrity), then, crucially, it makes perfect sense that (preserving its ipseitic core) it

could be used as a kind of universal hanger on which to put, or off which to take, at will, any number of attributes.

As a matter of fact, in the first place, this is exactly what goes on in typical meta-linguistic stipulations of the ‘let X be ...’ type.⁹⁹ For instance, halting at each intermediate stage to comment on a made-up, archetypal case:

‘let μ ’ (so far, nothing but pure ipseity) ‘be a number’ (one attribute on). ‘If μ is an even number...’ (one more attribute on). ‘Now, if μ is an odd number...’ (one attribute off, one attribute on). ‘But if μ is a prime number...’ (one more attribute on), etc.

And secondly, as can easily be checked by thumbing through volumes picked at random on the shelves of the mathematics section of a library, since an abstract symbol is ontologically a universal attribute-hanger, μ may just as well (in another article, another book, or in the next paragraph) be stipulatively associated with a set, a function, a mathematical structure, or so on or so forth, *ad libitum*.

Thirdly, in like fashion, since, on the one hand, in the chain from abstract symbol to graphemic type, to (ultimately) inscriptional tokens, the link (under scriptural assignment) between abstract symbol and grapheme is arbitrary, it follows that in any given text in which μ is chosen to graphically represent a formal symbol, uniform replacement of all inscriptional tokens (or realisations) of μ by inscriptional tokens (or realisations) of another grapheme Y will yield a free notational variant of that text, as long as two conditions are respected: 1) that either Y had previously no occurrence in the text, or, if it had, that the uniform replacement of all previous realisations of μ by new realisations of Y be accompanied by vice versa uniform replacement of all previous inscriptional tokens of Y by new inscriptional tokens of μ ; and 2), that the replacement be carried out, not only in the expressions of the object-language, but, crucially, in the accompanying expressions of the meta-language as well.

And fourthly, by the same token, since once whittled down to its last ontological tether, the ‘original’ individual cannot be retrieved from its ipseitic core, it makes perfect sense that the mapping from (the formal representations of) formal theory T_f to (the naïve-laden, unformalised constructs of) naïve theory T_n should be potentially one-many and not necessarily one-to-one.¹⁰⁰

5. In defence of ipseity: quantifiers, variables, nonspecific constants, ‘individual’ and ‘domain of discourse’ revisited

Returning now to the Predicate Calculus,¹⁰¹ in this section we shall concentrate on some specificities of the notations for quantifiers and variables and one or two terminological pitfalls which could easily obscure the relevance of our contention (XIX), and are thus in need of clarification.

5.1. Quantifiers and variables

The first specificity has to do with the seemingly abbreviatory nature of the notations used for quantifiers. For instance the universal quantifier ‘ \forall ’ in, say, $(\forall x) P(x)$ and the existential quantifier ‘ \exists ’ in, say $(\exists x) P(x)$ may be held, respectively, to subsume “a kind of generalized conjunction” and “a generalized form of disjunction” “extending over the entire domain of discourse,” that is to say over the entire set comprising all and only the “constants” which, by definition, may serve as possible “instantiations of $P(x)$.”¹⁰²

Now, such symbolic condensation may be deemed necessary because, given that the set of possible instantiating constants is an open class, such symbolic notations for the underlying generalised conjunctions and disjunctions as (respectively) ‘ $P(a) \wedge P(b) \wedge P(c) \wedge \dots$ ’ and ‘ $P(a) \vee P(b) \vee P(c) \vee \dots$ ’ can only be indicative and are not satisfactory.

But, useful as it may be, this symbolic condensation is somewhat confusing because it results in a kind of indistinct coalescence of two heterogeneous sets of objects: a tight class of connectives and an open class of constants—and this first thrust at the concepts does not take us very far.

Furthermore, if only one quantifier could be used per well-formed formula, and if all predicates were one-place predicates, no variable at all would be needed, since, after all, it would be enough to just write ‘ $\forall P$ ’ or ‘ $\exists P$.’

But such is not the case, since multiple quantification and n -uples of arguments are available options in the formation rules of Predicate Calculus. And it is precisely in such cases that resorting to variables provides useful notational resources.

For instance,¹⁰³ in such simple well-formed formulas (or ‘propositions’) as i) ‘ $(x)(\exists y)xLy$ ’ or ii) ‘ $(\exists y)(x)(yLx \rightarrow xLy)$,’ as a first approximation, trying to dispense with variables by somehow mixing or reshuffling constants and generalised conjunctions and disjunctions to find equivalent algebraic notations proves hopelessly unpromising, if not totally infeasible.

The second specificity has to do with the triple function played by the notations used for variables¹⁰⁴ in such cases as i) and ii).

Since there exists a proper subset of formulas of the Predicate Calculus (the ‘propositional functions’) in which certain variables play a less complex role, it is by this relatively simpler case that we shall begin.

In the case of such formulas (or ‘propositional functions’) as iii) ‘ xLy ’ or iv) ‘ $yLx \rightarrow xLy$ ’,¹⁰⁵ then, free variables fulfil only two functions:

- a) each occurrence of a free variable marks a position (a rank) in the formula where an instantiation may take place (by replacement of that occurrence by an occurrence of some suitable constant symbol); and
- b) the occurrences of free variable symbols present in a propositional function *pf* collectively impose combinatorial constraints amongst instantiations taking place at different positions in *pf*.

More precisely, two positions in *pf* may be instantiated by two (tokens of) distinct graphemes representing each a distinct constant symbol only if those two positions are held by two (tokens of) distinct graphemes representing each a distinct variable. Or, in more easy-going, rule-of-thumb style: before you introduce two distinct constants by instantiation, make sure you are replacing two distinct variables; if you introduce twice the same constant, as long as it is free variables you are replacing, feel free to do so.

As a result [cf. the ‘may ... only if’—and not ‘must ... whenever’ in the formulation of b)], given a) and b), and in potentially disturbing relation with (XIX),

- (XX) the graphemic distinction of two occurrences of free variables does not guarantee graphemic distinction within the pairs of occurrences of constant symbols that may legitimately instantiate them.¹⁰⁶

For instance, under a) and b), a legitimate instantiation for ‘ $yLx \rightarrow xLy$ ’ [our iv) *supra*] is γ): ‘ $aLa \rightarrow aLa$ ’

Returning now to the more complex cases, before analysing the third function played by certain variables in such wffs as i) or ii), we must first say another word about quantifiers (this time without trying to proceed *via* generalised conjunction or disjunction).

Each occurrence *Q* of a quantifier in a given well-formed formula *wff* of the Predicate Calculus PredC signals that, in certain positions in *wff*, either any instantiation is valid [when *Q* is an occurrence of the universal quantifier] or that at least one instantiation is valid [when *Q* is an occurrence of the existential quantifier]. But *Q* by itself does not specify in which positions those instantiations are supposed to take place—a vital specification if instantiation is to be defined as a formal operation.

If the formation rules of PredC could guarantee that Q is the only occurrence of a quantifier in wff , then the problem could be solved by the default stipulation that [q.v., *mutatis mutandis*, function a) *supra*] the set of relevant positions in wff is coextensive with the set of positions occupied by a (bound) variable in wff . But such is not the case, and something else must be done to cope with wff s comprising more than one occurrences Q —as for instance in i) and ii).

One further step towards a solution is then to resort to scope-indicating brackets (and scarcity of) to circumscribe the substring of wff in which the positions governed by each particular Q must be located. If the formation rules of PrdC could guarantee that, for any two occurrences Q , their scopes can never overlap, then that further move would suffice. But such is not the case—as exemplified, again, by i) and ii).

So that, for instantiation to be definable as a formal operation, something more must be done to somehow link each occurrence of a quantifier with the positions it governs and exclusively those. That is to say, in Richard C. Jeffrey's terms,¹⁰⁷ the "linkage" problem remains to be solved.

From this perspective, resorting to quantifiers and bound variables may then be seen to be one way of completely solving the problem. In other words, the third function played by variables can be thus identified:

- c) the function of bound variables is to contribute to a solution of the linkage problem.¹⁰⁸

More precisely, to each occurrence of a quantifier is exclusively attached its particular grapheme¹⁰⁹ (the exclusivity rights reaching as far as needs be to exclude graphemic homonymy in overlapping scope domains). So that, in a given well-formed formula wff of the Predicate Calculus, for any given (possibly zero-) occurrence of a quantifier Q having closely concatenated to it an occurrence signalling its hallmark grapheme, the positions governed by Q in wff are all and only the positions occupied by the other occurrences of that grapheme inside the scope of Q .¹¹⁰

Nevertheless, if variables are one way of contributing to a solution to the linkage problem, they are not the only one. Since "the only purpose of the [bound] variables is to show which [position] is [...] governed by which quantifiers," instead of using the standard algebraic notations we have been examining, the "cross-indexing job [...] can be clarified by actually drawing links between quantifiers and the variables they govern," and "all relevant information can be shown in the link notation without using variables—for an example of this, cf. fig. 1-4 and 1-5 *infra*, which show how, starting from the well-formed formulas of i) and ii) *supra*, nothing is lost in the transition from purely algebraic notations [1a and 2a],

to labelled links [1b and 2b], onto purely variableless geometricised representation of the cross-indexing [1c and 2c]. So that if this “clarifi[cation]” is not common practice, it is only because, “for typographical reasons” it is thought “convenient to identify the links without showing them.”¹¹¹

From a), b) and c), and taking into consideration the dispensability exemplified in fig. 1-4 and 1-5, we then conclude that

(XXI) Variables are position-holders and part of a notational guiding system for instantiation. But they cannot ontologically fill the positions they syntactically occupy. Only constants can.

From which it follows that since variables have at best an indirect link with ontological import,¹¹² and uniquely serve to help sign-posting the way to legitimate instantiations,

(XXII) Like commas, brackets and quantifiers, variables are incomplete symbols devoid of ontological content.

And it then follows from (XXII) that, since (XIX) does not deal with incomplete symbols, on closer inspection, (XX) is no counter-example to it, and neither is the fact that

(XXIII) The graphemic distinction of two occurrences of bound variables does not guarantee graphemic distinction within the pairs of occurrences of constant symbols that may legitimately instantiate them,¹¹³

for exactly the same reason: all such cases as pertain either to (XX) or (XXIII) have no bearing on (XIX) because the occasional lack of one-to-one correspondence between graphemic distinction among pairs of occurrences of instantiated variables on the one hand and among pairs of occurrences of instantiating constants on the other is an ancillary matter of potential formal traffic regulation inconvenience, not of ontological concern.

5.2. Unidentified Formal Objects elucidated: ‘nonspecific constants’ and/or ‘variable constants’

Having thus dealt at some length with variables and quantifiers, we shall now turn to constructs [graphically represented, with or without subscripts as ‘ v ,’ ‘ v_1 ,’ ‘ v_2 ,’ ..., ‘ w ,’ ‘ w_1 ,’ ‘ w_2 ,’ ...] one of the denomination

of which ('variable constants') sounds so much like a contradiction in terms that we shall provisionally name them 'UFOs' (Unidentified Formal Objects) while working at their elucidation. In the process, our contentions with (XIX)-(XXIII) will be comforted or not, to the extent that bringing them to bear sheds light on the terminological oxymoron.

In this subsection, the argumentation will locally proceed *via* two insights numbered ① and ② and four formal rules numbered ③-⑥, and will culminate in mainstream comforting conclusions (XXIV)-(XXVI).

The logic behind the use of those UFOs as used in the kind of formal proof¹¹⁴ presented in Wall (1972) may be reconstructed in terms of two interrelated insights:

Insight ① If one compares the Predicate calculus PredC and the Propositional calculus PropC, PropC offers far less expressive power than PredC, but (in a sense to be exemplified shortly) much greater ease of formal manipulation.¹¹⁵ So that it would be nice if one could enjoy the richness of the one without having to give up the flexibility of the other.

In order to thus have one's formal cake and eat it, the leading idea is then that

Insight ② In formal proof, one should i) start from richly expressive wffs of PredC [the premises of the proof], ii) somehow transit *via* less expressive but much more easily manipulable wffs of PropC [intermediate stages of the proof] and iii) somehow alight safely back onto wffs of PredC [proved conclusions]—a strategy which, if feasible, sounds perfect, since once the PredC conclusions are reached and retained, the intermediate PropC stages leading to it may be disposed of.¹¹⁶

To work out those insights, and particularly ②ii, a formal rule (of logical implication), ③, serves to introduce occurrences of subset $\{w, w_1, w_2, \dots\}$ of our UFOs and (on the way to formulas of PropC) eliminate at each application one occurrence of the existential quantifier and all the occurrences of the variable it binds.

Rule ③ Existential Instantiation (E.I.): if one premise in a formal proof consists in a formula ff_{\exists} prefixed by an occurrence E of ' \exists ' having scope over the whole of the rest of ff_{\exists} and having G_E as its associated hall-mark grapheme,¹¹⁷ one may validly both erase the first bracketed substring of ff_{\exists} (comprising E and one occurrence of G_E) and replace each one of the remaining occurrences of G_E in ff_{\exists} by the appropriate member of $\{w, w_1, w_2, \dots\}$ with the minimal subscript choice as may ensure that the chosen UFO is introduced for the first time in the proof.

Pausing for a while at this stage, the UFOs introduced by E.I. can be considered in their relation to (XVII)-(XIX), and in those terms we may begin to make critical sense of *à la* Wall terminology.

If a UFO may thus be introduced by E.I., it is because the conjoined definitions of ‘premise’ and ‘existential quantification’ guarantee that there exists at least one constant of the domain of discourse such that instantiating all those variables by that constant yields a valid instantiation of $\forall \mathcal{F}$. The crux of the matter is then that though a) we know almost nothing about that particular constant, still we know that b) even though there is no telling which, it exists as a certain constant, that particular one and none other.

As it turns out, a lot hinges on point b), since without tacit admittance of its validity, Robert Wall’s style of formal proof¹¹⁸ could not operate properly.

For instance, without recognition of b), there would be no basis for deciding that, say, $P(w_1)$ and $P(w_2)$ are not the same propositions. In other words, there would be no basis for deciding that while on the one hand, $P(w_1)$ is trivially logically equivalent to itself $[P(w_1) \Leftrightarrow P(w_1)]$,¹¹⁹ on the other, $P(w_1)$ is not logically equivalent to $P(w_2)$ $[P(w_1) \nLeftrightarrow P(w_2)]$. As a consequence, there would be no way to decide, as one should, that¹²⁰ ‘ $P(w_1) \wedge \sim P(w_1)$ ’ is a contradiction, but not ‘ $P(w_1) \wedge \sim P(w_2)$.’ With ultimately the disastrous result that without tacit admittance of b), there would be no way to decide that ‘ $P(w_1) \wedge \sim P(w_1)$ ’ but not ‘ $P(w_1) \wedge \sim P(w_2)$ ’ may directly lead, at the next line, to the successful closure of an attempted proof by *reductio*, which would play havoc with the actual functioning of Robert’s Wall’s ‘Indirect Proof.’¹²¹

In our terms, then, the subset of UFOs considered so far epitomizes the definition of formal symbol reached in (XX). For each member of {‘w,’ ‘w₁,’ ‘w₂,’ ...}, the idea that its essence as abstract *locus tenens* is pure distinctiveness is reflected in its exclusive right to the subscript (or lack of) attached to it;¹²² and the idea that its essence as abstract object is ipseity is aptly glossed by point b) which we have shown to be immanent in the way the type of formal proof advocated by Robert Wall actually functions.¹²³

By contrast, calling the UFOs of {‘w,’ ‘w₁,’ ‘w₂,’ ...} ‘nonspecific constants,’¹²⁴ is at best unrevealing. Not because of the choice of the noun¹²⁵ (since if, say, ‘w₁,’ were not a constant, then ‘ $P(w_1)$ ’ would be a Propositional function, not a proposition [q.v. note 116 *supra*], and such rules as *Modus Ponens* could not apply to it), but because of the choice of the adjective. Though the term is not explicitly defined, upon careful examination of its use by Wall, it seems clear that the word ‘nonspecific’ does not have any hidden esoteric acceptance that could convincingly be

related to points a) and b).¹²⁶ Rather, ‘specific’ has the ordinary language meaning it has in such sentences as “*there is a specific tool for each job*,”¹²⁷ so that ‘nonspecific’ is to be understood in terms of the size (or cardinality) of the subset of the domain of discourse from which those ‘constants’ can be drawn. More accurately, if that non-empty¹²⁸ subdomain had been defined as comprising exactly one individual, then, and only then, could our UFOs have been deemed ‘specific.’ And it is precisely because they are not so defined in the general case, that, in that logic, each one of the UFOs of $\{‘w,’ ‘w_1,’ ‘w_2,’ \dots\}$ may be considered as ‘nonspecific.’¹²⁹

But the problem is that (non)specificity in that sense has nothing to do with points a) and b). Formally, all we know about the number n of valid instantiators available for Existential Instantiation is that $n \geq 1$. But even if we could formally decide that $n=1$ (in actuality we cannot), even under that counterfactual claim, a) and b) would still hold for the then ‘specific’ w , because, formally, i.e. ahead of naïve interpretation, we would just as well ‘know almost nothing about that constant’ [a], and though there would therefore be no telling which, we would just as well know that it exists as a certain particular constant, that one and none other [b].¹³⁰

In other words, to summarise, (non)specificity has nothing to do with point b), but point b) tacitly plays a crucial role in the way *à la* Robert Wall formal proofs actually work. Talk about ‘nonspecific constant’ is thus seen to shed no light on a fundamental principle, and it is precisely in that sense that we may conclude, as announced, that calling the UFOs of $\{‘w,’ ‘w_1,’ ‘w_2,’ \dots\}$ ‘*nonspecific constants*,’ is at best¹³¹ unrevealing.

So far, in the light of (XVII)-(XIX), we have seen in what respects the designation ‘nonspecific constant’ was (half) unsatisfactory. But we have yet to see what considerations could lead, and with what (de)merits, to the paradoxical ‘variable constant’ appellation. For that, we now need to turn to the remaining subset of our UFOs, move on to Universal Instantiation, and bring (XXI)-(XXII) to bear.

As an additional tool in the working out of insights ① and ②, and particularly ②ii, a formal rule (of logical implication), ④, serves to introduce occurrences of subset $\{‘v,’ ‘v_1,’ ‘v_2,’ \dots\}$ of our UFOs and (on the step-by-step way towards formulas of PropC) eliminate at each application one occurrence of the universal quantifier and all the occurrences of the variable it binds.

Rule ④ Universal Instantiation (U.I.): if one premise in a formal proof consists in a formula ff_v prefixed by an occurrence U of ‘ \forall ’ having scope over the whole of the rest of ff_v , and having G_U as its associated hall-mark grapheme,¹³² one may validly both erase the first bracketed substring of ff_v (comprising U and one occurrence of G_U) and replace each one of the

remaining occurrences of G_U in ff_v either by anyone of the UFOs previously introduced in the proof, or by the appropriate member of $\{‘v,’ ‘v_1,’ ‘v_2,’ \dots\}$ with the minimal subscript choice as may ensure that the chosen UFO is introduced for the first time in the proof.

If a UFO may thus be introduced by U.I., it is because the conjoined definitions of ‘premise’ and ‘universal quantification’ guarantee that any arbitrarily chosen constant in the non-empty domain of discourse would yield a valid instantiation of ff_v .

In terms of what we have seen so far, certain things make straightforward sense in rule ④, but shed no new light on the vexing ‘variable’ issue,¹³³ or are just as problematic as we argued was the case with E.I.¹³⁴ But as a decisive step towards elucidation, we may note a feature of U.I. which does not fit in that easily. In the case of E.I., we saw that the introduction of individual difference-preserving subscripts to w was indispensable to avoid formal proof fallacy.¹³⁵ But since instantiations triggered by applications of U.I. are unrestricted, no such precaution is needed in the case of v . In fact, what is going on is that the introduction of UFOs $\{‘v,’ ‘v_1,’ ‘v_2,’ \dots\}$ would be totally superfluous if all there was to formal proof was the transition from ②i to ②ii; but as such is not the case, it is crucial for the transition from ②ii to ②iii.

More precisely, as an additional tool in the working out of insights ① and ②, and particularly ②iii, a formal rule (of logical implication), ⑤, serves to eliminate occurrences of subset $\{‘v,’ ‘v_1,’ ‘v_2,’ \dots\}$ of our UFOs and (on the step-by-step way back to formulas of PredC), (re)introduces at each application one occurrence of the universal quantifier and all the occurrences of the variable it binds.

Rule ⑤ Universal Generalisation (U.G.): if one line in a formal proof consists in a formula ff_v comprising occurrences of at least one UFO of subset $\{‘v,’ ‘v_1,’ ‘v_2,’ \dots\}$, one may, choosing one UFO v_j occurring in ff_v , introduce (UG_U) as the new initial substring of ff_v , where ‘ U ’ is an occurrence of ‘ \forall ,’ and G_U a hall-mark grapheme for U not previously introduced in the proof by generalisation; then make minimal bracketing adjustment to ensure (UG_U) has scope over the rest of ff_v ; and finally replace each occurrence of v_j in ff_v by one occurrence of G_U .¹³⁶

Only in the context of U.G., and in the terms of (XX)-(XXI) can we then at last understand the true gist of the relation between ‘variable’ and our UFO’s:

(XXIV) One thing that variables and members of $\{‘v,’ ‘v_1,’ ‘v_2,’ \dots\}$ have in common is that they each contribute in their own way to a

solution to the linkage problem: the former are part of a notational guiding system for instantiation, the latter of a notational guiding system for generalisation.

For instance,¹³⁷ if it were not for the distinction between ‘ v_1 ’ and ‘ v_2 ’, starting from ‘ $(\forall x)(\forall y)P(x, y)$ ’ [stage ②i of insight ②], U.I. could only yield $P(v, v)$ [at stage ②ii], which in turn could only yield ‘ $(\forall x) P(x, x)$ ’,¹³⁸ by U.G. [stage ②iii]. In other words, if it was not for the distinction between ‘ v_1 ’, ‘ v_2 ’, in the formal traffic from one stage of ② to another, only ‘ x ’ could be granted a return to ②i, not ‘ y ’.¹³⁹

Furthermore,

(XXV) What holds for $\{‘v,’ ‘v_1,’ ‘v_2,’ \dots\}$ in (XXIV) also holds for $\{‘w,’ ‘w_1,’ ‘w_2,’ \dots\}$.

To be more precise, an ultimate tool in the working out of insights ① and ②, and particularly ②iii, the formal rule (of logical implication) ⑥ serves to eliminate occurrences of subset for $\{‘w,’ ‘w_1,’ ‘w_2,’ \dots\}$ of our UFOs and (on the way back to formulas of PredC), to (re)introduce at each application one occurrence of the existential quantifier and all the occurrences of the variable it binds

(Rule ⑥ Existential Generalisation (E.G.): if one line in a formal proof consists in a formula ff_w comprising occurrences of at least one UFO of subset $\{‘w,’ ‘w_1,’ ‘w_2,’ \dots\}$, one may, choosing one UFO w_i occurring in ff_w , introduce (EG_E) as the new initial substring of ff_w , where ‘ E ’ is an occurrence of ‘ \exists ,’ and G_E a hall-mark grapheme for E not previously introduced in the proof by generalisation; then make minimal bracketing adjustment to ensure (EG_E) has scope over the rest of ff_w ; and finally replace each occurrence of w_i in ff_w by one occurrence of G_E).

And for rule ⑥ to work properly then, if it were not for the distinction between ‘ w_1 ’ and ‘ w_2 ’, starting from premise $(\exists x)(\exists y)(P(x) \wedge \sim P(y))$ [stage ②i], not only would E.I. disastrously yield (in two applications) [stage ②ii], the fallacious contradiction $P(w) \wedge \sim P(w)$ [playing havoc with Indirect Proof], but by the same token U.G. would equally disastrously yield (in one application) $(\exists x)(P(x) \wedge \sim P(x))$ [supposed to be true by definition of ‘premise,’ and thus play havoc with Complement Law c]. In other words by introducing the distinction between ‘ w_1 ’ and ‘ w_2 ’, one may kill two birds with one stone: avoid PropC catastrophe [via ‘ $P(w_1) \wedge \sim P(w_2)$ ’ instead of ‘ $P(w) \wedge \sim P(w)$ ’] and shun PredC disaster [via safe return to ‘ $(\exists x)(\exists y)(P(x) \wedge \sim P(y))$ ’ instead of crash-landing onto ‘ $(\exists x)(P(x) \wedge \sim P(x))$ ’].

More generally, subsuming (XXIV) and (XXV),

- (XXVI) Because of their role in the transition from stage ②i to stage ②ii of insight ②, our UFOs deserve the appellation of ‘constant.’
Because of their role in the transition from ②ii to ②iii, they deserve the appellation of ‘variable.’

So that, at the end of the day, ‘variable constant’ is seen to be a much better designation for our UFOs than ‘nonspecific constant,’ and the unsuspected key to the oxymoron is that, by a kind of formal conjurer’s trick,¹⁴⁰

- (XXVII) Properly so-called ‘variable constants’ conflate two roles in one notation: being constant-like, they ontologically fill the positions they syntactically occupy; being variable-like, they are part of a notational guiding system for generalisation.

Thus with the ‘constant’ hypostasis as *locus tenens* ensuring the graphemic distinctiveness that singles out the represented ipseities lying in wait for naïve interpretations, and with the ‘variable’ hypostasis distributing return tickets to PredC home and quantification, our starting-point oxymoron does not prove to be so paradoxical after all. In fact, it proves to be much more to the point than the rival appellation ‘nonspecific constant.’

In a nutshell then, in the light of (XVII)-(XIX), we have been able to figure out what it was that Wall was trying to say, and for what principled reasons he could not quite succeed in formulating explicitly what his actual formal practice called for. And to the extent that the status of our UFOs has been elucidated, as we hoped to establish, our contentions are thereby comforted.

5.3. ‘Domain of discourse,’ ‘universe of discourse’ and ‘individual’ revisited

In this section, finally, we shall turn to two terminological pitfalls, one inducing the other, which, if not surmounted, could easily obscure the relevance of our contention (XIX).

The first pitfall has to do with the common¹⁴¹ equation of two terms: (1) ‘domain of discourse’ and (2) ‘universe of discourse,’ with each of the two synonyms equally defined as (3) “contain[ing] everything that we might want to talk about” “in the context of a particular discussion” (*alias* “everything that enter[s] in the discussion”) and/or (4) comprising everything that “may serve [...] to instantiate both free and unbound

variables for a particular discussion.” The second pitfall, inherited from the first, has to do with the definition of ‘individual’ as (5) a member of the universe of discourse (or domain of discourse) for that discussion.

Within our perspective, of course, definitions (1)-(5) are unacceptable, because they are so contrived that, unless they are revised, our formal symbols in particular, and, more generally, the rich class of formal objects which (XIX) postulate as existing within the ‘plenitudinous’ ontology of FBP will not even be “allowed to enter in the discussion.”

However, it is not necessary to refer to FBP to show that there is something amiss with those definitions. For instance, in standard predicate Calculus PredC, a predicate cannot instantiate a variable. Hence, under (4) and (5), a predicate cannot belong to the universe of discourse in the context of PredC. Hence, under (3), there should be no way a predicate could ‘enter the discussion’ in the context of PredC. But this flies in the face of the necessity of metalinguistic mention of predicates in such indispensable subparts of the formation rules for PredC as ‘given any predicate H , and given any variable x , both ‘ $(\exists x)H(x)$ ’ and ‘ $(\forall x)H(x)$ ’ are wffs’: if predicates cannot enter in the discussion of Predicate Calculus, then there cannot be any syntax for the Predicate Calculus, that is, there cannot be any Predicate Calculus at all to be discussed about. Which is enough to show that, FBP or no FBP, definitions (1)-(5) are in bad need of refurbishing.

In such dire straits, we suggest that (1) and (2) should no longer be held to be synonyms, that, (3) and (4) being slightly revised in the process, acceptations (3) and (4) should be allotted to two separate terminological entries, and that (5) be emended accordingly. To be more precise, (5) is redefined as (XXVIII), (2) as (XXIX) and (XXX), and (5) as (XXXI):

(XXVIII) In the context of a particular Formal System FS, the ‘Domain of discourse’ DD_{FS} is the set comprising all and only the constants which may instantiate the object-language variables of FS (which are then said to ‘range over’ DD_{FS}).

Under (XXVIII), no ‘Domain of discourse’ is defined for the Propositional Calculus, predicates are excluded from the Domain of discourse of first-order predicate Calculus, but predicates are included in the Domain of discourse of second-order predicate Calculus.¹⁴²

(XXIX) In the context of a particular discussion D of a formal system FS, the universe of discourse UD_{DFS} for that discussion includes DD_{FS} and comprises all the entities mentioned or designated in

the meta-language for FS as well as all the naïve constructs mentioned in the discussion of possible interpretations for FS.

Under (XXIX) the universe of discourse $UD_{N,33FPropC}$ for the discussion of the Propositional Calculus PropC found in note 33 *supra* may comprise propositions, truths, reasonings and veridiction.

(XXX) The Universe of discourse UD comprises everything that we might want to talk about in the context of any discussion about any formal system.

Under this all-embracing new definition, for any conceivable Domain of discourse DD_{FS} , DD_{FS} is comprised in the universe¹⁴³ UD, which notably, but not exclusively,¹⁴⁴ encompasses all of the multitudinous entities postulated as existing under FBP.

(XXXI) At three increasing levels of generality, an individual may be defined as i) a member of DD_{FS} , or as ii) a member of $UD_{D_{FS}}$, or as iii) forming part of UD.

Since under these new definitions, DD_{PredC} forms part of UD, (XXXI) does not rule out such deeply entrenched designations as the ‘individual variables’ of standard Predicate Calculus. But, contrary to what this parochial collocation of the terms might have suggested before, it is now clear that individuals can no longer be confined within the bounds of a nominalist chapel intent on minimising at all costs their ontological commitments.

6. Formal representations and objects, notational variants and (de)merits of algebraic vs geometricised notations: on figures 1–1–20 as a mine of exemplification

In this section we shall delve more specifically into the arcana of fig. 1–1–20, both to illustrate and comfort already formulated contentions and to work on the compared merits and/or demerits of algebraic and geometricised formal representations.

Here, the argumentation will locally proceed *via* successive steps 1.–20, with interspersed intermediate results $\boxed{1-5}$ and will culminate in mainstream conclusions (XXXV)-(XL).

6.1. On some equivalent definitions and representations for one and the same ‘canonical tree’

As one and the same class of formal objects, canonical trees¹⁴⁵ can be defined in a variety of equivalent ways¹⁴⁶ providing distinct Deciphering Instructions for a variety of equivalent representations.

Step I. Necessary and sufficient conditions may be stipulated for membership to the defined class, as in the following definition by Robert Wall.¹⁴⁷

A [canonical] tree $[T]$ is a mathematical [structure]¹⁴⁸ (N, Q, D, P, L) where N is a finite set, the set of nodes, Q is a finite set, the set of labels; D is a weak partial order in $N \times N$, the dominance relation,¹⁴⁹ P is a strict partial order in $N \times N$, the precedence relation,¹⁵⁰ L is a function from N into¹⁵¹ Q , the labelling function and such that the following conditions hold:

- i. $(\exists x \in N)(\forall y \in N)(x, y) \in D$ Single root condition
- ii. $(\forall x, y \in N) ((x, y) \in P \vee (y, x) \in P) \leftrightarrow ((x, y) \notin D \wedge (y, x) \notin D)$
Exclusivity condition
- iii. $(\forall w, x, y, z \in N) ((w, x) \in P \wedge (w, y) \in D \wedge (x, z) \in D) \rightarrow (y, z) \in P$
Nontangling condition.

From which it follows that “the leaves [or terminal nodes of T] are totally ordered by P .”¹⁵²

In the above, “the single root condition [ensures that] in every well-formed [canonical] tree there is exactly one node that dominates every node”; the exclusivity condition ensures that for any two nodes in a well-formed canonical tree, there are exactly two possibilities: either one precedes the other (in which case neither dominates the other) or one dominates the other (in which case neither precedes the other); and the nontangling condition (or heritage principle q.v. note 32 *supra*) ensures that in a canonical tree if two nodes are such that one precedes the other, then any node dominated by the one will precede any node dominated by the other—in naïve terms, precedence rights in terms of relative superiority and inferiority of rank is hereditary.

When (using the notations of note 45 and in conformity with (II) and (XII) *supra*), the preceding definition is used as deciphering instructions DI_{Fig11} , the barbed-wire gibberish of fig. 1-11 can be made intelligible, and once the indicated extensions of all the relevant relations have been checked to satisfy all of the above defining conditions, it can be seen that

□ the formal object $DI_{Fig11}(LT_{Fig11})$ represented by fig. 1-11 is [henceforth ‘Conclusion CT’] a fully specified member of the class of canonical trees.

Step 2. Instead of being defined by necessary and sufficient conditions, a canonical tree may just as well be defined by constraints on representations.

To this effect, one must start from a wider class of tree-like formal objects, impose further strictures on those objects, filter out all the tree-like objects that do not satisfy those constraints, and thereby obtain the tighter class of canonical trees. A wider class from which to start can then be the ‘arboriferences’ introduced in Pamiès 2001. Roughly,¹⁵³ an arboriference is like a tree in that it has branches, nodes and labels, a dominance and a precedence relations, and a labelling function. But arboriferences differ from trees in that though two branches may not converge on their terminal node (so that the branches and the leaves of an arboriference are totally and strictly ordered by the precedence relation), and though the nodes of each branch are totally and weakly ordered by the dominance relation, two branches are allowed to have distinct nodes of rank one (so that the single root condition does not hold) and any two branches may successively converge and diverge on nodes of the same rank (as a result, in arboriferences, symmetrical meshes are accepted, the precedence relation is not transitive, and the heritage or nontangling condition does not hold).

If one then imposes the stricture that all the branches must converge on their first node, and that once any two branches have diverged, they may not converge again, one obtains the tighter class of canonical trees by constraints on the wider class of arboriferences. In this context, identity or distinction among nodes of the same or different rank(s) in any two distinct branches is of crucial importance. So that in a totally disambiguated notation, each node is graphically represented by the arbitrarily chosen grapheme ‘*a*’ bearing both a superscript indicating the rank of its branch and a subscript indicating its rank in that branch.

If one adds that the grapheme ‘ \equiv ’ is used to graphically represent the labelling into function, then, when using the notations of note 45 and in conformity with (II) and (XII) *supra*, the preceding definition is used as deciphering instructions DI_{Fig12} , the scribblement of fig. 1-12 can be made sense of, and once all the indicated subscripts and superscripts have been checked to satisfy all of the above filtering constraints, it can be seen that

□ Conclusion CT holds for the formal object $DI_{Fig12}(LT_{Fig12})$ represented by fig. 1-12.¹⁵⁴

And finally,

Step 3. Instead of being defined *via* necessary and sufficient conditions or *via* constraints on representations, a canonical tree may just as well be defined by constraints on derivational rules:

To this end, in broad outline, one may start from a formal procedure Γ associating one arboriference to each derivation¹⁵⁵ of each grammar of a relatively unconstrained class.¹⁵⁶ Then, if one restricts the rewriting rules of those unconstrained grammars so that they may rewrite only one occurrence of symbol at each application,¹⁵⁷ it can be proved that this new constraint on derivational rule reduces the class of the corresponding arboriferences assigned by Γ to just the class of canonical trees.¹⁵⁸ So that another equivalent definition now obtains: a canonical tree is an arboriference which can be associated (*via* Γ) to a restricted (constituent-structure) grammar.

Where,¹⁵⁹ in all of the above, procedure Γ constructs piecemeal the arboriference associated to a given derivation by introducing (further) nodes and labels and links as graphic correlates for each (successive) line of that derivation in such a way that, on a conventionally oriented page,

- (XXXII) a) identity (of nodes of the same rank in distinct branches) is graphically represented by superposition; b) each ordered pair (X , $\equiv (X)$), by just one token of X ; c) the co-membership of two adjacent nodes of the same branch, by a non-horizontal segment joining the token representing the one (and its label) to the token representing the other (and its label); d) the relation X dominates Y (distinct from X), by a configuration in which Y is linked to X by a path all segments of which are uniformly ascending; and e) the relation X precedes Y , by a configuration where X is located on the left of Y and is not linked to Y by a path all the segments of which are uniformly ascending or descending.

Then, when (using the notations of note 45 and in conformity with (II) and (XII) *supra*), the definition of step 3. and conventions (XXXII) are used as deciphering instructions DI_{Fig2} , the indeterminate diagram of fig. 1-2 can be deciphered, and once it has been checked that fig. 1-2¹⁶⁰ can be associated to a derivation¹⁶¹ resorting exclusively to restricted (constituent-structure) rules,¹⁶² it can be seen that

③ Conclusion CT holds for the formal object $DI_{Fig2}(LT_{Fig2})$ represented by fig. 1-2.

Furthermore, if in (XXXII) [with arrows pointing from dominator to dominated introduced as surrogates of the upper-to-lower orientation], the ‘non-horizontal’ of c) is deleted and in both d) and e), ‘segment’ is replaced by ‘arrowed segment’ and ‘ascending or descending’ by ‘co-oriented’,¹⁶³ then, *mutatis mutantis*, by the same token but *via* the thus newly obtained deciphering instructions DI_{Fig3} , the puzzling zigzags of fig. 1-3 can be made sense of, and it can also be seen that

[4] Conclusion CT holds for the formal object DI_{Fig3} (LT_{Fig3}) represented by fig. 1-3.

And if, as a last further emendation on (XXXIII), ‘segment’ (of a straight line) is replaced throughout by the more permissive ‘link,’ then by the same token but *via* the thus twice revised newly obtained deciphering instructions DI_{Fig8} , the a-mazing entanglement of fig. 1-8 can be made sense of, and it can ultimately be seen that

[5] Conclusion CT holds for the formal object DI_{Fig8} (LT_{Fig8}) represented by fig. 1-8.

Thus, by [1]-[5] (and note 154 *supra*), for each of fig. 1-1, 1-2, 1-3, 1-8, 1-11 and 1-12 the represented abstract formal object is a fully specified canonical tree.

But then, by the definition of note 71 *supra*—which, crucially, is insensitive to *locus tenens* diversity for nodes and relations,¹⁶⁴ and with due consideration of notes 154 and 160 singling out as irrelevant in this context redundant and/or meta-linguistic (an)notations, the fact that each one of these formal objects turns out to be a mathematical structure comprising the same number of sets comprising the same number of elements as well as the same number of relations with the same properties and comprising the same number of distinct ordered pairs as members¹⁶⁵ entails that

(XXXIII) The distinct Figures of 1-1, 1-2, 1-3, 1-8, 1-11 and 1-12 have in common to represent one and the same canonical tree.

And hence, by the definition of (XIII), from [1]-[5] and (XXXIII), that

(XXXIV) The formal representations of fig. 1-1, 1-2, 1-3, 1-8, 1-11 and 1-12 are notational variants of each other.

By which final result for this subsection it is hoped the contentions of (II), (V), (IX), (XI), (XII) and are both illustrated and comforted.

6.2. Of equivalence classes of derivations as a hard derivational nut to crack, and of the ‘algebraic’ and the ‘geometricised’ as the blindman and the cripple

In this subsection, in the context of the formalisation of two naïve constructs (‘to be a constituent of a certain type’ and ‘to be analysable as’) we shall study the relations between two types of definitions for formal objects (derivational and configurational), two classes of formal objects (equivalence classes of derivations and canonical trees) and, paying particular attention to their compared (de)merits, two types of formal representations (algebraic and geometricised).

In order to capitalise on the properties of canonical trees to formalise the naïve constructs of Phrase structure theory,¹⁶⁶ then, by the kind of feedback effect of the formalised on the formalising alluded to at the end of section 1, an effort may be made to define a relation of ‘exhaustive dominance’ in order to capture the formal gist of ‘to be a constituent of a certain type’ and ‘to be analysable as’.¹⁶⁷

Step 4. In a canonical tree T , node N_1 **exhaustively dominates** nodes N_2, \dots, N_n iff for all i ($2 \leq i \leq n$), N_i precedes N_{i+1} and each node distinct from N_1 and dominated by N_1 in T either is one of the nodes N_2, \dots, N_n , or is dominated by one of them.

For instance (*via* a common extension of relations from nodes to labels which we will henceforth practise),¹⁶⁸ in the canonical tree \mathcal{T} represented by fig. 1-2, S exhaustively dominates $AEHJ$ or $ABFHJ$, but neither EHJ nor $ABHJ$, and E dominates exhaustively BF or HIF , but neither HI nor IG —which may be interpreted in terms of naïve Phrase Structure theory as ‘ $AEHJ$ or $ABFHJ$ are constituents of type S , but neither EHJ nor $ABHJ$ ’ and ‘ BF or HIF are constituents of type E , but neither HI nor IG .’

And,

Step 5. In a canonical tree T , $N_j \dots N_{j+m}$ is **analysable as** N_i, \dots, N_{i+n} iff there is a node N_1 in T such that i) N_1 exhaustively dominates N_j, \dots, N_{j+n} , ii) N_1 exhaustively dominates N_i, \dots, N_{i+m} and iii) each node of N_j, \dots, N_{j+m} is dominated by a node of N_i, \dots, N_{i+n} .

For instance (with the same extension of note 168 *supra*), in the canonical tree \mathcal{T} represented by fig. 1-2, $CDHIGIABC$ is analysable as (A, E, H, J) or

(A,B,F,H,J), but HIGI is not analysable as (E,F), and IABC is not analysable as (H,J) either.

In this formalising perspective, given the role of the relation ‘exhaustively dominates’ in the definitions of steps 4. and 5., it is important to have access to the ‘cumulative exhaustive dominance index’ of each tree, where

Step 6. The **cumulative exhaustive dominance index** $CEDI_T$ of a canonical tree T comprises all and only the ordered pairs (X, Y) such that X exhaustively dominates Y in T .¹⁶⁹

Now if we add that

Step 7. Given a constituent grammar G and procedure I , an **equivalence class of derivations** may be defined as a class of distinct¹⁷⁰ derivations derivable in G which are assigned the same canonical tree by I .

And if furthermore we agree that

Step 8. A ‘**derivational**’ definition is a definition formulated in (partial) reference to the relation ‘follows from’,¹⁷¹

and that,

Step 9. A ‘**configurational**’ definition is a definition formulated in (partial) reference to the relation ‘dominates’,¹⁷²

then,

Step 10. The definitions of steps 4. and 5. are purely configurational, and the definition of step 7. is half derivational and half configurational.

However, purely derivational alternatives are possible if a notational innovation is introduced in the representation of derivations.¹⁷³ More precisely,

Step 11. Conventions for **superscript enrichment**: In each derivation permitted by a constituent-structure grammar G , i) each occurrence of symbol rewriting the occurrence of the axiom¹⁷⁴ (constitutive of line 1) by application of rule R_i of G is assigned the superscript ‘(i)’; and ii) if ‘(α)’ is the superscript assigned to the unique occurrence of symbol rewritten by (one further application of) of rule R_j of G , then each occurrence of symbol in the string replacing it is assigned the superscript ‘(α, j).’

Thanks to the enriched notations¹⁷⁵ of step 11.,

Step 12. By purely derivational means, the full genealogy of each occurrence of symbol is gradually imprinted by encoded reference to the rules the successive applications of which have led to its having occurrences in the derivation.

For instance, thanks to the superscript ‘(1,3,4)’ above the third constitutive occurrence of line 8 of the derivation represented by fig. 1-7, and with respect to the notations of fig. 1-6, ‘H’ can be read to have resulted from, successively, one application of rule R₁, one application of rule R₃, and R₄, and therefore [since rules R₁, R₃ and R₃ rewrite occurrences of S, E and B, respectively], from ancestor to descendant, the line of descent of H can be read as: first (an occurrence of) S, then (an occurrence of) E, then (an occurrence of) B, then, ultimately (that occurrence of) H itself.

Similarly, thanks to the enriched notations of 11.,

Step 13. By purely derivational means, constituency boundaries and constituent types may be correlated with maximal spread of common subscript intersection.

For instance, in line 8 of the derivation represented in fig. 1-7, a maximal spread for sub-superscript ‘(1,3...)’ covers the occurrences of rank 3 [superscripted ‘(1,3,4)’], 4 [superscripted ‘(1,3,4)’] and 5 [superscripted ‘(1,3,5)’], at the exclusion of the occurrences of rank 2 [superscripted ‘(1,2)’] and 6 [superscripted ‘(1,6)’] so that it can be read from line 8 that ‘HIG’ is a constituent the type of which is the symbol rewritten by rule 3, that is to say, of type E.

Thanks to the notations of 11., furthermore, a purely derivational, co-extensive definition may be found as an alternative to the definition of 7.:

Step 14. Given a constituent grammar *G*, an **equivalence class of derivations** may be defined as a class of distinct derivations derivable in *G* the superscript-enriched final lines of which are (typographically) identical.

For instance (taking an example to which we shall return shortly), if ‘*C*’ is the equivalence class of all and only the distinct derivations derivable using the constituent structure rules represented in fig. 1-6 which have in common to be assigned by *Γ* the same canonical tree *T* represented by fig. 1-2, then ‘*C*’ can equally be defined as the class of all and only the distinct derivations obtainable by application of the rules of fig. 1-6 having as their last line the enriched string of fig. 1-10.—among them all

of the distinct derivations $\Sigma_1, \dots, \Sigma_{11}$ of fig. 1-13, as well as the derivation of fig. 1-7.

In a similar vein, capitalising on steps 11-13, and just as was the case with the re-defining move from step 7. to step 14., it is possible to find purely derivational homologues for the configurationally defined ‘analysable as’ (step 5.), ‘dominates,’ ‘precedes,’ ‘dominates exhaustively’ (step 4.), and a similar kind of homologue for the cumulative exhaustive dominance index $CEDI_T$ of step 6. can be devised:¹⁷⁶

Step 15. Defined in purely derivational terms, the **cumulative filiation index** CFI_C of (in the sense of step 14.), an equivalence class of derivations C is such that, using the notations of steps 6. And 7., if for any derivation Σ_C of C , $\Gamma(\Sigma_C) = T$, then $CFI_C = CEDI_T$.

By systematically working out the type of homology exemplified by steps 7./14. and steps 6./15 it is even possible to show that, though remaining irreducibly distinct formal objects in spite of the identity stated in step 15., equivalence classes of derivations and canonical trees are strongly isomorphic.¹⁷⁷

However, it is precisely at this juncture that the notations used in steps 11.-15. meet with a somewhat intractable problem which can apparently be solved by those used in fig. 1-2. A fact which, upon critical examination, may be held to epitomise the compared merits and/or demerits of algebraic and geometricised formal representations.

The problem can be formulated as follows:

Step 16. Problem: for a given equivalence class of derivations C , find a formal way of collecting all and only the distinct strings of occurrences of symbols constitutive of at least one line of at least one derivation of C .

A solution to the problem of step 16. is essential to the determination of the cumulative filiation index CFI_C of C ,¹⁷⁸ (and hence to a derivational formalisation of the naïve concept of ‘analysable as’).

But it is difficult to solve, because

Step 17. Due to the combinatorial explosion from rules to derivations, the wanted strings of step 16. are randomly scattered throughout the large number of members of C , thus enforcing a laborious process of compendious derivation-to-derivation collation.

For instance, on the basis of the meagre seven rules of fig. 1-6, the associated equivalence class of derivations comprises no fewer than 240 distinct derivations,¹⁷⁹ among which the derivation of fig. 1-7 comprises

only 7 of the elusive 40 wanted strings of the form (S,...) listed in note 169 *supra*¹⁸⁰—which leaves one with the awkward perspective of having to comb through the remaining 239 to find the missing 33.

By contrast, if we think of a derivation as a path each stage of which is a line of that derivation, and if we think of an equivalence class of derivations as a set of paths (or ‘weft’) starting all from the same first stage, ending all in the same terminal stage, and such that for any two of them, there is at least one stage through which one goes, but not the other, then, first

Step 18. The **weft** of an equivalence class of derivations C may be represented by resort to the geometricised resources of enriched circuitless oriented graphs.¹⁸¹

For instance, the weft of the equivalence class of derivations C , all the derivations of which start from S and terminate in the string of fig. 1-8, may be represented as fig. 1-15.¹⁸²

And second, when the representations of step 18. are maximally curtailed of connecting links to minimise the number of paths without losing any of the transit stages, the resulting ‘condensed weft’ is such that

Step 19. The remaining stages in a **condensed weft** of an equivalence class of derivations C constitute a solution to the problem of step 16.

For instance, for the same equivalence class C as in the above examples (obtained without loss by trimming fig. 1-15 down to a minimal compendious reticulum) fig. 1-16, which represents a condensed weft of C , lays bare the much sought-for 40 strings of which fig. 1-7 could only offer 7, which one will find still somewhat scattered (cf. fig. 1-13) in the tight class $\Sigma_1 - \Sigma_{11}$ of the fully fledged 11 distinct derivations corresponding to the 11 distinct paths of fig. 1-16.

However, such geometricised representations as are used in steps 18. and 19. can only represent (but not obtain) the results of computations effectuated by using other, algebraic, representations.

For instance, the weft (and *a fortiori* the condensed weft) of C are only accessible once the derivations of C have been derived in algebraic style by applications of constituent-structure rules. Similarly, though less directly, the meta-language used to specify the formal procedure for condensing wefts¹⁸³ (for instance, for condensing fig. 1-15 into fig. 1-16) resorts to algebraic meta-variables and indices without which its definition by recursion could not have been formulated,¹⁸⁴ and condensed wefts would remain in limbo. And finally, though it is relatively easy to detect

the wanted 40 strings by slantwise, diagonal ‘windscreen-wiping’ visual inspection of such representations as fig. 1-2, even this informal approach circumventing the problem of step 16. would not be available without resort to at least one complete phrase-structure derivation, coupled with at least one application of the recursively defined procedure Γ .¹⁸⁵

So that,

Step 20. For all their merits, such representations as fig. 1-15, 1-16 and 1-2 could not possibly supplant algebraic representations in the formalising process.

From this discussion of step 1.-20, then, our three-fold conclusion will be the following:

Firstly, since it is very difficult to find one’s way into the representations churned out by mechanical application of algebraic rules alone, and since geometricised representations are useless in the effectuation of formal computations,

(XXXV) Computation-wise, the algebraic and the geometricised are like the blindman and the cripple:¹⁸⁶ one can go anywhere, but doesn’t know where he is going, the other can see all the open paths, but can’t follow any.

Therefore algebraic and geometricised formal representations fare better together than alone: while the ones supply for the needs of the inner workings of the formal machinery, the others can provide heuristically invaluable notational material for the needs of bird’s-eye, holistic apperceptions.¹⁸⁷ And in that sense, secondly,

(XXXVI) *Pace* Ockham, representation-wise, the paucity of mono-style is vice and the abundance of double register, virtue.¹⁸⁸

And, since algebraic and geometricised formal representations fare more poorly alone than together, thirdly,

(XXVII) An ‘algebraicised’ formal study shunning geometricised representations may be blind, but it would be a lame ‘formal’ study indeed that should resort to illustrative schemata and diagrams without providing any means of formal computation to accompany them.¹⁸⁹

At this point, we could close this section. But before that, a small number of qualifications would seem to be in order, starting from two corollaries of a methodological proviso:

(XXXVIII) Before jumping to the conclusion that a formal object is representation-wise refractory or recalcitrant, one should be wary of not confusing rebellious ontological nature and lack of formal imagination.

For instance, **1**, we have seen that though derivations were easily manageable by recourse to algebraic representations, by contrast, equivalence classes of derivations were not so docile because of the unmanageable over-redundant profusion of the associated algebraic representations. But if the algebraic labelled bracketing notations of fig. 1-9 are introduced, those classes may turn out to be not so recalcitrant after all, since (though, admittedly with slightly less ease than from fig. 1-2 and of course with much more difficulty than from fig. 1-16), the missing strings of problem 16. may be (just about) read into the one defining line ['8.']) for the class.

Similarly, **2**, none of the geometricised representations here play a direct role in the effectuation of formal computation. But that does not mean that the hallmark features of such representations (geometrical-like points and segments) are doomed never to be incorporated into an otherwise algebraic formal machinery. Thus, to give just one example,¹⁹⁰ in the spirit of suggestions made in the early sixties,¹⁹¹ the rules of fig. 1-6 may be interpreted not as rewriting rules yielding such sequences of strings as the one represented by fig. 1-17, but as “tree-formation rules” yielding such sequences of trees as the one represented by fig. 1-19 and offering far less compact but more legible notations.¹⁹²

Finally, given that the sets of abstract formal objects which formal representations are designed to represent are commonly denumerably infinite, heuristic representations may only serve as notational appetisers kindling the imagination, since

(XXXIX) Formal objects are so immensely numerous that apart from a few samples, it is without figures that we are forced to figure out what they might be.

So that, since recursive definitions and inductive proofs are the only way to bridge the gap between the finite and the infinite, and since, furthermore, algebraic graphic representations play a crucial role in the meta-linguistic notations indispensable for the formulation of recursive definitions and inductive proofs, in this sense,

(XL) At the end of the day, the algebraic always wins.

Conclusion

To conclude, we shall first recapitulate at some length what ground has been so far covered and by what means. And finally we shall more briefly outline the main features and guiding principles of the sequel to come.

Recapitulation

In this work, we have introduced, by way of argumentation and/or stipulation:

- a synthetic view of an epistemological framework in which [Introduction] an overarching concept of ‘metalinguistic discourse’ is articulated, and in which [section 1] the concept of ‘formal representation’ is integrated into a conceptual network comprising as other key interdependent elements ‘formalisation,’ ‘naïve theory,’ ‘formalised theory,’ ‘(degree of) abstraction’ and ‘empirical data’;
- a vindication [(III)-(XI)] of the very idea of a ‘formal *representation*’ against formalist reductionism(s) which would not tolerate the concept;
- an analysis of formal representations as [(II)] of a consubstantially dual (hence three-fold [note 45]) nature and as [(XII)] representing structures in the mathematical sense;
- a definition [(XIII)] of, among formal representations, the relation ‘to be a notational variant of each other’ resting on [note 71] an abstract definition of the relation of identity between formal objects;
- a three-fold distinction [(XIV)-(XV)] between abstract formal symbol (as abstract *locus tenens*, pure distinctiveness), abstract grapheme (as such, this but not that bundle of graphemic distinctive features) and concrete inscription;
- within the framework of Plenitudinous Platonism (FBP) [note 87], an analysis [(XVI)-(XVIII)] of that which is represented by a formal symbol as being pure ipseity [notes 97 and 98];
- in defence [(XX)-(XXIII)] against putative counter-examples of the overall analysis [(XIX)] introduced here for the formal symbol, an analysis [(XXI)-(XXII)] of variables as incomplete symbol-like position-holders forming part of a guiding system for instantiation, but as such devoid of ontological import;
- with the same intent, an elucidation and critical assessment [(XXIV)-

- (XXVII)] of the puzzling denominations ‘nonspecific constant’ and ‘constant variable’ (as used e.g. by Wall), resting on an elaboration [(XXIV)] of the concept of linkage, and in which analyses (XVI)-(XVIII) demonstrate their robustness;
- a revised set of definitions [(XXVIII)-(XXXI)] for ‘universe of discourse,’ ‘domain of discourse’ and ‘individual,’ in part independently motivated, but suitable to host the plenitudinous entities of FBP in general, and our formal symbols as (radically abstracted) formal objects in particular;
 - an original, integrated formal apparatus comprising arboriferences; (condensed) wefts of equivalence classes of derivations; a procedure assigning in general one arboriference to each unrestricted grammar derivation, and in particular one canonical tree to each phrase structure derivation; a procedure for condensating wefts; cumulative exhaustive dominance and filiation indexes; a distinction between derivational and configurational definitions; and finally, enriched superscripted notations meta-linguistically recording the derivative past of each occurrence and each substring constitutive of each line (but the first) in a phrase structure grammar derivation—an apparatus both illustrated and comforted as follows by an examination of fig. 1-1–20;
 - thanks to this apparatus, an analysis [(XXXII)-(XXXIV)] of how three different ways of defining (by necessary and sufficient conditions for membership, by constraints on representations, by constraints on rules) the same class of abstract formal objects (a subclass of the arboriferences, namely the canonical trees) may inspire different sets of deciphering instructions (hence very different types of formal representations), thus yielding an equivalence class of notational variants comprising fig. 1-1, 1-2, 1-3, 1-8, 1-11 and 1-12—but not 1-20;
 - by the same means, a critical comparative analysis [section 6, step 4.-20.] of how problems arising in the formalisation of two naïve Phrase Structure Theory constructs (‘to be a constituent of a certain type’ and ‘to be analysable as’) can be conceptualised by derivational and/or configurational means and formalised *via* algebraic and/or geometricised formal representations;
 - on the basis of this analysis [(XXXVI)-(XXXVII)], an assessment of the compared merits and/or demerits of algebraic and geometricised formal representations concluding on their necessary complementarity;
 - and finally [(XXXVIII)-(XL)] a few methodological provisos, warnings or remarks on what should or can be expected of formal representations.

Prospective note

As we explained in our introduction, the work presented here is only the first half of a study on the Protean use of the concept of representation in formalised, or at least partially formalised (mainly Chomskyan), linguistic theories. The aim of this over-all study being as we said

to shed some light on what it is that holds together (or fails to hold together) the motley conglomeration of intended acceptations for the term in such collocations as “formal representation,” “cognitive representation,” “cerebral representation,” “graphic representation,” “scriptural representation,” “symbolic representation,” “semantic representation” or “intentional representation,”

it is clear that what we have done so far leaves us in mid-course. But it has paved the way, since throughout the over-all study, the same epistemological framework, body of definitions and notational devices will be used and all intermediate results and contentions cumulatively resorted to¹⁹³ from beginning to end.

In the sequel, then, we shall first dwell on issues of infinite regress and vacuity threatening formalised theories [in the sense of note 38 *supra*] claiming to have obtained a formalised account of how elements of natural language can have semantic and/or referential value. Then, turning to the relation between mind and brain, we shall dwell on issues raised by the so-called ‘bifurcation’ thesis, which claims an ontological divide should be drawn among empirical scientific theories: between the chosen ones (among them, reputedly, physics) and the reprobate (among them, allegedly, Chomskyan linguistics). And finally we shall dwell on the temptation (or pitfall) of resorting to the providential concept of ‘interface’ as a strategy (or stratagem) for discarding seemingly intractable problems.

- $B_1 = a_1^1, a_2^1, a_3^1$; $B_2 = a_1^2, a_2^2, a_3^2$; $B_3 = a_1^3, a_2^3, a_3^3$;
 $B_4 = (a_1^4, a_2^4, a_3^4, a_4^4)$; $B_5 = (a_1^5, a_2^5, a_3^5, a_4^5)$; $B_6 = (a_1^6, a_2^6, a_3^6)$;
 $B_7 = a_1^7, a_2^7, a_3^7$; $B_8 = a_1^8, a_2^8, a_3^8$; $B_9 = a_1^9, a_2^9, a_3^9$
 - $a_1^1 = a_1^2 = a_1^3 = a_1^4 = a_1^5 = a_1^6 = a_1^7 = a_1^8 = a_1^9$; $a_2^1 = a_2^2$;
 $a_2^3 = a_2^4 = a_2^5$; $a_3^3 = a_3^4$; $a_2^7 = a_2^8 = a_2^9$
 - $a_1^1 = a_1^2 = a_1^3 = a_1^4 = a_1^5 = a_1^6 = a_1^7 = a_1^8 = a_1^9 = S$;
 $a_2^1 = a_2^2 = A$; $a_3^1 = C$; $a_3^2 = D$;
 $a_2^3 = a_2^4 = a_2^5 = E$; $a_3^3 = a_3^4 = B$; $a_4^3 = H$;
 $a_4^4 = I$; $a_3^5 = F$; $a_4^5 = G$; $a_2^6 = H$; $a_3^6 = I$;
 $a_2^7 = a_2^8 = a_2^9 = J$; $a_3^7 = A$; $a_3^8 = B$; $a_3^9 = C$

Fig. 1-1.

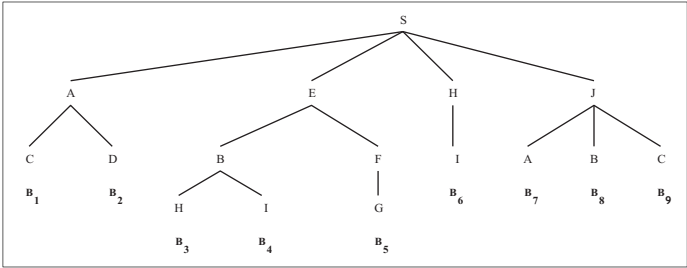


Fig. 1-2.

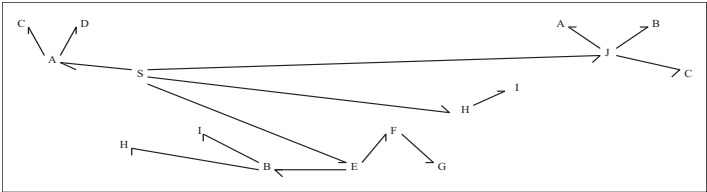


Fig. 1-3.

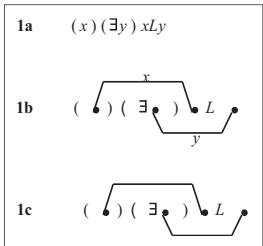


Fig. 1-4.

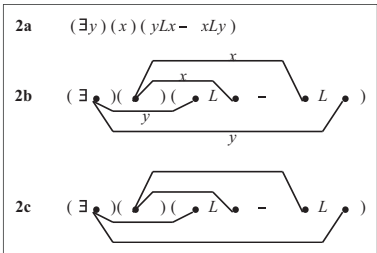


Fig. 1-5.

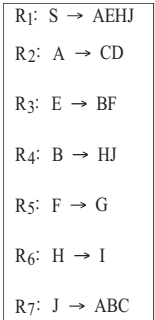


Fig. 1-6.

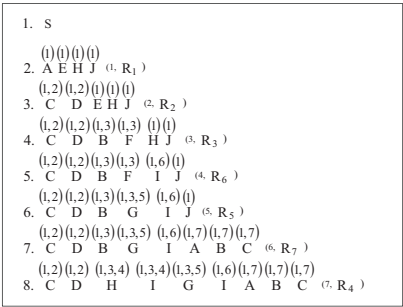


Fig. 1-7.

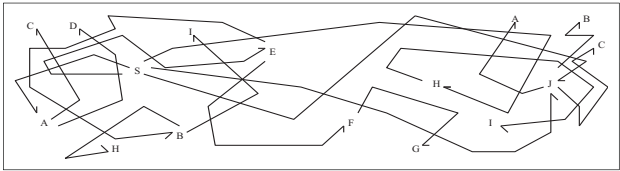


Fig. 1-8.

1. S
2. [s A E H J] (1, R'''₁)
3. [s [A CD] E H J] (2, R'''₂)
4. [s [A CD] [E B F] H J] (3, R'''₃)
5. [s [A CD] [E B F] [H I] J] (4, R'''₄)
6. [s [A CD] [E B [F G] [H I] J] (5, R'''₅)
7. [s [A CD] [E B [F G] [H I] [J A B C]] (6, R'''₆)
8. [s [A CD] [E [B H I] [F G] [H I] [J A B C]] (7, R'''₇)

Fig. 1-9.

(1,2)	(1,2)	(1,3,4)	(1,3,4)	(1,3,5)	(1,6)	(1,7)	(1,7)	(1,7)
C	D	H	I	G	I	A	B	C

Fig. 1-10.

$\mathcal{N} = \{N_1, N_2, \dots, N_{16}\}$; $\mathcal{Q} = \{A, B, C, D, E, F, G, H, I, J, S\}$; $\mathcal{D} = \{(N_1, N_1), (N_1, N_2), \dots, (N_1, N_{16}), (N_2, N_2), (N_2, N_3), (N_2, N_4), (N_5, N_5), (N_5, N_6), \dots, (N_5, N_{10}), (N_6, N_6), (N_6, N_8), (N_6, N_9), (N_7, N_7), (N_7, N_{10}), (N_8, N_8), (N_9, N_9), (N_{10}, N_{10}), (N_{11}, N_{11}), (N_{11}, N_{12}), (N_{12}, N_{12}), (N_{13}, N_{13}), (N_{13}, N_{14}), \dots, (N_{13}, N_{16}), (N_{14}, N_{14}), (N_{15}, N_{15}), (N_{16}, N_{16})\}$; $\mathcal{P} = \{(N_2, N_3), \{(N_2, N_6), (N_2, N_7), \dots, (N_2, N_{16}), (N_6, N_7), (N_6, N_{10}), (N_6, N_{11}), \dots, (N_6, N_{16}), (N_7, N_{11}), (N_7, N_{12}), \dots, (N_7, N_{16}), (N_8, N_9), (N_8, N_7), (N_8, N_{10}), (N_8, N_{11}), \dots, (N_8, N_{16}), (N_{10}, N_{11}), (N_{10}, N_{12}), \dots, (N_{10}, N_{16}), (N_{11}, N_{13}), (N_{11}, N_{14}), \dots, (N_{11}, N_{16}), (N_{12}, N_{13}), (N_{12}, N_{14}), \dots, (N_{12}, N_{16}), (N_{14}, N_{15}), (N_{14}, N_{16}), (N_{15}, N_{16})\}$; $\mathcal{L} = \{(N_1, S), (N_2, A), (N_2, A), (N_3, C), (N_4, D), (N_2, A), (N_5, E), (N_6, B), (N_7, F), (N_8, H), (N_9, I), (N_{10}, G), (N_{11}, H), (N_{12}, I), (N_{13}, J), (N_{14}, A), (N_{15}, B), (N_{16}, C)\}$

Fig. 1-11.

$$\begin{aligned}
 &= a_1^1 = a_2^2 = a_1^3 = a_1^4 = a_1^5 = a_1^6 = a_1^7 = a_1^8 = a_1^9 = S; \\
 &= a_2^1 = a_2^2 = A; = a_2^3 = a_2^4 = a_2^5 = E; = a_2^6 = H; = a_2^7 = a_2^8 = a_2^9 = J; \\
 &= a_3^1 = C; = a_3^2 = D; = a_3^3 = a_3^4 = B; = a_3^5 = F; = a_3^6 = I; = a_3^7 = A; = a_3^8 = B; = a_3^9 = C \\
 &= a_4^3 = H; = a_4^4 = I; = a_4^5 = G
 \end{aligned}$$

Fig. 1-12.

Fig. 1-13.

1. $= a_1^1 = S$
2. $= a_1^1 = a_1^2 = a_1^3 = a_1^4 = S$
 $= a_2^1 = A; = a_2^2 = E; = a_2^3 = H; = a_2^4 = J \quad 1, R'_1$
3. $= a_1^1 = a_1^2 = a_1^3 = a_1^4 = a_1^5 = S$
 $= a_2^1 = a_2^2 = A; = a_2^3 = E; = a_2^4 = H; = a_2^5 = J$
 $= a_3^1 = C; = a_3^2 = D \quad 2, R'_2$
4. $= a_1^1 = a_1^2 = a_1^3 = a_1^4 = a_1^5 = a_1^6 = S$
 $= a_2^1 = a_2^2 = A; = a_2^3 = a_2^4 = E; = a_2^5 = H; = a_2^6 = J$
 $= a_3^1 = C; = a_3^2 = D; = a_3^3 = B; = a_3^4 = F \quad 3, R'_3$
5. $= a_1^1 = a_1^2 = a_1^3 = a_1^4 = a_1^5 = a_1^6 = S$
 $= a_2^1 = a_2^2 = A; = a_2^3 = a_2^4 = E; = a_2^5 = H; = a_2^6 = J$
 $= a_3^1 = C; = a_3^2 = D; = a_3^3 = B; = a_3^4 = F; = a_3^5 = I \quad 4, R'_6$
6. $= a_1^1 = a_1^2 = a_1^3 = a_1^4 = a_1^5 = a_1^6 = S$
 $= a_2^1 = a_2^2 = A; = a_2^3 = a_2^4 = E; = a_2^5 = H; = a_2^6 = J$
 $= a_3^1 = C; = a_3^2 = D; = a_3^3 = B; = a_3^4 = F; = a_3^5 = I$
 $= a_4^4 = G \quad 5, R'_5$
7. $= a_1^1 = a_1^2 = a_1^3 = a_1^4 = a_1^5 = a_1^6 = a_1^7 = a_1^8 = S$
 $= a_2^1 = a_2^2 = A; = a_2^3 = a_2^4 = E; = a_2^5 = H; = a_2^6 = a_2^7 = a_2^8 = J$
 $= a_3^1 = C; = a_3^2 = D; = a_3^3 = B; = a_3^4 = F; = a_3^5 = I; = a_3^6 = A; = a_3^7 = B; = a_3^8 = C$
 $= a_4^4 = G \quad 6, R'_7$
8. $= a_1^1 = a_1^2 = a_1^3 = a_1^4 = a_1^5 = a_1^6 = a_1^7 = a_1^8 = a_1^9 = S$
 $= a_2^1 = a_2^2 = A; = a_2^3 = a_2^4 = a_2^5 = E; = a_2^6 = H; = a_2^7 = a_2^8 = a_2^9 = J$
 $= a_3^1 = C; = a_3^2 = D; = a_3^3 = a_3^4 = B$
 $= a_3^5 = F; = a_3^6 = I; = a_3^7 = A; = a_3^8 = B; = a_3^9 = C$
 $= a_4^3 = H; = a_4^4 = I; = a_4^5 = G \quad 7, R'_4$

Fig. 1-14.

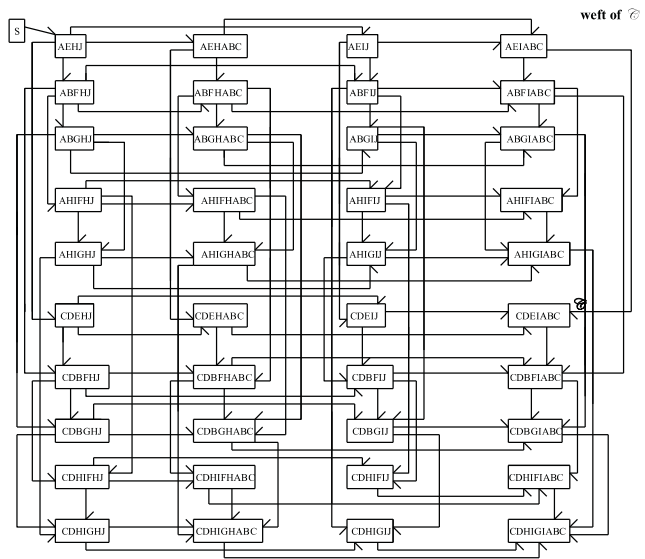


Fig. 1-15.

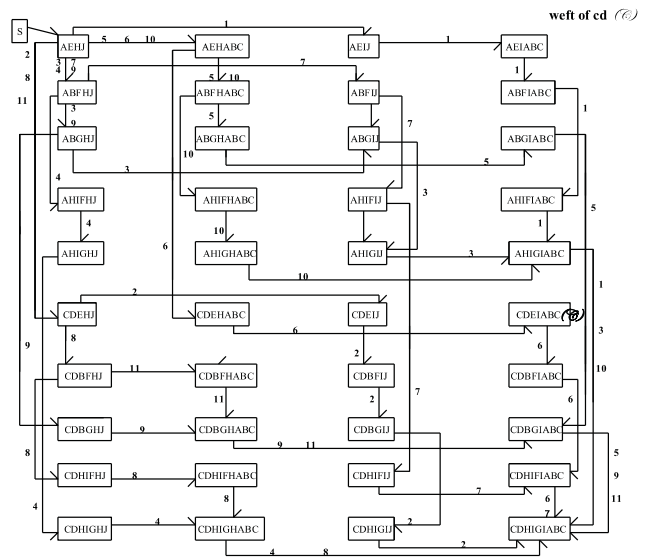


Fig. 1-16.



Fig. 1-17.

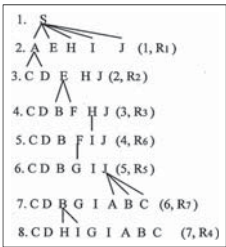


Fig. 1-18.

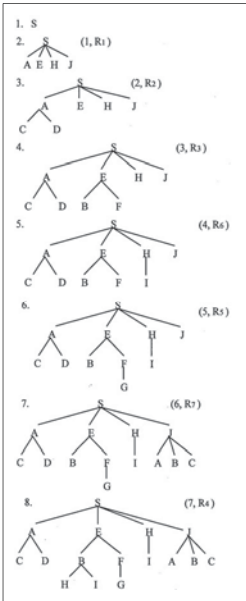


Fig. 1-19.

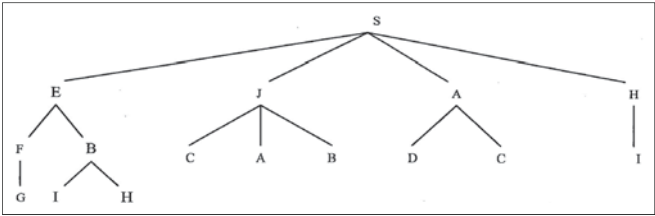


Fig. 1-20.

CHAPTER TWO

GENERATIVE GRAMMAR AND COGNITIVE LINGUISTICS: ON THE HISTORY OF A THEORETICAL SPLIT IN AMERICAN LINGUISTICS

JEAN-MICHEL FORTIS

Introduction

Cognitive linguistics (CL) is commonly depicted as a new framework in direct opposition to generative grammar (GG). Yet its founding fathers all took part in the generative movement, or held positions associated with the generative movement. It is the purpose of this paper to retrace the path which led to this theoretical split.

As will be shown, the schism which can be taken to characterize the present situation is the final state of an evolution, not the sudden upheaval of a revolution. To a large extent, this evolution was driven by tensions internal to the generativist camp, culminating in the battle between interpretive and generative semantics, from the second half of the 60s.

The fact that the founding fathers of cognitive linguistics all espoused, or at the very least showed sympathy for generative semantics (GS) is certainly not coincidental. On the assumption that cognitive linguistics did not emerge in a theoretical vacuum, it is legitimate to ask whether cognitive linguistics owes anything to generative semantics, or whether it constituted a radical departure from both transformational grammar (TG) and generative semantics. According to the latter view, the role of GS in the birth of cognitive linguistics would have been mostly negative: its demise would have driven some of its supporters away from TG and compelled them to explore other paths, but there would not be any discernible legacy.

The present chapter will argue that ideas which originated in GS did have an influence on CL. The relation of CL to GG is thereby rendered more complex. On the one hand, the generative movement fostered a great diversity of approaches, and provided an impulse toward semantic and mentalistic views. This first move will be dealt with in the first part of the paper. On the other hand, semantic generativists felt the need to dissociate themselves from the movement which had harbored their initial undertaking.

The first part of the chapter briefly depicts the historical background out of which TG and GS arose. The second part describes the development of GS and presents some of its theoretical claims. The final three parts are devoted to short historical sections on Lakoff's, Langacker's and Talmy's work. Each time, the emphasis is on their relation to TG and GS, and on the course which took them away from GG.

1. The historical background

1.1. The "Chomskyan revolution"

It is beyond the ambitions of the present chapter to narrate the advent of transformational grammar. However, a few words need to be said about the expansion of TG and its attraction for linguists of the 1960s. Certainly, part of the appeal of TG is to be attributed to its "revolutionary" impact.

The catchwords *Chomskyan revolution* have been used countless times to capture the spirit of the time (e.g. by Searle 1972). Disputes have arisen among historians, as to how appropriate the phrase is (Koerner 1983, 1989; Newmeyer 1986a / b). In view of the fact that ideas on the role of productivity, formal processes and transformations had already been voiced by Hockett and Harris prior to Chomsky's publications (Hymes and Fought 1981), it is fair to say that important tenets of GG had been anticipated. This structuralist thread in Chomsky's work has been widely recognized by his opponents and by historians, including Newmeyer (1986a) who nonetheless thinks it is appropriate to use the term "revolution." To Newmeyer's eyes, the "revolution" was not a change of Regime, rather a decisive development and a new reference frame for linguistics, one that linguists could no longer ignore and had to take into account when stating their own position (Newmeyer 1986b). Unfortunately, the use of the term "revolution" has, in Newmeyer's account, overtones of a Whiggish conception of history, as Koerner aptly describes it (Koerner 1983, 163). For Newmeyer, GG is a sort of

intellectual acme, and he seems confident that a theory which prevails does so by natural selection.

If “revolution” has a definite meaning, it is best viewed as applying to a complex range of phenomena. There was a mood of a “generational rebellion,” as Murray (1980) put it, and, significantly, an institutional situation, in which funding was flowing to universities and consequently to linguistics. The number of students was growing fast: the number of degrees in linguistics increased fourfold between 1960 and 1970, a figure apparently unmatched by any other field (Newmeyer 1986a, 44s). In such a context, it was potentially rewarding to place a bet on newcomers called to set up or expand linguistics departments.¹ The “revolution” is also an optical illusion resulting from an “eclipsing stance” (Voegelin and Voegelin 1963, 12) toward the preceding generation and contemporary diverging schools (such as tagmemics). With the help of a self-serving historiography, the image of Chomsky as the protagonist of an upheaval was propagated, and the gap with “taxonomists” and structuralists widened with time: compare, for example, the tone of *Language and Mind*, which acknowledges the twofold influence of structuralism and universal grammar, with that of *Knowledge of Language*, where Chomsky distances himself from structuralism. Whatever the case, what “revolution” should not convey is a Kuhnian view of one paradigm replacing another, especially since the notion of paradigm, in its Kuhnian sense, does not accord well with the situation in linguistics, where no school commands uniform assent from practitioners (Percival 1976) and radical theoretical discontinuities are questionable.

1.2. On the perception of transformational grammar

Of course, no amount of historical revision will ever dispel the perception of a revolution by the witnesses themselves (Newmeyer 1986b). The speed with which TG was incorporated into the basic theoretical equipment of linguists attests to its sudden importance: general introductions to linguistics soon made room for it (Gleason 1967; Lyons 1968), and several textbooks were published in quick succession (Bach 1964; Roberts 1964; Thomas 1965; Jacobs and Rosenbaum 1968, the list is not exhaustive). One explanation for this success is that GG focussed on syntax, a sector of linguistics which was a weak link in Bloomfieldian work, as Hymes and Fought note (1981, 235).

Most relevant for our subject is the notion that GG was doing away with the strictures against semantics and mentalism, supposedly enforced by Bloomfield (1933) and maintained to a large extent by the

Bloomfieldians from that point on. This notion legitimized the GS movement, as we shall see, and we find it expressed by linguists who were generative semanticists, like Langacker and McCawley:

In recent years, linguists have recognized that meaning and syntax are crucial to an understanding of language. [...] They have also recognized that language is basically a psychological phenomenon, one that cannot be studied fruitfully just by observing linguistic behavior (Langacker [1967] 1973, 10)

Aspects brought semantics out of the closet. Here was finally a theory of grammar that not only incorporated semantics (albeit very programmatically) but indeed claimed that semantics was systematically related to syntax... (McCawley 1976b, 6)

As we now know, Chomsky's zeal for semantics was to remain moderate. Neither was he born a "mentalist." According to Randy Harris (1993, 268–69) citing unpublished work by Iain Boal, Chomsky had initially expressed anti-mentalist views in the manuscript of his *Logical Structure* (1955), before expunging them (discussion in Seuren 1998, 253s). Whatever the case, the mentalist turn took place around 1956–57, possibly kindled by Roger Brown's remark that a TG may characterize what children attain in learning a language (Harris 1993, 269).

In Chomsky's work, this psychological outlook progressively ramified into positions declared to be antagonistic to Bloomfieldian linguistics (rationalist and innatist vs empiricist, intuition-driven vs corpus-driven, committed to psychological reality vs not committed). Thus, in a paper defending the mentalist bent of GG, Katz (1964) set two ways of doing linguistics against each other: the "taxonomic" (i.e. based on the classification of forms from their distribution in a corpus) versus the "mentalic." Only the latter, he claimed, could be empirically adequate, since it is predictive of a potentially infinite number of "sentences." Further, since its constructs are claimed to be psychologically real, it is susceptible to refutation by experimental science. In effect, Postal's line of argument was turning upside down the anti-mentalic view that working on observables was a way to ensure empirical adequacy.

Another ground for seeing GG as psychologically oriented was its reliance on speaker intuitions, as indicated by the following dialogue between Archibald Hill and Chomsky:

Hill: If I took some of your statements literally, I would say that you are not studying language at all, but some form of psychology, the intuitions of native speakers.

Chomsky: That is studying language. (Third Texas Conference 1958, in Harris 1993, 54)

By the 1960s, mentalism was no longer viewed as being in opposition to Bloomfield's "mechanism," i.e. a causal explanation based on observables. Putnam's famous paper on "Minds and machines" (1960) argued that the relation of mental states to brain states was as trivial as the relation of logical states of a computer (or a Turing machine) to its physical states. In short, he suggested that the mind / body problem could be dissolved in the analogy between mental states and the logical states of a machine. This analogy was seized upon by Katz in the aforementioned paper, and was taken up by him to give linguists a free hand in laying claim to the psychological and neurophysiological reality of their constructs. In other words, linguists could go about their mentalist business (on the level of "logical states") without being accused of reinstating dualism.

Psychologists could draw the same benefit from the computational view of the mind and envisage TG as providing an information processing account of language understanding and production. TG was indeed of considerable appeal to psychologists. Greene (1987, 65) notes that "in the late 1950s the psychological influence of Chomsky's theory was enormous. [...] In the case of language, Chomsky's rules supplied psychologists with a ready-made set of representations for linguistic knowledge. Particularly influential was the notion that understanding language entails mapping the surface order of the words in a sentence into some 'deeper' representation." Many studies attempted to put TG to the experimental test, with mixed or disappointing results (Greene 1972; Fodor, Bever and Garrett 1974; Wanner 1988), and psychologists were quickly to tire of the hectic pace of change in generative theory. In the linguistic camp, the threat of a linguistic theory being refuted by a psychologist's chronometer may be the reason why Chomsky, in *Rules and Representations*, defends the autonomy of linguistics, that is, the claim of linguistics to reach into the functioning of the mind / brain with its *own* methods. Both parties went their own way and divorce by mutual consent was inevitable.

Laying claim to the cognitive reality of linguistic constructs without the help of psychology is a practice which GG grammar shares with cognitive psychology. It is tempting to say that TG legitimized mentalism and encouraged this practice.

1.3. Deep structures and semantics

In retrospect, it may seem surprising that TG was seen as opening up the prospect of doing semantics, and even ushered in a theory centred on semantics, namely generative semantics. Yet, this was indeed the perception shared by some young linguists coming of academic age in the 1960s. What follows is an attempt at understanding this perception and the advent of generative semantics.

As early as *Syntactic Structures*, Chomsky declared that “we should like the syntactic framework of the language that is isolated and exhibited by the grammar to be able to support semantic description” (1957, 102). In *Syntactic Structures*, this concern is especially illustrated by the treatment of ambiguities like *the shooting of the hunters*, which are assigned different representations in the kernel. Furthermore, transformations take charge of sentences which are similar in meaning, for instance active sentences and their passive counterparts. In short, deep representations are different when a surface structure is ambiguous and identical when one is the transform of the other and parasynonymy holds.

In their 1964 opus, Katz and Postal suggest that transformations be enriched with purely formal markers, and that semantic interpretation be mapped from this level. For example, the underlying phrase marker of (1)b is the deep structure of (1)a, containing the deep formal markers Q and wh. (1)c is an explanatory paraphrase of (1)b.

- (1) a. Will you go home?
- b. Q wh yes/no you will go home!
- c. I request that you answer whether yes or no you will go home.

In *Aspects*, under the influence of Katz and Postal (according to Jackendoff; Huck and Goldsmith 1995, 98–99), representations on the level of b become the “syntactic framework” designed to support semantic interpretation, under the name of “deep structure.” Further, Chomsky integrates selectional restrictions that Katz and Fodor (1963) had placed in the semantic component (see Fodor 1977, 97) into the grammatical component. In view of all this, we can better understand why McCawley said that *Aspects* had brought semantics out of the closet.

Besides being a level from which semantic interpretation is accessed, the deep level of Katz and Postal served other purposes: grammatical relations were identified with configurations on this level, and forms with identical selectional restrictions and in paraphrastic relations were analyzed as sharing the same deep structure. For example, *John’s flying of the plane* and *the way in which John flies the plane* were said to share the

same underlying structure on the grounds that both could cooccur with *erratic* or *foolish* (Katz and Postal 1964, 140).

2. Generative semantics

The following sections expound the general theoretical orientation of GS, with special emphasis on Lakoff's contribution. The last two sections present some of the difficulties encountered by Lakoff and examine factors which have contributed to the downfall of GS.

2.1. Generative semantics takes off

Shortly before Katz and Postal, Lakoff ([1963] 1976) made two rather bold moves, in a paper where the expression “generative semantics” is introduced for what appears to be the first time.² First, Lakoff suggests extending the notion of paraphrase. Thus, he points out that *I fear John / John scares me* could be analyzed as having the same deep structure (note that a syntactician with a more formalist approach, like Postal, was similarly liberal in handling similar cases; Postal 1970). Lakoff's second move was to use distributional tests in order to differentiate sentences with the same syntactic structure, for example, *X hit a ball / hit a smash*, and to correlate distribution with semantic features. His deep representations, therefore, contained semantic features, allowing for a fine semantic differentiation of lexical items, and were more remote from surface structures than anything that had been proposed so far in generative grammar.

More importantly, Lakoff questioned the interpretive perspective on semantics. In essence, he and other generative semanticists appeared to consider it unrealistic that speakers construct sentences, then filter out the right interpretation, whether during lexical insertion or within the semantic module. One of the motivations for GS, Lakoff observes, is “the intuition that we know what we want to say and find a way of saying it” (1963 [1976]). In accordance with this intuition, he equates his deep structures with “thoughts” to be expressed. In one of his papers counterattacking GS, Chomsky will object to this construal of the *Aspects* model, arguing that the model provides an architecture of the language faculty, not a flow chart specifying the direction of processing. The Standard Theory is therefore a model for the *production* as well as for the understanding of sentences ([1970b] 1972b, 69–70). However, the claim that GS and the Standard Theory are “notational variants” is hardly more than a sleight of

hand since the Standard Theory, unlike GS, is very sketchy on semantic matters.

2.2. Generative semantics and logic

Given their cultural background, for generative semanticists, “semantics meant logic—there was no other technically viable approach to semantics” (Lakoff in Huck and Goldsmith 1995, 107). Indeed, GS made extensive use of logical tools (essentially from predicate calculus). Overall, the borrowing of logical tools was opportunistic and motivated by linguistic issues. Three kinds of motivation are discernable.

First, there were problems related to the treatment of certain kinds of sentences, for example those with “crossing” anaphoras (“Bach-Peters sentences” like *a boy who saw her kissed a girl who knew him*). These sentences could not be handled by deriving the pronoun from a copy of its antecedent and necessitated the introduction of variables (x_1 saw x_2 , $x_1 =$ a boy who saw x_2 , $x_2 =$ a girl who knew x_1). Likewise, indexed variables were used to distinguish between the different meanings of a sentence like *everyone wants everyone to win*, which was supposed, in one of its meanings only, to underlie *everyone wants to win* by Equi-NP deletion of the second *everyone* (McCawley [1970] 1976).

Secondly, issues inherited from logic and philosophy involving the scope of quantifiers and belief-contexts, were transcribed into tree-structures. For example, Lakoff ([1965] 1970 and 1971) suggested detaching quantifiers from the NPs they modify and treating them like predicates in a tree structure. To simplify somewhat, a quantifier with scope over another was represented as commanding the other quantifier. Obviously, complex constraints on derivations were needed to derive a surface structure from such representations, but the theory was opening up the ambitious prospect of deriving sentences in natural language from logical representations. It is no wonder that some linguists who had been alerted to these issues by generative semantics turned thereafter to “pure” logical grammars, like Montague’s theory (cf. the testimony of Barbara Partee on this matter, Partee 1975, 2011).

Thirdly, under Postal’s influence (Harris 1993, 108), generative semanticists had undertaken a drastic reduction of deep lexical categories, which had been cut down to N, V, S. For instance, Lakoff argued in his dissertation that adjectives and verbs could be conflated into one supercategory (V). Among the various reasons cited was the fact that parallel semantic distinctions could be found in both subcategories (stative V and Adj vs non-stative V and Adj: cf. for V, *look at the picture*^{-stat} /

**know that Bill went there*^{+stat} and for Adj., *don't be noisy*^{-stat} / **don't be tall*^{+stat}). This reduction of categories made it possible to consider S, V and N as homologous to a proposition, a predicate and its arguments. In a way, this was a return to the “logical” origins of immediate constituent analysis, that is, to Wundt’s decomposition of a sentence into subject-predicate structures (the logical form of the time; Percival 1976).

2.3. On the status of logic

In texts by generative semanticists, a thorough discussion of the relationship between linguistic thinking and logical inference is nowhere to be found, although Lakoff’s important paper on *Natural Logic* (1970) does offer some elements. It may be asked whether the subsequent rejection of logic by cognitive linguists and Lakoff in particular was, at least in part, motivated by difficulties in integrating it into GS.

Part of the answer may lie in the fact that GS aimed to be a *total* theory. *Natural Logic* aimed at providing an explicit representation of logical phenomena (like quantification), of lexical semantics, and of distributional facts, and extended its territory to pragmatics (presuppositions and information structure). Needless to say, satisfying all these goals at once was no easy matter. Two examples will illustrate the point.

The first concerns the relation of logical representation to semantics. When discussing the distribution of *absolutely*, Lakoff hypothesizes that its behavior may be explained by the presence of a universal quantifier (*Sam saw absolutely everyone / no one* vs **Sam didn’t see absolutely anyone*). Since from a logical point of view, $\forall x (\neg (\text{Sam saw } x))$ is equivalent to $\neg \exists x (\text{Sam saw } x)$, it would be necessary to state a constraint restricting the surface generation of *absolutely* to deep logical structures with a universal quantifier. However, this restriction is far from capturing the distribution of *absolutely*: *absolutely* does not only cooccur with quantifiable formulas, but also with *impossible*, *fascinating*, *to love*, etc. (but not with *possible*, *interesting*, *to like*, etc.). Since these cooccurrences involve extreme values on a scale, it might be hypothesized that the right generalization is to be found in that direction, not in a logical paraphrase. In other words, Lakoff’s natural logic fails because of the very limitation which, as Lakoff observes, affects more conventional logical approaches: it is satisfactory only for those aspects of human reasoning that the technique of logic can cope with (Lakoff 1970, 252).

The second example involves pragmatic entailments (Lakoff 1974a). Consider (2). A logical equivalence can be established between this sentence and (3).

- (2) Get out, or I'll slug you.
- (3) If you don't get out, I'll slug you.

(4), which conveys a similar meaning, has no logically equivalent sentence of the form of (3).

- (4) I think you'd better get out, or I'm afraid somebody will have to slug you.

To simplify, Lakoff's solution is to consider that in (4) the *or*-relation holds of sentences which are conversationally entailed by the surface sentences, i.e. it holds in effect for an equivalent of (2). In Lakoff's account, sentences in which the logical structure is recoverable via pragmatic entailment are *syntactic amalgams*.

Remarkably, in interviews, Lakoff mentions syntactic amalgams, and the difficulties involved in stating rules for recovering their logical structure, as one of the reasons why he abandoned GS (Huck and Goldsmith 1995, 117; Ruiz De Mendoza Ibáñez 1997, 36). Syntactic amalgams pertain to the issue of reconciling logical representation with pragmatics. It can, therefore, be hypothesized that difficulties in elaborating a logico-semantic-pragmatic theory played a part in driving him toward another approach.

2.4. On “prelexical” syntax

Prelexical syntax refers to operations performed before lexical insertion occurs. The best-known instance of a prelexical transformation is McCawley's proposal for a derivation of *kill* from a “conceptual” structure [CAUSE [BECOME [DEAD]]] (McCawley [1968] 1976). For the purposes of the present chapter, it is interesting to observe the development which led from a more lexical and syntactic account in Lakoff's dissertation ([1965] 1970) to McCawley's paper.

In Lakoff's dissertation, transformations were used to account for derivational morphology (*thick* > *thicken*_{INCHOATIVE} or *thicken*_{CAUSATIVE}), and were generalized to morphologically simple items like *kill* (*die* > *kill*). Inchoative and causative verbs resulted from the merging of lexical items like *thick* with abstract, phonologically empty verbs (“pro-verbs”) with the

features [+inchoative] or [+causative]. In effect, Lakoff was proposing a *syntactic* analysis of the *semantic* composition of lexical units.

McCawley's took Lakoff's account a little further by proposing to treat pro-verbs and their features as deep semantic lexemes (CAUSE, BECOME), on a par with the *content* of the items they merge with (DEAD). This merging (or *predicate raising*) thus occurs on a semantic level, even if it is accomplished with syntactic means, that is, transformations performed on tree-structures. McCawley's proposal received some support from Morgan (1969), who argued that adverbs like *almost* could selectively target one of the deep components of *kill*, e.g. in *I almost caused John to die* (= 'I almost caused John to die' or 'I caused John to almost die'). The semantic equivalence of *kill* and *cause to die* was, however, subject to controversy (Chomsky [1970b] 1972b, Fodor 1970; an early refutation was proposed by Hall 1965, 25 sqq).

In brief, pre-lexical syntax was an attempt at extending transformational grammar into the morphological realm. By seeking underlying regularities beyond the morpheme level (i.e. by deriving simple words like *kill*), the theory moved to a semantic level of analysis. As we shall see, this syntactic-conceptual mode of analysis was to be pursued by Talmy in his "pre-cognitive" dissertation.

2.5. Fillmore and Chafe

Limitations of space preclude us from going into the details, but the role of Chafe and Fillmore in GG and their influence on the development of CL must be discussed briefly.

Fillmore's case grammar and its dependency-based syntax (itself influenced by Tesnière) inspired Langacker at certain stages of his theory (see below; Fortis 2010b). Furthermore, Fillmore oriented Lakoff and Langacker toward matters of lexical semantics, through the notion of frame (cf. 3.2), which both adopted in one guise or another. Though lexical semantics has a long history (Nerlich 1992), it seems that neither Lakoff nor Langacker were much aware of it, and in these circumstances, Fillmore played an important role; his references, sometimes rather eclectic, reach back to European linguistics (cf. for instance Fillmore 1985). Fillmore's construction grammar, developed in collaboration with Kay, also helped generative linguists to keep in touch with a strand of American linguistics, that could be described as construction-based and empiricist, and illustrated, in different ways, by Bloomfield's notions of taxeme and tagmeme, Pike's tagmemics, and Fries' grammatical patterns.³ In this respect, the work of Goldberg (1995), a student of Fillmore, is a

late offshoot of this trend. It should be mentioned that in dealing with the issue of ditransitive constructions, Goldberg could capitalize on Green's study (1974), which was a detailed GS account bearing on this same topic. Certainly, construction grammars appealed to cognitive linguists because of the importance placed on semantics. Goldberg's version was appealing in two other ways: it applied the prototype approach to constructional polysemy (a problem Green had difficulty dealing with), and it could be integrated into a larger, empiricist conception of language acquisition and structuring.

The role of Chafe is more difficult to grasp. His *Meaning and the Structure of Language* (1970a) might well be the most detailed and unified theory of grammar in the generative semantics spirit. The theory was intended to handle typologically different languages: in other words, it was universalist and, in this respect, reflected the episteme of the time.⁴ This comparative ambition was explored in the companion book on an Iroquoian language, *A semantically based sketch of Onondaga* (1970b), which Chafe had initially entitled *A Generative Semantic Sketch of Onondaga* (Chafe 2002). However, Chafe soon parted company with generativists, whom he accused of having a much too liberal conception of synonymy (Chafe 1971, 1974b; cf. Fortis 2012). We will see that some of Chafe's ideas probably had an impact on Langacker. Another contribution of Chafe to the cognitive turn in linguistics was a series of papers where the faculties of attention, memory and consciousness are invoked in order to account for the lexicalization of referents (\emptyset , pronominal or nominal), information structure, and intonational phenomena (Chafe 1973, 1974a, 1976).

2.6. The demise of generative semantics

The reasons for the downfall of GS have been eloquently discussed in Harris (1993). Retrospectively, Chomsky's opposition reflects a broader antagonism between two positions which Huck and Goldsmith have aptly described as follows (Huck et Goldsmith 1998, 345–46):

...differences between the Generative Semantics program and the Interpretive Semantics program can profitably be viewed against the backdrop of a longstanding tension in modern linguistics between mediational and distributional orientations of grammar. A mediational orientation is one that sees grammar as linking inner thought and outer form and that takes the task of the linguist to be the discovery of the nature of that link. A distributional orientation sees grammar as determining the patterning of linguistic units and takes the task of the linguist to be the

discovery of principles governing that patterning, both in individual languages and cross-linguistically...

This opposition materialized in a series of papers presenting Chomsky's counter-attack (collected in Chomsky 1972). Chomsky targeted the freedom generative semanticists had allowed themselves in deriving nominals from more complex or non-nominal deep structures. Thus, his "lexicalist hypothesis," put forward in *Remarks on Nominalizations*, called for restrictions on prelexical transformations. Distributional parallels between nouns, verbs and adjectives were now explained by positing a syntactic structure common to all categories, rather than by deriving one from the other. The new framework formed the base of the X-syntax. Chomsky also argued at length in favor of the relevance of surface structures for semantic interpretation, e.g. for assigning pragmatic focus. Again, the latter arguments had generative semanticists in their sights, since Lakoff (1970 [1965]), for instance, had proposed analyzing the pragmatic focus of a clause as a deep predicate. In launching this attack on GS, Chomsky (1972b) drew on Jackendoff, who had obviously been of great assistance. Jackendoff's 1972 book was to offer an impressive alternative.

Other more circumstantial factors should be mentioned. Generative semanticists did not form a unified front. Their efforts were dispersed and pursued many lines of investigation at once. No textbook came out, although Lakoff and Ross had promised one (Harris 1993, 219). Indeed, Lakoff changed models so often that it was difficult to keep up with the pace and crystallize the theory in a textbook.⁵ More trivially, the boisterous temper as well as the schoolboyish pranks, political allusions and various obscenities of generative semanticists were not to everyone's taste (Newmeyer 1986a, 136–37; Harris 1993, 224). Finally, their institutional role was weak: the main branch was Chicago, where McCawley was teaching and could attract students (on the institutional situation, see again Harris 1993, 150). The result was that approximately after 1975, GS was no longer a movement which set the linguistic agenda.

3. Lakoff and the cognitive turn

The defeat of GS meant that linguists who had taken part in it were disaffiliated. In Lakoff's case, this marginalization coincided with what seems to have been a period of reflective doubt and publishing sterility (1975–77). Langacker elaborated his pre-cognitive model during the same period.

Lakoff gives two reasons for his doubts: theoretical problems with syntactic amalgams (see above) and a series of studies which he interpreted as auguring a new era (Huck and Goldsmith 1995, 116–17; cf. also Ruiz de Mendoza Ibáñez 1997, 39):

In the summer of 1975, I ran an underground Linguistic Institute at Berkeley. [...] The word got out and 188 people came. [...] A number of historic lectures were given that summer. First, there was Eleanor Rosch's first lecture on her basic-level category results. Second, there was Len Talmy's first lecture on his work demonstrating that the primitives for spatial relations concepts were topological and orientational. Third, Chuck Fillmore gave his first lecture on the need for Frame Semantics. And fourth, Paul Kay presented his work with Chad MacDaniel on the neurobiological basis for color categorization. [...] After hearing those lectures, I could no longer believe in formal logic as the right way of doing semantics, even though I had been one of the people who had brought formal logic into linguistics.

This raises the issue of why these studies were so important for Lakoff. The discussion of Talmy's ideas will be dealt with in part 5.

3.1. Lakoff and the prototype theory

In his paper on hedges (1973a), Lakoff was the first linguist to exploit Rosch's notion of prototype and some of her preliminary results on semantic categories.⁶ Rosch returned him the favor by using some of the material from Lakoff's study in an experimental test on cognitive "reference points" (i.e. prototypes; Rosch 1975a; on the history of prototype theory, Fortis 2010a).

Lakoff loosely defined hedges as "words whose job is to make things fuzzier or less fuzzy" (1973a, 471). Fuzziness referred to the degree of membership of an item in a category and was defined more precisely in terms of Zadeh's theory of fuzzy sets (Zadeh 1965). Examples of hedges were, in the direction of greater fuzziness, *loosely speaking*, *sort of* or *regular* (in *Harry is a regular fish*) and, in the direction of greater precision, phrases like *technically* / *strictly speaking*. Another way of defining hedges was to say, in ascribing a referent to a category, that they target different dimensions of relevant properties of the referent (for example definitional properties in the case of a *technically speaking*, or non-definitional for *regular*). A more rigorous definition along these lines was provided: if a predicate was characterized as a vector composed of values on several property dimensions, a hedge was a function "distorting" the vector's profile. In order to represent such distortions, Lakoff made use

of the algebraic functions introduced by Zadeh, and argued they had to play a role in natural language semantics. In brief, Lakoff's orientation in this paper was mathematical.

Since prototype theory and formalism were not perceived by Lakoff as antithetic then, the change brought about by Rosch's paper at the Summer Institute must have had to do not with prototype theory as such, but with the concept of basic level. How momentous this concept was is further attested by this confession: "When I first heard Rosch present her results on basic-level categorization, I was thrown almost into a state of shock. They contradicted the world-view that I was brought up to accept as if no other could possibly exist" (Lakoff 1982, 83).

Rosch's basic level owed much to Berlin's work on folk taxonomies, specifically to his notion of *folk genus* (hence its first name, "generic level" in Rosch 1975b). The folk genus was described by Berlin as a taxonomic level corresponding to salient perceptual discontinuities (Fortis 2010a). In effect, Rosch adopted Berlin's idea of a salient level of categorization, applied it to nonbiological taxonomies, and added further characteristics. One amounted to quantifying the criteriality of attributes (i.e. how distinctive of a category they are) by a value called *cue validity*,⁷ and to perceptual discontinuities, Rosch added distinctive functional properties, i.e. motor interactions with objects. In short, items on the basic level, for example *chairs*, were said to have distinctive (i.e. with high cue validity) attributes, and to mark off a discontinuity with superior levels, so that little gain in shape correlation obtains at an inferior level (e.g. *armchair*), and a significant loss of shape correlation occurs when moving up the taxonomy (e.g. on the level of *furniture*, since pieces of furniture have less in common than chairs). Items at the basic level were claimed to prompt the same type of behavior from people interacting with them.

In 1975, the scientific outlook of Rosch's prototype theory was reinforced by the fact that Kay and McDaniel (mentioned above by Lakoff) were developing a neurophysiological model of prototype effects in color categorization. Ironically, this speculative model used Zadeh's fuzzy set theory, but, importantly perhaps for Lakoff, it drew on previous experimental research by De Valois to support its claims.

It is now clear why these results had so much impact on Lakoff: they implied that categorization was a *natural* achievement of human cognition. The human cognitive apparatus was the appropriate place to look for an explanation. Typicality effects were taken as a "natural" given (as explananda), and explicit formalization using fuzzy set theory was no longer desirable as such (Lakoff 1982).

Over the following years, categorization was to be Lakoff's main field of investigation, and prototype theory his most important tool in conducting this research (Lakoff 1987). One of the theory's benefits was that it could revive lexical semantics, a neglected field of generative semantics. In particular, it afforded an easy way of tackling polysemy, lexical items being analyzable as Roschian categories whose members are their different senses (Brugman 1981, Lakoff 1982, 1987).

3.2. Fillmore and frame semantics

Lakoff's description of the 1975 Summer Institute laid great importance on Fillmore's paper and the concept of frame introduced therein. *Frame* is a polysemous word, and much in use at that time. The term was used by the sociologist Erving Goffman (1974), after Bateson (1955), to refer to background assumptions which determine how we make sense of reality, and identify "what is going on" in a given situation. In AI, Marvin Minsky (1974) employed the term for a data structure describing a stereotyped situation. In logic, the problem of devising logical procedures to handle implicit changes (or absence of changes) in belief systems when actions take place was known as the Frame Problem (McCarthy and Hayes 1969). Dreyfus' philosophical critique of AI argued that the Frame Problem reflected the embodiment of human cognition and the open-endedness of our interactions with the world. Finally, Fillmore himself (1968) used the terms *case frame* for the list of cases attached to a predicate. The notion had evolved toward a finer grained analysis of thematic roles, in which roles were relativized to semantic fields, scenes and presuppositions. In fact, this notion of frame was increasingly close to the more general one (Fortis 2012b for more details).

Fillmore's 1975 paper imports the idea of a data structure in correspondence with chunks of behavior, stereotyped situations, etc. In this very general sense, frames are linguistic systems associated with scenes, which in turn are "not only visual scenes, but also familiar kinds of interpersonal transactions, standard scenarios defined by the culture, institutional structures, enactive experiences, body image, and, in general, any kind of coherent segment of human beliefs, actions, experiences or imagings" (Fillmore 1975, 124). Furthermore, Fillmore makes a connection between frames and prototypes: since frames are stereotyped situations, they define central cases, which fit the situation, and marginal cases, which do not. For example, the Pope does not fit the frame associated with the lexeme *bachelor* and is accordingly a nontypical member of the category (1975, 128–29).

In this light, the aforementioned studies suggest a convergence which points to the importance of human experience, and embodied and situated cognition for semantics. What is less clear is why Lakoff then felt compelled to forsake formal approaches. I think the answer lies in the conception governing Lakoff's ideas on what was to become his arch-enemy, "objectivism." Under this name, Lakoff and Johnson conflate verificationism, truth-conditional and model-theoretic semantics, and a realist correspondence theory of truth, in short any view which supposedly attributes to objects themselves properties that are relative to our interaction with them. Objectivism is thereby associated with formal theories and opposed to experientialism, which emphasizes by contrast the role of the human experience of the world (Lakoff and Johnson 1980). In what Lakoff sees as a conflict of *Weltanschauungen*, frames are on the side of experientialism.

In the philosophical context of the time, objectivism is definitely a straw man (see Haser 2005, ch. 4, for a discussion), and perhaps a pretext for collapsing everything Lakoff wishes to break away from in one big *-ism*. Its relevance for linguistics might not be clear. Indeed, in *Metaphors We Live By*, Lakoff and Johnson have a hard time explaining why generative linguistics should share the infamy of objectivism (1980, 205).

3.3. Experiential linguistics

Lakoff's cogitation after 1975 led to a hybrid paper of cognitive-generative semantics, *Linguistic Gestalts* (1977). Lakoff brings under the notion of gestalt a collection of heterogeneous facts, a number of them familiar from the generative literature. From the notion of gestalt, he took the idea that linguistic structures are wholes which are more than the mere assembling of parts. He emphasizes that for linguistic structures to be understood, appeal must be made to the speaker's experience of the world, hence the name of his new orientation, *experiential linguistics*.⁸

An illustration may be furnished by the behavior of "intransitivized" verbs such as

- (5) Bean curd digests easily.
- (6) *Bean curd eats easily.

In Lakoff's account, access to the subject position requires for an argument to be the most causally responsible for bringing about the state of affairs, a condition that is not satisfied in (6) (where the implicit agent is more causally responsible than the patient). This shows, according to

Lakoff, that experience about the degree of volition involved in digesting vs. eating is a condition for understanding the distribution of *digest* and *eat*.

In sum, Lakoff's text does not constitute a significant departure from his previous work, either in the nature of the data he handles or in his concern for the relation of semantics and world knowledge to distribution. Yet, in its emphasis on human experience, the paper heralds cognitive linguistics.

3.4. Lakoff and Johnson on metaphors

In the years following the demise of GS, metaphors became the next major avenue of research Lakoff engaged in, with the collaboration of the philosopher Mark Johnson. This new direction would fall beyond the scope of the present chapter, were it not for two facts. The first, which is of minor significance, consists in sporadic analyses of figures of speech in generative linguistics. Of greater import is the fact that Lakoff and Johnson used metaphors against formal approaches, including generative linguistics.

Metaphors were by no means a new subject in the 1970s. Honeck (1980, 25) remarks that "the 1970s have seen the renaissance of figurative language. It is now a 'hot' topic," an observation fully justified considering the number of publications and conferences devoted to the question.⁹ Stating, as Bamberg does, that Lakoff and Johnson were responsible for a "Metaphernboom" (Bamberg 1983) is definitely a retrospective illusion, fed by the "eclipsing stance" of *Metaphors We Live By*: the boom was already happening. The reception of *Metaphors We Live By* (Lakoff and Johnson 1980) and its success (9000 issues were sold in the year of its publication; Lawler 1983) might be partly explained by this widespread interest. The authors evidently invested their theory with a scope of the utmost significance, describing it as a reworking or redirection of Western thought since the Greeks, no less. Similarly, the paucity of references to previous work was probably intended to convey the impression that the book was proposing something radically new. However, Johnson at least was well acquainted with a significant share of the literature on metaphors, mostly philosophical in his case (see his 1981 paper, where the missing references are provided).¹⁰

A few studies on metaphors in the generative grammar framework were published in the 1970s (e.g. Matthews 1971). In Lakoff's circle, a transformational analysis of metonymy by Borkin (1972), which had grown out of problems related to coreference,¹¹ can also be singled out.

Instances of metonymy sometimes went by the name of “reification” (McCawley [1968] 1976).

In terms of the strategic role of metaphors in the war against formalism, it may be asked in what way *Metaphors We Live By* was intended to fulfill its task.

The main tenet of the book can be condensed in the claim that “human thought processes are largely metaphorical” and that “*the essence of metaphor is understanding and experiencing one kind of thing in terms of another*” (1980, 5–6). Prime examples are the structuring of time relations by spatial concepts, the metaphorical script of love as a journey, or the conceptualization of an argument as a war. Metaphors can be complex structures, sometimes consisting of a script with actors superimposed on a relatively amorphous field, as in the case of the ‘argument is war’ metaphor (which might also be a reminiscence of frames and story grammars). Furthermore, Lakoff and Johnson link metaphors with prototypes and “experiential gestalts.” For example, physical causation by an intentional agent constitutes a cognitive whole (a gestalt) which serves as a prototype for physical and nonphysical causation (1980, 70–71). Given the cognitive import of metaphors, they put at the forefront what Lakoff has called his “cognitive commitment,” in effect, the marriage of linguistics to a theory of cognition (Lakoff in Huck and Goldsmith, 109). Again, Lakoff and Johnson’s dual insistence on a general theory of cognition and on the embodiment of mind sets them in opposition to the formally regulated and language-specific module of the opposite camp.

An important point is that metaphors shore up an empiricist theory, in which, to borrow Locke’s words, “Names which stand for things that fall not under our Senses, <are found> to have had their first rise from sensible Ideas...” (Locke [1700] 1975, II.i.x, §103). Likewise, Lakoff and Johnson assert that “we typically conceptualize the nonphysical *in terms of* the physical” (1980, 59). Crucially, during the emergence of cognitive linguistics, lexical semantics, localist ideas (as we shall see) and metaphor research progressively rally around this empiricist core. This trend was soon to be bolstered by “inductivist” (or abstractionist) conceptions of grammatical structures and language acquisition (in construction grammars and, as we shall see, in Langacker’s work). The empiricist convergence which resulted from this evolution built a paradigm which is now perceived as the rival of Chomskyan nativism.

4. Langacker's work

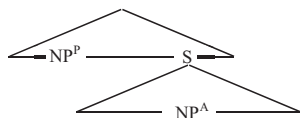
Langacker was not a protagonist of the war which opposed GS and interpretive TG. Yet, his evolution has followed a course which crossed Lakoff's path at several points. Like Lakoff, he was raised with GG, adopted positions sympathetic to GS, and finally drifted away from GG.

Langacker is remarkable in several respects: his interest still lies primarily in "grammatical" matters, and his evolution has been especially complex, going from "formal" TG, GS and functional stratigraphy (1975) to Space Grammar (developed between 1978 and 1982), which finally ushered in Cognitive Grammar. The complexity of this evolution and Langacker's prominent role in CL justify giving it ample treatment.

4.1. Langacker's early period

In his early papers, Langacker practises the kind of transformational grammar advocated at the time by Katz and Postal (1964): his treatment of French interrogatives is directly inspired by the descriptions proposed by Katz and Postal for English (Langacker 1965).

An important contribution of Langacker to syntax-centred transformational grammar is his definition of command, a relation constraining the distributional pattern of anaphoric pronouns (Langacker 1969b). His definition excludes the configuration on the left, where NP^P stands for a pronominal copy of a full NP that is its antecedent (NP^A). In the unacceptable configuration, NP^P both commands and precedes NP^A (as in **He is much more intelligent than Ralph looks*).



"a node A commands another node B if (1) neither A nor B dominates the other; and (2) the S-node that most immediately dominates A also dominates B" (Langacker 1969b, 167)

Fig. 2-1. The structure ruled out by pronominalization. The *command* relation.

For Langacker, precedence and command are ways of establishing the *primacy* of a constituent. Section 3 shows that the notions of primacy and prominence play an important role in Langacker's views on functionally motivated movement rules.

4.2. Towards semantic deep structures

Langacker's position on formal markers and formal transformational games became increasingly sceptical: "There is something inherently suspicious," he writes, "about the postulation of underlying segments with no clear semantic value and no obvious surface manifestation" (Langacker 1974a, 35). An effect of this scepticism is his elimination of Q (Katz and Postal's deep interrogative marker) in favor of a deep performative verb I ASK, in accordance with the common practice of generative semanticists (since Ross [1967] 1970).

From 1969 to 1975, GS was Langacker's basic framework. He appears to have first declared his allegiance to generative semantics in the context of a generative theory of kinship terms (1969a).

4.3. Motivating movement rules

In Langacker's view, conceiving of transformations as formal operations rearranging strings of constituents fails to explain why they exist at all. In other words, their motivation must be explained. This is what Langacker set out to do in a paper which discusses raising rules (1974b).¹² Langacker suggests that the function of movement rules is to elevate the prominence of elements which belong to the propositional core of a sentence. Promoting an element of the propositional core is normally done by raising it to the main clause. For example, Langacker claims that in (8), Marvin, being a constituent of the main clause, attains a higher degree of prominence than in (7).

- (7) I believe that Marvin is a fool.
- (8) I believe Marvin to be a fool.

It should be pointed out that in Cognitive Grammar, constructions formerly related by means of raising rules are described in terms of variations in focal prominence (Langacker 1991b, 454).

4.4. The analysis of passives

Langacker carried out fieldwork on Uto-Aztecan languages from at least 1963 (Langacker 1977). As was the case for Chafe (1970a, 1970b) and Talmy (1972), the quest for universal structures (inherited from generative grammar) and the difficulty of finding structures general enough to cover Amerindian and English facts certainly guided Langacker

to a very deep and abstract level of representation. Passives may be one of the mainsprings of this move to abstraction (Langacker and Munro 1975).

In some Uto-Aztec languages, passives are formed by reflexivization, while in others they are more like impersonal constructions or nominalizations. For example, in Mojave, ‘John was killed’ would be expressed as ‘<there> was killing <of> John.’ Furthermore, some impersonal passives may diachronically evolve into reflexive passives. In order to capture both types of passive in a single generalization, Langacker suggests introducing the notion of *non-distinct argument*: in a reflexive construction, subject and object are non-distinct, and in an impersonal structure, one of the arguments, being non-specified, is non-distinct from the other argument (Langacker and Munro 1975, 100–1). Diachronically, a reflexive construction evolves from an impersonal one by instantiating the non-distinct argument.

In this analysis, a passive construction is made up of the propositional core with the non-distinct argument and of a stative predication which applies to this core:

Δ = “non-distinct argument”
(missing, or identical with N_2
in a reflexive construction)

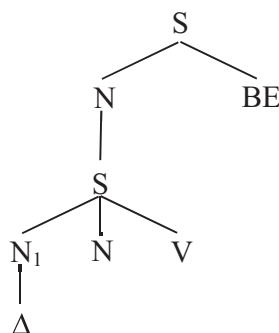


Fig. 2-2. Structure of Uto-Aztec passives (Langacker and Munro 1975, 791).

Langacker claims that the English passive is generated from the same structure, and that the *by*-phrase makes an *independent* predication. In other words, an English passive results from the integration of two constructions. *By* is no longer an overt trace left by a transformation but a predicative function in its own right. This opens up the prospect of providing a semantic analysis of *by* and of its counterparts in other languages.

This semantic concern is strengthened by an interest in “generic” verbs such as BE, HAVE or DO, which are remarkable for their versatility: they are used in passivization and possessive structures in Uto-Aztec for

example, and may exchange their roles from one language to the next (Langacker 1977). Thus, typological description led Langacker to a *semantic* analysis of auxiliaries, copulas, prepositions and their relation to possessive constructions (Langacker 1975, 1978).

4.5. From generative semantics to a stratificational model

The next stage in Langacker's evolution can be summed up by the hypothesis that *all* sentences have the kind of structure that was posited for passives, with a deep "auxiliary" which can be DO, HAVE or BE. This hypothesis characterizes Langacker's new model: *functional stratigraphy*. In functional stratigraphy, the bracketed representation of *The apple was eaten* is I SAY [PAST [BE [Δ APPLE EAT]]]. The affinity to generative semantics is manifest: the higher node is a deep performative (I SAY), tense is treated as a predicate (as in McCawley 1971), while deep "auxiliary" verbs (like BE and DO)¹³ function as predicates (as in Ross 1969). The latter are meant to capture stativity, agentivity, intentionality or inchoativity. However, levels are not clearly delineated and some analyses seem to betray a certain amount of confusion. In particular, what is characteristic of verbhood (the "processive" nature of verbs) has not yet been separated from the generic meanings of deep auxiliaries (Fortis 2010).

4.6. Space Grammar

Functional stratigraphy, Langacker's penultimate model, directly anticipates Space Grammar, which Langacker regards as the initial version of Cognitive Grammar. There are two motivations for naming the new model *Space Grammar*. First, Langacker claims that the hierarchy of grammatical strata is iconic. This iconicity is best captured in a spatial, diagrammatic representation. Second, Langacker proposes a spatial, diagrammatic representation of tenses and modalities. I will concentrate on the first point.

The figure below shows the general stratification of linguistic predication. Obviously, the layers of this structure are hierarchically organized like the levels of functional stratigraphy. The downward arrow is meant to represent what Langacker calls an *epistemic path*, a move which starts from Ego as the center of the speech act (the Ground), in the direction of increasing objectivity and lesser subjectivity, and which ends in the propositional core.

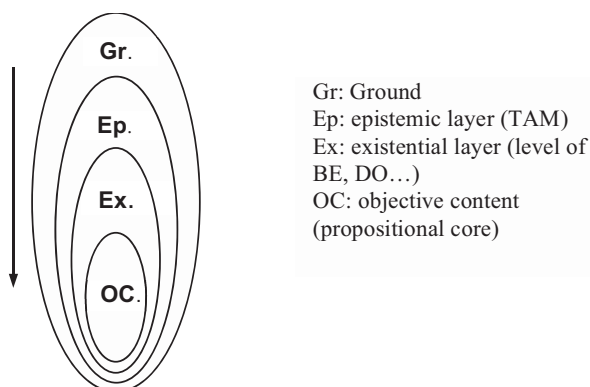


Fig. 2-3. *Epistemic path* (adapted from Langacker 1978, 854).

This structure is iconic in two respects: the successive layers of the epistemic path map to contents of increasing objectivity; and these contents project to surface units in configurations that mirror (to a certain extent) their stratification.

4.7. Sign and dependency

The strata positioned above the layer of objective content essentially comprise features which are dependent on the verb. A consequence of this conception is to favor the adoption of a syntactic model based on dependency. And this was indeed the direction taken by Langacker after 1975.¹⁴

Of course, different languages lexicalize the stratal structure in different ways. In the English sentence *he might be running* (Langacker 1978, 860), the Ground is left implicit but is by default located at the speaker, whose assessment of the situation transpires at the epistemic level in an auxiliary (*might*). The existential layer is composed of *be ...-ing*.

At this point, Langacker's innovation consists in handing down to morphological and lexical units the construction of linguistic structures and the distortions this construction may cause to the stratal structure. The combination of a discontinuous complex form like *be ...-ing* with the objective content form *run* is handled by the units *be* and *...-ing*, which carry instructions on their combination with other signs. Thus, *-ing* is a two-sided-sign, whose semantic side expresses stativity, and whose formal side specifies its phonological realization and its mode of composition (*bond*) with its base. The autonomous element to which *-ing* attaches (*run*)

is characterized as an abstract unit with a semantic pole reduced to the content of its lexical category (the notion of ‘process’ for a verb; Langacker 1979). Semantically, suffixing *-ing* to a base amounts to specifying the content of this lexical category internal to the suffix. From 1979 on, internal categories (or more restricted selectional restrictions) are called *elaboration-sites*. Fig. 2-4 illustrates the *-ing* unit.

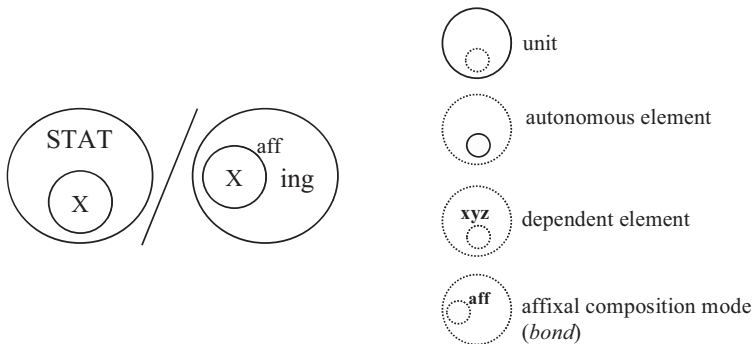


Fig. 2-4. The sign [STAT / -ing] (from Langacker 1978, 860).

Complex structures are constructed by assembling units, according to a hierarchy of embeddings specified in the universal stratal structure of Space Grammar. This is well on the way to Cognitive Grammar, in which the grammar of a language is defined as “a structured inventory of conventional units” (Langacker 1987, ch. 2), and morphology is continuous with syntax. This unit-based account of linguistic composition quickly came to supplant the universal stratal structure, which disappeared from Cognitive Grammar.

4.8. Splitting generative trees

Langacker’s 1979 paper set apart a class of predications which he referred to as *epistemic* and which can be characterized by their relationship to the speech act participants and their knowledge of the “objective” situation. To anticipate Langacker’s later descriptions (Langacker 1985), epistemic signs are special in that they *refer* to a relation (to the speech act participants) but do not *designate* this relation.

The special semantic status of epistemic signs, and the dependency-based model of Space Grammar caused generative trees to break apart.

This consequence can be illustrated with the following representation, which is markedly different from all hitherto familiar models:

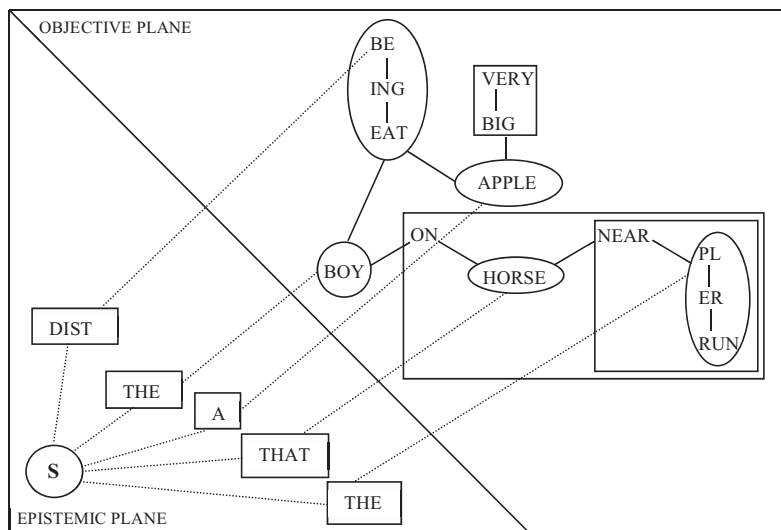


Fig. 2-5. Representation of *The boy on that horse near the runners was eating a very big apple*

(S is the speaker; DIST is for 'distal,' i.e. removed from the present-real; heads are in ellipses and modifiers are in rectangles; Langacker, 1979, 117).

In such a network representation, the constituent structure, clausal head and grammatical relations are not apparent. Further, elaboration sites are not represented as internal to the linguistic units. These problems called for modifications in the theory.

4.9. The figure / ground asymmetry

Possibly inspired by Talmy (1972, 1975, 1978), Langacker uses the notions of figure and ground in order to solve one of the above issues, the question of grammatical relations. He defines the subject as the figure of a predication and the verb phrase as a ground or trajectory against which the subject-figure (or *trajector*) stands out (Langacker 1979, 102). This localist view of grammatical relations was to be completed in 1981 by the introduction of the notion of *landmark* (borrowed from Miller and

Johnson-Laird 1976) as a substitute for the grammatical object (though this is not the landmark's only function).

Remarkably, Langacker resorts to the figure / ground asymmetry in order to redefine two different but connected notions: the phrasal or clausal head, and the relation of a designatum to its semantic field or frame. I will turn first to the head.

It has been seen that in the split network in fig. 2-5, the clausal head was not readily apparent. Further, the tense marker DIST, though applying to the proposition as a whole, was treated as a modifier. Both problems are handled by claiming that tense (and voice) markers "determine the profile" (= figure) of a verb and that the clause inherits its profile from the verb. This last point is all the more justified since in Langacker's view a verb is in fact propositional (it contains its arguments, albeit in a schematic form and sense). These revisions are effective in Langacker's 1982 paper.

In addition to the notion of head, the figure serves to characterize what is properly designated by a form, by opposition to the system of concepts the designatum relates to, whether a taxonomy, a semantic field, or an event (Langacker 1979). The connection between the head as profile and the designatum as figure resides in morphology: in *runner*, the morpheme *-er* is both a head and a designatum that stands in relation to a background (called *base*) whose semantic pole is the process 'run' (Langacker 1979, 109–11). In all likelihood, this incursion into lexical semantics owes much to Fillmore's notion of *frame*, which had been progressively extended by Fillmore to the point of subsuming a system of mutually dependent concepts (Fillmore 1982).¹⁵

4.10. Further developments

A full account of Langacker's evolution to this day is beyond the scope of this chapter. I will confine myself to three additional aspects: the reintegration of constituency, the use of diagrammatic representations, and the notion of usage-based grammar.

A linguistic structure like the one in fig. 2-5 involves a nesting of figure / ground relations which cannot be clearly represented in a split network. In other words, constituency had to be reintegrated. This was accomplished in the 1982 paper. Initially, it should be noted, Langacker provides a classical analysis of constituency not considering (unlike Fillmore) constructions which cross the borders of constituents or which are idiomatic.¹⁶

The use of diagrammatic or imagistic representations may have several motivations: first, Langacker had voiced qualms about propositional

representations (of the kind used in GS) which, being of a linguistic nature, were accused of projecting their own combinatorial potential (their own “grammar”) on situations (Langacker 1976); second, diagrams make it possible to represent elaboration-sites and trajectors / landmarks as internal to linguistic units (see the illustration below for an example of the latter kind).



Fig. 2-6. Diagrammatic representations of *run* and *runner*.
The figure is in bold (Langacker 1979, 111).

Finally, diagrams are well suited to representing phenomena that have been analyzed in localist terms (e.g. tenses and modalities). Whether these representations correspond to mental images (rehabilitated in cognitive psychology in the 1960s-1970s) and to actual mental processes remains an open issue.¹⁷

The last of the aforementioned developments concerns Langacker’s notion that grammar is based on pattern recognition, abstraction toward generic meaning, and more or less “fuzzy” categorization. This is the view epitomized in the dictum “grammar is usage-based” (Langacker 1988). Such an “empiricist” theory, explicitly opposed to Chomsky, could only be reinforced by the newly emerging construction grammars (such as Fillmore et al. 1988). But one should not forget that, among other factors, discussions on the limitations of generativity (e.g. Bolinger 1977), on idioms (e.g. Chafe 1968) and fuzzy categorization (Bybee and Slobin 1982) had laid much of the ground for this usage-based framework.

By way of recapitulation, we may say that Langacker’s evolution up to Space Grammar is best characterized as a *drift* away from TG. This drift appears to result from a variety of reasons. Some of them are inadequacies felt to weaken TG, including functionally unmotivated rules, representations too shallow to capture typological diversity, and ad hoc formal markers. Others reflect a long-standing interest in specific issues, such as the semantics of auxiliaries; finally, his evolution toward a dependency grammar marks a significant departure from generative constituency-based rules, though he was to reintegrate constituency into the theory at a later stage. His theory definitely took on a cognitive outlook at the end of the 1970s, probably reflecting the influence of Talmy and

Fillmore and, more generally, the convergence which, by then, was emerging between the protagonists of this movement.

5. Talmy's contribution

Talmy is the latecomer in this story. He was not a member of Lakoff's circle of generative semanticists, nor did he take part in the internal struggle we recounted above. However, his initial theory, expounded in his dissertation, bears unmistakable affinities to GS and he explicitly acknowledges GS as his framework in a later paper (Talmy 1976).

His contribution to cognitive linguistics is clearly foreshadowed in his initial theory. There is no doubt that, to a large extent, much of his later work consists in recasting, revising, elaborating on issues and descriptions first submitted in his dissertation (in this respect, see his introduction to Talmy 2000). Given its importance, I shall now take a closer look at this dissertation.

5.1. *Semantic Structures in English and Atsugewi (1972)*

Talmy's dissertation is first and foremost an attempt at a comparative grammar of English and Atsugewi (a language of California, now extinct). Two major aspects make this attempt a product of its time. First, Talmy's project is to provide elements of a *universal* grammar, that is, to describe a level of grammatical structure presumed to be common to all languages. The second aspect pertains to the way this project is carried out, by deriving surface structures from a deep semantic structure endowed with a syntactic organization. The proximity to Chafe's program (1970a, 1970b) is obvious, although there are marked differences in the theories (Fortis 2012).¹⁸

Talmy's point of departure is the notion of *translatory situation*. A *translatory situation* (an event or state in which an entity moves along a path or is in a spatial relation to another entity) is analyzed into a fixed structure (*translatory structure*) of 4 components labeled *Figure*, *Motive*, *Directional*, and *Ground*. The *Figure*, Talmy says, is "the object which is considered as moving or located with respect to another object" (1972, 11), while the *Ground* serves as the object with respect to which the *Figure* is moving or is located. The *Motive* is the component which confers "verbhood"; on the level of the initial phrase marker, this component boils down to one of two primitives, *MOVE* (if the situation involves motion) or *BE* (if the situation is static). Finally, the *DIRECTIONAL* is the spatial relation holding between the *Figure* and the *Ground*. To each of these

semantic components corresponds a syntactic category, respectively N, V and P (see fig. 2-7).

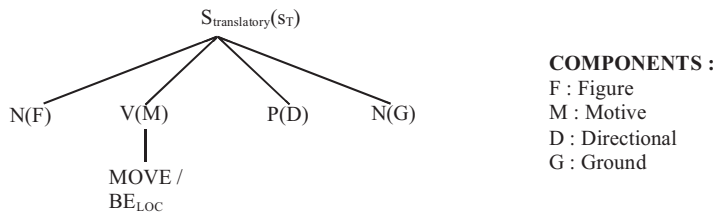


Fig. 2-7. The *translatory structure* ap. Talmy (1972, 13).

Surface structures are derived via two main operations: a component is appended to another by *adjunction*, while *conflation* merges one deep component with another. Components external to the basic structure can also be attached to it by tree-adjunction. An example is given in fig. 2-8. In the case at hand, the figural component RAIN is moved from the first position, adjoined to MOVE and merged with it, to give the verb *rain*.

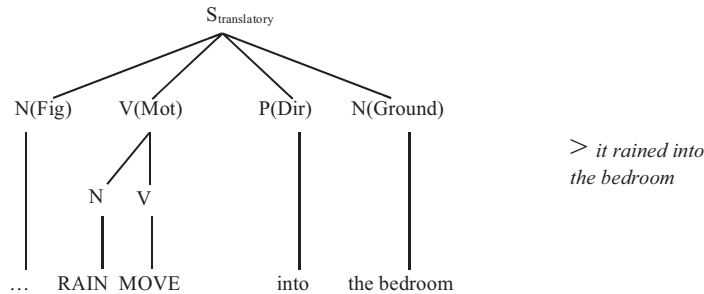


Fig. 2-8. Example of an adjunction preceding a conflation (Talmy 1972, 24; an alternative and more complex analysis is also given p. 324).

The strategy exemplified by *rain* is not prevalent in English. It is more habitual for English to conflate a manner component with the Motive, and say for instance *he ran into the bedroom*. In the present descriptive framework, this is captured by adjoining a manner component to the basic structure above, then by conflating it with MOVE (e.g. MOVE + BY RUNNING gives *to run*).

The verbal element of an English sentence is visible, but in a “polysynthetic” language like Atsugewi, localizing the verb on a specific

morpheme is a far more delicate matter. For reasons that cannot be discussed here, Talmy chooses to consider that Atsugewi typically conflates a figure or a property of the figure with the Motive, thus localizing the verb on the figural component. The following example illustrates an intermediary stage in the derivation of an Atsugewi sentential verb. One of the Figure's properties (DIRT) has already conflated with MOVE, while another characteristic of the Figure has been left behind which will surface as a verbal prefix (with the meaning 'which is in free fall,' glossed here as FREEBODY). Finally, a property of the Ground has conflated with the Directional, to give a morpheme specifying that the goal is of a liquid nature. An external tree bearing inflections is adjoined to this basic structure. Reordering of the inflections and various phonological processes produce the final surface structure.

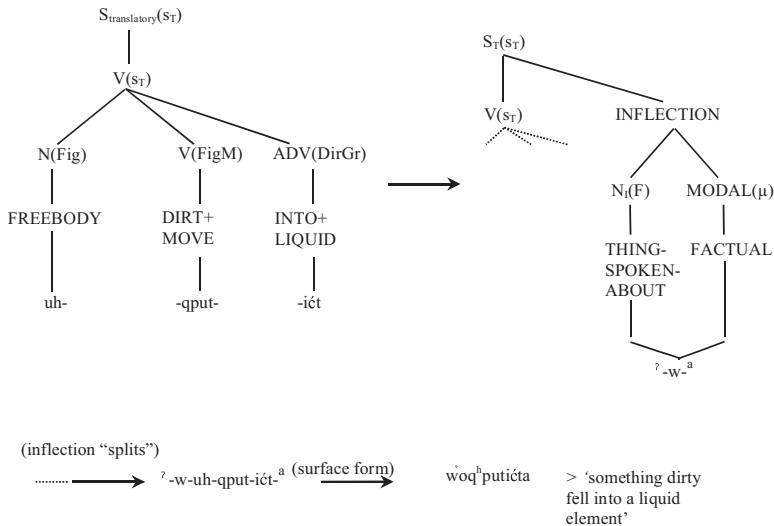


Fig. 2-9. Derivation of an Atsugewi sentential verb in Talmy (1972; simplified and adapted from 56–59).

In an appropriate context, this sentential verb could be used to speak of ashes falling into soup (Talmy 1972, 60). Provided with a context, therefore, neither the Figure nor the Ground need be specified in full NPs outside of the sentential verb.

5.2. Remarks on Talmy's dissertation

As has already been noted, the general approach of this theory is characteristic of generative semantics: a deep semantic structure is the basis for further syntactico-semantic derivations. Further, conflation is very similar to *predicate raising*: both offer an “Item-and-Process” account of semantic composition and lexicalization.

On closer scrutiny, Talmy's account presents many singularities. First, the translatory situation is used as a *tertium comparationis*. It is properly this situation which is “conceptually” structured. To put it differently, the translatory situation appears to be a cognitive structure. The originally nonlinguistic terms Figure and Ground are indications of this cognitive import.¹⁹ However, *Ground* is used in a sense which deviates from its original meaning, since it is identified as referring to an entity, not to a substance—or mass-like background. Further, the translatory structure is broken down into four components which mirror English constructions. In sum, it is a hybrid beast, half cognitive half linguistic.

Importantly, Talmy suggests that the translatory structure can be extended to the analysis of non-spatial relations. In his dissertation, this extension concerns causal situations and changes of state, and temporal relations. With his sometimes baroque terminology, Talmy uses the terms Figurid / Relator / Director / Groundid (noted φ , ρ , δ , γ) to refer to the nonspatial counterparts of the by now familiar Figure / Motive / Directional / Ground. An example from the field of causal events is provided by his decomposition of *the soot blew into the creek from the wind* into a deep structure joining two events, the blowing of the wind, and the motion of the soot (1972, 86–94):

[the soot_F fell_{FM} into_D the creek_G] _{φ} [followed] _{ρ} [from] _{δ} [the wind blowing on it] _{γ}

Note that the basic translatory structure occurs within the figural event.

This analysis is a plea for a new form of *localism*, an orientation Talmy explicitly endorses when he states that “situations that involve state and change of state seem to be organized by the human mind in such a way that they can be specified by structures homologous with motion structures” (1975b, 234).

It is puzzling to observe that Talmy does not find a name for this hypothesis. This might be explained by the fact that he was unaware of the localist tradition in linguistics, although it had just been revived with a generative twist by Anderson's case theory (1971). Alternatively, he may have thought his own account too idiosyncratic to receive a traditional

epithet. The closest theory available was Gruber's localist theory of thematic roles, proposed back in 1965, and affiliable to generative grammar.²⁰ However, Talmy says he was not aware of it until he had completed his dissertation (p.c. to Gilles Col). It should be noted that Gruber's brand of localism had an early influence on Jackendoff (1969), who developed thereafter his own "pre-cognitive" theory of thematic roles following Gruber (Jackendoff 1969, 1976). It is not without interest to recall that localism is not an exclusive property of CL, however important it may have turned out to be for CL.

5.3. The seeds of cognitive semantics

Several aspects of the analyses in Talmy's dissertation seemed to beg for cognitive amplification. His point of departure, the translatory situation, furnished a basis for a semantic typology. It would indeed be pushed in that direction in later studies (Talmy 1985). While there might be nothing specifically cognitive in a typology of the sort, some indications of a psychological interpretation of the issue could already be found in a parallel between deep and surface elements on the one hand, and *attentionally backgrounded* and *foregrounded* elements on the other (1972, 72 sqq). Talmy claimed that deep elements conflated in a morpheme were thereby backgrounded, whereas the identification of a semantic component by a separate morpheme caused it to be called to attention. This line of investigation, i.e. the relation between lexicalization and attention to facets of a situation, was to be considerably expanded in later work (1986, 1996, 2007). On this matter, Talmy faced the same difficulties as Langacker: it seems problematic to analyze embedded linguistic structures as structures with nested attentional focuses. Such a view defies introspective evidence, yet introspective evidence is claimed to be the ultimate judge (cf. the introduction to Talmy 2000).

It has been seen that Talmy extended his basic structure to causal events (Talmy 1972, 1976). On this matter, his analyses are very distinctive: on the deep level, causal relations hold between events, and the caused event assumes the figure position in the basic structure (the basic causal situation can be paraphrased as 'event₂ follows from event₁,' not as 'event₁ causes event₂'). Surface structures may considerably reorganize this basic structure and even reverse its ordering (by using a verb like *cause*, for instance). In practice, derivations operate on fine-grained, fully developed semantic paraphrases of surface structures. Such an approach eventually resulted in a reduction of causative surface structures to a basic organization of entities in dynamic interaction, and from there, to a

cognitive account of causal conceptualization, a sort of “naïve physics” underlying linguistic expression. This fully-fledged cognitive orientation characterizes one of Talmy’s later, and best known, studies (1988b).

Talmy’s analysis of directionals, first broached in an appendix to his dissertation, has evolved along the same cognitive lines. In Talmy’s own version of transformational “prelexical syntax” (1972), directionals were derived from topological primitives, such as POINT, BOUNDED EXTENT, AT and ALONG. These primitives, not being confined to spatial situations, progressively formed part of a topological armature of language, first hinted at in Talmy (1972, 1977), then more systematically explored in Talmy (1988a). One familiar example of a topological primitive is BOUNDED EXTENT, which is both a spatial characteristic of some nominal referents and an aspectual feature of processes.

Similarly, contrasts of the kind illustrated in (9) are explained in terms of a universal asymmetry which tends to map the caused event to the figure position when it is described in a relation to a causing event:

- (9) a. *He exploded after he touched the button / ? He touched the button before he exploded.*
 b. *We went out although it was raining / * It rained in-futile-oppositiveness-to our going out.*
 (1977, 624–25)

Again, it can be seen that Talmy transposed what was initially a principle of perceptual organization (i.e. the figure / ground asymmetry) to a different plane, in this instance, to the linguistic structuring of events.

It is worth mentioning an issue which, once again, first arose in Talmy’s dissertation. The question bears on alternate constructions depicting similar states of affairs. Examples such as (10) and (11) had been discussed, in the context of generative and case grammar, by Hall (1965), Fillmore (1968), Chomsky (1972a) and Anderson (1971).

- (10) a. John smeared paint on the wall.
 b. John smeared the wall with paint.
 (11) a. Bees are swarming in the garden.
 b. The garden is swarming with bees.

Two ways of handling cases like these were proposed. The formal and distributional option favored by Hall (1965) consisted in deriving one sentence from the structure underlying the other. The second option was to derive both sentences from semantic deep structures. The latter approach

was the one adopted by Fillmore (1977) and Talmy (1972). In consequence of their semantic concerns, Talmy and Fillmore were progressively driven to discuss the subtle differences existing between a and b sentences, and, remarkably, they did so in terms that may be described as “phenomenological.” Thus, we see Fillmore ([1977] 2003, 198 sqq) invoking notions such as *perspective taking* and subjective *saliency* in its rendition of a and b sentences. Likewise, Talmy (1977, 624) spoke of variations of *focal-point*, a stance which would soon converge with his views on the gestalt organization of event structuring. Finally, all matters related to perspective were taken charge of by a linguistic faculty, called *schematic system*, and processing variations in the conceptualization of scenes (Talmy 1988a). Linguists like Talmy and Fillmore were effectively practicing a new sort of “introspective” linguistics, in which perspective taking and viewing point were integral parts of linguistic description. This shift is clearly acknowledged by Talmy when he states that “cognitive semantics is thus a branch of phenomenology” (2000, 4).

To sum up, Talmy’s positions have evolved in the direction of what may be described as a “psychologization” of linguistic theory. But the impetus was given by the framework first laid out in his dissertation, a study which bore the stamp of GS. More clearly than in Langacker’s case, Talmy’s work reflects an evolution in which issues and descriptions of the generative period have been recast into a more cognitively oriented theory.

Conclusion

The present chapter set out to demonstrate that the relation of CL to TG is quite complex. One sign of this complexity might be the fact that protagonists of CL seem to hold very different views on the historical role of generative semantics:

Lakoff (1987, 582): “I view cognitive grammar as an updated version of generative semantics.” Langacker (1987, 4): “Cognitive grammar is not in any significant way an outgrowth of generative semantics,” although, he adds, “it does share with that conception a concern for dealing explicitly with meaning.”

Lakoff’s view is probably closer to the mark. Langacker’s statement is somewhat puzzling. Space Grammar retains features of GS, and may be seen as resulting from a drift starting out from GS, while Langacker himself describes Cognitive Grammar as an outgrowth of Space Grammar. Talmy’s evolution is perhaps the clearest instance of a lack of radical discontinuity.

What does CL retain from TG? First, the fact that TG was perceived as lifting the ban on mentalism and semantics seems to have been felt as a liberation, and an encouragement to engage in a wide range of theoretical pursuits (logic, semantics, pragmatics). This freedom in pursuing theory can likewise be felt in CL. GG and CL both lay a claim to psychological reality, though, to a great extent, their psychology is endogenous and insulated from experimental psychology. Finally, GG and CL (at least in Talmy's and Langacker's work) are both quests for a universal grammar. This is sometimes reflected in the textual genre: in certain respects, Langacker's *Foundations* is reminiscent of universal grammars of the eighteenth century.

Why did cognitive linguists split from GG? In part, the reasons for their cognitive turn coincide with those which brought them to GS: a "mediational" and functional view of linguistic theory, suspicion as regards formal markers and transformations, the prospect of comparing English with Amerindian languages while holding universalist views. More circumstantial factors need to be taken into account: the lack of institutional clout of GS and its marginalization certainly played their part. Two attitudes can also be set against each other: one wished to restrict the scope of investigation to well delineated and seemingly manageable problems, and dismissed the temptation to do "a study of everything" (Chomsky 2000, 69); the other believed that manageability is obtained at the expense of realism, and of serious consideration of the functional and cognitive grounding of language.

By contesting GG, CL found itself in a strategic position. Built around an empiricist core (manifested in the study of metaphors, localism and schematization), it could federate a number of fields which GG had neglected, such as lexical semantics, analogy, and constructional and empiricist approaches to grammar. Diachrony, grammaticalization and corpus studies ("usage-based" grammar) were to be progressively incorporated. The expansion of this interrelated network of approaches and fields testifies to the success of CL, and is GS's revenge on its former opponents.

CHAPTER THREE

METALINGUISTIC ENUNCIATIVE SYSTEMS. AN EXAMPLE: TEMPORALITY IN NATURAL LANGUAGES*

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1. Linguistic, metalinguistic, and cognitive representations

Let us start with a quotation (in French) from Culioli (1990):

Le niveau 1 est un niveau de représentation, où représentation renvoie à la représentation mentale [...]. A tout cela nous n'avons pas accès, au sens d'accès immédiat [...] Au niveau 2, nous avons des représentations que j'appellerai linguistiques, et qui sont la trace de l'activité de représentation de niveau 1. On a donc des représentants au second degré et des agencements de représentants, mais il n'y a pas de relation terme à terme entre les représentations de niveau 1 et les représentations de niveau 2 [...]. Le niveau 3 est le niveau de la construction explicite de représentations métalinguistiques. (Culioli 1990, 21–22)¹

We would like to modify the order of levels put forward in Culioli's quotation. Linguistic representations are indeed expressed by means of semiotic configurations which are the most directly observable structures studied by linguists. Configurations are accessible to linguistic observation. In order to study how these linguistic configurations can be analyzed as the linguistic traces of cognitive representations (or mental representations) organized by specific operations but not directly observable, linguists build different metalinguistic representations of different interrelated metalinguistic levels. Thus, we distinguish three levels: (i) the level of linguistic (morphological and syntactic) configurations; (ii) the different

levels of metalinguistic representations; (iii) the level of cognitive representations.

Following the “generalised compilation” hypothesis (Desclés 1996), the metalinguistic representations (μ LR) are *intermediate representations* between cognitive representations (CR) and linguistic expressions (LR). Indeed, in computer science, a programming language (PL) is a symbolic language defined with a specific syntax. Instructions which can be executed by physical organs of the machine (a computer) are generated from the expressions of the programming language (PL). Computer science had a qualitative leap when it was realized that the association between expressions organized by the syntax of a program written in PL on the one hand, and the sequence of executable instructions on the other hand, cannot be direct but could be computed by means of intermediate levels of representations, by a Compiler. This was not realized in the early stages of computer science, with von Neumann’s model, but later, with John Backus’s (1978). The Compiler is a general program that automatically translates any program P written in PL into an associated sequence of instructions to be materially executed by the physical organs of a machine M and stored in its physical memory. The structure of symbolic expressions of a PL and the structure of physically executable instructions are very different. When the syntax of a PL is complex, rather than associate directly one symbolic expression of a program P with an instruction it is easier to use a compiler to translate P, in the last step, into sequences of expressions which are directly compatible with the structure of physical organs of the machine M. The *Generalized Compilation Hypothesis* transposes this idea from Computer Science into the field of Cognitive Semantics; the aim is clear: to design and to write a compiler (a “translation program”) in order to link semiotic expressions of natural languages to cognitive representations where meanings are expressed according to the points of view of cognitive semantics (Croft and Cruse 2004; Langacker 1987, 1991b; Pottier 2000, 2012; Talmy 1988a, 2000). Semiotic expressions of a natural language, on the one hand, and cognitive representations, on the other hand, are very different in their structures and nature respectively: semiotic expressions are public, objects of exchanges, directly observable; cognitive representations are internal, private, not directly observable. Thus, to connect these two kinds of representations, we have to conceive different metalinguistic levels related by means of an explicit compiling process. The aim of semantics in linguistics becomes threefold: (i) to exactly define the syntax of each metalinguistic level; (ii) to specify the architecture of relations between related levels; (iii) to

explain how the translation of the expressions of one level into expressions of another level is executed by an explicit operative process.

In Cognitive Semantics, a model with cognitive representations yields results that produce responses to the following questions: what are the primitives used in cognitive representations? What is the epistemological nature of these primitives? How are these primitives compounded to build more complex cognitive and semantic schemas (CSS)? Is this composition expressed inside a formal language? Are they logical forms of the classic predicate calculus or do they correspond to another formalism? Are they only figurative representations as in Langacker's (1991a) or Pottier's (2000) studies or an articulation between symbolic and figurative metalinguistic representations? In the enunciative approach of language, propositions underlying utterances are not directly expressed by linguistic expressions since different enunciative operations (for instance, act of saying, assertion, direct and indirect speech, mediative constructions...) are also taken into account; enunciative operations imply the existence of an abstract enunciator with its different correlates (co-enunciator, enunciative process, enunciative situation...), which are explicitly represented inside of a metalinguistic system. What representations of these different enunciative operations is it up to the linguist to formulate? What combination is it up to the linguist to establish with the more classical predicative operations which build and structure a proposition?

With the generalized compiling hypothesis, we formulate two supplementary hypotheses: (i) The *Cognitive Hypothesis* (Desclés 1990b, 2011) claims that the elementary components of cognitive representations of utterances are primitives anchored in the cognitive activities of Perception and Action; there is a "transfer Process" from some figurative cognitive representations directly associated to perception processes toward associated symbolic cognitive representations; (ii) The *Anti-anti-relativism* hypothesis (Desclés 1998) considers that the cognitive representations are specific to each natural language, but also that the primitives and formal tools to compound the primitives into cognitive and semantic schemas (CSS) are the same for the activity of language; in other words, each natural language uses specific schemas to represent meanings but the ingredients (primitives) of these schemas and the formal operations to build them are the same. Primitives are invariants of the activity of Language. It is up to the linguist to argue, by abduction, in favour of the necessity to use these primitives and to describe how they can be compounded to form semantic schemas. These two hypotheses (Generalized computation hypothesis; Anti-anti-relativism hypothesis) are working hypotheses.

The models of Applicative and Cognitive Grammar (GAC; see Desclés 1990b, 2004, 2011) and Grammar of Applicative, Cognitive and Enunciative expressions (GRACE; see Desclés and Ro 2011) are computerized models of cognitive semantics, where a level of cognitive representations (CR) is articulated with different metalinguistic levels inside an explicit architecture for relating observable linguistic configurations and non-observable cognitive representations (CR) built by means of a formal calculus (fig. 3-1).

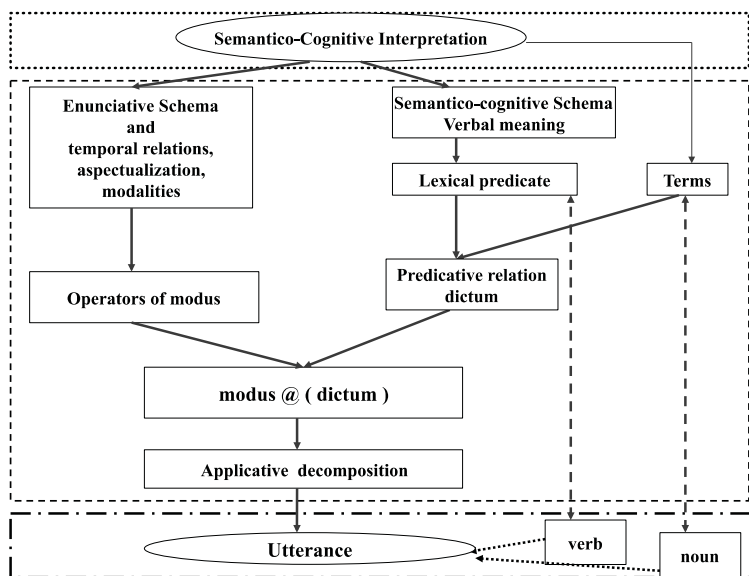


Fig. 3-1. Architecture of GRACE.

2. Enunciative Theory

According to Morris, syntax deals with the well-formedness of sentence rules; semantics, with the interpretation of sentence rules; pragmatics with users of sentence rules. Taking into account formal enunciative operations, Enunciative Theory (in French “Théorie de l’énonciation”) can be viewed as a theory of formal *internal pragmatic relations* where person, temporal and spatial positions of an abstract enunciator are explicitly described by operations and formal relations inside and not outside of a metalinguistic system, as in other pragmatic

approaches. Enunciative theory has had leading exponents in France, especially in the works of Benveniste (1966, 1974) and Culioli (1968, 1973, 1990, 1999, 2002; see also Desclés 1976; Dufaye 2009). However, there are important predecessors who had introduced important contributions a long time ago. For instance, Buber (1923) and Bühler (1934) analyzed the signs *I* and *you* as relations and not as denoting directly external persons. Bally (1932) divided the sentence into *dictum* and *modus*:

La pensée ne se ramène donc pas à la représentation pure et simple, en l'absence de toute participation d'un sujet pensant.

[...] La phrase explicite comprend donc deux parties : l'une est le corrélatif du procès qui constitue la représentation [...] ; nous l'appellerons, à l'exemple des logiciens, le *dictum*.

L'autre contient la pièce maîtresse de la phrase, à savoir l'expression d'une modalité, corrélatrice à l'opération du sujet pensant. La modalité a pour expression logique et analytique un verbe modal (p.ex. *croire*, *se réjouir*, *souhaiter*), et son sujet, le sujet modal ; tous deux constituent le *modus*, complémentaire du *dictum*. (Bally 1932, 35–36)²

Benveniste pointed out the subjective components of an utterance; as for Culioli (1968), he introduced the notion of “lexis” (according to us, an analog of Bally’s *dictum*) and abstract locating operations (in French “opérations de repérage”). Desclés (1976, 1980) has given a mathematical formalization of abstract locating operators generating locating relations (Desclés and Culioli 1982). By using an applicative formalism (where all expressions are built by an operator, an operation of application and an operand yielding a result), the enunciative decomposition is viewed as the application of enunciative operators (a complex *modus* acting) on a predicative relation (*dictum* or *lexis*). It is important to note that Harris (1976, 1982), who was not a follower of Enunciative Theory, also uses an implicit applicative formalism and the metalinguistic operator “I-say” in an “internal metalanguage,” since, for him, “the metalanguage is a part of the language”:

However, we can consider that the presence of the sentence (he is here) in a discourse, that is, the very saying of it, is itself the trace of an I say which states the saying of it. (Harris 1982, 98–99)

3. Locating operators and locating relations

The specifications (or semantic values) of an abstract locating relation are: identification, differentiation and disconnection (Fr. “rupture”). Locating operators generate locating relations in two successive stages: at the first stage, the locating operator, noted ‘rep,’ acts on entity ‘X,’ hence the unary operator ‘rep X’ (read: “is located from X”); at a second stage, this operator acts onto an entity ‘Y,’ building the binary relation [Y rep X] (read: “Y is located from X”). When the locating operator ‘rep’ is specified, we obtain an identification relation [Y = X] (a symmetric relation) or a differentiation relation [Y ≠ X] (e.g. an asymmetric relation) or a disconnection relation [Y # X] (e.g. irreflexive and symmetric relations). The properties of symmetry, asymmetry and irreflexivity contribute to defining abstract locating relations. The disconnection relation ‘#’ can be considered as a strong negation, and the differentiation ‘≠’ as a weak negation.

To illustrate how locating relations are used in a semantic analysis, let us take the problem of persons in natural languages (Culioli 1973; Desclés 1976; Desclés and Guibert 2011). The abstract enunciator³ is designated by ‘JE’ (or ‘EGO’) and the co-enunciator by ‘TU’: ‘JE’ and ‘TU’ are components of differentiation relations: [TU ≠ JE] and [JE ≠ TU]. Enunciator and co-enunciator are two components of the *dialogic dipole*: the enunciator ‘JE’ talks to ‘TU’ who interprets what is said by ‘JE’ and, afterwards, the roles are exchanged, since ‘A,’ who was ‘JE,’ becomes ‘TU’ and ‘B,’ who was ‘TU,’ becomes ‘JE.’ In a dialog between ‘A’ and ‘B,’ there is a third role, noted ‘IL,’ where ‘IL’ is in a disconnection relation with ‘JE’ and with ‘TU’: [IL # JE] and [IL # TU]. The set of elementary locating relations { [JE = JE], [TU ≠ JE], [JE ≠ TU], [IL # JE], [IL # TU] } is a system giving indexical interpretations to the signs *I*, *you* and *he* (or *she*). Indeed, the sign *I* does not always denote the speaker; for instance, in a reported speech such as: *You said: “I am working,”* the occurrence of *I* denotes the person who is reporting, that is *you*. It is necessary to specify the indexical denotations of the expressions of persons by an explicit formal calculus in using locating relators. It is also possible to argue that the signs *I*, *you*, *s/he* are linguistic traces of invariant metalinguistic relations [x = JE], [y ≠ JE] and [z # JE] and [z # TU], where ‘x,’ ‘y’ and ‘z’ refer to *denotata* associated to the signs *I*, *you* and *s/he*, respectively. It is important to point out that ‘JE’ and ‘TU’ are not empirical entities (as “Napoléon” or “Wellington”) but designate abstract roles in the dialog schema; they are formal (metalinguistic) parameters

which can be instantiated by empirical “external speakers” in an external pragmatic approach.

4. Temporal Frames of Reference (TFR) (Fr. “référentiels temporels”)

Abstract Locating relations are used to structure temporality in natural languages but we also have to consider different Temporal Frames of Reference (TFR) (Desclés and Guentchéva 2011). Identification and differentiation are locating operators acting onto instants of a specific TFR. When somebody is speaking, he/she is building a new frame of reference, called *enunciative frame of reference*, distinct from the external reference system (for instance, systems given by perception...) (Desclés 1976; Klein 2009; Desclés and Guibert 2011); it is organized by and from the standpoint of the enunciator ‘JE’ in a dialog with his co-enunciator ‘TU.’ From a temporal point of view, this enunciative frame becomes a temporal enunciative frame, designated by REN (Fr. “référentiel énonciatif”). There are different temporal frames: (a) an external frame, noted REX, for instance: a calendar system; a cosmic system of references organized from apparent movements of the sun and of the moon; a geographic system of reference by latitude and longitude coordinates); (b) an enunciative system symbolized by REN; (c) a frame of reference, noted RNA organized by narrations without any relation to the speaking process (fig. 3-2). So to take into account hypothetical constructions, conditional constructions for instance, there are other TFRs. Inside the same TFR, the identification (=) between two instants constitutes a *concomitance relation*, while differentiation, by anteriority or posteriority, holds between two different instants in this TFR. The disconnection relation (#) holds between any two distinct instants ‘T¹’ and ‘T²,’ one, for instance ‘T¹,’ located in one TFR and the other ‘T²,’ located in another TFR. However, two different TFRs can be *synchronized* by a specific identification between two instants ‘T¹’ and ‘T²,’ the latter being located in two distinct TFRs, hence the disconnection relation [T¹ # T²] *and* also the synchronism relation [T¹ = T²], where ‘=’ designates an identification by synchronization.

Each Temporal Frame of Reference (TFR) is supposed to be continuous (characterized by mathematics on the basis of Dedekind and Cantor’s works) rather than discrete. As a result, each TFR is in a one-to-one relation with a subset of real numbers or with a subset of the numerical line. It follows that an aspectualized predicative relation is actualized on an interval of different and successive instants of a TFR.

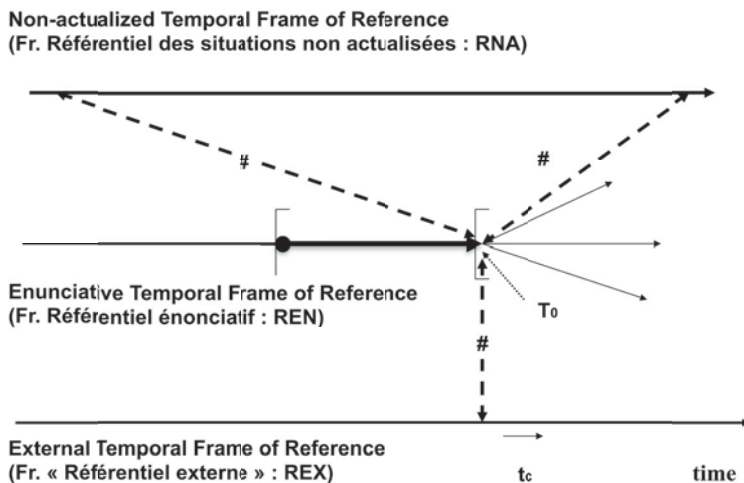


Fig. 3-2. Temporal Frames of Reference (TFR)
(Desclés 1978, 1995; Desclés and Guentchéva 2010, 2012).

5. State, Event and Process

The basic concepts of the actualization of a predicative relation are State, Event and Process (Comrie 1976; Lyons 1977; Mourelatos 1978/1981). We are going to specify these concepts (Desclés 1980; Desclés and Guentchéva 2012).

A *state* is actualized on an *open interval* where boundaries can exist but are not taken into consideration. A state expresses absence of change; the boundaries of a state are expressed at the left by the culmination instant of the event which yields the state and at the right boundary by the beginning of the event introducing a change from the preceding state. In other words, in a state, there is no first instant (but a last instant of change before the state) and no last instant of the state (but a first instant of change immediately after the state). Thus, a state can be bounded by two events. A permanent state is unbounded and boundaries are rejected to the infinity to the left and to the right.

An *event* is an occurrence which happens as a figure extracted from a stable underground. An event indicates a change, a transition from an initial state (before the occurrence) into a terminal state (after the occurrence). An event is generally not punctual; it is compatible with duration. It is actualized on a closed interval with a left boundary (the first

instant) and a right boundary (the last instant of the event) where the event is complete (Fr. “accompli”).

A *process* expresses a change viewed not as a complete transition but as an incomplete change from a preceding state. It is actualized on an interval open to the right and closed to the left (i.e., the first left instant, the beginning of the change); at the right boundary, the process is incomplete (Fr. “inaccompli”).

The concepts of state, event and process are closely related. Indeed, an event is bounded by two states; a non-permanent state is bounded by two events. When a process is closed by a last instant of change, it generates an event.

A state is true at any instant of its interval of actualization. If a process is true at one instant (the predicative relation is considered as true at this instant), the process is true at each anterior instant in the interval of actualization of the process, but not necessarily at any posterior instant. An event which has been actualized on a closed interval of instants is always true at the right closed boundary but not necessarily at the other instants of the interval.

An utterance is the result of an enunciation expressing the propositional content of an aspectualized predicative relation. Enunciation is a process with a first instant (the beginning of the enunciation) and without a last instant, since it is not complete. It is actualized on an interval of instants with a left closed boundary and a right open boundary, noted ‘ T^0 .’ Instant ‘ T^0 ’ does not belong to the enunciative interval; this instant is the first of the instants not yet actualized; it is a consequence of the continuity hypothesis: ‘ T^0 ’ is a Dedekind cut with continuity between the part of all already actualized instants and the part of all not yet actualized instants.

When a predicative process is concomitant with its enunciation, its right open boundary is identified with the right open boundary of the enunciative process; when there is no concomitance, the right open boundary is anterior to the enunciative process. An event cannot be concomitant with its enunciation since its right boundary is closed, hence it is impossible to identify this closed boundary (of the predicative event) with the right open boundary of the enunciative process: an event is always complete (not always completed as in the case of the notion of perfectivity in Slavic languages) and never concomitant with its enunciation. In these different cases, the relation between left boundaries is not relevant. The *resulting state* of an event is characterized by a continuous cut which is the last instant of the event and also the left boundary of the resulting state.

6. Enunciative acts (Fr. “prise en charge énonciative”)

A predicative relation is a proposition structured by predicative operations. Each proposition is true or false independently of any temporal consideration; a proposition expresses a propositional content without taking into account “*Who is it vouched for?*,” “*when is it vouched for?*,” “*with what intentions is it vouched for?*”... The systems studied by classical logic deal only with general or particular atemporal propositions vouched for by any speaker who is using the tools of rationality. But we have to extend this to Frege’s and Russell’s logical conceptualizations about propositions since, when we analyse the underlying proposition of an utterance, the proposition becomes a *dictum* (or a *lexis*) which is vouched for by an enunciator: what is accepted as true by one speaker can be said to be false by another speaker located in another place and with other temporal specifications. In natural language analysis, the enunciative act is always relative to an enunciator, conceived as an abstract and general speaker and not as an empirical speaker.

Let us introduce different acts of saying (Fr. “prises en charge énonciative”). The operator of enunciation “EGO-SAY” acts on an aspectualized predicative relation. Indeed, when a predicative relation built with predicates and arguments is uttered by an enunciator, this predicative relation has to be presented with a specific aspectual point of view. Thus the proposition must be presented as an event, or a state, or a process or with more specific aspectual considerations (for instance a resulting state, an experience fact, a habitual fact, a complete or a not completed event...). The predicative relation presented as an aspectualized relation is an operand of an enunciation act (*I am saying...*), which is itself aspectualized as an incomplete process without a terminal instant since the enunciative act is in progress and is not an event located in the past of the enunciator. Different enunciation schemas can be defined (Desclés 1976, 2009a; Desclés and Guentchéva 2000, 2011a):⁴

Simple enunciation:

PROC (EGO-SAY (aspectualized predicative relation))

“I am saying: aspectualized predicative relation”

Example: *This wall was white (when I saw it last week)*

Reported enunciation:

PROC (EGO-SAY (PROC (X-SAYS (aspectualised “predicative relation”))))

“I am saying that X says an aspectualized predicative relation”

Example: John, last week, said: “this wall is white”

Direct assertion:

PROC (EGO-SAY (is-true (aspectualised “predicative relation”)))

“I am saying that the aspectualized predicative relation is true”

Example: As for me, I am sure, this wall was white when I saw it last week

Mediative enunciation:

PROC (EGO-SAY (plausible (aspectualised “predicative relation”)))

“I am saying that the aspectualized predicative relation is plausible”

Example: *This wall is reported to be white, according to information given by the local press.*

The simple enunciation only presents a propositional content as a positive (or negative) fact but without a clear commitment of the enunciator to the truth or the falsity of this fact. If somebody raises an objection about this fact, then the enunciator has to change his/her enunciative act “to preserve his/her dignity.” This is not the case with a direct assertion since the enunciator vouches for him/herself not only about a fact but also on the truth of the enunciated fact. With a direct reported enunciation the enunciator utters the enunciation of another speaker ‘X’ who, according to the enunciator, has to commit him/herself to the uttered facts. The mediative enunciation, often called evidentiality in the specialized literature, is more complex (Guentchéva 1996) since, by this kind of enunciative act, the enunciator signals that his act of saying is not a commitment to the enunciated facts but only a clear orientation in favour of its plausibility (Friedman 2000 uses the notion of non-confirmativity to characterize the phenomenon of evidentiality in Balkan languages). The plausibility is argued from some specific indirect indices such as, for instance, hearsay, taking into account facts inferred from some specific observations... This notion is taken in Peirce’s sense for abduction process.

7. Useful formal tools to build metalinguistic representations

Different mathematical and formal tools are used to build metalinguistic representations at different levels. In our representations, we use several mathematical concepts and formal operators. *Topological concepts* are introduced to precisely define the elementary properties of aspectual operators (state, event, process): topological intervals of instants, open and closed boundaries of an interval, continuity defined by continuity cuts (Desclés 1980; Desclés and Guentchéva 2011b, 2012). *Formal operators* (for instance closed λ -expressions) give operative forms to

metalinguistic operators and linguistic operators (such as the predicates, prepositions, preverbs, adverbs, adjective). Operators and operands are constituents of an applicative formalism whose basic operation is application: an operator acts on an operand to build a result which is an applicative expression; according to its context, an applicative expression functions as an operator or as an operand. The notion of operator is more complex than an instruction rule, for at least two reasons: (i) there are different types of operators and operands formalized with Church's functional types; (ii) operators can be combined together, by different schemas, to build more complex operators. Curry's Combinatory Logic (CL) (Curry and Feys 1958) is an adequate formalism to express different combinations of elementary operators; the combinators of CL are general and abstract operators which give the formal possibility to intrinsically define different schemas of combinations and transformations of elementary operators, that is by means which are completely independent from the meanings (or interpretations in a given domain) of combined or transformed operators. A combinator, such as an abstract operator, can act on itself and can be combined with itself. There is an enumerable set of combinators generated from a very small set of elementary operators, each of these elementary operators having a clear intuitive functional interpretation (usual functional combination, different parallel combinations of operators acting on the same arguments, argument permutation of a binary operator, argument diagonalization of a binary operator, adjunction of pure syntactic arguments...).

Metalinguistic representations of sentences broken down into operators and operands of different functional types have been studied by categorial grammars and extended categorial grammars, giving deep syntactic analysis of complex sentences (for instance propositions with coordination). Combinators are explicitly used in semantic analyses (Shaumyan 1987; Desclés 1990b), especially for analysing:

- grammatical cases in predicative relations: nominative and accusative in the typological accusative languages; ergative and absolutive in ergative languages (Shaumyan et al. 1985; Desclés 1990b);
- transitive, middle, passive and antipassive constructions: different forms of diatheses in predicative relations (Desclés and Guentchéva 1998);
- representations of the meanings of lexical units (verbal predicates and combinations with preverbs and prepositions...) at a cognitive representation level (Desclés 2011);
- enunciative operators: operators of saying; assertion, reported speech, mediative operators associated to an abductive reasoning... (Desclés

- and Guentchéva 2000);
- grammatical operators (aspectual and modal operators, temporal relations) and combination of these operators with topological temporal relations... (Desclés and Ro 2011; Desclés and Guentchéva 2012).

8. Complete (Fr. “accompli”) *versus* completed (Fr. “achevé”) situations

The principal questions and problems in cognitive semantics are: (a) how to analyse and to represent the meanings of grammatical operators and lexical predicates by means of cognitive and semantic schemas (CSS); (b) how to integrate lexical knowledge (for instance the meaning of a lexical predicate) and grammatical knowledge (enunciative operations, aspectual, temporal and modal operators, different temporal frames of reference) in the same linguistic configuration; (c) how to explain the synthetic integrative process from a CSS into a lexical predicate with specific places of arguments (or into a verb with its ‘actants’ in Tesnière’s approach). Or, conversely, how to describe the analytic breaking up process of a lexical predicate, or more generally of a grammatical operator, into a representation of its meaning.

Representations of different metalinguistic levels and cognitive representations are organized as formal expressions (with explicit syntaxes) and are built with a formal calculus from linguistic configurations. This is illustrated with some metalinguistic representations of aspectual and temporal relations associated to utterances (with: P_2 = read/take; T^2 = a book/Mary’s book; T^1 = John) written with a prefixed semiotic presentation (the operator is always positioned before its operand on the syntagmatic axis):

(1) *John is reading a book.*

(1’) $\text{PROC}_{J_0} (\text{EGO-SAY} (\& (\text{PROC}_{J_1} (P_2 T^2 T^1)) ([d(J_1) = d(J_0)])))$

(2) *John was taking Mary’s book [when he arrived...]*

(2’) $\text{PROC}_{J_0} (\text{EGO-SAY} (\& (\text{PROC}_{J_1} (P_2 T^2 T^1)) ([d(J_1) < d(J_0)])))$

(3) *John took Mary’s book*

(3’) $\text{PROC}_{J_0} (\text{EGO-SAY} (\& (\text{EVENT}_F (P_2 T^2 T^1)) ([d(F_1) < d(J_0)])))$

The metalinguistic representations (1’), (2’) and (3’) describe the aspectual and temporal meanings of (1), (2) and (3). Associated diagrams also illustrate these meanings by figurative representations. Different

aspectual values are explicitly represented: the incomplete value (Fr. “inaccompli”) by a process and a concomitant (or a non-concomitant) relation (in (1') or (2')) and the complete value (Fr. “accompli”) by an event and non-concomitant relation in (3') (fig. 3-3 and 3-4).

Now, let us introduce the semantic distinction of aspectual values between complete (Fr. “accompli”), present complete (Fr. “accompli présent”), resulting state and completed (Fr. “achevé”):

- (4) *This morning, Luc wrote (and finished) his letter for the inspector*
 (4') PROC_{J0} (EGO-SAY (EVENT_{F1} (EVENT_{F2} (PROC_{J2} (write) his-letter)) Luc))
 (& [[d(J₂) < d(F₂)] & [d(F₁) = d(F₂)] & [d(F₁) < d(J₀)] & [Luc' # EGO]]))
- (5) *Now, Luc has written his letter to the inspector*
 (5') (PROC_{J0} (EGO-SAY (STATE_O (EVENT_{F2} (PROC_{J2} (write) a letter)) Luc))
 (& [[d(J₂) < d(F₂)] & [g(O) = d(F₂)] & [d(O) = d(J₀)] & [Luc' # EGO]]))

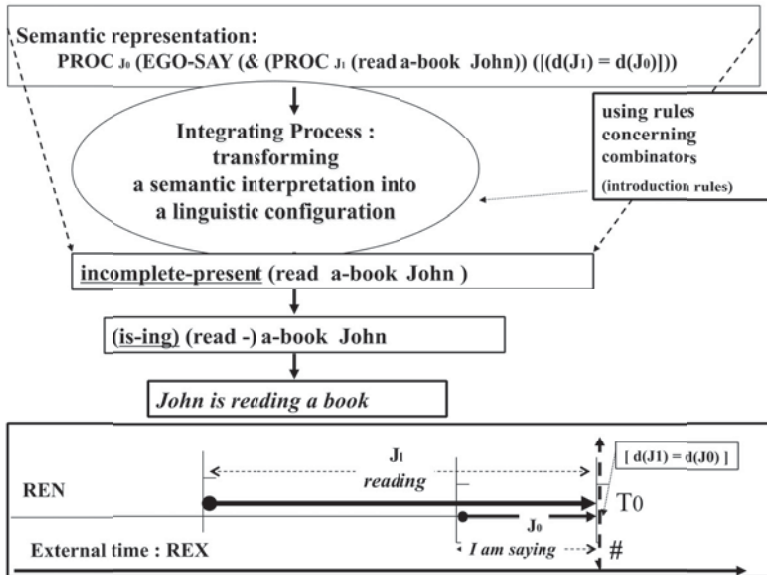


Fig. 3-3. A top-down approach: a synthetic integrative process.

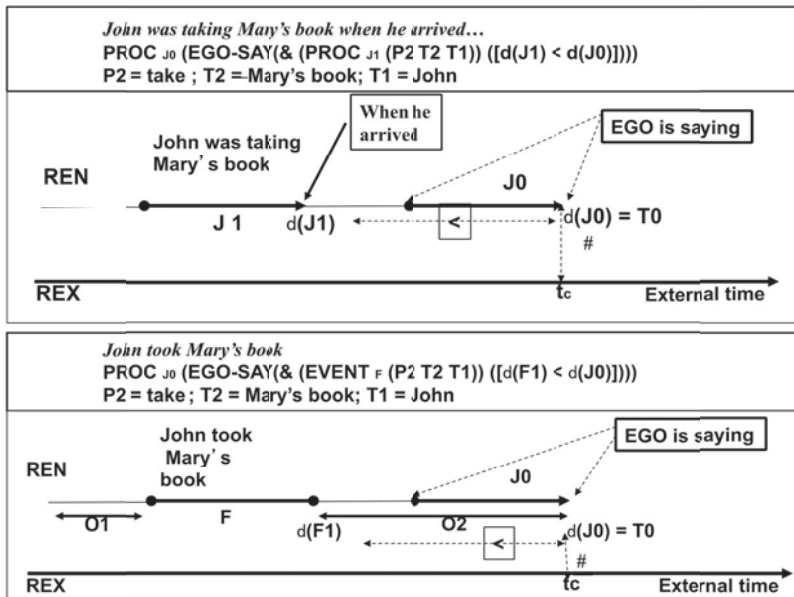


Fig. 3-4. Temporal figurative representations.

Metalinguistic representation (4') is more complex than (2') and (3'). The semantic aspectual value of the verbal predicate "write his-letter" is an event (actualized on F_2) generated by a continuous process "writing a-letter" (actualized on J_2); the whole predicative relation "(write his-letter) Luc" is presented by the enunciator as a *completed event*, actualized on F_1 , that is the process reached its final term at the temporal boundary 'd(F_2)' (where "the letter is finished"). The representation involves two dimensions: a temporal axis and an axis representing the gradual change in the properties of an object by the verbal predicate (in the example, the change affects "a letter" from nonexistence to full existence) (fig. 3-5).

Completed situation: *This morning, Luc wrote (and finished) his letter for the inspector*

PROC_{J₀} (EGO-SAY (EVENT F₁ (EVENT F₂ (PROC J₂ (write) his-letter)) Luc))
(& [|d(J₂) < d(F₂)| & |d(F₁) = d(F₂)| & |d(F₁) < d(J₀)|])

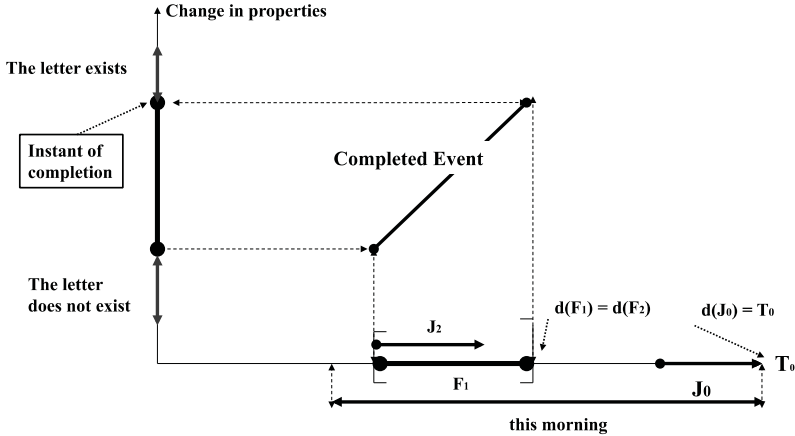


Fig. 3-5. Completed situation.

Utterance (5) is the resulting state of an event. The completed event, actualized on F₂, generates a state (a new property of the agent), actualized onto the open interval O, contiguous to the event: the boundary 'd(F₂)' is a continuous cut; the resulting state is concomitant with the enunciative process (fig. 3-6).

More generally, an *aspecto-temporal schema* (in a narrow Kantian sense) expresses how an aspectualized predicative relation 'P_nTⁿ...T¹' is located inside of a TFR, identified to (or in a disconnection relation with) the enunciative frame of reference. By means of combinators of Curry's Combinatory Logics, aspectual, temporal and modal elementary operators are combined with the enunciative operator EGO-SAY and the temporal relations in order to build the *modus* complex operator acting on the predicative relation (*dictum*). The calculus is very technical (Desclés 2004, 2005; Desclés and Ro 2011); we will not present it in this article. This calculation is, in a top-down approach, an integrative operative process starting from a cognitive representation with a specification of aspectualization and temporal conditions in order to generate an utterance in different stages (fig. 3-3).

Resulting state: *Now, Luc has written (and finished) his letter to the inspector*

PROC_{J0} (EGO-SAY (STATE_O (EVENT_{F2} (PROC_{J2} (write) a letter)) Luc))
 (& [|d(J2) < d(F2)] & [g(O) = d(F2)] & [d(O) = d(J0)])

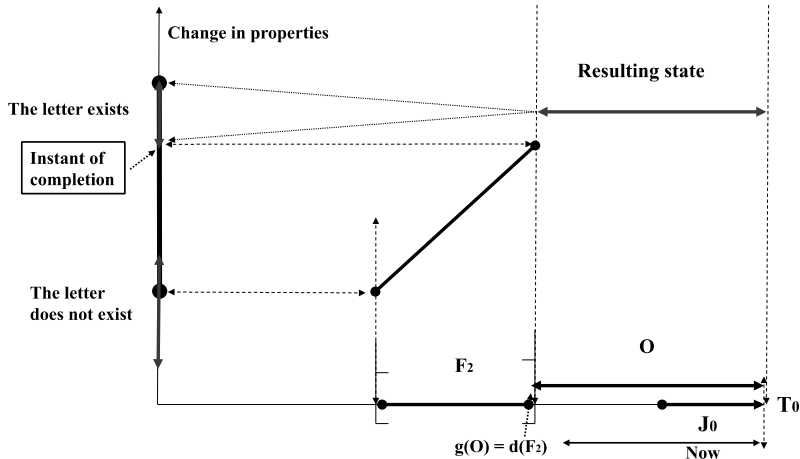


Fig. 3-6. Resulting state.

The concepts of “perfectivity” and “imperfectivity” are associated with the Perfective and Imperfective grammatical forms in Slavic languages. Perfectivity implies the semantic completed value. For instance, in Bulgarian, the distinction between completed and complete situations can be illustrated by using Perfective Aorist verbal forms (preverbs *iz-* and *pro-*):

- (6) *Iz-metox* *stajata* *tazi* *sutrin*
 Prev-sweep.Aor.Pf room.Art this morning
 “I swept the room this morning” (completed event: the room is completely swept)
- (7) *Metox* *stajata* *tazi* *sutrin*
 sweep.Aor.Impf room.Art this morning
 “I swept the room this morning” (complete event: it is not said that the room is completely swept)
 (Fr. J’ai été occupé à balayer la chambre ce matin)
- (8) *Pro-četox* *tozi roman* *minalata sedmica*
 Prev-read.Aor.Pf this book last week
 “I read this book last week” (completed event: the reading of the book is full)
 (Fr. J’ai lu [de bout en bout] ce roman la semaine dernière)

- (9) *Četox* *tozi roman* *predi mesec*
 read.Aor.impf this book ago month
 “I read this book a month ago” (complete event: it is not said that the book had been completely read)
 (Fr. J’ai été occupé à lire ce roman il y a un mois).

9. Representation of meanings of verbal predicates

We use Cognitive and Semantic Schemas (CSS) conceived as formal and structured representations of a verbal meaning. A CSS is an applicative representation at the cognitive representations level; it is generated from a very small set of semantic primitives; each primitive has a cognitive interpretation in the fields of perception (topological spatial and abstract places; movements and changes), action (an agent “controls” a movement or a change affecting an object) and, teleonomic representation (where a goal guides an action to attempt this goal...). We explicitly use the following cognitive and semantic primitives (Desclés 1990b, 2011):

- *Static primitives*: general locating relation, noted ‘rep’ (with more specific values as “belonging to,” “is contained in,” “is a mereologic part of”...; topological operators acting on an abstract place (to delimit the interior: ‘Int’; the exterior: ‘Ext,’ the closure: ‘Clo’; the frontier: ‘Fro’);
- *Kinematic primitives*: MOV_T (movement), CHA_NGE (change);
- *Dynamic primitives*: CON_TR (control), TELEO (teleonomic representation).

These semantic primitives are not features but operators and relations; CSS are complex operators abstracted (by a λ -abstraction in Church’s sense) from applicative expressions where the components are operators acting on structured relations. For example, the meaning of the verbal predicate “to go out” is a schema (a CSS) represented by the applicative representation with a λ -abstraction that follows:

- (10) $\lambda y. \lambda x. \{ \text{CONTR (MOV}_T \text{ (} \underline{\text{rep}} \text{ (Int (Loc(y)) } x)) (\underline{\text{rep}} \text{ (Ext(LOC(y)) } x))) x \}$

The interpretation of CSS (10) is:

- (10’) An agent ‘x’ controls a movement where ‘x,’ in an initial position, is inside of a place ‘Loc(y)’ associated to an object ‘y’ and, in a terminal position, ‘x’ is outside of the same place ‘Loc(y)’

In (10'), the name of variables 'x' and 'y' is not important since these variables are linked by the two λ -abstractions. By using Combinatory Logics combinators, the primitives of (10) are combined together by means of a complex combinator 'Y' in order to integrate the verbal predicate as a new synthetic unit, i.e. a verbal predicate with two places of arguments (Desclés 1990b, 2004, 2006, 2010, 2011):

$$(11) \text{ CONTR (MOVT } (\underline{\text{rep}} (\text{Int}(\text{Loc}(y)) \text{ x}))(\underline{\text{rep}} (\text{Ext}(\text{LOC}(y)) \text{ x}))) \text{ x} \Rightarrow \\ (\text{go-out } y) \text{ x}$$

with the *definendum/definiens* relation:

$$(12) [“\text{go-out}” =_{\text{def}} \text{Y CONTR MOVT } \underline{\text{rep}} \text{ Int Ext Loc}]$$

Conclusion

The different metalinguistic levels are defined inside the cognitive and computational architecture of GRACE (Grammar of Applicative, Cognitive and Enunciative metalinguistic expressions) (fig. 3-1). Expressions at each level are applicative expressions related to other levels by means of a formal calculus, using combinators and *definendum/definiens* relations to explicit how an operator of one level can be analysed and represented at another higher level or, conversely, how a complex expression can be integrated into a new unit of a lower level. It is important to note that the linguistic configurations are also applicative expressions, with operators and operands of different types, built by an algorithm associated with an extended categorial grammar (Desclés 2009b). These applicative expressions are transformed and analysed by other applicative expressions (at another metalinguistic level) where two main components emerge: a *modus* complex operator acting on a *dictum*. At the following step, *modus* is an applicative expression compounded of elementary aspectual operators (for instance, state, event, process), modal operators and the operator of enunciation 'EGO-SAY.' On the other hand, the meaning of the verbal predicate of the *dictum* is analysed by a CSS; the relation between the CSS and the verbal predicate involves the use of combinators to explain how semantic primitives can be compounded into an integrated whole, that is a new unit (a verbal predicate). The results of these two analyses are merged in a cognitive representation where semantic primitives are interpreted in cognitive domains showing how the activity of language interacts with other cognitive abilities of humans: perceiving the environment, acting on this environment, representing intentionality... Metalinguistic representations can be expressed by symbolic expressions

manipulated by a formal calculus but also by figurative representations which contribute to organizing the analysis of the meanings expressed by the semiotic systems of natural languages.

CHAPTER FOUR

FROM FUNCTIONS TO METAFUNCTIONS: THE SOURCES OF BRITISH FUNCTIONAL LINGUISTICS¹

CHARLES-HENRY MORLING

Introduction

Since ‘function’ here is being used in a more abstract, theoretical reading, I have found it helpful to give the term the seal of technicality, calling it by the more weighty (if etymologically suspect) term metafunction (Halliday 1992, 201).

Michael Halliday’s Systemic Functional Grammar (SFG), is, and has been since the 1970s, structured around metafunctions. These are defined in *An Introduction to Functional Grammar* as “the basic functions of language, in relation to our ecological and social environment” (Halliday and Matthiessen 2004, 28). Or in other words what we *do* with language. Nowadays, he distinguishes between three metafunctions: 1) the ideational metafunction which is responsible for construing our experience of the world; 2) the interpersonal metafunction which regulates social interactions; and 3) the textual metafunction which ensures that a discourse flows properly and is coherent. Halliday however, is not the first to put forward a theory of the functions of language, and amongst his more famous predecessors Karl Bühler and Roman Jakobson spring to mind. This raises the question: why did Halliday choose to differentiate his own functions by calling them “metafunctions”? As can be seen in the above quote, he uses the prefix “meta” with caution. If a metafunction is a rather abstract function of language, does the prefix “meta” imply that these functions are “about” functions? And if so, what is this second layer of functions over which the metafunctions are laid?

The status of the functions of language, as defined by most functional theories, is generally acknowledged to be a problematic topic in need of clarification. “Function” is a very broad term, and the functions of language identified by functional theories often seem *ad hoc*, leaving us with the question as to why give preference to a specific set of functions rather than another. Christopher Butler (2003) seems to recognize this state of confusion: in his overview of current functional grammars, he does not identify any specific functions of language on which all functional theories agree but uses instead the more general expression of “functional explanation” to designate the common denominator of all these grammars. While this expression does describe accurately one of the main characteristics of functional grammars, it nevertheless leaves the door open for each of these theories to select the set of functions that best fit the phenomena they are attempting to explain.

The British School of Linguistics, and John Rupert Firth in particular, never shied away from *ad hoc* explanations, making them part and parcel of the methodology of linguistics,² but these explanations were generally made necessary by the material at hand and were not theoretical extrapolations. Halliday’s metafunctions however do not appear to stem from any particular material in need of description, so one is left wondering if such a general concept can be of any use if it has no ontological basis. For this reason, this chapter studies the inception of this notion using a historical and epistemological approach in order to retrace the various steps that led Halliday to formulate his famous “metafunctional hypothesis” at the end of the 1960s. Not only will we review the sources that he drew from in order to forge the concept of metafunction, but we will at the same time examine the very status of the category of metafunction. Somewhat problematically, this category is often used as an introduction to Halliday’s work, making it seem *a priori*, even though his work is steeped in the empirical tradition of British linguistics.

Considering Halliday’s work in its entirety, we can set out the following chronology regarding the evolution of the notion of “function”³:

- from 1956 to 1966, the word “function” appears only very rarely and Halliday’s approach is essentially systemic, following the teachings of John Rupert Firth;
- starting in 1966 with the articles “Some Notes on ‘Deep’ Grammar” (1966a) and “Grammar, Society and the Noun” (1966b), we notice the beginning of a functionalist turn which will be fully acknowledged with the famous series of articles “Notes on Transitivity and Theme in English” (1967–68);

- following this functionalist turn, the 1970s are spent refining the metafunctional hypothesis before it finds a lasting place in SFG.

That we can identify such a sharp turn between 1966 and 1968 raises three types of questions:

- first of all, is there nothing in Halliday's work prior to 1966 which foreshadows this turn or are the metafunctions already an underlying presence between 1956 and 1966? Is this turn a break or a more gradual evolution?
- why does Halliday feel compelled to propose this metafunctional hypothesis? What problems is he attempting to solve with this move? How does it affect his later work?
- what influences affected the development of this concept? How did Halliday use them and/or distinguish himself from them?

This chapter is divided into three parts. Part 1 concerns Halliday's early career, ranging from 1956 to 1966, and focuses in particular on his reworking of typical Firthian concepts such as those of context and system. It will also be shown that, although Halliday was at this time certainly aware of the existence of various functional theories (notably those of Bronislaw Malinowski, Karl Bühler and the Prague School), these theories differ quite considerably from Halliday's specific brand of functionalism. Part 2 analyses two of Halliday's articles published in 1966, "Some Notes on 'Deep' Grammar" (1966a) and "Grammar, Society and the Noun" (1966b). Both articles suggest that the questions which Halliday was tackling at the time were at least in part American in origin and that both the work of Noam Chomsky and Benjamin Lee Whorf contributed to Halliday taking this functionalist turn, albeit for very different reasons. Finally Part 3 will focus on Halliday's series of articles "Notes on Transitivity and Theme in English" (1967–68) in which the metafunctional hypothesis is formulated for the first time. These three articles are particularly enlightening in that they show how the metafunctional hypothesis stems directly from more classic syntactic functions.

1. The Systemic Period (1956–66)

During this period which runs from Halliday's first published article "Grammatical Categories in Modern Chinese" (1956) to "Some Notes on 'Deep' Grammar" (1966a), the word "function" appears only very rarely

in Halliday's work, and is used only to refer to syntactic functions (such as Subject or Object). Over these ten years, Halliday is mainly concerned with reworking and clarifying Firth's systemic legacy by systematising it and making it more explicit. That such an ambition is at work here is clearly apparent in one of Halliday's most famous articles, namely "Categories of the Theory of Grammar" (1961) in which he defines the basic categories of his grammar—structure, unit, class and system—and how they are related to one another. This model will come to be known as Halliday's "scale-and-category grammar."

As regards functions, the term "function" only appears in this article when Halliday discusses the binary opposition of "formal" and "functional," a binary opposition which he ultimately rejects as he does not see any clear divide between theories focusing on the form of linguistic units and theories focusing on their functions. In Halliday's own words, "[my] whole description is both formal and functional at the same time, and 'function' is merely an aspect of form" (Halliday 1961, 51). Functions, whether they be syntactic or more general, are thus not one of Halliday's priorities at this moment in his career.

1.1. Context

Context, later another founding concept for Halliday's functionalism, is also a fairly peripheral concern at this time. As can be seen in fig. 4-1, Halliday distinguishes between "substance" (the object of phonetics), "form" (the object of linguistics) and "situation" which encompasses extra-textual and thus contextual features. Context however should not be understood as purely extra-linguistic (as in the Malinowskian expression of "context of situation" which describes the social and cultural environment in which an utterance is used): as can be seen in fig. 4-1, context "overflows" into linguistics, and bridges the gap between "form," the object of linguistics, and what are more specifically social phenomena. Following one of the fundamental principles of British linguistics, a linguistic form only becomes meaningful within a context. At this stage of his career, however, Halliday is willing to recognize that form remains his main concern, probably partly because the concept of "context" is at this time more difficult to handle, as it remains unclear and in need of proper boundaries: "formal criteria are crucial, taking precedence over contextual criteria" (Halliday 1961, 40).

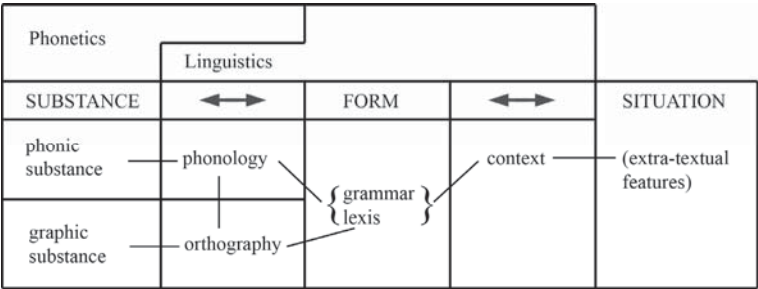


Fig. 4-1. Levels of Language (Halliday 1961, 39).

Right from the beginning of his career as a linguist Halliday was certainly acquainted with Bronislaw Malinowski’s and John Rupert Firth’s work concerning the functions of language and their uses in context, nevertheless it seems difficult to attribute a functionalist label to Halliday’s work between 1956 and 1966. Functions, whether internal or external to the language system, are hardly ever mentioned and the more social aspects of language are of no real concern to him. Instead, over the course of these ten years, Halliday is trying first and foremost to formalise Firth’s concept of system.

1.2. Systems as a premise of functionalism

The London School’s often quoted idea of “meaning as function in context” can be found in the work of both Malinowski and Firth, and now serves as something of a slogan for British functionalism. This idea highlights two fundamental aspects of the British tradition of linguistics: on the one hand the requirement to take into account contextual features, and on the other the fact that the purpose of a grammar is to explain how meaning is constructed. What is missing from this “sound bite” however is the fact that this definition of meaning hinges on that which originally in Firth’s work—less so in Malinowski’s—is a systemic approach to language. For Firth a function (and here Firth does not mean a broad function or use of language but a phonological, morphological or syntactic element fulfilling a function within an utterance) is never presented in a context on its own, but is instead part of a system. The meaning of such a function in fact derives from the interaction of *system* and *context*, and ultimately from the more fundamental interaction between *system*, or language as a potential for meaning, and *text*, the instantiation of such a

potential. To illustrate what he means by “system,” Firth (1935) gives the following example: within the phonological context /b_d/ one can introduce a system of sixteen different vowels—bi:d, bi:d, bed, bæd, bæ:d, bɔ:d, bu:d, bʌd, bɜ:d, beid, bæud, baɪd, baud, bɔɪd, biəd, beəd—the function of each vowel being its use within the context “b_d” in opposition to the other 15 vowels. The concept of system for Firth is thus inseparable from those of function and context, and meaning is derived from the presence of a function, *selected within a system of other functions*, within a specific context. As Firth explains:

Each function will be defined as the use of some language form or element in relation to some context. Meaning, that is to say, is to be regarded as a complex of contextual relations, and phonetics, grammar, lexicography, and semantics each handles its own components of the complex in its appropriate context. (Firth 1935, 19)

The notions of syntactic function,⁴ context and system are thus already thoroughly intertwined in Firth’s work and, as a result, when Halliday takes up the task of formalising Firthian systems, he cannot but address the notion of function. In fact, in his early works, Halliday chooses not to focus on it and instead tries to describe the systems of the English language as clearly and as explicitly as possible; fig. 4-2 is one of these systems and represents the thematic system as described by Halliday in 1964. Functions are therefore undeniably already part of Halliday’s background at this time, but he chooses to leave them out of the picture in what could be a methodological simplification triggered by his concern with formalising Firth’s theory. So although functions are not explicitly present in Halliday’s model during his systemic decade between 1956 and 1966, it would be an exaggeration to speak of a break in his theory at the end of the 1960s. In fig. 4-2, each entry within the system network reflects Firth’s definition of a function (“the use of some language form in relation to some context”) and prefigures Halliday’s: for instance the entry “non-nominal” is a function as opposed to “nominal” in the context of the selection of a “non-subject” theme.

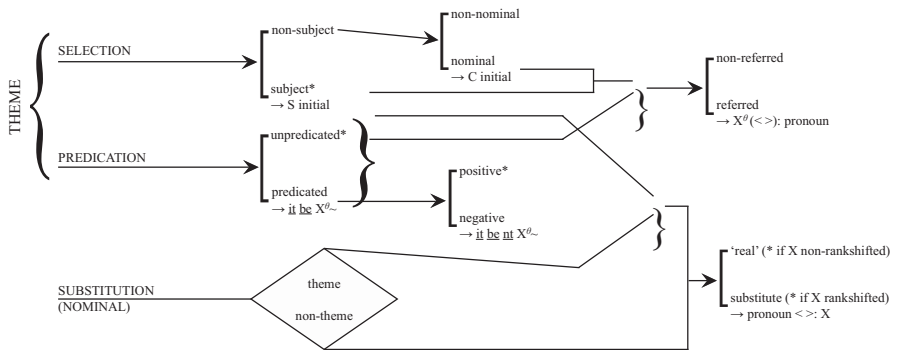


Fig. 4-2. Systems of the Clause: Theme (Halliday and Kress, 1976, 12).

1.3. Functionalist sources

At the end of “Notes on Transitivity and Theme in English” (1967–68), Halliday briefly discusses some of the theories that make up this functionalist background, notably those of Bronislaw Malinowski, Karl Bühler and František Daneš (a member of the Prague School).

Given the important role Malinowski played within the London School of Linguistics, we cannot doubt that he influenced Halliday in some way or another. However, contrary to what one might expect, Halliday does not take up Malinowski’s functions of language⁵ directly, but uses instead Malinowski’s anthropological work as a broader theoretical framework in which to describe his own metafunctions. Following Malinowski’s teachings, Halliday thus sees language as an activity and not as a means of representing one’s thoughts. In Malinowski’s own words:

The fact is that the main function of language is not to express thought, not to duplicate mental processes, but rather to play an active pragmatic part in human behaviour. (Malinowski 1935, 7)

Malinowski’s approach is that of an anthropologist and he describes it as akin to translation, albeit a special kind of translation:

Translation [in the sense of defining a term by ethnographic analysis] becomes rather the placing of linguistic symbols against the cultural background of a society, than the rendering of words by their equivalents in another language. (Malinowski 1935, 17)

In other words, an anthropologist has to translate phenomena from one culture to another and, so as to render these phenomena intelligible to the other culture, he has to describe how they *function* within the context of the original culture. Once again the idea of “meaning as function in context” underpins Malinowski’s anthropology. However, unlike Firth, function here is not understood as “function within a grammatical system,” but carries a far more telic undertone: for instance, Malinowski pays considerable attention to myths and to their function of systematising the beliefs of a community. Functions serve first and foremost a purpose of social regulation and are therefore fairly independent from the form of language. As we will see later on, Halliday’s theory differs significantly from Malinowski’s on this point.

As regards Karl Bühler’s functions of language, they seem to have just as little in common with Halliday’s functions as do those of Malinowski. Bühler’s functions, like Malinowski’s, do not stem from the grammar of a language, contrary to Halliday’s. Bühler arrives at his functions of language by separating the various components which make up an act of communication, each function corresponding to one of the minimal constituents of such an act: when one communicates, one expresses oneself, one calls someone and one represents something. However, one of the subtleties of Bühler’s thinking lies in the fact that these functions of language do not derive from the way in which we use language and are not equated with a speaker’s intentions. In her presentation of Bühler’s theory, Janette Friedrich explains that “what interests Bühler, is *what language does* in being representation, expression or calling.”⁶ (Bühler [1934a] 2009, 39) not what the speaker does with language. The functions of language are thus an intrinsic property of language, and in this Bühler’s functions seem closer to Halliday’s than Malinowski’s. For both Halliday and Bühler, the notion of function is, or at least should be, partly independent from that of purpose and derives first and foremost from the form of language itself and not from its uses.

Concerning the Prague School, while the theme/rheme distinction does play an important role in Halliday’s argumentation throughout “Notes on Transitivity and Theme in English” (1967–68), Halliday surprisingly does not discuss Functional Sentence Perspective or Vilém Mathesius’ work, although the latter is sometimes credited with having written the first functional grammar (Paveau and Sarfati 2003, 115). Halliday does however spend time going over the work of František Daneš and more specifically his article “A Three-Level Approach to Syntax” (1964). If Daneš, unlike Malinowski and Bühler, writes from the point of view of a grammarian, some important differences nevertheless exist between his

functions and Halliday's—something Halliday passes over rather quickly. For instance, Halliday compares his experiential metafunction with Daneš's "semantic level," both of which enable the speaker to construe his experience of the world. While they do share a certain number of similarities, there is one major difference between the two which cannot be overlooked. It is to be noted that Daneš opposes his "semantic level" to a grammatical one, and although both levels do interact, the grammatical level is fairly autonomous and the grammatical categories, such as that of Subject, are entirely defined at this grammatical level. As we shall see, this is far from being the case with Halliday's theory in which all four metafunctions are equally encoded in the grammar of a language: the experiential metafunction is therefore no less grammatical than any other metafunction.

Finally, one may find it surprising that Halliday does not mention Roman Jakobson's work on the functions of language despite it being already well known at the time. The reason for this neglect is certainly not ignorance of Jakobson's work since, when Halliday mentions Bühler's functions, he draws on the terminology Jakobson used to rework some of Bühler ideas—"representational," "expressive," and "conative"—rather than Bühler's ([1934b] 2011) original terms or their translation into English: while "representation" (*Darstellung*) and "expression" (*Ausdruck*) remain the same, Bühler uses the term "appeal" (*Appell*) instead of "conative." Although this choice of words may seem fairly trivial, it was important enough for Bühler to choose to comment on this last term:

Today I prefer the terms *expression* (*Ausdruck*), *appeal* (*Appell*) and *representation*, because among language theorists 'expression' is increasingly taking on the precise meaning demanded here, and because the Latin word '*appellare*' (English: appeal, German: more or less '*ansprechen*') is apt for the second; as everyone knows today there is sex appeal, and in addition to that speech appeal seems to me to be just as palpable a fact. (Bühler [1934b] 2011, 35)

The reason for this omission by Halliday seems to be a certain scepticism vis-à-vis Jakobson's functions of language, and this scepticism will last throughout Halliday's career. As he explains while discussing Malinowski's and Bühler's theories in an interview with Paul J. Thibault:

M.A.K.H.: Jakobson is on the fringe here. You remember the arguments that the Prague linguists had over the years about whether the functions were functions of the utterance or functions of the system, and they never got fully built into the system.

P.J.T.: Yes, and that seems to me to be a flaw in Jakobson's theory.

M.A.K.H.: I agree.

(Steele and Threadgold 1987, 608–9)

Since the beginning of his career, Halliday had thus been exposed to functionalist theories of language. However, none of these theories stem from the approach of a grammarian (apart maybe from Daneš). It is as if, during this period running from 1956 till 1966, Halliday lacked the means or the will to integrate the functions of language into his grammar and to create a link between these functions and the more classical grammatical functions. It is only in 1966, and rather surprisingly in articles on Noam Chomsky's deep structure and Benjamin Lee Whorf's linguistic relativity, that Halliday will take the next crucial step.

2. 1966—discussing Chomsky's deep structure and Whorf's linguistic relativity

If the metafunctional hypothesis is explicitly stated for the first time in "Notes on Transitivity and Theme in English" (1967–68), two articles published in 1966 can be read as precursors. In the first article, "Some Notes on 'Deep' Grammar" (1966a), Halliday clarifies his position vis-à-vis Chomsky's notion of "deep structure." While noting that some elements are compatible between his theory and that of Chomsky, Halliday seems to call on deep structure mainly to highlight the fact that his grammar is a grammar of meaning. In the second article, "Grammar, Society and the Noun" (1966b), Halliday puts forward a Whorfian reading of the system of transitivity, pondering over the existence of a link between grammar and our experience of the world, and the nature of such a link. This will serve as the groundwork for his experiential metafunction.

2.1. Systems as "deep paradigms"

While some British linguists had already questioned the idea of any clear divide between syntax and semantics, this was not one of Halliday's major concerns during the early years of his career, as he mainly focused on finding a way to describe formally the grammatical systems of the English language. It is only in 1966 that the study of how these systems contribute to meaning came to the forefront, prompting a change in the original model of scale-and-category grammar.

Surprisingly enough, "Some Notes on 'Deep' Grammar" (1966a) constitutes the first article in which Halliday truly addresses the syntax-semantics interface, suggesting that his growing concern with this

interface is in some way linked with Chomsky's work and more specifically his concept of "deep structure." By then, Chomsky had published *Aspects of the Theory of Syntax* (1965a) and *Topics in the Theory of Generative Grammar* (1967), and with "Some Notes on 'Deep' Grammar" (1966a), Halliday decides to tackle some of the issues raised by these books and notably the claim that deep structures act as the input for the semantic interpretation of sentences.

Halliday starts by distinguishing two different ways of describing an utterance: the first, which consists of a linear sequence of grammatical classes (such as noun, verb, adjective, etc.), is compared to the description of an utterance's surface structure; the second, which consists of a non-linear configuration of functions—functions selected beforehand in various systems—is compared to the description of an utterance's deep structure. He then states that the second type of description is to be favoured since it is underpinned by a paradigmatic analysis as opposed to a linear sequence of grammatical classes which supposes a syntagmatic analysis (Halliday 1966a, 59). Halliday's position has thus shifted since "Categories of the Theory of Grammar" (1961): the four basic categories of scale-and-category grammar described in this article—structure, unit, class and system—while still part of his model of grammar, no longer occupy centre stage (apart perhaps from the category of system) and it is now functions which Halliday concentrate on most. With this shift, Halliday finds himself at odds with some of Chomsky's methodological choices, despite suggesting in "Some Notes on 'Deep' Grammar" (1966a) that his and Chomsky's models bear some similarities, most notably that systems and deep structures are somewhat alike. Thus when Halliday states that,

[Class labels] may be conventionally interpreted as functional, but if so their correct interpretation depends on their association with a designated pair of brackets; for example 'adjective' is to be interpreted as 'modifier' when attached to a particular node in the tree. This adds considerably to the syntactic information; but if the tree itself represents sequence at the surface its application is limited. (Halliday 1966a, 58)

he seems to be addressing certain passages of *Aspects of the Theory of Syntax* (1965a) such as,

Functional notions like "Subject," "Predicate" are to be sharply distinguished from categorial notions such as "Noun Phrase," "Verb" [A Phrase-marker that would include functional labels would be] mistaken in two ways. For one thing it confuses categorial and functional notions by assigning categorial status to both, and thus fails to express the relational

character of the functional notions. For another, it fails to observe that [...] the notions Subject, Predicate, Main-Verb, and Object, being relational, are already represented in [Phrase-markers without functional labels]. (Chomsky 1965a, 68–69)

If Halliday favours a description using functional labels, as opposed to Chomsky's descriptions using class labels, it is for two reasons. The first reason brings us back to the British tradition of systemic linguistics according to which "two entities can only be said to contrast if they have a functional environment in common" (Halliday 1966a, 60). For example, a Subject Noun Phrase in an active clause and a Subject Noun Phrase in a passive clause cannot be said to contrast because they do not share similar functional environments, i.e. their functional role is different in their respective clauses; a description in terms of classes would tend to cloud this fact. While the distinction active clause/passive clause may be easy to handle for class-based grammars, Halliday (1967–68) introduces finer distinctions in his description of the clause that need to be accounted for using functional descriptions. For instance, Halliday distinguishes between effective clauses (clauses which describe a goal-directed process) and descriptive clauses (clauses which describe a non-directed process) and claims that the Subjects of these two types of clauses are different from a functional point of view (Halliday 1967–68, 42), although both are unmarked options in their respective clauses:

She washed the clothes > Structural description: Subject-Predicator-Complement / Systemic description: effective operative clause, subject = actor.

He marched the prisoners > Structural description: Subject-Predicator-Complement / Systemic description: descriptive operative clause, subject = initiator.

As Halliday notes, there is a "lack of direct correspondence between the systemic and the structural descriptions" (1967–68, 41), the systemic description consisting of a non-linear configuration of functions.

The second reason is a consequence of the first reason: because functions contrast with one another within systems, and the functional organisation of the clause makes up its deep structure, a system of functions behaves like "a 'deep paradigm,' a paradigm dependent on functional environment" (Halliday 1966a, 60). As a result, it is the functional description of the clause which brings out most explicitly the "deep paradigms" which contribute to the structure of the clause and to the meaningful contrasts which stem from it. In other words it is the functional

description of the clause which gives the linguist access to the various ways in which meaning is constructed in and through the clause.

Starting with “Some Notes on ‘Deep’ Grammar” (Halliday 1966a) systemic descriptions thus become systemic-functional descriptions, with “functional” referring for the time being to syntactic functions and not to language functions. Furthermore, these systemic-functional descriptions offer an image of the various options which have been selected in each system of the grammar to produce a given clause. As Halliday will explain later on in his career:

Once the systems are interrelated, in the form of a *system network*, then the underlying description of any item in the grammar is a *selection expression*, the set of features that delineate its path through the network; and since each feature is in systemic contrast to one or more others, the description consists in the statement of its patterns of agnation—of all the proportionalities into which it enters. (Halliday 2005, xix)

For instance, in fig. 4-2, the selection expression of a non-referred theme could be “Theme > Selection > Subject > Non-Referred” while its pattern of agnation could be stated as the fact that it contrasts with themes consisting of, amongst others, referred subjects and non-subjects whether referred or non-referred. Each of these “selection expressions” constitute what Firth would call “statements of meaning” (Firth 1950), i.e. statements by which the linguist describes how the various elements which constitute a clause contribute to the meaning of the clause: each of the options which make up the “selection expression,” and which were selected in a system, are “fundamental choices in meaning [that are] acted out” (Halliday 2005, xv) in the clause.

2.2. ‘Deep’ Grammar and Whorf

“Some Notes on ‘Deep’ Grammar” (Halliday 1966a) established that grammatical systems function as “deep paradigms” and as such contribute to the meaning of the clause, or rather, to use a more Hallidayan term, constitute its “meaning potential” (Halliday 1973). With “Grammar, Society and the Noun” (1966b), Halliday this time tries to determine in what way this meaning potential is organised. For this, he turns to Benjamin Lee Whorf’s hypothesis of linguistic relativity, i.e. the idea that different languages reflect different ways of construing the world, without this relation being necessarily too deterministic:

We cut nature up, organize it into concepts, and ascribe significances as we do, largely because we are parties to an agreement to organize it in this way—an agreement that holds throughout our speech community and is codified in the patterns of our language. (Whorf 1956, 213)

Even though Halliday's metafunctions are not explicitly mentioned in "Grammar, Society and the Noun" (1966b) nor even distinguished from one another, this article is truly a forerunner of Halliday's functionalism in that Halliday gives a Whorfian reading of the system of transitivity: this system helps structure the clause around a process and its participants, and thus to a certain extent it also pushes us to construe the world in a certain way. Acting as an interface between grammar and our experience of the world, the system of transitivity undoubtedly announces the experiential metafunction.

In Halliday's writing, the word "transitivity" can refer to two distinct ideas: it can either be used to describe the group of systems that determine how the participants of an action will be organised within a clause; or it can refer to a sub-group of these systems which is only responsible for expressing the extension of a process, that is whether a process applies to a goal or to a different type of participant. In this second definition of transitivity, transitivity *sensu stricto*, the system of transitivity accounts for the differences between sentences such as "John threw the ball," where "John" is Actor and "the ball" Goal, and "John marched the prisoners," where "John" is Initiator and "the prisoners" is Actor. Functions here are comparable to semantic roles and should not be confused with syntactic functions such as Subject or Object, which according to Halliday apply to surface structure descriptions and not deep structure ones. To avoid any confusion, he often uses the terms of "structural function" or "role."⁷

Distinguishing between these two definitions is important because the transitivity system *sensu stricto* co-exists with the ergativity system, a system which this time deals with relations of causality between two different participants, a Causer and an Affected: in "John threw the ball" "John" is Causer and "the ball" is Affected, and in "John marched the prisoners" "John" is Causer and "the prisoners" is Affected. The word "transitivity" can thus refer either to the ergativity and the transitivity systems together, or to the transitivity system alone.

The reason Halliday sets up an ergativity system is to be found in the fact that the English language does not distinguish between an Actor who acts on a Goal, and an Initiator who pushes an Actor to act: "taking 'directed' action (action on a goal) is equated, in English, with enforcing non-directed action" (Halliday 1966b, 59). In other words, according to Halliday, despite their differences, "John threw the ball," "John marched

the prisoners” and “John opened the door” share an identical structure from the point of view of ergativity, a fact that the transitivity system is unable to reveal. As seen earlier on, the transitivity system, unlike the ergativity system, assigns different systemic descriptions to “John threw the ball” and to “John marched the prisoners.” While this may not be problematic in the case of such examples, as they differ considerably in meaning, it is more problematic in the case of a sentence such as “John opened the door” which can equally be described in terms of “Actor-Goal” or “Initiator-Actor,” despite this sentence being completely unambiguous. This argument will be developed further in “Notes on Transitivity and Theme in English” (Halliday 1967–68).

In “Grammar, Society and the Noun” (1966b), Halliday does not aim to describe these systems in any detail. The questions which he seeks to address have a far broader scope as he tries to assess the extent to which these different systems contribute to the meaning potential of a language in a Whorfian perspective. In other words, what Halliday is concerned with here are the ties between grammar and culture.

Even if, quite obviously, he does not posit any direct correlation between grammar and culture, he nevertheless believes that the grammar of a language, and therefore the transitivity and ergativity systems, influence the way in which a speaker of the said language construes the world: “one’s experience is organized on many levels at once; the language has played a part in structuring it for us” (Halliday 1966b, 70). Given that they organize the distribution of the participants of a clause, it would seem logical that the transitivity and ergativity systems make a very important contribution to the way we understand a process and how it unfolds. The experiential metafunction, which describes the fact that we construe our experiences largely through language (for instance, we tend to distinguish between participants and the processes they take part in), will come about as a consequence of this conclusion.

From then on, Halliday will see the grammar of a language, or rather its deep grammar, as a way of gaining access not only to the linguistic knowledge of its speakers but also more generally to their cultural knowledge:

the line of investigation leads in the direction of Whorf’s language-specific ‘deep’ grammars, towards semantically significant generalizations about the grammars of languages which may serve [...] as linguistic evidence for any enquiry into language and cultural knowledge. (Halliday 1966b, 65–66)

We can already see that behind these “semantically significant generalizations” lie what will become Halliday’s metafunctions.

3. 1967–68—a first draft of the metafunctional hypothesis

“Notes on Transitivity and Theme in English” is a series of three articles published between 1967 and 1968 in *Journal of Linguistics*. In the first article, Halliday describes the transitivity system in considerable detail as opposed to what can be found in “Grammar, Society and the Noun” (1966b). In the second article, he describes the thematic system, which deals with the theme/rheme opposition, information structure and prosody. Finally, in the third article, Halliday tries to show how these various systems interact, leading him to formulate the first version of his metafunctional hypothesis. Even though the words “metafunction” and “macrofunction” are not used in this article, all the main ideas are already there. Interestingly what is made apparent in this first version of the hypothesis is that, although it does represent a turning point in Halliday’s work and is partly influenced by the work of the Prague linguistic circle, it nevertheless bears the mark of the British empiricist tradition.

Before going any further however, we will illustrate the workings of the transitivity and thematic systems with an example. The sentence “John’s seen the *play*” (where “play” carries information focus) will be analysed into the following components depending on the system under consideration:

- transitivity: Actor = John, Process = has seen, Goal = the play
- mode: Subject = John, Predicate = has seen the play
- focus: Given = John’s seen, New = the play
- thematic: Theme = John, Rheme = has seen the play

A clause can thus be submitted to several analyses, each analysis corresponding to a specific system, and each system assigning a particular structure to the clause. A clause is thus the result of various functions or roles being chosen within these systems:

These roles are mapped on to one another to form complex structural elements: the element of structure is thus a complex of structural roles. Certain options specify the presence of a particular role in the structure [...] others have a mapping function, and these include those of ‘voice’: ‘operative’ specifies the mapping of actor on to subject and of goal on to complement. (Halliday 1967–68, 2: 215–216)

We can recognise the London School of Linguistics' polysystemic approach here: each system contributes in its own way to the meaning of the utterance and it is the linguist's work to show how these systems, belonging to different levels of analysis (phonological, morphological, syntactic...), interact. Firth's following description of the work entailed by linguistic analysis seems to apply:

This proceeds on the assumption that language is polysystemic, and that multiple statements of meaning in linguistic terms can be made at a series of congruent levels. The language under description [...] is subject to analysis in terms of the categories of linguistics at all levels, and the resulting statements, which I submit are statements of meaning, are made in the language of description. (Firth 1956, 81)⁸

3.1. Systems and contexts

Halliday (1967–68) is thus concerned with describing the transitivity and thematic systems in detail using a polysystemic approach so as to clarify how each of these systems contribute to the meaning of an utterance. As mentioned earlier on, for the London School of Linguistics, a system however never exists outside a context: for functions to be said to contrast with one another, and more precisely to contrast *meaningfully* with one another, they necessarily have to share a common context. In the case of the systems of transitivity, theme and mood, this common context is that of the clause: in Halliday's systemic networks, the clause always constitutes the first node from which the various systems stem.⁹ If the clause acts as a starting point it is because the clause constitutes the context base on which one can elicit the most significant grammatical contrasts, whereas other contexts might obscure these contrasts while bringing to light other less important ones:

We have seen the distinctions that are needed are not those of 'subject as initiator' versus 'subject as actor,' etc.; since subject as initiator in a descriptive clause is grammatically equivalent to subject as actor in an effective clause, and so on. (Halliday 1967–68, 1: 46)

Each role or function thus has no intrinsic value in and of itself, but is determined first and foremost by the type of clause in which it is used, by its context. "Subject as actor" is thus an unmarked option in an effective clause, while "subject as initiator" is an unmarked option in a descriptive clause, and conversely, both are marked options in the other's context. The clause however is not the only context that needs to be taken into account,

and the task of the linguist consists in embedding each context into a larger one just like Russian nesting dolls: the phonological context slots into the morphological context which in turn fits into the context of the phrase, the clause, the text and so on till one reaches the context of situation. Regarding the systems under scrutiny here, the context of the clause is simply the most important one.

3.2. Interacting systems

Having identified the clause as the context shared by the systems of transitivity, mood and theme, Halliday is then able to arrange these various systems on a single level, ultimately creating what amounts to a grammar of the clause. One of the important consequences of such a move is that, when Halliday later bases his four metafunctions on these systems, none of the metafunctions can be considered more “grammatical” than the others—unlike for instance what can be found in Daneš’s model in “A Three-Level Approach to Syntax” (1964). This also explains why these various systems can interact, most notably the thematic and transitivity systems, without any system having to shift to a different level altogether.

Halliday gives the following example: the question “Which is John?” can be answered in two ways “the *tall* one is John” or “John is the *tall* one” (the italic characters indicating the information focus). While the difference between “the *tall* one is John” and “John is the *tall* one” could simply be explained as a thematic difference, when placed within the context of an answer to the question “Which is John?” (this time the context of the text is taken into account) this difference takes on a new hue and raises issues pertaining to the transitivity system and more precisely to that part of the system concerned with voice. In Halliday’s account, “John is the *tall* one” is thus the receptive (or passive) version of what Halliday calls “*equative* be” (or identifying *be*) while “the *tall* one is John” is the operative (or active) version.¹⁰

“Which is John?”: question which calls for an “*equative clause*” as an answer. The equative relation however is reversible. “Which is John?,” with John as “x,” can either mean:

“what does x equal?” > “John is the *tall* one” (operative) or “the *tall* one is John” (receptive)

C P S S P C C P S

or

“what equals x?” > “John is the *tall* one” (receptive) or “the *tall* one is John” (operative)

S P C C P S S P C

(Halliday 1967–68, 1: 67–69)

With this contextual analysis, the difference between “John is the *tall* one” and “the *tall* one is John” is made considerably more complex, voice and transitivity coming into play where most accounts would generally limit themselves to thematic considerations. As can be seen in fig. 4-3, the choice of “operative/receptive” located under the node “Voice2” is the consequence of choices made at the level of the thematic and transitivity systems, since Voice1, which selects between “middle” and “non-middle,” belongs in full to the system of transitivity. Thus the thematic system does not belong to a completely separate level (that of pragmatics for instance), and must be considered as grammatical as the transitivity system.¹¹

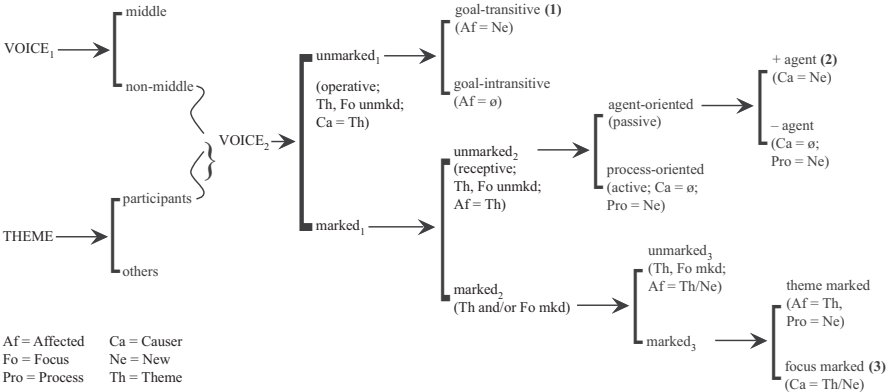


Fig. 4-3. The interaction of Transitivity and Theme (Halliday 1967–68, 3: 208).

The interaction of voice and theme in fig. 4-3 allows for various types of clauses, each with a different meaning (albeit the differences between them can be very subtle) and each fulfilling different functions within specific contexts. Here “function” should be understood in the most traditional sense of the word, as what we do when we select certain options in the system. The fact that markedness is present in this diagram is particularly noticeable in this respect: while “the books were sold by *John*” (corresponding to (2) in fig. 4-3) is a marked option by comparison to “John sold *the books*” (1), “the books were sold by *John*” (2) is an unmarked option by comparison to “*John* sold the books” (3). In (1) we have a goal-transitive clause where the Affected is New Information. If the Causer is the New Information, we can *use* a receptive clause (2) to highlight his importance: this is one of the main functions, or *uses*, of such a clause. However another way of highlighting John’s role is to keep the Causer as Theme while at the same time having the Theme be the focus in

(3); the function, or use, of such a clause is to further emphasize John's role as this clause is marked by comparison with what is already a marked option. The earlier more technical use of the word "function," through the interactions of grammatical systems and the presence of marked/unmarked options, now co-exists with one that is closer to the everyday meaning of the word.

3.3. A functional explanation

Establishing the existence of such interactions is only a first step for Halliday. He goes on to write:

It seems appropriate to interpret the feature 'receptive' in the grammar as that option which maps goal on to subject because *this is the reason for selecting the option* [my emphasis]: since the subject is the unmarked theme, the receptive allows the goal to be thematic while remaining, qua theme, unmarked. (Halliday 1967–68, 2: 216)

The grammar of English thus offers multiple options, each of which corresponds to specific goals. The term "function" in "*structural function*" is no longer purely technical and now also carries a telic undertone. Halliday's system networks are in a way conducive to such an undertone since their aim is to describe the various options available to the speaker of a language. As a result the "selection expressions" which the linguist is tasked with describing for each utterance necessarily become synonymous with a description of the options selected by the speaker, i.e. of the speaker's choices. And when speaking of choices, one is easily led to explain these choices in functional terms.

Halliday's functional inclination, while dormant in his early work, now appears more explicitly. As shown by Christopher Butler, one of the underlying principles of all functionalist approaches is the idea that "it would be of no use merely to specify the system, without saying why that system is as it is" (Butler 2003, 21). Halliday's argumentation in "Notes on Transitivity and Theme in English" (1967–68) is no exception to this principle and goes through two different steps: he starts off by organising utterances into paradigms and then tries to account for the differences between these utterances in terms of functional differences. His reasoning thus follows two complementary lines:

- first of all, one needs to describe differences when these are systematic;
- secondly, all differences are meaningful and need to be explained.

Butler's "functional explanation" (2003, 29) is therefore doubly functional in "Notes on Transitivity and Theme in English" (Halliday 1967–68). On the one hand, the differences in need of an explanation are differences between "structural functions" organised in a system,¹² and on the other hand, these differences are explained via functional differences, function being used here in a sense closer to that of "meaning."

The functional explanation pertaining to the thematic system comes naturally to Halliday since it is already present in the work of the Prague Linguistic Circle. Because of its strong ties to pragmatics, he can describe the different structural functions that make up the thematic system using very functionalist-sounding terminology such as "here structural function is function in communication" (Halliday 1967–68, 2: 200). As if the thematic system served as the natural or at least historic gateway into functionalist theories.

For the transitivity system to be described in similar terms, one needs to wait till "Notes on Transitivity and Theme in English, Part 3" and the introduction of the ergativity system, which Halliday had already described in Whorfian terms in "Grammar, Society and the Noun" (1966b), but which this time he describes in much greater detail. Halliday starts again with a discussion of the insufficiencies of analyses using the pairs Actor-Goal and Initiator-Actor, the problem being that in such a framework a sentence such as "John opened the door" is compatible with two different grammatical descriptions—the first one where "John = Actor" and "Door = Goal" and the second one where "John = Initiator" and "Door = Actor—and should therefore lead to two different semantic interpretations, as all differences are meaningful. This analysis however is unacceptable since this sentence is perfectly unambiguous. And Halliday notes once again that, "the description in terms of actor and goal fails to show that, in English, the enforcing of non-directed action is the same thing as taking directed action." (Halliday 1967–68, 3: 184). As evidence for this claim, he suggests the fact that the sentence "he grows and sells flowers"—where "he" is both Actor of "sell" and Initiator of "grow" in a transitivity analysis—is a perfectly acceptable sentence even though two different functions cannot coordinate. For Halliday, "he" in "he grows and sells flowers" is thus best analysed in terms of ergativity, for "he" can then be Causer both of "grow" and "sell," and "flowers" can be the Affected of both verbs.

What this particular line of reasoning illustrates is that Halliday is no longer afraid of mixing syntactic and Whorfian considerations in what resembles a typically functionalist move: transitivity and ergativity co-exist in the grammar of English because the English language's

“worldview” does not distinguish between the two.¹³ This coordination phenomenon thus not only becomes a sign that the English language does not differentiate between initiating non-directed action and taking directed action, but it also provides a syntactic argument in favour of an ergativity system in the English grammar. The structural functions of the transitivity system reflect the way in which the English language construes the world and will serve as the basis for the experiential metafunction.

3.4. Arriving at the metafunctional hypothesis empirically

It appears that in Halliday’s reasoning, structural functions are empirically grounded categories that one can identify thanks to the careful study of syntactic phenomena. They do contribute to meaning, and as such are semantic, but the levels of semantics and grammar being one and the same, they contribute to meaning by being syntactic categories. Furthermore, these structural functions are organised into “clusters” which are defined by strong internal dependency relations but while remaining fairly independent of one another:

while there is relative independence between [the systems of transitivity and theme], as compared with the high degree of interdependence among the options within each set, the two cannot be entirely isolated from one another in a description of the syntax of the clause. (Halliday 1967–68, 3: 179)

A cluster is a dense node in the grammar at the level of which a large number of choices are made, and which is connected to the other nodes of the grammar by a relatively small number of links. Because clusters group together options pertaining to the same domain, each cluster is specialised, as shown in fig. 4-4 where we have a thematic cluster, a mood cluster and a transitivity cluster.

Based on the existence of these clusters and their interactions, Halliday goes on to formulate his metafunctional hypothesis by equating a cluster with a function of language:

since a constituent may have value in many systems simultaneously, there are options specifying how the values are to be combined, options which link together the different functions which language is required to fulfil. (Halliday 1967–68, 3: 207)

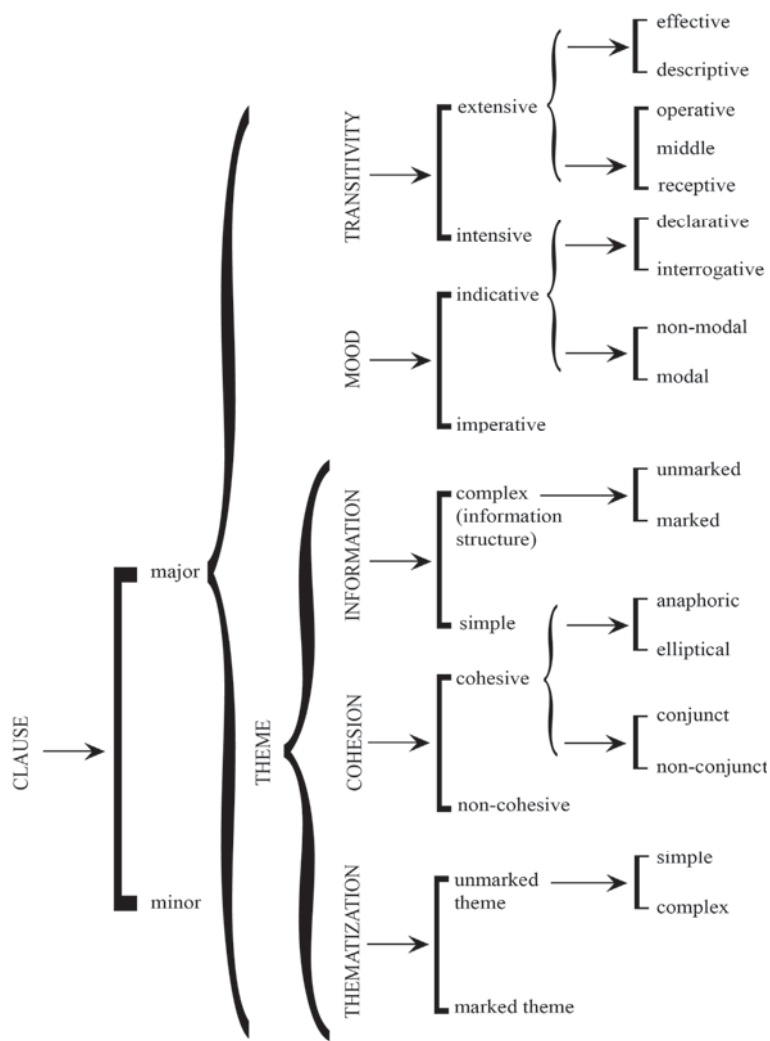


Fig. 4-4 Simplified version of the systems of the clause (Halliday 1969, 59).

A system therefore fulfils a function (which in this context is a synonym for “carries meaning”) and a group of systems, or a cluster of systems, represents a general function of language, or what will come to be known in Halliday’s Systemic-Functional Grammar as a metafunction. The

difference between a metafunction and a structural function is thus more a difference in scale than in nature. The evolution of Halliday's terminology seems to suggest this as the functions of language will successively be known as "macrofunctions" and "metafunctions."

As shown earlier on, Halliday is perfectly willing to admit that the idea that language fulfils certain functions is far from new and he mentions Bühler and Malinowski on this topic. Their functions however stem from very different approaches and they do not share the same objectives as Halliday's metafunctions. While "[these broad functions of language] are conceived of, in general, as uses of the language system, rather than as properties of the system as such" (Halliday 1967–68, 3: 270), Halliday stresses the fact that his metafunctions stem from the grammar and more specifically its organisation into clusters: "the options [available to the speaker in the grammar of the English clause] group themselves into a small number of subsets [...] This provides a syntactic basis for the concept of language functions." (Halliday 1967–68, 3: 207).

Having identified four different clusters, Halliday postulates the existence of four different metafunctions:

- *the experiential metafunction* which acts as a conceptual framework which we use to encode our experiences using the categories of process and participants;
- *the logical metafunction* which handles universal relations such as and/or, negation, implication, etc.
- *the discourse metafunction* which Halliday will later rename the "textual" metafunction and which is responsible for making a text coherent;
- *the interpersonal metafunction* which is used to express the various roles that the speaker can adopt during an act of communication.

And each of these metafunctions translates into the grammar as a group of specialised systems: the experiential metafunction yields the transitivity systems, the logical metafunction yields the predication systems, the discursive metafunction yields the thematic systems, and finally the interpersonal metafunction yields the mood systems.

Even if the term of "metafunction" is not actually used in this series of articles, we can see that the content of the metafunctional hypothesis is already present and throughout the 1970s it will simply be refined. From our research, the word "macrofunction" for instance will appear for the first time in "Towards a Sociological Semantics" (Halliday 1972) and the word "metafunction" in "Into the Adult Language" (Halliday 1975). The

metafunctional hypothesis will also be further modified following Halliday's work on language acquisition as he will distinguish three phases through which child language evolves into adult language. During Phase I the functions of the child's language are numerous and highly specialised; these functions progressively become more abstract and more general and as a result they decrease in number, giving rise to the macrofunctions of Phase II;¹⁴ and finally this process of functional reduction comes to completion with the ideational, textual and interpersonal metafunctions of Phase III. Another major evolution of the metafunctional hypothesis during the 1970s is the grouping together of the experiential and logical metafunctions under the name of "ideational metafunction." This latter metafunction still applies to the grammar of the clause, whereas the former ones will be shifted to the rank of phrase:¹⁵ concerning the noun phrase for instance, the experiential metafunction groups together functional categories such as deictic or attributive adjective and the logical metafunction such relations as head-modifier.

3.5. Metafunctions and the speaker's intentions

It is worth noting that the metafunctional hypothesis and the argumentation upon which it is based in "Notes on Transitivity and Theme in English" (1967–68) seem largely dependent on the form of Halliday's grammar and its organisation into clusters. Whether the metafunction hypothesis is a completely formal and internal consequence of such a grammar, or whether it is an intrinsic property of the grammar of a language which can be arrived at via grammars—this time in the sense of historically determined tools—structured differently, is a perfectly valid question which we will not try to answer here. The aim of this chapter is not to evaluate the usefulness or the validity of the metafunctional hypothesis, but simply to retrace the history of its elaboration, history so enabling us to bring out the originality of this hypothesis.

However if the metafunctional hypothesis is too form-dependent, one problematic point does spring to mind. If the form of Systemic Functional Grammar really does play such a crucial role, then we are entitled to question to what extent the metafunctions are truly divorced from any form of intentionality, as Halliday so often claims: once again, he distinguishes his grammar from the more general functions of language since these "are conceived of, in general, as uses of the language system, rather than as properties of the system as such" (Halliday 1967–68, 3: 270). But are these systems—as well as the grammar as a whole which is organised into clusters of systems—not designed to explain the choices

made by the speaker? As a result, for the metafunctions to be truly more than simply uses of the language system, and for them to become properties of the system, either we need to be able to account for them independently of these systems of choices, or we need to dissociate the notion of choice, as Halliday's grammar ultimately seeks to explain, from that of the speaker's intentions. While this latter option is a possibility, such a reworked notion of choice would certainly require some clarification.

Recontextualising the metafunctional hypothesis

As far as the metafunctional hypothesis is concerned, the three seminal articles analysed in Part 3 seem to indicate that the concept of metafunction was based first and foremost on grammatical considerations. These considerations however will become more peripheral in Halliday's functional work during the 1970s. During this period, he will be more concerned with sociolinguistic questions, in what resembles an attempt to study the relations between grammar and society taking this time society as the starting point and not grammar. Although its origins are rooted in grammar, the metafunctional hypothesis will serve as a gateway into more sociolinguistic considerations, bridging the gap between language and society, which Halliday was already exploring in "Grammar, Society and the Noun" (1966b):

The questions of sociolinguistics, to return to the point from which I began, involve correlations of some kind between language and society. I have suggested that these may need to be approached through a consideration of correlations that are found within language itself. It is important therefore to keep both aims in focus. We cannot hope to relate language and society except on the basis of a sound interpretation of language as a system. (Halliday 1966b, 73)

As this chapter shows, approaching SFG from a historical point of view results in a complex picture. When linguists categorise SFG as a "structural-functional" framework as is often the case, alongside for instance the work of the Prague School of Linguistics, or more recently Robert Van Valin's Role-and-Reference Grammar, it is probably because they have in mind Halliday's work of the 1956–66 period. As he acknowledges himself, this was a period when structuralism did play a role in the shaping of his theory, most notably via the work of Hjelmslev. So, while Halliday certainly was influenced by structuralism,¹⁶ we believe that the label "structural-functional" tends to cloud the fact that SFG, starting

in 1966–68, progressively moved away from these more classically structural-functional theories and drew closer to what Croft (1991) calls “integrative functionalism,” i.e. functionalist theories that deny the self-containedness of grammar (such as those of Talmy Givón, Joan Bybee, Paul Hopper and Sandra Thompson). That is not to say that SFG is not in any way influenced by structuralism, but simply that its functions are not solely internal to the language system but are also external to it (they are for instance partly social in nature) and in some ways resemble the more external functions of integrative functionalism (which tend to be cognitive in nature). We hope to have shown that one of the specificities of Halliday’s metafunctions is that they act precisely as the hinge between these two types of functions, allowing Halliday later to focus more on the social functions of language without necessarily discarding his earlier work. Far from being *a priori* categories or categories rooted in socio-cultural considerations, Halliday’s metafunctions are on the contrary defined on empirical grounds.¹⁷ The “meta” prefix does not carry any form of transcendental quality and does not signify some sort of break from the more classic syntactic functions but simply describes a difference in scale. This is what distinguishes Halliday’s functionalism from most of the other theories grouped under this label. No major theoretical shift is thus at stake with Halliday’s metafunctions but instead they illustrate Halliday’s way of building his theory by adding layer upon layer upon layer—to the point that his model has sometimes been criticised for its lack of coherence. Thus when Halliday claims that his SFG “is built on the work of Saussure, Malinowski and Firth, Hjelmslev, the Prague school, and the American anthropological linguists Boas, Sapir, and Whorf; the main inspiration being J.R. Firth” (Halliday 1985, 262), it is important to differentiate the contributions of each of these authors.

CHAPTER FIVE

GRADIENTS, SCALES, CLINES, AND STRUCTURAL AMBIGUITY

OLIVIER SIMONIN

Introduction

Gradients, scales and clines pertain to categories—and to tokens that can belong to them to a greater or lesser extent. How linguists conceptualize categorization has obvious consequences and implications for the linguistic categories they postulate and the analyses they provide. The phenomena for which gradients, scales and clines are invoked are investigated in the light of two major models of categorization—and cases in which linguistic tokens appear to belong to two categories at the same time are of special interest here. Three case studies are proposed to account for the ambiguity of some linguistic forms or constructions, leading to the conclusion that several interpretations may be equally valid for some of them.

1. Categorization models (and degrees of belonging to a category)

The traditional categorization model derived from Aristotle will be briefly presented and compared with prototype theory (1.1)—both providing diametrically opposed models—in order to establish a basis for a discussion of their uses and the implications for linguistic categories as they have been postulated and understood (1.2).

1.1. Two distinct models

The conception of categorization in Western thought crucially relies on Aristotle's work on categories as it is put forward in (the first part of) the

Organon and his *Metaphysics*. Leaving aside the various types of categories (a term inherited from him in this sense) in his philosophical system, it is presented here as it has been generally understood and interpreted ever since. Prototype theory, first developed by Rosch and colleagues in the 1970s,¹ offers an alternative and a very different conception. It has mainly come down to us (linguists) as seen through the lens of subsequent readings and reviews. Its assumptions will be introduced and then discussed alongside the Aristotelian model. How these have been integrated and applied in the field of linguistics provides an insight into the current (mis)conception(s) regarding linguistic categories.

1.1.1. Aristotelian categorization

Aristotelian categorization has come down to us as a matter of all or nothing. Either an item belongs to a category or it does not. Whether it does depends on whether it meets a set of necessary conditions that are jointly sufficient in order to delineate the category in question. This can be illustrated with fig. 5-1:

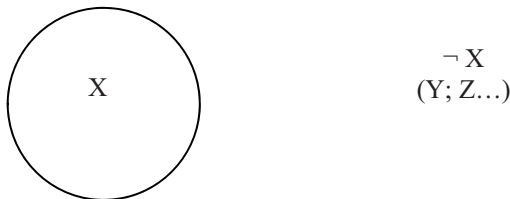


Fig. 5-1.

An item either does belong to category *X* or it does not. A man is a lawyer (*X*) or he is not ($\neg X$). If he is not, he can still be a judge, a policeman, or anything else (*Y*; *Z*...). The circle drawn around *X* represents the boundary of the category, which is very sharp and differentiates *X* from $\neg X$. Let's now consider another example to explain how necessary and sufficient conditions work to define categorization. I will assume for the sake of argument that the age-old (i.e. Plato's) characterization of knowledge as "justified true belief" holds water.² Taking this for granted, one can then say that the proposition '*Peter knows that John went to the concert*' is true if and only if:

Condition 1: John went to the concert in question

Condition 2: Peter is justified in his belief

If Peter believes truly that John went to the concert owing to a hallucination, then Peter does not actually know that he went to the concert, although his belief happens to correspond to what actually took place, and Peter does not have knowledge of John's going to the concert. In other words, given a set of necessary and sufficient conditions, all of them must be jointly fulfilled to ensure that a category is instantiated.

Providing sets of necessary and sufficient conditions may turn out to be extremely tricky, especially when confronted with complex categories like natural species, which are notoriously problematic. Take Plato's well-known characterization of man as a featherless biped. The definition is clear and elegant, but fails to rule out featherless chickens. A full-fledged definition in biological terms stating necessary and sufficient conditions is obviously to be preferred.³ This should simply alert us to the fact that some definitions may be inadequate.

1.1.2. *Categorization as a continuum*

Instead of regarding categories as a matter of all or nothing, they could be seen as being structured around a core of prototypical representations serving as reference points, while other instances are like them to some greater or lesser extent—with the most distant tokens that still represent the category resembling the others only vaguely. In this model, based on prototype theory,⁴ belonging to a given category is a matter of more or less, with the natural result that some instances are more typical than others. In a schematic form:

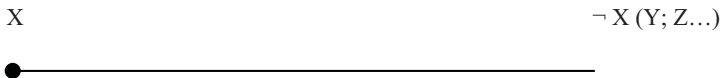


Fig. 5-2.

This can easily be applied to colours, for instance, as there appears to be a continuum between green and blue, as one moves from one point on the colour circle to another:

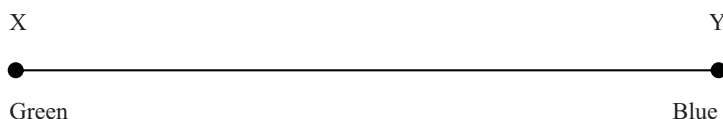


Fig. 5-3.

Much the same can be said of natural kinds or species. Take the category 'bird.' It will be intuitively obvious that a robin is more representative of the category than an ostrich or a hen.

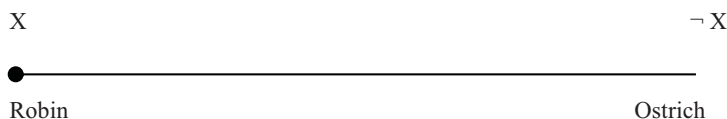


Fig. 5-4.

The notion of prototypes on which categories are based is almost identical with the French linguist Antoine Culioli's presentation of attracting centres, focal points that are essential to structure notional domains (relating to notions or categories), leaving the door open to gradients:

It [a gradient] is not a scale and the attracting centre is necessary to characterize one of the poles, which makes it possible—through operations that can be performed by speaking subjects on structured domains—to delineate areas spreading away from the attracting centre, which are weaker than this centre.⁵
(Culioli 1990, 61)

... you are going to raise questions (in your mind) like: "Well, if a calf had 5 legs, would it still be a calf?" This is not a spurious question. It is an important question in so far as we always ascribe typical properties [to beings and things]; we deal with items that instantiate types and the notion of type is fundamental (it has been recently rediscovered in cognitive psychology with the notion of prototypes).

Let us now turn to the construction of prototypes...⁶
(Culioli 1990, 86–87)

From the ideas of an attracting centre and a gradient, Culioli postulates the existence of a boundary zone or a *frontier* (which can be empty) between X and $\neg X$, and so a third term in the equation:

[Having defined the attracting centre and its gradient] Let us construct a *frontier*, i.e. what possesses the property 'p' albeit in a debased form, which makes it not fully 'p', lacking the property 'p', without it being fully outside its purview.⁷
(Culioli 1990, 88)

This concept, which is particularly handy, was initially developed and is particularly handy to account for linguistic approximate adverbs like *almost* and *nearly*. It raises interesting questions concerning categorization with utterances like *He's almost a sailor (but not quite)*, in spite of being originally an elaboration on the idea of a gradient or continuum informed by prototype theory.

1.1.3. Discussion

My purpose being not to provide an up-to-date, full-fledged critical appraisal of the two major categorization models,⁸ but to contrast two different ways of conceptualizing categories so as to highlight their implications, I wish to start by making a few general remarks before focusing on categorization within linguistics exclusively.

First, although both models account perfectly well for some categories, they are inadequate for others. If you take the category 'green', as opposed to 'blue' or 'yellow', it might be a good idea to postulate some kind of continuum between those colours. On the other hand, 'know' or mathematical concepts seem to call for strict Aristotelian definitions. As a result, one might be justified in the belief that the two models correspond to two different types of categorization, which could apply in some cases to a single linguistic term: 'birds' are precisely defined entities in biology (with necessary and sufficient definitions), whereas the intuitive notion of a bird is not a matter of all or nothing and probably involves a scale or a gradient.

Second, the idea of prototypes has been subject to criticism ever since Rosch's work. In particular, it is obvious that prototypes are likely to change depending on a variety of social, cultural and geographical factors, to name the most conspicuous. The prototype for 'bird' might very well be a pigeon for a city-dweller and a seagull for someone living in a sea-port. This leaves one with the awkward question of how prototypes contribute to the construction of a category. Moreover prototype theory has been applied to primary numbers and 1, 3, 5 and 7 are the primary numbers that naturally come to mind first. Yet mathematicians do not regard them as more (proto)typical than others. It is therefore likely that there are some

well-defined categories or sets (in terms of necessary and sufficient conditions) within which prototypical effects can be observed.⁹

Third, the idea of a frontier or in-between area turns out to be extremely useful in some instances. Take the hue ‘blue-green’ (rather than ‘green-blue’, which has usage against it). It is easy to account for it as being a medium point located on the blue-green continuum, with the colours blue and green as end points. Although the category X is simply logically opposed to its complementary $\neg X$, continua may exist between X and another positively defined category Y . Green and blue are a case in point.

1.2. Linguistic categories

Enough has been said on the two major categorization models for the present purpose, and I now turn to their implications for categorization within linguistics. How these have been integrated and applied in this field offers a powerful insight into the current (mis)conception(s) regarding linguistic categories.

1.2.1. Categorization and linguistic categories

Well-defined categories with sharp boundaries have been postulated in grammar ever since the very beginning of the discipline, relying on necessary and sufficient conditions. This conception is still shared by linguists working without a formal syntactic framework, as well as many typologists such as Alain Lemaréchal. He defines nouns, adjectives and verbs as follows:

Definition of the parts of speech nouns, adjectives, and verbs:

When envisaged in the light of their fundamental function, nouns are predicative elements like adjectives and verbs; from a semantic standpoint, they denote a quality like adjectives and verbs (unlike substantives).

Yet nouns, adjectives and verbs can be distinguished semantically just as they can be told apart morphosyntactically (through affixes and complements): *nouns denote defining properties, adjectives express non-defining stable properties, and verbs carry properties whose validity is limited to a situation* (the boundaries of which are themselves defined through the language-specific system of time and aspect markers), if not to a specific context of utterance.¹⁰

(Lemaréchal 1989, 32–33; italics mine)

In contrast, cognitive grammarians embrace the view that the distinction between categories as foundational as parts of speech is subject to prototypicality and gradience. Langacker is quite explicit on this topic:

[A] dimension of the discreteness issue concerns the propriety of positing sharp distinctions between certain broad classes of linguistic phenomena, thereby implying that the classes are fundamentally different in character and in large measure separately describable. The nondiscrete alternative regards these *classes as grading into one another* along various parameters. *They form a continuous spectrum* (or field) of possibilities, whose segregation into distinct blocks is necessarily artificial. (Langacker 1987, 18; italics mine)

Similarly Lakoff postulates that in Dyirbal, the classifier *balan*, which is used to refer to women, fire, and (other) dangerous things, represents a single category the elements of which exhibit a family resemblance, with women being central (i.e. forming the prototype).

Kleiber (1990, 175) denounces this (extended) use of prototype theory to account not only for cognitive categories like ‘birds’, but linguistic categories too, whose connection to the former categories is indirect:

... what is forbidden is to put them [linguistic “categories”] on a par with referential categories, to amalgamate a linguistic “category” like *bayi* [another category in Dyirbal], which subsumes various meanings and categories, without being a conceptual category itself, and a linguistic category like *bird*, which forms a conceptual category, including members and referents (elements or subcategories) rather than other meanings and categories.¹¹

The main issue I wish to address relates to abstract categories postulated by linguists or grammarians, like parts of speech, pertaining to metalinguistic discourse. Granted that they belong to Kleiber’s “conceptual categories,” do they exhibit prototypical effects, with some members being more representative than others?

1.2.2. *Subjective gradience and intersective gradience*

Aarts (2007) distinguishes between two kinds of gradience: *intersective gradience*, with elements located on a scale between two categorical poles (just like ‘green’ and ‘blue’ in fig. 5-3); and *subjective gradience*, which is concerned with elements that belong to a category with clearly defined boundaries. Within this category, some elements are

regarded as more (proto)typical than others. Naturally, deciding which properties are (proto)typical or representative is a matter for debate. The rate of occurrence of elements with such properties is a feasible possibility, and it would be worthwhile to spell out the criteria one resorts to.

Let's now illustrate subjective gradience with examples from Aarts (2007, 106):

- | | | |
|-----|------------------------------|-------------------------------------------|
| (1) | a happy woman | (p ₁ : attributive position) |
| | she is happy | (p ₂ : predicative position) |
| | very happy | (p ₃ : intensification) |
| | happy/happier/happiest | (p ₄ : gradedness) |
| | unhappy | (p ₅ : <i>un-</i> prefixation) |
| (2) | a thin man | |
| | he is thin | |
| | very thin | |
| | thin/thinner/thinnest | |
| | *unthin | |
| (3) | *an alive hamster | |
| | the hamster is alive | |
| | very (much) alive | |
| | ?alive/more alive/most alive | |
| | *unalive | |
| (4) | an utter disgrace | |
| | *the problem is utter | |
| | *very utter | |
| | *utter/utterer/utterest | |
| | *unutter | |

The five properties in parentheses on the right-hand side can be used to define matrix and to cull out adjectives (which display at least one of the properties) and the most typical instances of that category. If an adjective can almost always appear in an attributive position (modifying a noun) in English (property 1)—except for predicative-only adjectives like *alive*—much the same could be said for properties 2 and 3. The last property, *un-*prefixation, is apparently the least commonly found, just behind gradedness (property 4). The examples (1) to (4) make it clear that *happy* is more representative of adjectives than *thin* according to the criteria selected; *alive* is less representative than either of these and *utter* is the least representative of the series. For the category 'adjectives', a scale of

representativeness based on the proposed criteria could well account for prototypical effects. What is likely to be dismissed as a continuum if only looked at very cursorily, may well turn out to be a scale when more carefully observed.

1.2.3. *In between two categories*

In his book on English syntax in which he evokes a variety of gradients, Khalifa (1999, 91) postulates the existence of a continuum between the categories ‘noun’, ‘adjective’ and ‘verb’:

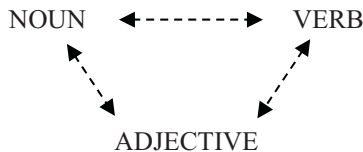


Fig. 5-5.

He illustrates his claim with *-ing* forms, and writes that there is “a gradient adjective ↔ noun, in the middle of which one will find instances like “*It was part of his profession to care for the dying and the suffering.*”¹²

A few remarks are called for here. Firstly, Khalifa appears at times to use the terms *gradient*, *continuum* and *scales* interchangeably in his textbook. Perhaps it is not requisite to go into too much detail in this type of book with a clearly stated didactic aim. Indeed, theoretical and classificatory refinement can be introduced later and starting with too-fine-grained distinctions is liable to be counterproductive. The use of the word *gradient* is presumably the most neutral, as it does not imply that degrees of belonging can be measured in steps—and so the gradient is a *scale*—or else they are blurred, as instances are found on a *continuum* without discrete steps. Since Khalifa provides tests (and so criteria) to assess the nominal character of *-ing* forms, it is obvious that he has in mind a scale rather than a continuum in this instance. Nevertheless, for the sake of conceptual clarification, in research work at least, it seems to me all the more crucial to state in which sense *gradient* is meant (or whether one hesitates between the two senses) as many linguists are not ready to espouse the view that everything that looks like a continuum at first is in fact one.

Secondly, regarding the postulated gradient adjective ↔ noun, it is easy to point out that *dying* and *suffering* in the utterance *It was part of his*

profession to care for the dying and the suffering really are nouns, from a syntactic standpoint. They are substantive adjectives, i.e. erstwhile adjectives that have gone through a morphological process known as conversion that has transformed them into nouns (cf. Plag 2003, 12). They are nouns to all intents and purposes. Through category-changing morphological processes, it is possible to move from one category to another, but that does not imply that there is a categorical no man's land between the two.

Aarts argues at length that this is how intersective gradience should be regarded: even though in some cases it is possible to see that categories merge into one another to some extent, and so to postulate a gradient moving from one category to another, parts of speech remain still quite distinct from one other and any one element belongs to one and only one part of speech. In other words, there is no intermediary area, no frontier between two parts of speech, and true syntactic hybrids are (presumably) linguistic chimeras. He nevertheless adduces a possible counterexample:

- (5) I dislike *Brown's painting his daughter*

Here the italicized string is apparently verbal and nominal in equal measure.

(Aarts 2007, 232)

The genitive form is an argument for considering the italicized phrase as nominal, while the complementation of *paint* argues for parsing it as a verb phrase (*his daughter* looks like the DO of *paint*). How should that phrase be interpreted then? Additional evidence tips the balance in favour of a VP interpretation: adverbs would be used in order to modify the phrase (*Brown's not/defily painting his daughter*), as opposed to adjectives (*Brown's deft painting of his daughter*). *Brown's painting his daughter* is a VP then, even though one of its properties (use of the genitive for the subject NP) is clearly nominal. As a result, for *-ing* forms at least, postulating an adjective-to-noun scale without a shadowy, indeterminate in-between area makes much linguistic sense. Parts of speech may then still be neatly circumscribed categories, although tokens are liable not to have all the typical properties of the category and can exhibit properties of another category.

2. Case studies

Let me now question the assumption that syntactic constituency is exempt from categorial hybridity, as some forms may historically have

crossed a categorical boundary and found themselves in between two categories for a time. I start with grammaticalization, illustrated with the rise of the *to*-infinitive (3.1.). I then mention *to*-infinitive phrases that can be parsed both as adjunct *and* relative clauses, fulfilling two syntactic functions at the same time (3.2.). Lastly I focus on relative clauses that are indeterminate or ambiguous between a determinative (/restrictive) reading and an appositive (/non-restrictive) interpretation (3.3.).

2.1. Grammaticalization: the *to*-infinitive

Heine and Kuteva (2002, 2) recognize four main interlinked mechanisms that underlie the process of grammaticalization, which they define, following Hopper and Traugott, as the development “from lexical to grammatical and from grammatical to even more grammatical forms”:

- (a) desemanticization (or “semantic bleaching”)—loss in meaning content
- (b) extension (or context generalization)—use in new contexts
- (c) decategorialization—loss in morphosyntactic properties characteristic of lexical or other less grammatical forms, and
- (d) erosion (or “phonetic reduction”)—loss in phonetic substance

Point (c) is of special interest here since it implies that linguistic forms undergoing grammaticalization may lose a categorial status as they progressively move away from the core of the category to which they belonged at first and, ultimately, beyond its boundaries. I will illustrate grammaticalization in this section with the rise of the *to*-infinitive in English, which is well-documented.

Let us return to Heine and Kuteva’s list and start with points (a) and (b). Crosslinguistically, infinitive forms are initially used to express a purpose or a goal (Haspelmath 1989), and in doing so they fulfil an adverbial function, and as they extend to new contexts, their semantic range expands (i.e. new meanings develop) along with their distribution. In Old English, *to*-infinitives occur as verbal arguments, without conveying a meaning of purpose or goal in any obvious way:

- (6) *Fengon to wurðienne æt nyhstan mistlice entas.*¹³
They started to worship, at night, various giants.

Purposive meaning is at best inferred in (6), indirectly derived from the sense ‘*fengon/start*’: if someone decides to start performing an action, they usually mean to perform it fully and have set their mind on doing so. Loss in meaning content, desemanticization or semantic bleaching is even more

blatant with other *to*-infinitives, which are complements to verbs like *forbeodan* and *aliefan*, ‘forbid’ and ‘allow’ (Los 2005, 107). Extension to new (distributional and syntactic) contexts (a) is naturally correlated with semantic weakening (b), or at least to semantic redeployment since, as Traugott and Dasher (2002, 82–89) have observed, grammaticalization does not always imply semantic weakening, loss, or bleaching.

Decategorialization (c) may pertain to several elements within a construction at the same time. Even though the *to* found in *to*-infinitives was a preposition originally, it has come to lose properties commonly ascribed to that category. While a preposition has an NP as a complement, the verb-derived form following it can no longer be parsed as NP. What is more, some *to*-infinitives must themselves be parsed as NPs (as in *To be or not to be—that is the question*). This means, in this instance, that (some) *to*-infinitives have historically evolved from the status of PPs to that of NPs. In other words, reanalysis (or reanalyses) must have occurred during the ongoing grammaticalization of the *to*-infinitive, both for the preposition and the infinitive as a whole.

Erosion (d), the loss of phonetic substance, results from increasing the use of a term or construction as it is extended to cover new contexts. The more frequent an item is, the more predictable it is and the more readily phonetic material tends to be thrown overboard, without any comprehension loss. As far as *to* is concerned, it is now a weak phonological form, with a reduced vowel (schwa, or /u/), while in Old English the vowel was presumably long in most cases (*tō* is the only form given by Clark Hall, but it is likely the vowel was not long in all cases). In Middle English, and especially at the beginning of that period, the spellings <te> and even <t’> are occasionally found, albeit rarely (Fischer 2000, 156; Jack 1991, 322). Phonetic erosion itself naturally leads to coalescence, as morphological units lose their independence and fuse. Free morphemes tend to become clitics, clitics affixes, and affixes to be amalgamated with other morphemes (especially lexemes), or simply disappear. The spelling <t’> shows that *to* has already lost its morphological independence in early Middle English. The deverbal form following *to* was originally inflected, as it had an oblique case ending (with the suffix *–enne*). This inflection was no longer distinguished from the one found with the infinitive ending in *–an* (now described as the bare infinitive in English grammars) in the twelfth century in Southern England, and earlier in the North (Stévanovitch 1997, 90). The ending common to both infinitives gradually disappears, between the twelfth and the fifteenth century (Lass 2000, 98). What has become *to bear* in English

today was *to beranne* in Old English, and the suffix *-enne*, which had no morphological independence, is no longer part of the language.

The list of criteria given varies in the literature, as the phenomenon of grammaticalization is still widely debated (cf. Lehmann [1982] 1995; Hagege 1993; Hopper and Traugott 2003), but the notions of decategorialization and reanalysis—crucial here—are well-established. *To* gradually loses its prepositional status as reanalysis occurs and the *to*-infinitival phrase as a whole is no longer understood as a PP as a result. Decategorialization is just one cline among several that make it possible to assess the degree to which a linguistic construction or form is grammaticalized. Although one may have the impression of being confronted with a real continuum when looking at this linguistic phenomenon, it is presumably more accurate to account for this process using multiple scales, one for each criterion selected. I therefore fully agree with Traugott and Trousdale (2012, 2) when they write that “we do not consider diachronic processes themselves to be gradient. Rather, we argue that most instances of change involve small micro-steps that are in fact discrete and therefore abrupt (in a tiny way).” Note that the word *cline* instead of *scale*, widely used when referring to grammaticalization, implies that it is easier to go down the slope of a cline than up it. The general tendency is to follow the downward slopes of clines, but there are counterexamples, in particular with some later developments of the *to*-infinitives (Boulonnais 2004, 69–72; Fitzmaurice 2000). Nevertheless, as I have argued elsewhere, for paradigmatic cases of grammaticalization (the development of the *to*-infinitive being a perfect example), there is still a general tendency towards entropy in that clines tend to be followed downwards: distributional extension and its corollary semantic redeployment, decategorialization, phonetic erosion and consecutive morphological loss occur together and going backward is far less likely, and seldom involves many criteria at the same time (Simonin 2010).

Now the profound and interesting problem regarding categories is whether there is a mid-point on scales or clines to do with decategorialization, when one linguistic form or construction moves from one category to another (PP to NP for instance, when considering *to*-infinitives in their nominal uses in present-day English). In some contexts two syntactic interpretations are plausible—whether one considers that reanalysis has occurred or not—and one finds what has been called a *bridging context* (see Brinton and Traugott 2005, 26–27), so called because it makes it possible for the relevant form or construction to be reanalyzed and then for it to extend its distribution—this particular context providing a bridge as it were for it to spread. Bridging contexts pertain to

what Bolinger (1961) called generality, which Aarts (2007, 41) pithily presents as: “a situation where a particular linguistic item or locution can have more than one interpretation, but these interpretations need not necessarily be distinguished sharply for communication to go through when the item or locution is used.”

Let’s illustrate with an Old English instance of a *to*-infinitive that can be parsed as a purpose adverbial or a verb argument, for which PP and NP constituency can be respectively argued:

- (7) & blodig regn & fyren *fundiaþ* þas eorþan to forswylgenne & to forbærnenne. <HomS 26 172>
 and bloody rain and fire strive the Earth to devour and to consume.
 a. ‘and bloody rain and fire *make haste* in order to devour and consume the earth.’
 b. ‘and bloody rain and fire *strive* to devour and consume the earth.’
 (Los 2005, 48)

This interpretative possibility derives from the use of verbs like *fundian*, which licenses purpose *to*-infinitives or *to*-infinitive arguments. Such verbs provided perfect bridging contexts for reanalysis and the ongoing spreading of *to*-infinitives. At some point the adverbial analysis of the *to*-infinitive, the only one available originally, must have been competing with a new one, which could be extended to other verb types. The categories considered here remain distinct and separate, but ambiguity between two interpretations occurs in some (rare) cases, and it is not possible then to decide between the two—which are more or less equivalent from a communicative standpoint.

2.2. Adverbial and relative *to*-infinitives

I now turn to infinitives in present-day English that can be understood as fulfilling two different functions. These are other likely candidates for being located at a mid-point on some continuum. In (8) the *to*-infinitival phrase could be given two different syntactic interpretations:

- (8) I’ll give you a little money *to buy drinks with*.

The phrase can be understood as an adjunct, an adverbial element expressing some kind of (weakened) purpose, with the meaning ‘(*I’ll give you a little money*) so that you can buy drinks with this money’; or it can be parsed as a relative clause, with the preceding head noun as its antecedent, as (8) could be rewritten *I’ll give you a little money with which*

to buy drinks.¹⁴ Here is another example, with syntactic gaps within the infinitive clause represented by lines:

- (9) Here is Ulysses ____ to read ____ in class to the students.

The adverbial and relative interpretations are available for the *to*-infinitive clause in (9). It contains two syntactic gaps, including a subject gap,¹⁵ as opposed to traditional purpose or rationale adverbial clauses which have one subject gap only, as in *I'll do it ____ to please you*.

Here are some other (semantic) properties of these clauses with a dual syntactic reading:

- i. Their matrix clause implies (or states) that the head noun referent is available for further use.
→ The referents of *little money* in (8) and Ulysses in (9) are given to the hearer for him to use.
- ii. The implicit subject of the infinitive clause refers to the beneficiary of this availability.
→ The hearer is the beneficiary in both cases.
- iii. The stated or implied availability is oriented towards fulfilling a goal that is conveyed by the infinitive clause. In this respect, the purposive sense of the infinitive is weakened: availability does not necessarily entail use for the intended purpose by the beneficiary.
→ The hearer is meant to buy drinks in (8), but he can decide to do something else with the money, while the person being given Ulysses might choose some other reading for students (9).

The idea of a weak purposive sense argues for an adverbial reading, but the semantic conditions just spelled out have interesting implications. If a referent must be available so that someone can perform an action, then a property is indirectly attributed to that referent: it is earmarked for a given use (stated by the infinitive clause), which is made possible thanks to its availability. As a consequence, a relative clause interpretation (which is not determinative/restrictive) is superimposed on the (weak) purpose adverbial meaning which implies that the clause is an adjunct. But to demonstrate fully that both interpretations are equally valid, and the relative one is predicated on the purposive meaning of the infinitive clause, let's add a syntactic argument to purely semantic considerations.

Another significant property of such weak purposive infinitive clauses is that, all other things being equal, the head noun (and its complements)

can (normally) become embedded within a(nother) relative clause when heading an indefinite NP. Let's see how this works with (8), whose head noun fulfils the condition:

- (10) Don't think about the little money I'll give you *to buy drinks with*.

Note that it would have been possible to write:

- (10b) Don't think about the little money I'll give you WITH WHICH *to buy drinks*.

Here follows an authentic occurrence of what I call double relativization with an overt relative pronoun:

- (11) Pressure is exerted on the player in possession of the ball by challenging him or moving towards him, cutting down on the time and space he has available IN WHICH *to play*.
(ICE-GB <w2d-015 055>)

Although *He has time and space available to play* does not sound too felicitous alone, (11) is fully acceptable. There is nonetheless a strong constraint on double embedding for relative clauses: such double embedding ("double relativization") is ungrammatical—except with bridge verbs, like *say*:¹⁶

- (12) I am looking forward to the free time and space he SAID I would have available ____
- (13a) *I am looking forward to the free time and space I will have available he means to give us ____
- (13b) *I am looking forward to the free time and space he means to give us I will have available ____

So while in (10b) and (11) the occurrence of a relative pronoun establishes the validity of a relative reading for the infinitive clause, it appears that it can in fact be parsed initially (or as well) as a (purposive) adjunct so as to make double embedding possible, as in (14a) and (14b):

- (14a) I am looking forward to the free time and space I will have available ____ in order to play
- (14b) I am looking forward to the free time and space he means to give us ____ in order to play

This corroborates the hypothesis that the relative interpretation of the infinitive is retrospectively added to an adverbial, adjunct reading; as the new, relative interpretation becomes available, a relative pronoun can appear overtly.

Whatever their correct analysis might be, weak purposive clauses are a(nother) perfect illustration of what Bolinger called generality. Both interpretations proposed for weak purposive clauses are valid and not mutually exclusive, in that a relative clause reading is superimposed on an adverbial one. As far as syntactic function is concerned, it appears that some syntactic constituents can belong to two categories at the same time and therefore be true hybrids.

2.3. Determinative and appositive relative clauses

The distinction between determinative (or restrictive, defining, integrated...) and appositive (or non-restrictive, non-defining, supplementary) relative clauses is often called upon in linguistics, and it is extremely productive and useful in describing languages. The fact that any language that has appositive relative clauses must have determinative relative clauses as well (while a language may have determinative relative clauses only) is a well-known implicative universal. In English, there is an overwhelming tendency for finite appositive relative clauses to occur with a *wh*-pronoun rather than *that*, or no overt relative pronoun at all (Ø). *To*-infinitive appositives can be semantically correlated with finite relative clauses introduced by a *wh*-pronoun and the verb *be* followed by a *to*-infinitive: *This scholar, to be found daily in the British Museum, has devoted his life to the history of science* is equivalent to *This scholar, who is to be found daily in the British Museum, has devoted his life to the history of science*,¹⁷ while *There's a lot to be done* cannot be paraphrased in this way. Other examples in which postulating a distinction between determinative and appositive clauses makes generalization possible abound. For instance the (erstwhile interrogative) pronoun *which* started to be used in appositive clauses in the twelfth century (Crépin 1994, 129).

Most objective syntactic criteria or properties adduced to distinguish between the two types in English must, at best, be regarded as predictive in a probabilistic sense: intonational boundaries between the antecedent and the relative, introduction of the clause by *that* and stacking are simply strong clues as to the type of relative one is faced with (Auran and Looock 2012; Looock 2010). The absence of an overt relative pronoun, however, appears to be a clear indication that a finite relative clause is determinative.

In any event the definitions and criteria that have been traditionally put forward prove to be insufficient to determine the nature of a relative clause. Possibly as a result, many linguists differ in their conceptions of the distinction, and the classification of genuine relative clause occurrences into one category or the other by linguists is subject to some variation, especially when the antecedent is an indefinite NP (Fuchs 1987; Rivière and Rivière 2000). There is little wonder, perhaps, that Gosselin (1990) proposed that there was a continuum between the two types with determinatives and appositives being regarded as (prototypical) poles on this continuum.

The definition I will assume for determinative relative clauses draws on the logical concept of intension. A determinative clause creates a new intensional unit with its antecedent, and together they can be seen as forming a complex term. In terms of intension, (15) and (16) are equivalent:

(15) I met *a man who is a firefighter*.

(16) I met *a fireman*.

A man who is a firefighter and *a fireman* have the same intension, they denote the same referent, and the relative in (15) is determinative. An appositive, by contrast, does not create a new intensional unit that is used to point out some referent. The definition in intensional terms can be traced back to Port-Royal, whose scholars did not see (extensional) restriction as primary, as the following excerpt from their *Logic* makes clear:

When saying *Men who are pious are charitable* one does not assert that men, whether men in general or some men in particular, are pious; but the mind having put together the idea of *pious* and that of *men*, and made a complete idea, judges that the predicative complement *charitable* applies to this complete idea.¹⁸

(Arnauld and Nicole 1993, 122)

The question now is whether there are still ambiguous cases (relative clauses that could be parsed as appositive or determinative) when one has adopted the intensional definition just proposed.

There are indeed relative clauses that oscillate between the two interpretations, as in (17):

(17) You've added on a random extra number *which you then subtract at the end...*

(ICE-GB <s1b-004 256>)

A determinative interpretation can be represented by one proposition: ‘You’ve added a random extra number which you then subtract at the end’, the number in question being denoted by the whole phrase *a random extra number which you then subtract at the end*. In contrast, an appositive interpretation can be developed into two propositions: ‘You’ve added a random extra number’ and ‘That number you then subtract at the end.’ It seems to me that the appositive reading is more probable, but the determinative one cannot be ruled out. In order to determine which interpretation is valid, the pragmatic procedure of disambiguation is called for. Typically, disambiguation excludes interpretations that are not relevant or fail to be salient enough (Sperber and Wilson 2004, Recanati 2004, 27–29). The problem for the hearer is that the status of the relative clause turns out to be undecidable, as the hearer cannot read the speaker’s mind. Moreover, choosing one analysis or the other does not make much difference in terms of communication: they both boil down to the same general meaning. The distinction appears to be neutralized here as it illustrates once again Bolinger’s notion of generality. Despite the sharp categorical boundaries between determinatives and appositives, there are contexts in which relative clause occurrences have an ambiguous status. There are no hybrids between the two categories but—in some cases—an interpretative undecidability which does not prevent or impair communication.

Conclusion

While the Aristotelian model of categorization relies on necessary and sufficient conditions to determine if an item belongs to a given category, prototype theory postulates the existence of prototypes, which are essential for the construction and understanding of categories. The first model gives rise to an orderly vision of well-defined categories, with sharp boundaries, while the second encourages one to see categorization judgments as taking place alongside continua, with poles representing the most central or prototypical instances of a given category. Both views have proponents in linguistics, as linguistic categories can be understood as having sharp boundaries or pertaining to continua. I have shown that even though some linguists tend to use the term *continuum*, this may be a pedagogical gesture (though not always), and that what linguistic phenomena reveal is that what appears to be a continuum at first sight will turn out to be a scale with many small steps when carefully observed and analyzed.

As we have seen, Aarts distinguishes between subjective gradience on the one hand, to account for the fact that some tokens of a given category are deemed to be more representative of that category (adjectives, for instance) and, on the other hand, intersective gradience, when two linguistic categories appear to merge. For the latter type, he believes that there is no in-between area where true hybridity is found, i.e. where one item does not belong to one category only. This rules out two possibilities: an item found in this area may belong to none of the two categories or to both at the same time. The case studies presented here are a tentative exploration of this issue.

Grammaticalization involves reanalysis, and one might think that this consists in a linguistic element or construction that originally belongs to a given category gradually becoming a member of another category. *To*-infinitives lost their status of purpose adverbials and adjuncts (as PPs) to turn into verb arguments. A bridging context was found in which it was not possible to determine which analysis to select (adjunct or argument), as both were acceptable and did not impair communication. This means that in such contexts, the relevant linguistic item belongs to one category or another, but it is impossible for the hearer to tell which. The same applies to some relative clause occurrences, for which the determinative or appositive status of the relative is undecidable. The boundaries of the categories are well-defined, but context prevents the hearer from excluding one interpretation or the other, as they amount to the same general meaning. As opposed to such truly ambiguous instances, I have demonstrated that some constructions (weak purposive clauses) can be parsed in two different ways, one interpretation being predicated or superimposed on the other. This shows that true linguistic hybrids may exist, though they appear to be found only very rarely.

CHAPTER SIX

ARE POSSIBLE WORLDS NECESSARY? EVALUATING THEORIES OF MODALITY

KATE JUDGE

Introduction

Theories of modality generally observe a broad split between two different perspectives on language. On the one hand, “formal” approaches aim to characterise the underlying logic-like systems of meaning that hold regardless of context. For formal semanticists, such a system exists for semantics, and an isomorphism exists between syntactic structures and semantic systems. Traditional “Chomskian” views (for example Chomsky 1957), by contrast, observe that even clearly nonsensical sentences can be grammatical, while ungrammatical sentences may still have discernible meaning, so that while there is a formal syntactic system, its rules work independently from semantics. Moreover, on this view, even if a “formal” semantic system can be hypothesised, it is impossible to extricate it from the myriad of other influencing factors in language use and interpretation. “Functional” approaches, by contrast, aim to characterise meaning in terms of how language functions in context. Theories of modality from the former tradition usually utilise a *possible worlds* semantics. Theories of modality from the latter tradition, by focusing on the communicative function of linguistic expressions rather than their formal properties, do not require the denotational apparatus provided by possible worlds. There is considerable metaphysical debate regarding possible worlds’ dubious ontological status, and how this affects philosophical theories of modal reasoning. This is usually framed in terms of Lewisian realism vs. Quinian Scepticism, though alternatives also exist (see Melia 2003 and Vetter 2011 for discussion).¹ The focus of this paper, however, is not concerned with this debate, but rather with the utility of possible worlds in linguistic theory.

The physical reality of possible worlds is obviously not of interest to linguistics; however, their utility (as abstract objects) to linguistic theory is important. Linguistic theory aims to characterise the linguistic reality of expressions, regardless of metaphysical or ontological debates. A distinction may then be drawn between formal theories, which suppose that the important linguistic reality is an underlying logic-like system, and functional approaches, where the important linguistic reality is the communicative function a linguistic item performs. Both types of linguistic reality appear to be important in explaining the systematic ambiguities in the semantics of modal expressions. The question of whether or not possible worlds are necessary for a successful linguistic theory of modality does not depend on whether a “mind-based” view of language is inherently inferior or superior to a “world-based” one, but on whether the possible worlds model is an adequate descriptive and predictive tool for explaining linguistic phenomena.

Section one looks at the phenomenon of modal relativity and the epistemic/root distinction. Relativity and gradability are the two main ideas behind the standard “Kratzerian” analysis of Modality (Kratzer 1977, 1981, 1989, 1991a, 1991b, 2012). Kratzer’s theory takes modals to be quantifiers over world sets that are determined by two conversational backgrounds: a modal base and an ordering source. Conversational backgrounds are contextually determined sets of propositions that represent sources of information. The central assumption of Kratzer’s analysis is that modals are unified, not lexically ambiguous. Therefore, the semantics of different types of modality (epistemic, deontic, dynamic, abilitive, etc.) is located in the character of the relevant information set, not in the modal relationship between a proposition and that set. However, syntactic evidence suggests that modals occupy different positions in the hierarchy of verbal inflectional heads (Cinque 1999). Moreover, evidence that some non-Indo-European languages lexically encode type, but not force, distinctions (Rullman et al. 2008 and Deal 2011) has prompted a re-think of whether conversational backgrounds are really the appropriate domain for describing the difference between root and epistemic modals. If not, this suggests the fundamental limitations of a possible worlds based semantics of modal expressions. Recent incarnations of the Kratzerian approach, such as Hacquard’s event relativity (Hacquard 2006, 2010), successfully account for the syntactic split. However, there are still problems with the underlying semantic story.

For functional perspectives, epistemic modality is meaningful in terms of its function as an indicator of the speaker’s degree of commitment to a proposition. As such it is a form of illocutionary marker and is “external”

to truth conditional content (Halliday 1970, Palmer 1986). This concept of epistemic modality can then potentially extend to accounting for the epistemic/root distinction: Epistemic modals are not truth conditional because they fail various scope diagnostics. Roots, by contrast, scope lower and therefore do contribute to truth conditional content. This analysis corresponds to their different syntactic positions more obviously than the formal Kratzerian approach. Of course, the theory that best describes the linguistic evidence should be preferred. However, as Papafragou (Papafragou 2006) and Hacquard and Wellwood (Hacquard and Wellwood 2012) point out, it is not clear that the linguistic evidence *does* indicate epistemic modals are not truth conditional. Moreover, by the inherent standards of a functional approach, epistemic modals and non-modal expressions do serve meaningfully distinct communicative functions. Thus modal and non-modal expressions are not truth-conditionally equivalent, and epistemic modals do contribute to truth conditions, albeit in a significantly different way to root modals.

Section two looks at the comparability and gradability of modality and the distinction between epistemic modality and evidentiality. The Kratzerian theory of modality also utilises the concept of possible worlds to account for the gradability and comparability of modals by introducing a second conversational background, the “ordering source” (Kratzer 1981). The ordering source induces a partial ordering, or ranking, of the worlds accessed by the modal base. This ordering is then translated into broad qualitative categories of good, slight and better possibilities and weak and strong necessities (with the appropriate quantification over closer-ranked or further-ranked worlds). One objection to such an approach is that it does not account for more specific, numerical grades of probabilities, such as those expressed in sentences such as:

- (1) There is a 70% chance of rain tomorrow.

Potentially, Kratzer’s qualitative ordering of worlds could be mapped onto degrees of quantitative probability, with different lexical items being taken to express different probability measurements (“might” could correspond to 70% probability for example). However, the adjectives “probable” and “possible” seem to have different scales that cannot be assumed to be broadly equivalent. The gradability and comparability of modal expressions may then be a fact of the semantics of adjectives, rather than of modality. Arguably, expressions of possibility imply a position on a probability scale, but this position is not entailed by any particular modal expression. It can be made more or less lexically explicit in the case of modal adjectives, or even modal nouns, however modal auxiliaries cannot

be graded, and their unspecified probability measurement allows for a flexibility of interpretation that can be pragmatically manipulated in interesting ways.

The functional perspective, as already noted, takes epistemic modals to express the degree of speaker commitment. It is straightforward then to assume that any gradability or comparability of epistemic modality has to do with this illocutionary domain. Distinctions between reliability of evidence would then correlate with better or worse assessments of probabilities. Thus a proposition inferred from “objective” evidence will be interpreted as implying a “better” possibility than one inferred from “subjective” evidence. However, clearly we can be highly committed to something (such as a belief in the predictive power of Horoscopes or the existence of The Loch Ness Monster), regardless of having virtually no external “reliable” evidence for being so. The type of evidence will not necessarily correspond to either the speaker’s degree of commitment, or the addressee’s computation of degree of likelihood. Nuyts (2001) suggests a more convincing explanation of the differences between “subjective” and “objective” epistemic modality; formulating the distinction in terms of “subjective” and “intersubjective” sources of evidence. He also suggests that source and type of evidence have more to do with the evidential dimension of meaning, than epistemic modality.

The interaction between evidentiality and epistemic modality is complex, leading some to assert equivalence between the two (Drubig 2001, McCready and Ogata 2007). However, just as the type of conversational background proves inadequate for explaining the epistemic/root distinction for the Kratzerian approach, the type of source of evidence does not necessarily correlate with any position on a modal scale—either of speaker commitment or numerical/quantitative probability. Thus, for approaches from both linguistic perspectives, a conflation of the semantics of evidentiality and epistemic modality has proved problematic and misleading. A clearer analysis is suggested by combining insights from both sides of the linguistic divide.

1. Modal relativity and modal types

1.1. Kratzerian modal relativity

The theory of modals and conditionals developed by Kratzer (1977, 1981, 1986, 1991a and 1991b) is generally accepted as “standard” in formal approaches to semantics. This approach to the semantic analysis of modal expressions aims to characterise those elements of meaning that

remain invariable regardless of context. It adapts some of the crucial insights from modal logic (Carnap 1957, Hintikka 1962), in that it is model theoretic, truth conditional and based on possible worlds. In modal logic, modals are sentential operators: \Box and \Diamond , where the former corresponds to necessity and the latter to possibility. These operators qualify the truth of the proposition/sentence that falls within their scope. Possible worlds are then utilised as a means of fixing the denotation of sentences. The denotation of a sentence is all the worlds in which it is true (assuming the law of the excluded middle and the law of non-contradiction²). Modals can then be understood as quantifiers over sets of possible worlds. If a sentence is true in every world, then it is necessarily true; if it is true in some world, then it is possibly true.

A possible world-based theory of modals then is primarily concerned with identifying just the right kind of world set over which a modal quantifies. Differences in types of world set are then the means of accounting for the variability of interpretation which modals present. For modal logic, different world sets are yielded by different accessibility relations (transitive, reflexive, etc.) that map on to modal types (epistemic, deontic, etc.). In modal logic, therefore, accessibility relations are fixed semantic systems, which is consistent with analytic aims to explain and describe systems of logical reasoning that use modal concepts. Kratzer's theory is by contrast concerned with describing and explaining what modal expressions mean in natural language, hence context plays a greater role in determining world sets. This fundamental difference in how the relevant world set is determined is due to an important difference in philosophical vs. linguistic aims. The question remains, however, of whether determining different types of world-sets is sufficient to account for all the semantically important distinctions of modality in natural language.

For Kratzer, the relevant world set is provided by a contextually determined conversational background. The conversational background represents some relevant body of information relative to which a proposition's truth value is qualified. The relevant conversational background can be fixed by explicit linguistic means via an "in view of clause." For example, in a sentence such as:

(2a) John must cycle to work

The relevant conversational background in an epistemic interpretation of *must* could be represented overtly as:

(2b) [In view of what I know], John must cycle to work

The conversational background then can be understood as a set of propositions, known by the speaker at the time of the utterance. Kratzer (1977) also utilises a premise semantics, where necessity modals and possibility modals are understood in terms of their “compatibility with” or “consequence from” (or “following from”) a premise set. However, by employing set-theoretic mechanisms, a “trick” can be performed so that the ideas of compatibility and consequence can be formulated as existential/universal quantifiers over the intersection of the premise set³ This means the focus of the semantics of modality can remain fixed on characterising and differentiating world sets, rather than types of modal relation (which is assumed to be a fixed and unified, bivalent distinction of modal force).

Thus, in its original form, Kratzer’s model accounts for the relativity of modals by adapting ideas from modal logic and incorporating contextually determined parameters. The working assumption is that modals are unified, not lexically ambiguous. The variability of their interpretation lies in the different sorts of premise sets from which modal inferences are made. Kratzer (1981) developed this original theory further in order to account for the gradability and comparability of modals (see section 2.1., for further discussion). Differences in modal type however remained contextually determined. Specifically, the main epistemic/root distinction was defined in terms of different types of factual premises, namely “informational” or “circumstantial.” Informational modal bases represent the intentional content of some source of information in the world of evaluation; circumstantial bases represent some body of facts or circumstances in the world of evaluation.⁴ In other words, the difference between epistemic and root modality lies in the different semantic properties of the conversational backgrounds, rather than different semantic properties of modals. Kratzer herself has since observed that this was “an erroneous assumption” (Kratzer 2012, 24) and that a different story about the source of the root/epistemic distinction may be needed. Roughly speaking, characterising the semantics of modality in terms of its relation to a contextually determined premise set seems fitting enough—especially for epistemic modality. However, differences in the character of this premise set are not responsible for the semantic distinction of epistemic and root modality.

1.2.1. Modal Relativity and the functional approach: Truth-conditional content and epistemic modality

One answer to the problem of the Kratzerian approach might be to suppose that the formal approach itself is misguided; that contextual parameters cannot be successfully isolated from “core” semantics in neatly packaged conversational backgrounds. By contrast, a different linguistic perspective, broadly labelled “Functional,” seeks to explain language—not in terms of underlying formal properties—but in terms of the communicative use to which a linguistic item is put. Typological approaches to modality, for example, tend to adopt a functional perspective: taking into account the context of use, as well as historical processes (such as grammaticalization) and cross-linguistic comparisons in order to explain language structures (for example Bybee et al. 1994, Van der Auwera and Plungian 1998, Palmer 1986 and de Haan 2006). Traugott and Dasher (Traugott and Dasher 2002) discuss the historical development of modality; arguing epistemic modality arises from deontic modality via conventionalised pragmatic inferences (see Van der Auwera and Plungian 1998 however, for the potential problems with assuming that the development from deontic to epistemic is always unidirectional).

Some cognitive-functional theories object to formal approaches on the grounds that objective truth is inaccessible to “human systems of meaning and interpretation,” and therefore the “experientially based construal” (Dancygier and Sweetser 2005, 11) of meaning should be the enterprise of linguistic semantic study. One explanation is that the *experientially based construal* of modality is “Force-Dynamic” (Talmy 1988b; Sweetser 1990). According to this theory, modality is interpreted and understood in terms of metaphorical extension (Lakoff 1987, Lakoff and Johnson 1980) via the experience of the application of physical force altering a target object’s state. Deontic necessity or “obligation” for example, would be metaphorically conceptualised in terms of the physical application of force on the relevant individual. The fact that obligations can be explicitly represented in such terms (for example: *I was forced to fire him*) suggests there is a certain degree of truth in such a theory. The problem is that it is seemingly unfalsifiable to claim anything too concrete about what such “metaphorically extended conceptualisations” are, or how they work.

Generally speaking however, functional perspectives aim more at describing modality, than constructing such theories (Portner 2009, 105–6). A characteristic position on modality from a functional perspective is that an epistemic modal’s function is to express the speaker’s degree of commitment to a sentence. Epistemic modality is thus “external to content,

being part of an attitude taken up by a speaker.” (Halliday 1970, 349) According to this view, in a sentence such as:

- (3) John may be at the pub

The modal force of *may* applies to “the status of the proposition in terms of the speaker’s commitment to it” (Palmer 1986, 55), not to the truth conditional content of the proposition. This is obviously fundamentally at odds with the standard theory of Kratzer, where modals contribute to truth conditions. Arguably the debate turns on a pre-theoretical commitment to “bottom-up” compositionality—where the compositional elements of a fundamental semantics can be “filled in” by context—versus a “top-down” approach, where meaning is provided by context: namely by its function and context of use.

Ultimately, the linguistic evidence ought to decide which approach best describes and predicts the semantics of modals. Papafragou (2006) observes that there are a number of “standard diagnostics” for proving the non-truth conditionality of epistemic modals. Firstly, epistemic modals fall outside the scope of conditionals, and are restricted from appearing in the complement of factive predicates or “verbs of telling” (Papafragou, 2006, 1690). Secondly, epistemic modals fail the “assent/dissent” diagnostic: epistemic modals cannot be challenged or endorsed by the addressee (rather their assent/dissent is traced to the embedded proposition). However, these tests seemingly only apply to “subjective” epistemic modals, not their “objective” counterparts. This distinction is based on Lyons’ definition (1977) where subjective readings are based on personal/unreliable evidence (such as personal beliefs and opinions), while objective readings are based on reliable, external information (such as scientific data). Thus it is subjective (but not objective) epistemic modals that fail the scope and assent/dissent diagnostics, because subjective (but not objective) epistemics are illocutionary force operators. However, as Papafragou points out, even if this weaker version of the non-truth conditional argument is accepted, an analysis of the truth conditional content of objective epistemic modals is still required (even if objective epistemic modals are rarer than subjective epistemic modals, they are far from unattested).

Moreover, even “subjective” interpretations seem to require a truth conditional account, precisely because of how they function in context. Papafragou illustrates this point with the following examples:

- (4a) My grandfather must be sick.
(4b) My grandfather may be sick.

- (4c) My grandfather is sick.
(Papafragou 2006, 1693)

If epistemic modals contribute nothing to truth conditions, then all three sentences are true if the speaker's grandfather is sick, and false if he is not. However, usually only sentence (4c) would be judged to be false if the speaker's grandfather turned out, in fact, to be in perfect health. Moreover, this seems to hold, regardless of whether the speaker was basing her utterance on "objective" medical reports or "subjective" personal information. Thus it appears that epistemic modals do contribute to the truth conditions of sentences, however, this contribution is restricted in certain pragmatic environments.

A crucial insight from Papafragou's own solution to this problem⁵ is the idea of the "external inscrutability" of the relevant information set for so-called "subjective" epistemic modals. Namely, when epistemic modals are "subjective," they are not formally/semantically distinct from objective epistemic modals; rather, they express an inference from a premise set that is externally inscrutable to the addressee. In order to assess if a modal inference is correct and true, one has to know the content of the relevant information set from which the inference is being made. Where the set is externally inscrutable, the addressee cannot express assent or dissent to the modal claim, because the means for assessing the modal's truth is opaque. This opacity, and the resulting failure of the assent/dissent diagnostic, is *not* a result of the modal not contributing to truth conditions in the first place. This preserves the basic premise semantics of Kratzer's original work, while partially explaining the subjective/objective distinction.

1.2.2. Truth conditions and the epistemic vs. root distinction

In tandem with arguments that epistemic modals do not contribute to truth conditions is the idea that roots *do*. One advantage, therefore, of assuming that epistemic modals are non-truth conditional would be that such an analysis could be a means of explaining the epistemic vs. root distinction. (As has already been observed, a shortcoming in the formal approach was the inadequacy of using conversational backgrounds alone to formally capture the difference between root and epistemic meaning.) If the distinction is understood in terms of truth-conditionality, then it could potentially be traced to the different scopal properties of epistemic vs. root modals. However, Hacquard and Wellwood (Hacquard and Wellwood 2012), observe that many of the arguments and counterarguments for this analysis over rely on invented and/or ambiguous examples. They thus conducted a corpus study to see if epistemic modals did show statistically

significant differences in distributions in those linguistic environments identified as diagnostics of truth-conditionality. These environments echo those identified by Papafragou, namely: matrix questions, antecedents of conditionals and the complement of attitude verbs.⁶

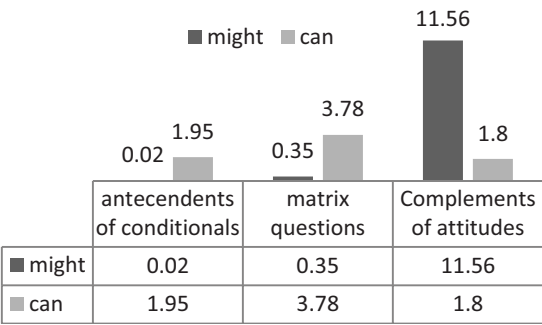


Fig. 6-1. The relative distribution of modals *might* and *can*. (Based on data from Hacquard and Wellwood 2012, 5).

Their data shows several remarkable generalisations. Firstly, while epistemics were restricted in these environments, they were not unattested. Secondly, root and epistemic modals showed similar restriction patterns across the three environments; both were most restricted in the antecedents of conditionals and least restricted in the complement of attitude verbs. Lastly, in the case of the complement of attitude verbs, epistemic modals were in fact more common than their root counterparts. Hacquard and Wellwood’s basic conclusion is that root and epistemic modals both appear to contribute to truth conditions, albeit in different ways. The nature of these truth conditions for epistemic modality is very hard to extricate or quarantine from pragmatic/inferential factors.⁷

1.3. Modal Relativity and event relativity

It has been observed that the standard Kratzerian model is inadequate for accounting for the difference between root and epistemic modality. However, this distinction also cannot be accounted for by assuming that epistemic modals lie outside truth conditional content. The original standard approach was largely motivated by an assumption of a unified semantics of modality. This assumption relied on the cross-linguistic evidence that a single lexical item can take different interpretations in terms of its type (such as epistemic/deontic/abilitive, etc.) but modal force

is always expressed using lexically distinct items. The functional perspective, by contrast, is partly motivated by the observation that epistemic and root modals occupy different positions in the hierarchy of verbal inflectional heads: epistemic modals scope above tense and aspect, while roots scope below⁸ (although it does not appear to follow that epistemic modals therefore scope outside truth-conditional content). The linguistic evidence provides a paradox: the lexical evidence suggests modals are unified, the syntactic evidence suggests that they are split (Hacquard 2010). Neither perspective (as they have so far been described) solves this. More recent studies have suggested, however, that the lexical evidence is not as cross-linguistically robust as previously assumed. Rullman et al. (Rullman et al. 2008) for example describe the language St'at'imcets as having lexical items that have “variable quantificational force” but that also “lexically restrict conversational background” (Rullman et al. 2008, 317). This is precisely the opposite lexical behaviour of what the Kratzer model would predict. It appears to be the case that either modal parameter (force *or* type) can be disambiguated by context. (An interesting question this raises is whether any language is able to leave both parameters undetermined,⁹ and, if not, what the semantic or pragmatic restrictions are that would prevent it.)

More recently, Hacquard (2010) has attempted to resolve the central paradox by accounting for the syntactic split, without losing the unified semantics of the standard Kratzerian analysis. In Hacquard's proposal, the modal bases (relative to which modals are interpreted) are projected from event arguments. Different kinds of modal base are available at different positions in the syntactic hierarchy, because of the different sorts of events that can appear in different positions. Lower in the hierarchy (beneath tense and aspect) are VP events—involving the participants and spatio-temporal co-ordinates of the VP. Above tense and aspect are speech events, or, in the case of mental state predicates, “attitude events.” These involve the speaker (or attitude holder), and their spatio-temporal co-ordinates. It is worth noting that Hacquard's approach allows for epistemic modality to relativise to speech or attitude events other than the speaker's, via reporting clauses and by utilising locality principles usually associated with theories of binding and anaphora (Rueland 2001). This means that modals always relativise to their nearest event binder, which might not be the speech event. This is shown by the following examples:

- (5) John said Bob might be late (modal *might* relativizes to speech event of “John said,” not to the speech event of the utterance).
- (6) John thought Bob might be late (modal *might* relativizes to attitude event of “John thought,” not to the speech event of the utterance).

- (7) George said that Lucy thought that Jim said that Mary believed that Fred said Bob might be late (modal *might* relativizes only to the speech event of Fred; observing the locality principle, it cannot “skip ranks”).

This approach provides syntactic reasons for why roots do not relativise to speech events and epistemics do not relativise to the VP events. The semantics, however, requires a reason for epistemics and roots to be systematically in different positions in the first place.

For Hacquard, the reason is Kratzerian: epistemics require different modal bases compared to roots. Epistemics need a modal base with propositional content (in other words, an informational, not a circumstantial, conversational background). This means they require binding to an event with an associated “knowledge set.” Either a speech event or an attitude event will provide such a set—but a VP event will not. The standard possible worlds semantics can then be applied: the speaker’s knowledge set accesses a set of worlds, then the modal quantifies over that set accordingly. There is, however, a problem with this analysis. The assert act is an “Implicit universal operator” (Hacquard 2010, 102) and thus provides a layer of “vacuous quantification” (Hacquard 2010, 107). Incorporating the speech event directly into the syntax (see also Krifka 2001) therefore means that the type of speech act itself is responsible for accessing the relevant world set or conversational background. This has the unwanted result that the semantics for “[ASSERT] $\Box p$ ” and “[ASSERT] (non-modal) p ” both represent universal quantification over the relevant set of worlds. According to this, epistemic necessity is truth conditionally the same as non-modal assertion (see also Kissine 2008 for a similar argument), the only difference is the degree of speaker commitment. This account is typically “Kratzerian” in that it becomes a matter for the ordering source (present in “must,” but absent in non-modals) to restrict the set of worlds (and potentially exclude the actual one).

This may not be a problem for an analysis of the semantics of language that can be confined to logical output: temporal relativity is enough to mark a distinction between logical tautology and contingent necessity (Thomason 1984, 137) and logical-type laws explain accidental vs. non-accidental generalizations. However, “The distinction between accidental and non-accidental generalization is not always sharp. There are uncontroversial cases of laws like the laws of logic or the laws of gravity. But there is also a grey zone.” (Kratzer 2012, 137). Such “grey zones” suggest the semantics of natural language cannot be confined to syntactic/logical output (regardless of what sort of covert syntactic

material or evaluation parameters are proposed). The proposed formal equivalence of epistemic necessity and non-modals is an issue because when it comes to how language is *used*, there is a clear difference in meaning. Obviously, the two sentences:

(8a) It is raining

(8b) It must be raining

have different restrictions regarding what situations they can refer to; the latter cannot be uttered if I am actually standing in a rain-shower. The question is whether this is just “logical equivalence that is unacceptable by conversational standards” (Kissine 2008, 145). This invites comparison to the results of the functional perspective (outlined in section 2.2), where the non-truth conditional account of epistemic modality supposed that epistemic modals and non-modals were equivalent, because epistemic modals did not contribute to truth conditions. Hacquard’s analysis, by incorporating speech acts directly into the syntax, results in the contribution of necessity epistemic modals to truth conditional content being identical to the contribution of non-modal assertions. Certainly, it seems that accounting for epistemic modality will involve a systemic account of how semantic and pragmatic contributions to meaning interact. Jaszczolt’s default semantics (Jaszczolt 2005, 2009), for example, suggests that rather than incorporating pragmatic phenomena (such as speech act types) into the syntax, or indeed relocating semantic phenomena (such as epistemic modality) out into the pragmatic realm, different contributions ought to be understood as contributing equally to compositional meaning, with none being considered automatically as the primary contributor. Compositionality must therefore move “a level up” and pragmatic considerations are equally as much a part of the linguistic reality of a sentence’s semantics as syntax. Such an approach may well be required in the linguistic analysis of the semantics of modality.

There are also potential problems with the event-relative analysis of root modals. One of the motivations behind Hacquard’s theory is the intriguing interaction between root modality and aspect (Dowty 1977, 1979; Portner 1998, 2003). Of particular interest here are “actuality entailments” (Bhatt 1999, Hacquard 2006). These are observable when roots scope beneath perfective aspect (in languages with an overt morphological perfective/imperfective distinction). Hacquard’s explanation of this is complex: roughly speaking, actuality entailments are explained as deriving from the nature of aspect as event quantifier. Imperfective aspect has a generic component, and from this counterparts¹⁰ of the events of the VP are quantified over in the relevant set of possible

worlds (accessed by a circumstantial/ “realistic” modal base). Perfective aspect entails restriction of the domain to the actual world, resulting in actuality entailments. This seems to imply that modality is provided by imperfective aspect, not overridden by the perfective. Thus it is also assumed that, as English does not have a morphological imperfective/perfective distinction, it therefore does not have actuality entailments.

However, there are examples in English where perfect aspect appears to result in a *negative* actuality entailment when combined with root modality, as in the following examples:

- (9) I could have been a millionaire.
- (10) You could have killed me!

Both seem incompatible with the interpretation that I was in fact a millionaire, or killed by my addressee. As there is no negation in the proposition, it is hard to see how purely restricting the domain of the modal to the actual world (accessed by the event in the VP) could yield the right interpretation (the event represented in the VP is positive, yet its realisation in the actual world is negative). All the worlds of the counterpart events may be accessed by, for instance, a stereotypical or deontic ordering source. However, the actual world is not necessarily normal or ideal (and therefore not necessarily itself a world where the event occurs). The simplest analysis seems to be that roots are compatible with epistemic certainty *or* epistemic uncertainty (about the relevant proposition’s truth). Epistemics are, by contrast, fundamentally expressions of uncertainty, and so they can never be compatible with certainty. The following are epistemic versions of sentences 9 and 10:

- (9a) #I might have been a millionaire
- (10a) #You might have killed me

In both cases the sentences are pragmatically unacceptable, although grammatically unproblematic.¹¹ For both sentences 9a and 10a, certainty of the embedded propositions’ falsity is guaranteed by combinations of context, world knowledge and, to some degree, the implicatures that uniquely stem from indexicality. However, as has already been noted, assuming that epistemic modality operates only at the level of pragmatic inference/illocutionary force is problematic (see section 1.2a-b). It is predictable that these sentences will be unacceptable in a way that suggests there is more than simple contextual disambiguation involved. It is, generally speaking, stretching credulity too far to think that someone was uncertain of their own financial status as a millionaire, and, even more

obviously, if I were killed, I could not be talking. By contrast it is perfectly acceptable to have epistemic interpretations of these sentences if we replace the first person indexical with a third person substitute. (For example: “Mary might have been a millionaire” is perfectly acceptable. Likewise, “Mary could have been a millionaire” does not have a negative actuality entailment.) The concept of “epistemic vigilance” (Sperber et al. 2010) is useful here. Epistemic vigilance constitutes the set of cognitive mechanisms that allow us to judge whether or not the content of an expression should be taken in good confidence. Arguably, our epistemic vigilance prevents us from accepting assertions of uncertainty in cases where certainty about the truth of the sentence has been provided. First-person indexicals in the above examples automatically discount uncertainty, and thus exclude epistemic modals. Because root modals are not about the possible truth of propositions, but rather the potentials and probabilities of individuals/entities, this means they are compatible with certainty or uncertainty at the epistemic level. This system is semantic; it functions at the level of truth conditional content, however it also relativizes to the status of propositions (as certain or uncertain) in a given conversational context. Thus it operates “in-between” the level of syntax or grammaticality (where sentences can be completely nonsensical yet still be grammatical) and the level of pragmatic, contextually provided, rules of inference and implicature.

There are potential problems, however, even with this simple formulation of the epistemic/root distinction. Examples of “past epistemics” (Von Stechow and Gillies 2008) are problematic precisely because they appear to be examples of epistemic modals expressing uncertainty about a proposition that the speaker knows is certainly false. In other words, such epistemics have (negative) actuality *presuppositions*. For example, in the following exchange:

- (11) Sue: There’s no milk left! Why didn’t you buy some when you were at the shop?
 Bob: Well, there *might* have been some left.

Bob’s utterance ought to be rejected by epistemic vigilance—it is clear from context that there was, in actual fact, no milk left. For Bob to assert that the opposite claim is compatible with his knowledge state (at the time of utterance) is obviously false. However, it is clear that Bob is not trying to say that he *still* thinks that there was milk left: he knows now that there was not. What Bob does assert, is that at a previous time (when he was at the shop), it was compatible with his knowledge *then* to think there might be milk left (and that he cannot therefore be accused of wilful domestic

negligence). To explain this, the essential mechanisms of Hacquard's event relativity can be utilised, along with something like a "covert attitude operator" from theories of Free Indirect Discourse (Sharvit 2008¹²). Bob's modal claim is relativised then to a covert attitude event, which can be overtly represented by a matrix clause as such:

[I thought] (there might have been milk left)
[Covert attitude event] ($\Diamond p$)

Principles of binding (Rueland 2001), sequence of tense (Abusch 1997) and past under past deletion, mean that the modal is relativised to its nearest (covert) attitude event rather than that of the speaker at speech time.

More puzzling than roots with negative actuality entailments, or past epistemics with actuality presuppositions, are examples of modal *can* that seem to exhibit actuality entailments, but in a way that cannot be explained via aspect/event quantification. A sentence such as

(12) Berlin can be very cold in February.

seems to entail that Berlin has, in actual fact, been very cold in February. Although there is such an actuality entailment, this sentence also simultaneously suggests epistemic uncertainty. If it can get very cold in February, then it might do so. However, by the same token, it does not mean that *every* February Berlin has been, or will be, very cold. This sentence expresses the fact that Berlin has the *potential* to get very cold every February (in much the same way as a glass may be always fragile, regardless of whether or not it ever breaks). In this case, Berlin has certainly realised this potential (to be very cold) on past occasions, and even for those Februarys where the weather was mild, the potential was still present. It is hard to explain this in terms of aspectual restriction/event quantification alone. Again, root modality seems to be operating independently of the epistemic status of the sentence, quantifying instead over property sets of individuals, and assigning the members of that property set the status of either potential or fixed.¹³

Generally speaking, roots entail epistemics, unless for a fixed, *complete* event (indicated by aspect) this uncertainty has been overruled—in which case the epistemic uncertainty entailment is cancelled. Ipso facto, epistemics always presuppose roots (for example: if John *cannot* swim, then there is no way that he *might*). Epistemics are fundamentally concerned with the status of a proposition as either a member of the relevant information set (namely its status as a certainty) or the status of its

exclusion from that information set (as an uncertainty, with either a possibility or necessity status). Root modality operates at a different level, and may hold even when epistemic uncertainty is overruled.

2. Gradability, comparability and types of modal expression

2.1. Merging Kratzerian semantics and probability scales

So far the analysis of Kratzer's theory has focused on how it accounts for the relativity of modals. Kratzer's basic explanation of how modals relativise to different sets of information appears largely correct, certainly for epistemics. It could possibly also be adapted to apply to distinctions between actual vs. potential members of a relevant individual's property set (however, see endnote 12 for potential problems with this). These sets of information are not, in and of themselves, sufficient for explaining the epistemic/root distinction. Nor can the basic approach account for the gradability and comparability of modals. The latter problem is remedied by the introduction of a second conversational background, or "ordering source" (Kratzer 1981). An ordering source induces a partial ordering (or ranking) on the set of worlds accessed by the modal base. (This second conversational background also enables the modal base to be reserved for the informational/circumstantial distinction, thus dealing neatly with the epistemic/root distinction. However, as already noted in section 1.1, Kratzer has since conceded that this is still not an adequate explanation of the semantic differences between epistemic and root modals).

Ordering sources vary. For instance, stereotypical ordering sources order worlds according to how closely they resemble the normal course of events in the actual world, while a deontic ordering source ranks worlds according to how well they match an ideal. So the actual world might not be the most normal, or the most ideal. (This fits intuitions about deontic modality in particular—something may be obligatory given some set of rules or regulations, but rules clearly can be broken.) This ordering also means that necessity can receive a slightly weaker definition: a proposition is a necessity if it is true in all the closest worlds. By the same token, possibility gets a stronger definition: it is no longer sufficient that a proposition be true at some world, its negation must not be a necessity (in other words, p must be true in at least one of the closest worlds). Comparative possibility can then be defined in terms of the relative ranking of worlds. For two propositions, p and q , we can compare their relative possibilities by checking whether there are any worlds in which p holds, but q does not, that are higher ranking than worlds in which q holds,

but p does not. If there are, p is a better possibility than q . Thus a semantics can be developed to account for distinctions between broad qualitative types of modality (such as necessity, weak necessity, possibility, slight possibility, good possibility and better possibility) and their corresponding linguistic forms (*must*; *It is probable that*; *might*; *There is a slight possibility that*; *There is a good possibility that* and *It is more likely that p than q* respectively).

It might be observed that this can only capture fairly coarse-grained comparisons of modality, such as differences between slight vs. good possibilities, and weak vs. strong necessities. Natural language, however, is capable of expressing very numerically precise probabilities, such as “there is a 70% chance of rain.” This has led to some analyses of modality in terms of probability theory (Yalcin 2007). Kratzer’s ordering semantics could be refined to map quantitative probability measurements onto the existing qualitative possibility scale. Intuitively, probability could correspond roughly to comparative possibility; if p is a better possibility than q , it is also more probable. A probability measure could then be applied to a set of propositions accordingly (see Kratzer 2012, 46). However, there are important distinctions between possibility and probability scales of modal adjectives that make a direct translation problematic.

According to Kennedy’s (2007) analysis, adjectives are a measure function, from objects to points on a scale. In this analysis, all adjectives are inherently gradable. The gradability of possibility and probability expressions then could be accounted for as arising from the semantics of adjectives, rather than the semantics of modality.¹⁴ Another view of adjectives, suggested by Hansen’s (2011) analysis of colour adjectives, is that the difference between gradable and non-gradable interpretations is a matter of lexical ambiguity. By this account, all modal adjectives could be potentially ambiguous between expressing a non-gradable possibility status, vs. a gradable probability measure. This seems unlikely, not least because in adjectival form, “possible” and “probable” express different sorts of scale. The adjective *possible* systemically takes modifiers such as *humanly*, *logically*, etc. These imply a qualitative scale. The adjective *probable*, by contrast, takes quantitative modifiers, such as *extremely*, *highly*, *more* and *very*. Possibility also appears to have a closed scale—a proposition can be “completely possible” (in the way an object can be *completely full*, but not **completely skinny*). A proposition cannot, however, be **completely probable* (in the same way a person cannot be *completely skinny*). There are obvious patterns of presupposition and entailment between probability and possibility: if something is possible

then this entails that it has a degree of probability (although that may be below the 50% cut-off for being deemed “probable” as such). If something has a degree of probability above zero, then it is therefore possible. In other words, a possibility can be probable or improbable, but a probability is always possible.

Due to the entailments/implicatures between them, the two scales are therefore sometimes packed into one lexical portmanteau item, with interesting results. The adjective *possible*, for example, seems far more flexible in allowing quantitative modifiers such as *very*, than *probable* is in allowing qualitative/closed scale modifiers such as *humanly* or *completely*. Interesting examples then, would be cases where the adjective *possible* is quantitatively modified,¹⁵ but without this corresponding to an interpretation of a higher position on the qualitative possibility scale. An example would be as follows:

- (13a) “It’s very possible that I’ll go back to Blur. It really is very possible”
 (Quote from “Blur reunion is ‘very possible’” By Sinead Garvan
 06/11/2008
http://news.bbc.co.uk/newsbeat/hi/music/newsid_7710000/7710537.stm)

Here the speaker, the ex-lead singer of the pop group *Blur*, is discussing his possible return to the band. The interesting thing about this example is that the adjective “possible” is modified by a quantitative adverb, but it does not appear to translate to a higher position on a qualitative possibility scale. If the probability and possibility scales were directly mappable, it would be expected that the non-modified version of the adjective would imply a lower position on the possibility scale, but the opposite seems to be the case:

- (13b) It is possible I’ll go back to blur. It really is possible.

Somehow, the explicit quantitative measure appears to have an effect akin to hedging: a decreased speaker commitment and a lower position on the qualitative possibility scale. This is a result of a number of intertwined pragmatic and semantic factors. For example, the fact that the speaker is discussing his own decision-making is important. In this context, an “objective” statement about degree of probability is less reliable than a “subjective” one about the speaker’s qualitative judgement of a possibility. The use of the adverbial “very” highlights the “objective” probability scale, and thus draws focus to, and intensifies, the perceived uncertainty of the speaker about their own intentions (or perhaps their unwillingness to

communicate their intentions explicitly). There is also a potential to explain this in terms of scope ambiguity. Namely, it is ambiguous whether probability scopes above possibility (there is a probability that p is possible) as opposed to possibility scoping over probability (p is definitely possible, and moreover has a certain degree of probability). Clearly the former structure implies a greater degree of uncertainty. For now it simply illustrates that even when probability and possibility are packed into one portmanteau item, their respective scales do not always map neatly on to one another.

One result of defining modal expressions in terms of a probability scale would be that different modal expressions could be assigned different probability measures. Taking Kratzer's basic scale of strong/weak necessity and good/slight possibility, it could then be assumed that modal "might" for example expresses a probability of around 70%, while "There is a slight possibility that" expresses a probability of around 30%–40%; modal "must" expresses a probability of 90% and above, and so on. As sentence (13a) showed, however, it is very difficult to predict what probability measure a given modal expression will express in different contexts. It seems modal expressions—particularly modal auxiliaries, are meaningfully flexible in terms of the degree of probability they express. For example, in the following scenario:

I have a friend, Barbara, who is throwing a party. She tells me gleefully: "John might come to my party!" I however, know that John has recently discovered that Barbara is in love with him, and as a consequence he is assiduously avoiding her. I reply: "Well, he *might*."

Barbara's hopelessly optimistic use of "might" obviously expresses a significantly higher probability than my own. There is nothing to distinguish the two but tone of voice, gesture, and other extra linguistic cues. Arguably then, gradability is an optional implicature of modal expressions and is not central to their semantics.¹⁶ Although the two concepts of probability and possibility are closely entwined, they perhaps are not amenable to identikit semantics.

2.2. Degrees of modality and the functional approach

Central to the functional perspective of modality is the view that modals express a degree of speaker commitment. Degree modification therefore presumably applies to the illocutionary dimension, rather than truth-conditional content. It has also been observed that most work in the functional tradition assumes some incarnation of the subjective/objective

distinction. Objective epistemics, in being based on more reliable information, will therefore be interpreted as more probable than their subjective counterparts (which are based on unreliable evidence). There is an intuitive disconnect, however, between assuming that an objective source of information indicates higher speaker commitment (as illustrated already in sentence 13a). Moreover, human beings are certainly capable of being highly committed to beliefs for which there is no sound or reliable external evidence—superstitions being the most obvious example. There does, however, appear to be an important linguistic difference between information sourced from an individual “externally inscrutable” source, and information sourced from an externally accessible, shared source. It pertains however to evidentiality, not epistemic modality.

Nuyts (2001) has developed perhaps the most convincing account of the interaction between information source and the subjective/objective distinction. Rather than focusing on potentially problematic ideas about reliable or unreliable evidence, Nuyts suggests that modals are “subjective” or “inter-subjective” depending on the source of information on which they are based. Namely they are either inferences from the subjective, personal information set of the speaker, or the inter-subjective, shared information set of the relevant conversational group. Furthermore, they may be neutral, referring to entirely external sources of information. Crucially, Nuyts also observes that the different types of modality correspond to different grammatical forms. Use of the first person subject, such in the mental state predicate of the following sentence

(14a) I think I have lost my gloves.

explicitly codes the speaker as the source of evidence¹⁷ and is thus *subjective*. “An impersonal subject” is represented via modal adjective and dummy subject, such as in the following example:

(14b) It is possible that I have lost my gloves.

This codes the relevant group (designated by the conversational context) as the source of evidence. Therefore it is *inter-subjective*. Lastly, modal adverbs code no subject as source of information, and are thus *neutral*, as in the example:

(14c) Possibly, I have lost my gloves.

Nuyts’ analysis shows that different types of information correlate to different grammatical forms when they are understood in terms of source

of evidence, rather than reliability/unreliability of evidence. This focus on source of evidence has obvious comparisons to evidentiality. In all of the above examples (14a-14c), the modal relationship is the same, regardless of information source differences. The difference is simply the set relative to which this relationship is asserted to hold. Nuyts' theory thus could be straightforwardly combined with Kratzer's analysis, suggesting that functional and formal perspectives need not be assumed to be mutually exclusive. As with Kratzer's observation that the type of conversational background is not itself sufficient for explaining the difference between epistemic and root, characterising the information source in terms of its communicative function is itself insufficient for explaining differences in type or degree of modal expressions.

It is fairly obvious, however, that systematic relations between the source of evidence and associated degree of speaker commitment and/or interpreted degree of probability exist. However, these are better explained in terms of an interaction between evidentiality and epistemic modality, than as proof of their semantic equivalence.¹⁸ For example, if I utter the sentence:

(15a) I saw John leave.

I am asserting that I have direct evidence for the proposition "John left." This is automatically incompatible with an epistemic modal assertion. If a past perfect is embedded, as in the sentence

(15b) I saw John had left.

then the evidence is still *direct* in one sense—I have directly seen a number of things: perhaps I saw that John's coat was not in the hall, and his car was not parked outside. However the event of *John's leaving* was not necessarily one of the things I saw.¹⁹ Thus my assertion that "John left" is represented as an inference from an information set, and this is obviously very similar to an epistemic modal inference. The two are, however, distinct. Epistemics require perfect aspect to refer to the past, therefore if an equivalent modal proposition is embedded, it would be:

(15c) I saw John *might* have left.

Here a similar inferential act is being expressed as in sentence (15b). The difference, however, is important. For the embedded (past-perfect) non-modal, I am asserting that the other evidence is sufficient to render "John left" *certain* (at the past time of the seeing event); the embedded modal by

contrast asserts that the evidence was only enough to render “John left” *possible* (at the past time of the seeing event). In basic set-theoretic terms, non-modals assert that the proposition is a member of the information or *certainty* set. Modals assert that the embedded proposition is compatible with, or follows from, this set—but it is *not* a member. In both cases the same evidence may be used, but a different relationship between that evidence and the sentence is expressed.

Evidentiality, then, simply makes explicit the types of information source relative to which epistemic modals express a relation. As has already been outlined, the type of information source does not itself determine the type of modal relation (although patterns of implicature/entailment do exist). For example, because directly seeing an event implies its automatic membership in the information state/certainty set, this is incompatible with epistemic modality applying to a proposition that represents that event. By contrast, the temporal dislocation²⁰ of perfect aspect implies that the event represented in the proposition was not itself directly observed, but that some state of affairs following that event’s completion was. Thus this is compatible with epistemic modality. This reiterates the previous assertion that epistemic modality is fundamentally an assertion of uncertainty. Therefore it is incompatible with certainty, regardless of whether this certainty is directly entailed by a suitable evidential, by conversational implicature (as with the interaction of indexicality and negative actuality entailments in section 1.3) or whatever other contextual contributions that may be present. Epistemic modality is easily confused with inferential evidentiality, as sentences (15b) and (15c) show. However, modality expresses relations between an embedded proposition and a source of information of which the embedded proposition is not a member. A non-modal assertion simply states that the proposition is a member of the information state, whatever that state is. The crucial difference therefore, lies in the concept of certainty, not in the potentially delimited classification of different kinds of information sources. Thus the nature of the evidential dimension is not responsible for the modal/non-modal distinction. The source of information, or conversational background, does not itself contribute modal meaning. It simply flavours it.

Moreover, the character of the information set is not responsible for the epistemic/root distinction, nor does it determine quantitative grades or degrees of probability. The former is a fundamental semantic distinction, the latter a separate parameter (potentially made explicit in the case of grading modal adjectives). Given this view, there may be potential for an approach to modality that utilises this simple set-theoretical apparatus, but

applies it to updatable/dynamic information sets (adapted from Stalnaker 1974, 1978; Groenendijk et al. 1996; Beaver 2001) and the expectation patterns that hold of those sets (Veltman 1996). A necessity modal encodes an expectation that the embedded proposition will be added to the information set, and moreover, that adding the negation of the proposition to the information set would render the set inconsistent. A possibility encodes an expectation that either the embedded proposition, or its negation, could be added to the information set, with neither rendering the set inconsistent. Non-modals simply assert that the proposition is already a member of the relevant information set. In other words, the compatibility vs. consequence of modals would be defined in terms of inferential relations to a dynamic conversational information state. Yalcin (2007), for example, suggests something along these lines: namely that modality performs a “test” on a conversational information state, and does not alter it as such. This would not necessarily require possible worlds or complex probability measurements. Nor would modal meaning be relocated into the illocutionary/pragmatic arena. Compatibility could be defined, not in terms of quantification over the relevant world set, but in terms of the “update potential” of shared vs. subjective information sets, and the systems of interaction between those sets. This would account for epistemic modality—root modality, as previously suggested, requires its own semantics, which operates independently of the epistemic certainty/uncertainty status of the relevant sentence.

Conclusion

This paper sought to compare approaches to the semantics of modality that represent a broad split in terms of their general perspective on language. On the one hand, “formal” approaches aim to characterise the underlying systems of meaning that hold, regardless of context. “Functional” approaches, in contrast, aim to characterise meaning in terms of how a linguistic expression functions in context. Two conclusions are drawn from this analysis: firstly that the epistemic and root distinction is determined by a different semantics encoded in the modal relation, not the kind of information source. However, systematic patterns of entailment do exist between the two types of modality. Secondly, qualitative possibility and quantitative probability are distinct scales that might not be semantically equivalent. Moreover, as with the epistemic-root distinction, the type or reliability of an information source does not map directly to degrees of probability, or degrees of speaker commitment. This suggests that, for approaches in both perspectives, a conflation of evidential and

modal dimensions of meaning leads to a confused overall picture of the essential semantics of modality.

Focusing exclusively on formal properties may result in the contributions of context being overlooked, or mischaracterised. For formal, model-theoretic accounts, modality poses an inherent problem by appearing to talk about things that are not meaningful in terms of the truth or falsity of the state of affairs or event represented in the sentence. Possible worlds solve this by making the denotation of a sentence the set of worlds in which that sentence is true, meaning modal expressions can thus be evaluated according to the denotation of an intersection of a set of sentences. The essential fact remains that modals seem to be meaningful not in virtue of the worlds they are true in, but in virtue of their being a consequence of, or compatible with, a given source of information. Modality in Linguistics therefore, cannot be straightforwardly accounted for in terms of a denoted world set—regardless of how detailed the semantic or pragmatic rules make the selection and differentiation of that set. Worlds, therefore, are not necessary, but nor ought they be rejected out of hand.

However, by the same measure, focusing too exclusively on the contextually provided elements of meaning may result in essential formal characteristics of language being overlooked or mischaracterised too. Just as linguistic evidence suggests problems with the standard formal analysis, it also appears to suggest that the fundamental understanding of modals (namely, as expressing relations to sources of information, whether these are conceptualised as conversational backgrounds or information sources) is correct. There is more to modality than the illocutionary force of speaker commitment. Modality is an area of semantics where it appears to be particularly important to recognise the metalinguistic dimensions of pragmatics, cognition and socio-cultural understanding and the systematic roles they play in the semantics of natural language. However, it also illustrates just how difficult it is to characterise these interactions. Doing so requires a combination of functional and formal perspectives, indicating that the perceived chasm between different theoretical perspectives on language can, and perhaps should, be bridged.

CHAPTER SEVEN

IRONY IN TWO THEORETICAL FRAMEWORKS: RELEVANCE THEORY AND ARGUMENTATIVE POLYPHONY THEORY

TOMONORI OKUBO

Introduction

This chapter sets out to compare and examine the two theoretical frameworks of Relevance theory and Argumentative polyphony theory, focusing on the analysis of irony within these two frameworks or metalinguistic discourses. While the theoretical background here is principally grounded in the latter framework, the aim is not to discredit the former. Rather, by closely examining these two alternative approaches, I hope to find a better way in which to describe irony, and to consider the roles that the two theories can play in linguistic investigation.

In order to undertake these tasks, this chapter will first make clear the fundamental theoretical difference between Relevance theory (RT) and Argumentative polyphony theory (APT): RT is a pragmatic theory based on truth-conditional semantics, while APT is a linguistic theory grounded in argumentative aspects of discourse. There follows a brief presentation of the well-known RT echoic account of irony, followed by a theoretical description of the same linguistic phenomenon within the APT framework. Thirdly, by comparing the two approaches presented, some obvious differences and possible common ground between the two will be made clear. The chapter will end with a brief summary and concluding remarks.

The two theories, RT and APT are basically different in that they do not share the same theoretical premise on the meaning of linguistic expressions. At the same time, it can be argued that they are both interested in some similar aspects of utterance acts. This chapter sets out to explore the possibility of drawing on both theories in linguistic investigation, if not of combining them.

1. Relevance and Polyphony: fundamental differences

1.1. Propositional meaning vs argumentative meaning

While RT considers the meaning of an utterance as a combination of *explicature* and *implicature*, the former being calculated from the semantic output of the propositional (logical) meaning of a sentence, APT's point of view concerning meaning is quite different.

Argumentative Polyphony Theory was developed by Marion Carel (Carel 2011a), a French linguist strongly inspired by the linguistic polyphony theory of Oswald Ducrot (1984), and is paired with another framework: Semantic Blocks Theory (SBT). The main point of these two frameworks is that they emphasize the argumentative character of discourse: the meaning of linguistic expressions is primarily argumentative. When one says "It is fine (weather)," according to RT, the meaning of this utterance will be evaluated first of all as regards its propositional value: it expresses a certain weather condition and its truth condition must be judged. For APT, on the other hand, it is not the description of the actual condition of the weather that is most important in discourse, but rather a certain conclusion which can be drawn from this utterance: "we can go out for a walk," "the match will be held in good conditions," "the park will be too crowded," etc. In RT, such a conclusion would of course belong to implicature. However, for both APT and SBT, this kind of argumentative character is essential for the meaning of linguistic expressions.

In order to demonstrate this point, another simple example can be presented.

- (1) a. *I need this big dictionary*, because I have to look up a particular word that cannot be found in a small dictionary.
- b. *I need this big dictionary*, because I need a weight to keep all these papers from scattering in the wind.
- c. *I need this big dictionary*, because by placing it on my desk, I will look like a serious student.

The italicized segments of these three utterances are formally identical, but the meaning conveyed by each of them is completely different. SBT makes two points on this observation. Firstly, we cannot conceive of a general state of affairs corresponding to the linguistic expression "(to) need this big dictionary" which covers the three uses; what kind of things could be simultaneously a tool for looking up difficult words, a paper-weight, and a kind of desk decoration? Secondly, the theory does not

consider this first segment by itself as an “utterance”: rather it is the set of two unified segments in each example that can be regarded as such. In each of these examples, the segment “I need this big dictionary” makes sense only by being connected to the second segment, and the three first segments of these examples, while superficially identical, are completely different as they are associated with three different *argumentative aspects*,¹ according to the theory’s terminology.

1.2. A non-referentialist view of language and the argumentative nature of meaning

In the previous section, it was argued that according to APT-SBT, the description of the actual state of affairs is not the most important thing in discourse. In fact, APT-SBT’s claim goes even further than this in that these twin theories are presented as having a “non-referentialist” viewpoint of language. The term “non-referentialist” means that linguistic expressions do not refer to any non-linguistic entity and have no direct relation with any state of affairs, nor with any thought or cognition of the speaker. Language is thus supposed to be an autonomous system to be structured without resorting to any other system than language itself. Such a point of view (which might be described as Saussurian) may seem to be anachronistic, especially when compared to RT which stresses the importance of cognitive aspects in linguistic communication. From the point of view taken in this chapter, however, it still seems worth considering such a non-referentialist approach: while referential elements undoubtedly offer an effective contribution to linguistic investigations, it remains open to question whether all linguistic internal elements have been fully examined: if they have not, it must still be relevant to investigate the linguistic structure itself exhaustively.

1.3. Discussion

As has been observed, the fundamental differences between RT and APT-SBT are so great that any attempt to compare these two approaches might appear questionable: RT is based on the examination of the relationship between factual reality and its cognitive representation realized as an utterance, whereas APT excludes all such referentiality of language to describe utterance solely from an argumentative point of view. Despite these differences, however, the two theoretical frameworks explore similar aspects of similar linguistic phenomena, and they place great value on what appear to be comparable characteristics of language

and discourse. The next section sets out to highlight these points by considering the example of ironical discourse.

2. Irony according to RT: irony as echoic interpretation

Sperber and Wilson's initial treatment of irony as *echoic mention* in their monumental paper (Sperber and Wilson 1981) was later modified and incorporated into their Relevance Theoretical framework, in which irony is treated as *echoic interpretation* (Sperber and Wilson [1986] 1995). Among the numerous points raised in these papers, only two will be discussed here.

The first point is their critical remark on the traditional and conventional view of irony, which I will refer to as *opposite meaning analysis*: “(irony is) the expression of one’s meaning by using language that normally signifies the opposite, typically for humorous or emphatic effect.”² Wilson and Sperber make repeated criticisms of the fact that such a view of irony is still present in recent pragmatic research, even, and typically, in Grice. Rather than repeat here the discussions on the fallacy of such analyses resting on the deliberate flouting of the maxims of Quantity or Quality, the point can be made clear by presenting some of Wilson’s examples for which the traditional explanation does not work at all.

- (2) a. Don’t forget to use your indicator.
- b. Do you think we should stop for petrol?
- c. I really appreciate cautious drivers. (Wilson 2006, 1726)

Wilson presents these examples as ironical utterances addressed to “a neurotically cautious driver who keeps his petrol tank full, never fails to indicate when turning and repeatedly scans the horizon for possible dangers,” although in all of them, the conveyed meaning cannot necessarily be “contrary to the words.” The speaker does think that it is important not to forget to use the indicator and not to run out of petrol, and he/she does appreciate cautious drivers. Wilson’s paper thus demonstrates that the opposite meaning analysis of irony “does not do justice to the very rich and varied effects of irony” (ibid.).

Opposite meaning analysis cannot provide sufficient conditions for irony; nor can it provide the necessary conditions either. Wilson (2006) quotes Grice’s own example of a blatantly false utterance which is not successfully interpreted as ironical.

- (3) A and B are walking down the street, and they both see a car with a shattered window. B says, Look, that car has all its windows intact. A is baffled. B says, You didn't catch on; I was in an ironical way drawing your attention to the broken window. (Grice [1967] 1989, 53, quoted in Wilson 2006, 1727)

Grice here points out that irony involves the expression of a certain sort of critical judgment or attitude, and Wilson remarks that this idea raises further questions, in particular: "What is the object of this attitude, and what is the connection between communicating such an attitude and expressing a proposition that is patently false, under-informative, or irrelevant?" (Wilson 2006).

In order to answer this question and to explain what makes utterances which are not blatantly false ironical (see [2]), and what blocks blatantly false utterances from being ironical (see [3]), Wilson proposes her *echoic interpretation* analysis, which is a theoretical elaboration of Sperber and Wilson's description of irony as *echoic mention*.

Firstly, Wilson distinguishes two types of uses of utterances: *descriptive* and *interpretive use*. An utterance is descriptively used when it is used to represent a possible or actual state of affairs and interpretively used when it is used to represent another representation that it resembles in content.³ Echoic use of an utterance in RT is a type of interpretive use of language, not "simply to report the content of the attributed thought or utterance, but to show that the speaker is thinking about it and wants to inform the hearer of her own reaction to it" (Wilson 2006, 1730). It is in this sense that irony is a sub-type of echoic use, as the following quotation explains:

[...] verbal irony is a sub-type of echoic use in which the speaker (generally tacitly) expresses one of a range of dissociative attitudes (scepticism, mockery, rejection, etc.) to a (generally tacitly) attributed utterance or thought. The main point of irony is to dissociate the speaker from an attributed thought or utterance which she wants to suggest more or less obviously false, irrelevant or under-informative. (Ibid., 1730–31)

The last important point which must be noted here is that when Wilson regards irony as a sub-type of echoic use of language, she also claims that irony cannot be a natural kind, but "belongs together with other forms of echoic, attributive and interpretive use, which must all be treated in the same way" (Ibid., 1732).⁴

In this way, the question about whether the speaker's "dissociative attitudes" to an attributed utterance are ironical or not is gradual, so that RT places irony in its general framework of language use.

3. Irony according to APT: irony as utterance *conceived* (in the *Speaker's tone*) and *rejected*

This section sets out to illustrate an alternative analysis of irony from the APT standpoint. This theory's basic standpoint has already been presented in previous sections (1.1. and 1.2.), but considering that it is less well known, especially in the English speaking linguistic community, some further presentation of its theoretical requisites might be necessary. After reviewing the APT standpoint in relation to utterance meaning through the example of irony, two essential notions, *tones* and *textual functions*, will be introduced. Finally, in the following section, an analysis of irony using the APT framework will be presented and discussed.

3.1. Argumentative standpoint of APT

Carel (2011b) clarifies the fundamental difference between her standpoint and that of RT, taking a similar example to Wilson's quoted as example (2) above:

- (4) Tu as vu, il y a un vélo tout là-bas. (Look, there's a bike over there.)
(Carel 2011b, 69)

The context presented for this example is similar to that of Wilson's cautious driver; the speaker is a fellow passenger, and he/she knows that the driver is "a neurotically cautious driver." He/she makes this utterance seeing a bike on the road, but it is so far away that it is not necessary to be cautious at the moment of speech.

Similarly to the above discussion, regarding the fact that such examples do not convey the opposite meaning (the speaker really does see a bike, albeit one that is far away), the following points can be noted in regard to Carel. Firstly, this example can be considered a variant of the series in example (2), in that it is not obviously false. So, it could be another (less than original) counter-example to the traditional opposite meaning analysis: the speaker does not communicate that there is no bike. Carel's paper, introducing her main theory of Semantic blocks (SBT),⁵ claims that the speaker of (4) "discredits and rejects, not the *fact* that there is a bike, but the *interpretation* of the fact as danger-urging-precaution" (Carel 2011b, 69).⁶ When one says "It's dangerous!," this utterance can be interpreted as urging precaution: "It's dangerous, you have to be cautious!" The utterance in (4) is thus presented as another exemplification of the same argumentative discourse, which can be followed by a similar

segment: “Look, there’s a bike just over there, you have to be cautious!” According to SBT, the meaning of the utterance in (4) is to be interpreted as an exemplification of the argumentative aspect “danger THEREFORE precaution,” and it is this interpretation which is presented as absurd, not the communicated fact that there is a bike.

Carel’s discussion is presented here just to show how APT-SBT sees the meanings of utterances. Utterances do not refer to facts or states of affairs; rather, their meanings are evaluated in their argumentative aspects, which are strictly of a linguistic nature. Therefore, the falsehood of the propositional content of the utterance is not, so to speak, concerned to account for irony. At the same time, there is significant common ground between the two theories for describing irony. The following paragraphs will be devoted to showing that APT provides the semantic setup to clarify what is communicated by an echoic interpretation of irony: a “dissociative attitude to an attributed utterance or thought.” In other words, they aim to show that APT’s linguistic setup can describe a large part of the ironical effect before resorting to pragmatics.

3.2. Essential notions of APT

As is noted above, APT is a critical elaboration of the linguistic polyphony theory of Ducrot (1984). The most innovative point of APT is that it advocates two essential theoretical notions, *tones* and *textual functions*,⁷ which are operational for various linguistic phenomena. After pointing out some other important points of APT, the following two sections will present the two notions.

Paired with SBT, APT is presented as to be a set of *linguistic* notions, meaning that utterances (*énoncés*) are not representations of any non-linguistic states of affairs or thoughts. In this perspective, in order to describe an utterance act/event (*énonciation*), APT supposes firstly the *content* of the utterance which is also a linguistic entity providing a syntactically arranged set of lexical meanings of words composing the utterance. APT is thus claimed to be “a theory of bringing content into discourse” (*la mise en discours du contenu*).⁸ This operation of bringing content into discourse is carried out by the *speaker*, which is once again a disembodied discourse entity (*être du discours*) conceived for the semantic description of utterances. This last point means that, by introducing the notion of *speaker*, APT does not take into account any physical subject but rather a *concept* which functions for the purpose of describing the meaning of utterances.⁹

The most important point of the theory is that this operation is achieved at two independent levels, giving *tones* and *textual function* to utterances.

3.3. Tones

Since Ducrot (1984), the plurality of *voices* (*énonciateurs*) in one utterance has been repeatedly demonstrated linguistically. APT, by renaming these voices *tones*, claims that all utterances have one or several tones, which determine a certain “tone” for every utterance. The term “tone” is to be understood in its ordinary sense, as in “don’t talk in that professorial *tone*.” *Echoic use* in RT would be considered one of the various cases of plurality of tones in that it lets one hear a voice other than that of the speaker him/herself.

A simple syntactic negative utterance like “X is not Y” proves that one utterance can present two *voices*: the one which asserts “X is Y” and the other which rejects this assertion. This is not a speculative conception but is linguistically attested.

- (5) He did *not* stay home; *on the contrary*, he went out with his friends.

In example (5), what are the two contents that are contrasted by the expression “on the contrary”? They cannot be the two segments themselves on either side of the expression: his not staying home and his going out with his friends are not contrary to each other. What is opposed to the latter segment of this utterance by this expression is rather the content [he *did* stay home].¹⁰ There are thus two contrastive *voices* presented in negative utterances, and as will be explained later, in a negative sentence, the positive content is *rejected*, while the negative content is *endorsed* by the speaker.

According to RT, reported speech is a case of the attributive use of an utterance, which, for APT, is another evident example to illustrate the presence of *voices* other than that of the speaker him/herself. Free indirect speech notably shows the “free” character of the plurality of *voices*.

- (6) He laid down his bundle and thought of his misfortune. *And just what pleasure had he found, since he came into this world?* (Wikipedia “Free indirect speech”)

The content of the second utterance cannot be endorsed by the speaker, since it is “he” who thinks of his misfortune concretely depicted by this utterance.

Other expressions such as “I heard that...,” “according to...,” “they say that...” are discussed quite often in the theory, but the following example may be of more interest in that it demonstrates a polyphony of *voices* without such a “polyphony marker.”

- (7) Bill Gates ne cesse de rappeler que le monde est dans sa “décennie numérique” (“digital decade”). Selon lui, dans dix ans, ordinateurs, téléviseurs, téléphones, appareils photo, tous seront reliés et communiqueront. Avec les outils Microsoft au milieu, afin de “donner de l’autonomie aux gens”. *Microsoft veut notre bonheur, et c’est bien ça qui fait peur.*

(Bill Gates repeatedly reminds us that the world is in its “digital decade.” According to him, in ten years, computers, televisions, telephones, and cameras will all be linked and will communicate, with Microsoft tools at their heart, in order to “give people autonomy.”)

Microsoft wants us to be happy, and that is exactly what is scary about it.

(“Un Goliath inaccessible – Grâce à ses bénéfiques colossaux et à l’emprise que lui assure Windows, Microsoft domine le marché comme jamais.” *Libération* 16/2/2003, 20)

This example is interesting firstly because it is dated 2003, and Gates’ prevision has more or less come true. This journalistic observation aside, the last utterance is the most interesting part: “*Microsoft wants us to be happy, and that is exactly what is scary about it.*” Whose voice expresses “Microsoft wants us to be happy”? Is it that of Microsoft (or of Gates), or that of the author of this article? We figure out that it is the voice of Microsoft, thanks to the second part “*and that is exactly what is scary about it.*” We know not only that it is probably the company’s mission statement, but also that the author does not endorse what he/she is writing: he/she is rather scared of this expression. This observation will be made clearer by comparing the example to the following (8):

- (8) The staff of this welfare office really want us to be happy, and we are very pleased with that.

The context change in example (8) makes it clear that the speaker endorses the content expressed in the first part of this utterance.

All these *voices* are presented with different levels of speaker commitment, depending on whether the utterance is negative, reported speech preceded by “I heard that,” “according to,” “they say,” or free indirect speech, etc. The utterance can also take on different levels of

authority. Quoted proverbs, for example, obviously do not present the speaker's voice, but rather that of a certain level of authority in that they enshrine a more or less shared principle. The theory mainly offers three *tones* which characterize three main natures of voices: *Speaker's tone*, *World's tone* and *Other's tone*.¹¹

Speaker's tone

We can say something by conceiving its content ourselves:

- (9) Tarski is much too difficult.

It is the speaker him/herself who finds it difficult to read and understand the famous mathematician's theory. In this case, APT says that the content [Tarski is too difficult] is *conceived* by the speaker, and so presented in the *Speaker's tone*.

World's tone

- (10) Alfred Tarski's family name used to be "Teitelbaum."

This utterance cannot be produced by the speaker's own conception but he/she must have *learned* this biographical information. This is thus content *discovered* by the speaker, and considered as factual. The theory thus states that the content [Alfred Tarski's family name used to be "Teitelbaum"] takes on the *World's tone*.

Other's tone

- (11) I have heard that Tarski is much too difficult.

Because of the introductory "I have heard that," the same content as in (9) [Tarski is much too difficult] cannot take here the *Speaker's tone*. It is not as a result of his/her own conception, nor can it be taken as factual; rather, the speaker has just heard about it, so he/she *received* the content. The theory calls it *Other's tone*.

3.4. Textual function

In the previous section, in order to see how tones work in concrete examples, terms such as *endorsing* and *rejecting* were introduced without explanation. In the process of bringing content into discourse, in addition to attribution of certain tones, APT proposes another descriptive notion

called *textual functions* operating independently of *tones*. Textual functions are similarly indispensable for bringing the content into discourse.

Textual functions consist of the speaker's attitudes to the utterance.¹² Three types are distinguished: *endorsing* (*prise en charge*), *rejection* (*rejet*) and *granting* (*accord*).

Endorsing

When an utterance is *endorsed*, the content is foregrounded and determines the (argumentative) continuation of the discourse.

(12) I like music; I'm delighted to go with you to the concert.

It is because the speaker *endorses* the content [I like music] that he/she can continue his/her discourse by expressing his/her goodwill to go to the concert.

Rejection

When an utterance is *rejected*, it means that the speaker refuses to continue his/her discourse in the direction of the rejected content. As has already been shown, this function is typically expressed by a syntactically negative sentence, for which the theory considers there are two contents presented.

(13) I don't speak French; it's hard for me to live here in Paris.

In the first segment of this utterance, there are two contents: [I speak French] and NEG-[I speak French].¹³ The speaker *rejects* the first by refusing to continue his/her discourse linked to it and *endorses* the second.

Granting

Granted content corresponds roughly to presupposed content: it is accepted by the speaker, as is the case for the *endorsed* content, but it does not give any discourse development, remaining in the background, not permitting the discourse to be continued and developed along its current course, nor being opposed to it.

(14) He stopped smoking.

The speaker of this utterance *endorses* the content [he stopped smoking] and *grants* the content [he used to smoke].

As is suggested, tones and textual functions work independently in bringing content into discourse. Two further examples will illustrate this independence.

- (15) I said he had stayed home, but it was a mistake.
- (16) I heard that Japan is totally contaminated by the nuclear disaster, so I advise you not to go there now.

Utterances in the *Speaker's tone* are not always *endorsed* by the speaker him/herself. In (15), the content [he had stayed home] is presented in the Speaker's *tone* ("I said"), while the speaker does not *endorse* it, as revealed by the following segment of the utterance. In (16) on the other hand, the content [Japan is totally contaminated by the nuclear disaster] is *received* ("I heard") in the *Other's tone*, but the speaker *endorses* it at the same time, as the following content [I advise you not to go there now] discloses.

3.5. Irony in the APT framework (Ducrot 2010)

In the framework of APT presented in the last sections, Ducrot (2010) proposes an analysis of irony comparing it with the negated utterance. In this paper, Ducrot considers irony to be a particular type of utterance with its content *conceived* by the speaker in the Speaker's tone but then rejected.

Firstly, rejection, in terms of the theory, is the speaker's refusal to continue the discourse in the direction of the content; however, it is not limited to utterances with syntactic negation. For example, the French adverbial "*voire*" is presented in the theory as a rejection marker (Ducrot and Carel 2006).

En disant "ce film est excellent, voire le meilleur de l'année," on s'attribue à soi-même l'appréciation "meilleur de l'année," mais d'une façon pour ainsi dire parenthétique, et on renonce à l'imposer au destinataire, à qui on demande seulement d'accepter la qualification "excellent." C'est une des différences entre "même" et "voire." (Ducrot and Carel 2006, 218)

(By saying "this film is excellent, if not [*voire*] the best of the year," we attribute the value judgement "best of the year" to ourselves but, parenthetically, so to speak, and we choose not to impose it on the hearer, whom we ask only to accept the description "excellent." It is one of the differences between "même [even]" and "voire [if not].")

In other words, we cannot continue our discourse by considering the film in question as the “best of the year” but only as “excellent,” because the latter content is endorsed while the former is rejected.

As rejection is therefore not used exclusively for negated content, it is coherent that the theory should describe the content in an ironical utterance as rejected. However, irony is characterised by the fact that rejection is realized without any morpho-syntactic marker, depending solely on the linguistic context, as is discussed also in Carel (2011b).

Let us briefly look at Ducrot’s analysis of a classical example from the French poet Nicolas Boileau:

(17) Quinault is a great poet.¹⁴

This utterance can be understood to be ironic by the fact that we know Boileau considered the fashionable seventeenth century poet to be talentless. According to Ducrot’s analysis, the content of this utterance must be conceived by the speaker, meaning it must take the Speaker’s tone, and at the same time, it must be rejected, so that the speaker has to refuse to continue his/her discourse according to the content, conceived by him/herself.

As has been shown, rejection can be realised by a simple negative utterance, such as:

(18) Quinault is not a great poet.

As the positive content [Quinault is a great poet] is also rejected in this utterance, as far as the textual function is concerned, examples (17) and (18) can share a part of their argumentative meaning.

However, there are two important differences between the two examples. While in a straightforward negation like (18), the rejected positive content is paired with its negative counterpart which is endorsed, in an ironical statement like (17), there is no such endorsed counterpart: the speaker presents just one content conceived and rejected by him/herself. This is how the ironical effect can be brought about in an effect described by Swiss linguist Berrendonner (2002) as the “falsely naïve speaker (*énonciateur en faux naïf*)” akin to so-called “pretence” in English literature on irony.

(19) Polyphonic schematization of negation and irony (according to Ducrot (2010))

Negation

[Q is a great poet]: *rejected*¹⁵

NEG-[Q is a great poet] (*Speaker's tone*): *endorsed*

Irony

[Q is a great poet] (*Speaker's tone*): *rejected*

(no *endorsed* content)

4. Common ground and differences between the two analyses

RT uses *echoic interpretation*, while APT proposes a particular combination of tones and textual functions for the theoretical description of irony. As has been noted, there are a number of fundamental differences between the two frameworks, but some possible common ground can also be suggested. RT considers irony as an echoic use of language, which is a sub-type of the attributive use of language: a certain “dissociative attitude” on the speaker’s part towards the (attributed) content of an utterance can be observed in irony. For APT, irony is realized by bringing a content conceived (in the Speaker’s tone) and rejected by the speaker in the discourse. By setting aside tentatively the important difference between the two theories on the notion of the “speaker” APT’s description of irony can be related to “dissociation” in RT’s echoic explanation. According to APT, an ironical utterance has no endorsed but only rejected content, and all these operations are carried out at the linguistic internal level. The speaker in the RT framework is a physical subject and he/she can have a dissociative attitude thanks to this linguistic arrangement by APT: rejection makes dissociation possible, and the fact that there is no endorsed content, which is specific to irony, might stimulate the speaker (in RT) to embody his/her dissociation in such attitudes as scepticism, mockery, etc.

Ironical utterances are located quite differently within the overall framework of each theory. For RT, irony is an echoic use of an utterance, and the echoic use itself belongs to the attributive use of language in general. In this sense, irony and reported speech, for example, must have a more or less comparable function in language use: their difference is considered to be a matter of degree.

Within the range of interpretively-used utterances, however, the borderline between attributive and echoic use, between ironical and non-ironical attitudes, and between tacit and overt attributions and expressions of attitude are much less clear-cut. (Wilson 2006, 1732)

In APT, however, these two kinds of utterances are analysed quite differently. Irony is realized by bringing a conceived (in the Speaker's tone) but rejected content into the discourse, while in reported speech, the content of the utterance is received, taking the Other's tone, and it can be endorsed by the speaker.¹⁶ In APT, the tone of the content of an ironical utterance is the conceived, Speaker's tone. The content is conceived by the speaker, but rejected. This apparently contradictory operation ensures the "pretence" nature of irony, which is mentioned as characteristic of irony in APT, while RT does not consider it an essential feature of an ironical utterance.

5. Supplementary discussion on APT analysis

Apart from the points discussed in the last section, two other problems concerning APT analysis arise. Firstly, RT argues that it is possible for an utterance not intended to be ironical by the speaker nevertheless to be understood as such by the hearer. As APT sets out to depict the utterance act/event (*énonciation*) from the standpoint of the speaker (even though the "speaker" in the theory does not mean the real subject of the utterance), this argument represents a real challenge. However, it does not appear difficult to give two different descriptions of the same phrase, ironical and non-ironical, and this solution does not appear to be theoretically contradictory. For example, after a meeting which finished with an ambiguous result, in some senses good and in others less positive, the speaker may say:

(20) That went well.

The speaker might utter this with no intention of its being ironical, that is, the content takes the *conceived Speaker's tone* and it is *endorsed*. But the hearer, focusing on the less positive aspects of the meeting, could understand it as ironical, interpreting it as conceived but rejected.

A second possible problem is that one can object to the claim that the content of an ironical utterance is always rejected. There are cases of ironical understatement in which the content does not seem to be totally rejected. For example, after extremely hard physical labour, the speaker is exhausted. His friend asks him "Are you ok?" though it is obviously not the case, and he replies:

(21) It was just a bit hard.

If one considers that the meaning of an utterance is based on its propositional (logical) content, the (ironically) conveyed information that the speaker is exhausted belongs to the implicature, so it could be argued that the speaker does not reject the content of the utterance which is not necessarily contradictory to the conveyed meaning. At this point, APT could possibly be judged not to account for such (lightly) ironical utterances. In response to such an objection, the following answer could be given. First of all, the textual function of rejection does not mean negating the propositional content of the utterance. It should be recalled that the theory is based on the point of view that considers meaning as argumentative aspect, and also that rejection does not mean the denial of the propositional content of the utterance but that the speaker refuses to continue the discourse in the direction of the rejected content. The speaker is exhausted after extremely hard physical labour and so all he wants to do is to go home and sleep. In this situation, he is far from ready to continue his discourse with, for example,

(22) It's OK, let's go get a drink.

To paraphrase it schematically, he refuses to continue his discourse as in (23).

(23) [Little fatigue THEREFORE OK for a drink]

APT claims this is the argumentative aspect of the utterance which is rejected in irony, so that this explanation is evidently far removed from traditional opposite meaning analysis.

It should be noted that the rejection in ironical understatements is, so to speak, *weaker* than more typical irony. Let us compare these two traditional examples uttered, of course, when it rains heavily:

- (24) a. It's a lovely day for a picnic.
b. It's not an ideal day for a picnic.

The ironical effect is somewhat stronger in (24a) than in (24b). For the moment, APT has not yet considered this problem of the “graduality” of *textual function*, but as these examples show, content can be strongly or weakly *endorsed*, *granted*, or *rejected*, and the difference of the force of the textual function is not a matter of the propositional content of the utterance, rather of its argumentative aspect for continuing the discourse in the direction of the content.

6. Summary and concluding remarks

This chapter aimed to find a way to compare and connect two metalinguistic discourses fundamentally different from each other, but treating a similar kind of utterance: irony.

The echoic analysis of RT is founded on the view that there is interpretive use of language opposed to descriptive use. Leaving aside the fundamental difference between the two theories in how to treat the meaning of the utterance, as has been discussed, echoic use can be compared to the polyphony of tones and textual functions. According to echoic analysis, “the speaker (generally tacitly) expresses one of a range of dissociative attitudes (scepticism, mockery, rejection, etc.) to a (generally tacitly) attributed utterance or thought” (Wilson 2006, 1730). The APT description can be said to try to depict this dissociation by constraining itself to the linguistic aspect, attaching importance to its argumentative aspects. This chapter claims that many of the things depicted in terms of cognitive pragmatics should still be described in linguistic terms, and that there must still be more linguistic phenomena to be treated at the level of the linguistic structure. Polyphony is, it must be emphasized, in language, and it is language itself that commands the *tones* and *textual functions* of an utterance at the moment of the utterance act/event, and their disposition may prepare the dissociative attitude of the real speaker who uses his or her utterance as an echo.

There is a need now for the possibility of APT correctly depicting other different kinds of ironies to be researched. The APT analysis of irony is a linguistic setup related with the dissociative attitude of the speaker, so the various effects of irony must be examined in more detail.

CHAPTER EIGHT

PRAGMATIC VS. ENUNCIATIVE VIEWS OF SPOKEN ENGLISH DISCOURSE: INTERPRETING THE PROSODY OF CERTAIN PARENTHETICAL “COMMENT CLAUSES”

STEVEN SCHAEFER

Introduction

In recent years, debate over the use of expressions known as “comment clauses” in discourse analysis has been dominated by pragmatic linguistics. From this point of view, expressions like “I think,” “I mean,” “you know,” “I believe,” etc. are thought to have evolved into markers of subjectivity in verbal exchange starting from an introductory S-V matrix structure embedding a subordinate proposition and ending up as a semi-grammaticalized adverbial disjunct; these derived forms which are seen to help structure discourse are considered to parenthetically frame a main clause, and as such have accrued expanded distributional properties. Their use has become so overwhelmingly present in casual speech that they have developed into a new family of discourse marker.

As defined by Brinton (2008, 1) a discourse marker is “a phonologically short item that is not syntactically connected to the rest of the clause (i.e. it is parenthetical), and has little or no referential meaning but serves pragmatic or procedural purposes.” For Quirk et al. (1985, 1114) such “comment clauses are either content disjuncts that express the speakers’ comments on the content of the matrix clause, or style disjuncts that convey the speakers’ views on the way they are speaking.” These secondary expressions include a variety of syntactic categories, discursive functions and lengths, interpolated into an utterance in one of three linear positions, initial (introductory), medial (interpolated) or final (or juxtaposed, a term also used for initial position) in relation to a central

proposition which is thereby qualified or commented upon by the speaker. According to Bolinger (1989, 186), for whom interpolated expressions are the only true parentheticals, “the typical parenthesis has three prosodic characteristics: it is lower in pitch than the matrix sentence, it is set off by pauses, and it has a rising terminal. [...] ...but any one of the three can be suspended, and the suspension will often depend on the length and the syntactic makeup of the parenthesis.” It is revealing that semantics do not enter into consideration here. Bolinger concludes that as parenthesis interrupts the prosodic flow of the utterance, it has a number of predictable effects on intonation. As we will see, these effects are in fact often less predictable than is reported in the literature.

The present study focuses on the contrast between functional or pragmatic uses and constructivist or “enunciativist” approaches to the prosodic realization of two specific types of comment clause (*I think* and *you know*) in parenthetical—and seemingly non-parenthetical positions.¹ My aim here is to broaden the definition of parentheticals in the sense that they be not considered solely either on syntactic or prosodic criteria, but on a range of other considerations, including their combination with other markers, and above all in relation to the utterer’s subjective point of view. I will first briefly outline the work being done currently in the prosodic analysis of their structure and use in oral English, both in Southern British and American varieties. This will then lead me to make a number of liminal remarks on the theories underpinning these studies. The data used for this study of the two discourse markers *I think* and *you know* come from four separate corpora: a selection of five recordings from the London-Lund Corpus, another selection of six recordings from the Santa Barbara Corpus, a Radio 4 interview with Tony Blair, and a BBC radio programme, *Start the Week*. (Details of the corpus selection will be given in Section 3.)

Subsequently a comparison of the two competing theories will be offered, still within the area of parentheticals in oral discourse. I will attempt to enumerate my theoretical objections to a pragmatics-oriented approach, all the while acknowledging the credit due the many researchers who have spent time exposing problems in discourse analysis that have made my area of inquiry possible. Subsequently it will be necessary to outline certain metalinguistic concepts and terminology used worldwide in some detail before highlighting the insights of an enunciative analysis of the same phenomena, relating the data to an utterer-centered model inspired in part by the work of Emile Benveniste and subsequent developments in Antoine Culioli’s Theory of Enunciative Operations.

1. Pragmatic characterization of discourse markers

1.1. Since Chafe (1986, 263) identified the function of “I think (that)” as the expression of a *mode of knowing*, linguists have pointed out its distributional versatility in terms of sentence position. Thompson and Mulac (1988, 165) notably made a grammatical distinction between “I think (that),” a complement-introducing main clause, and EP (epistemic phrases in medial position) or EPAR (epistemic parentheticals in final position), both considered as nascent forms of grammaticalization, thus rejecting the long-held thesis of “that-deletion” as powerless to explain these expanded distributional properties. In their pioneering grammatical study on parenthetical expressions in casual American speech, they focused on which syntactic position was privileged. Target expressions such as *I believe*, *I assume*, and *I think*, were included, as well as others such as *I mean* and *you know*. While *I think* and *I believe* have been treated elsewhere as epistemic adverbials in the literature, *I mean*, *you know* and *you see* have been treated chiefly as discourse markers. While initial position *I think that...* was seen to function primarily as a main clause introducing a complement clause in “I think that we’re definitely moving towards being more technological,” occurrences of “that-deletion” were seen as epistemic phrases “I think exercise is really beneficial, to anybody,” an initial step in a process of grammaticalization, initial *I think* functioning as an epistemic marker conveying a lessened degree of certainty. In final position or clitic *I think* e.g. “...it’s just your point of view you know what you like to do in your spare time I think” was a more fully grammaticized form with the same function (ibid.). On the basis of these examples, taken at random from their corpus, it is at first difficult to grasp the distinction they are trying to make as regards meaning.

In their view, the “complement clause” becomes the topic of discourse when not introduced by a conjunction of subordination, and therefore the main clause subject undergoes a “process of semantic bleaching,” functioning as an epistemic morpheme. Only those occurrences where the epistemic phrase (EP) is not initial, i.e. here final, were considered as true epistemic parentheticals (EPAR). Two criteria were retained in this hypothesis of grammaticalization: the first was that the frequency of expressions that can occur without “that” is directly proportional to their capacity to occur as EPARs. The other is semantic, as “the meanings of the verbs which appear most frequently as EPs are those associated with belief as a mode of knowing,” as proposed in Chafe (1986, 263) though our concern here will be less with the type of knowledge referred to in the Chafean sense, based on extra-linguistic factors, than to the formal

characteristics of linguistic constructions employing verbs of knowing or of presenting thought content.² What has come to be termed “epistemic stance” is defined by Kärkkäinen (2003, 19) as “ways of showing commitment towards what one is saying”; she considers that attitudes towards knowledge are part of this, so that “evidential distinctions are part of the marking of epistemic modality.” The expression most closely corresponds in our terms to the construction of a subjective point of view in the utterance, regardless of the form or source of knowledge. This POV takes as its object a proposition (what is said) and qualifies it as an adverbial would, and at the same time individualizes that propositional content as the scope of the modalizer; this will have distinct consequences for the co-locutor (often simply termed “the hearer”)—who is in principle outside the scope of this modalization—when confronted with the utterer’s positioning with *I think*. By way of contrast, the subjective point of view constructed with *you know*, which attributes the anchoring of content under scope to the co-locutor, externalizes this POV. An analysis of these two constructions will be developed here.

A quite recent study of discourse markers based on the ICE-CAME corpus of British English by Dehé and Wichmann (2010, 1) reformulated the principle of grammaticalization, integrating specific prosodic cues into the analysis. Rather than qualifying comment clauses, or epistemic parentheticals (*I think, I believe*) as inherently sentence adverbials relating to the “truth value” of the proposition, the authors see EPs as occupying a “transitional place in the process of semantic change.” The process of grammaticalization is thus seen to correspond prosodically to the loss of pitch movement on these expressions as they become “ossified” in a reduced acoustic form, with a concurrent shift from comment on propositional meaning (adverbial) to discourse or formulaic meaning (pragmatic), or finally to function as a verbal filler in disfluent speech. Following a painstaking prosodic analysis of a fairly largely number of items from the ICE GB corpus, this process of grammaticalization is presented as justification of the pragmatic functioning of *I think*:

Most importantly, these authors favor a parenthetical analysis in their approach and show that there is prosodic evidence in favor of it. They start from the premise that the comment clause is separated from the “anchor” clause by a syntactic phrase boundary, which in canonical prosodic theory coincides with a strong prosodic boundary. This is the assumption that parentheticals are “external to the root sentence they are associated with” Nespor and Vogel (2007, 186), who assume that they “form intonation domains on their own.” As seen above with Bolinger (1989), parentheticals are often observed to constitute their own intonation domain (IU) and to be

Propositional -----Formulaic		
Prosodic separation and prominence go along with semantic transparency: expression of speaker attitude (genuine uncertainty, doubt, etc.)	Prosodic integration and deaccentuation go along with semantic bleaching: comment clauses are used for discorsal, interactional and interpersonal purposes (politeness, mitigation)	Comment clauses mark phases of disfluency and hesitation: they reflect mental planning and word-searching phases or are used as floor-holding devices; they co-occur with other disfluency markers

Fig. 8-1. Cline of grammaticalisation, in Dehé and Wichmann (2010, 24).

marked by a change in pitch level, intensity or tempo in relation to the primary utterance. Prosodic cues that can indicate phrase boundaries at the beginning and/or end of parentheticals include pauses, rising pitch at the end of the preceding domain or at the end of the IU formed by the parenthetical, and the blocking of sandhi (linking) phenomena between IU. However, certain types of the shorter parentheticals such as the comment clauses (*I think, you know*) under consideration here can be prosodically integrated into an adjacent intonation domain. The point of view espoused in the foregoing study (Dehé and Wichmann 2010) holds that once a sequence has been grammaticalized as a comment clause, with pragmatic functions, we can ignore its constituent parts, i.e. the subject pronoun *I* and the predicate *think*. It will be seen that this view runs counter to our own findings. I have retained these last two comment clauses, preferring them over several others (*I mean, I believe, I suppose, you see, you think*) in this study for two reasons: firstly, to simplify the demonstration and secondly due to their overwhelming ubiquity in contemporary English, both in RP and GA, regardless of considerations of style and discursive context.

It is our hypothesis that all of these expressions are to some extent parenthetical, and typically retain the same interactive function when they occur initially, finally or medially. Hence, when they initiate an utterance, they can still be understood as discourse markers (though non-parenthetical in a linear sense), behaving as analysable constructions. They contrast, interestingly, with expressions composed of the verbs *think, know, believe* and *mean* with a different subject (e.g. *you think, you know, you believe* and *you mean*), which retain much the same meaning whether as main clauses or as comment clauses.

The syntactic argument was also challenged by Kärkkäinen (2003) as ignoring the organizational function of intonation units (IUs) for defining

the scope of the parenthetical expression *I think*. Her analysis hinges on the interactive nature of IUs in “turn-taking” and “turn management.” Although it also treats prosodic organization, her viewpoint considerably complexifies the process of analysis, as she maintains that *I think* is always forward-looking (meaning it is essentially always initial in a tone unit), which attaches it not necessarily to the discourse material in its scope, but rather to the IU in which it occurs (Kärkkäinen 2003, 30). Our approach tries to strike a compromise approach, whereby both the prosodic information as well as factors indicating scope and other co-occurring material (logical markers, comment clauses, etc.) are taken into consideration.

1.2. A variety of discourse functions for *you know* are identified by Fox Tree and Schrock (2002, 727), who reviewed much of the pragmatic literature on the subject. Firmly placing their analysis in current Relevance theory, they see *you know* (and *I mean*) as competing forms in many contexts, with varying nuances of local meaning. Following a principled analysis of common functions found in the literature for these expressions, they conclude that *you know* not only takes a “basic meaning” of shared knowledge, but attribute its use to inferences in the Relevance-theoretical sense.

A distinction made by these authors may help to shed some light on a basic difference between the marker *you know* and the modalizer *I think*: whereas the latter has an adverbial function in commenting on the matrix proposition, *you know* is said to have another, “metacommunicative” function. It focuses not on the substance of the message but rather on the success of the communication (Fox Tree and Schrock 2002, 728). In their view, this essential functional difference justifies their definition of the basic meaning of *you know*: it not only invites the addressee to share background information, but at the same time helps him to make the appropriate inferences as to the speaker’s intent, with no clear evidence of how this is accomplished, nor in what sense this could be considered a linguistic interpretation. This is of course an indirect reference to Relevance theory, but with no convincing argumentation to back up its claims (Wilson and Sperber 2002, 249). For example, they claim that this basic meaning of *you know* can explain its usefulness in conveying politeness, positive or negative. In this first sense, the marker is thought to help one distance oneself from face-threatening remarks by a tendency toward vagueness, in the second, to invite addressees’ interpretations, thus achieving negative politeness. The familiarity engendered by shared views is seen as a positive function, although they concede that *you know* may

not necessarily imply politeness. They conclude that for the interpersonal function, politeness is in fact a product of a situation and not a particular marker. Their discussion is a good example of taking a discourse marker at face value, which results in a circular argument, without asking oneself if it may be used for different purposes because it constructs meaning in a particular fashion in each context.

Unfortunately, relative little linguistic information can be gleaned from the Relevance theory they claim to be illustrating, and their remarks on inference remain on the whole unconvincing. Sperber and Wilson offer a theory of “relevance” that is more a theory of human communication than a formal linguistic theory, and one which revises Gricean principles and Grice’s prescriptive approach to language use. Their theory is based on what they call a “principle of (optimal) relevance,” a specific understanding of the notion of relevance related to the notion of cognitive environment as they understand it (Wilson and Sperber 2002, 250). However, this is an intentionalist theory of human action, as it abstracts away psychological inferences from language acts, and pays little attention to language form as such. As a “universalist” theory, it only considers strongly oriented usage, as the means to assure communication, but does not account for the very complex functioning of attested language use, especially in consideration of specific socio-cultural constraints that may come into play. For these authors, information is only relevant in the measure that it contributes to intended meaning; in such a scheme, the effort required by the addressee (or “hearer”) to make the necessary inferences to decipher intended meaning is considered to be inversely proportional to the relevance of the “talk” (discourse). At bottom, their model posits an irenic view of communication, where unsurprisingly the pragmatic goal is successful communication, and where the complexity of actual language use, both irenic and antagonistic, is glossed over.³

2. An Enunciative approach to discourse

2.1. The problem posed by language structures involving the speaker’s point of view (and not simply his “attitude”) in relation to his use of metadiscursive forms was certainly in the air early in the twentieth century, though perhaps only in anecdotal form. It was only much later that an examination of the nature of comment clauses was carried out in the form of an article originally published by Emile Benveniste ([1966] 1971, 228):

Now a number of verbs do not have this permanence of meaning in the changing of persons (as with *I suffer, you suffer, he suffers* - SS), such as those verbs with which we denote dispositions or mental operations. In saying *I suffer*, I describe my present condition. [...] Can I consider *I believe* to be a description of myself of the same sort of *I feel*? Am I describing myself believing when I say *I believe (that...)*? Surely not. The operation of thought is not at all the object of the utterance; *I believe (that...)* is equivalent to a mitigated assertion.

Although he did not examine parenthetical expressions as such, his insights into the subjective nature of similar expressions lead to an interesting line of inquiry. Can the various currents of contemporary enunciative theory, more or less directly inspired by the work of Benveniste on subjectivity in language contribute positively to the debate?⁴ The scarcity of enunciativist publications in English has not, of course, helped to acquaint American or British linguists with this specifically French approach to linguistic analysis. Recent publications such as those of Elise Kärkkäinen (2003) may, however, serve to establish common ground to bring these theories closer through discussion and extensive studies; as she stresses the concept of “epistemic stance” in the interpretation of comment clauses, clearly related to speaker attitude, her contribution is thus—in theory—compatible with Benveniste’s insistence on the role of subjective “attitude” in the role of the utterer towards his propositional content in utterances introduced (or framed) by, and therefore modulated by, some of the expressions listed above.

It is our contention that this variable functioning of the comment clause *I think* (and perhaps not limited to it alone) is due to the construction of its shifting relation to the “subordinate” (seen as thought content contained in the proposition or *lexis* in enunciative terms), that has been analyzed by Wyld (2001, 142) as operating on two levels, syntactic but also enunciative, where there is a kind of “inverse subordination” in complex sentences. It is this reconfiguration of the positioning of the uttering subject-enunciator which for us engenders the mobility of comment clauses, and which accounts for the confusion between a choice of parenthetical positions and a tendency to the reduction of the acoustic form and to what is considered as grammaticalization, or accompanying loss of semantic content.

2.2. In this paper we will be using a number of concepts of the Theory of Enunciative Operations (TEO) as elaborated by Antoine Culioli and two generations of students and associates. The theory maintains that the production of an utterance implies the endorsement of a predicative

relation (consisting of notions) by an utterer (or “enunciator,” a term coined in English to translate the French *énonciateur*). The operation by which the enunciator evaluates this relation corresponds to some form of modalization, or establishment of a point of view: to simplify by taking the familiar terms Subject and Predicate, the resulting predicative relation <S*P> can be considered as certain, possible, good, bad, necessary, etc. The end configuration will invariably be complex, but will favor a particular modality in the realisation of the utterance, such as assertive modality (where the utterance is judged by the utterer to be adequate to the extra-linguistic world, and can be validated as such), epistemic modality (the chances that the relation will be validated), appreciative modality (the valuation of qualities attributed to it) or interpersonal modality (the relationship that the utterer entertains with another, or attributes to him). However in most cases, an utterance is a mixture of compatible modalities.

An important part of our approach, inspired by the TEO, will be to consider the construction of an enunciative space with each utterance act whereby the enunciator deploys a minimal enunciative structure which is dissymmetrical in nature, as it takes the parameter of enunciator (*S₀*, along with space/time coordinates *T₀* which together constitute the Situation of uttering *Sit₀*) as its absolute origin.⁵ An utterer-centered approach means just that: one structured around the ultimate point of stability, the enunciator and his discourse, anchored in a situation; this language activity then involves *representation* (relative to the cognitive processes that “recreate” the world in language), *referencing* (relative to the situation) and *regulation* or *adjustment* (relative to the co-enunciator).⁶

The metaphor of the “communicative model,” or sender-receiver model of a hypostatized message (transposition of the sender’s thought into language, in turn decoded by the receiver) is rejected here. In other words, each utterer posits the “addressee” in abstract terms as a *co-enunciator* (a complementary coordinate position in the system, which may or may not be identified specifically as “you” in the extra-linguistic world of the speech act). However, in the sense that the enunciator is identified with “I” in this individual speech act as the one who endorses the predicated content (cf. *I think*), the co-enunciator is simply an image in language when expressed, or an implied entity when unexpressed, not necessarily present in the utterance but always present in the utterance situation (*Sit₀*).

2.2.1. The assertion of the predicative relation <S*P>, whether positive or negative, consists in choosing one value for the predicative relation P considered as the Interior or Exterior (p, p’) of a notional domain. If the

relation is validated, then the Interior value *p* is chosen to the exclusion of its opposite *p'*. However, a predication introduced by *I believe* (or *I think*), to take the simplest example, is not fully an assertion. What the speaker endorses is his point of view concerning the adequation of the propositional content of the predicative relation; it neither corresponds to the Interior or Exterior of the notional domain, but IE: it favours *I* without however excluding *E*.

- (1) You wrote the book over three years, and you wrote the book, *I believe*, in long hand. *T. Blair Interview*

In the first part of this coordinated utterance, <you wrote the book over three years> functions as an impersonal assertion, and is fully asserted, i.e., considered as being validated for the enunciator (IE->I) where *I* “is the case” corresponding to the current state of affairs; however, the second clause, with an interpolated comment clause *I believe*, is presented as merely being tentatively the case: unable to assert, the position of the enunciator *S*₀ is at the boundary position in a movement towards the center [IE-> I(E)] where *E* cannot be excluded as “being the case.” This is in essence the parametric description of a simple enunciative positioning, and where the position of the enunciator leads the co-enunciator to react to this position, and endorsing in turn <I wrote the book in long hand> as “being the case.” As regards *I think*, we have seen some claims that the parenthetical forms cannot be syntactically derived from the introductory matrix clause in initial position, followed by the subordinate clause with—or without—the complementizer *that*. For example, we have an egocentric point of view expressed in:

- (2) I think he’s a total fraud. *LLC 2-3*
 (2a) I think that he’s a total fraud.

In both cases, *I think* relays an opinion established in the subordinate as to the character of a certain Herbert Kahn, American right-wing Cold War polemicist and founder of the Hudson Institute. There is no true “epistemic” value of uncertainty here, as claimed by the authors mentioned above, but an opinion attributed solely to the utterer (identified here as the enunciator-origin of <he’s a total fraud>) who thus endorses the statement in relation to his point of view. Although we are still in the realm of certainty concerning the point of view, this does not guarantee the assertion of the entire utterance. On the other hand, such a statement without this explicit attribution of the utterer’s point of view, is impersonally asserted:

(2b) He's a total fraud.

Here the predicative relation in utterance in (2b) is both endorsed by the utterer and validated as “being the case,” thus potentially endorsed by any other utterer in the capacity of enunciative source. At this point, the discursive exchange leaves the co-utterer entirely free to endorse this statement as his own, reject it or ignore it.

With *I think* <S*P>, regardless of the position contained in the comment clause, the position of S₀ is constructed relative to the proposition as a POV, but equally in relation to the enunciative domain, where it constitutes a position relative to S'₀, whether expressed or not. The functioning of point of view will depend in large part how the propositional content is presented, but also on the position of S'₀ created by S₀ in his utterance, which then will influence the position of (the co-utterer) S'₀ in his turn to intervene as enunciator.⁷

2.2.2. Doro-Mégy (2008, 30) has termed the value for this construction in (2) *I think he's a fraud* as “qualitative alterity” (*altérité qualitative*); that is, the enunciator-source, identified to “I,” remains neutral but relays a point of view in a modalized predication (presence of the valuative term “fraud”). As *valuative modality* is preponderant, *alterity* is constructed relative to another (potential) enunciative source, so that although the POV expressed here is presented as being unique, its endorsement by another utterer cannot be excluded. Elsewhere, we do find a more clearly delineated “epistemic” value constructed with *I think*;

- (3) A: I don't think this is Charlie Wilson's line
 B: you don't...
 A: honestly - - *I think* he's he's entirely taken up with English as a second language - - I - I may be complete - completely wrong about that ... but (clears throat) *LLC 2-1*

Here the utterer constructs a point of view in relation to the predication “he's entirely taken up with English as a second language” which is not only *not* asserted, but is presented as being uncertain. The following line (“I may be completely wrong”) justifies this interpretation, although its presence is optional and we cannot always rely on such “evidence.” The difference to the utterance in (3) is that the “subordinate” predicative relation bears no trace of a modalization, nor is any subjective point of view already present in the proposition. Again in the following example, the utterer indicates his uncertainty as to the going pay rate for research assistants:

- (4) – and what sort of rates do you pay for this sort of thing!
 – well, I’m sorry, I ought to know this. I think it’s about one-fifty an hour. *LLC 3-2*

Doro-Mégy (2008, 28) has proposed the term “alterity of propositional value” (my translation of *altérité des valeurs*) for constructions which are interpreted as epistemic. It applies to utterances where the predicative relation contained in the proposition, which refers to an external event or property, becomes unstable when modalized by *I think* so that if (I) is chosen as the selected value, (E) cannot be excluded as we saw in the second clause of (1). Other examples of *I think* in final position bear witness to the fact that this interpretation is in no way dependent on the position of the comment clause:

- (5) [hmm] Charlie Wilson’s just been here - he’s been here two or three weeks ago - - [erm] - - he left on - - July the twenty-eighth. June the twenty-eighth, I think *LLC 2-1*

In (ex. 3, 4, 5) where the interpretation of the utterance is epistemic, *I think* is in initial or final position, and the verb carries stress (nuclear stress in ex. 5). Does this mean there is some kind of equivalence between an epistemic interpretation and sentence position? Confronted with the evidence in our corpus, this would be a presumptuous conclusion. In her review of prosodic literature, Kärkkäinen (2003, 110) concludes that semantic meanings like “insufficient evidence” (epistemic interpretations) and “opinion” (subjective point of view) can be distinguished by prosodic means.⁸ This is surely an over-simplification. However, if the comment clause is seen to induce an interpretation of uncertainty on the part of the utterer, and there is some degree of stress on the clause, this will fall regularly on the verb and not on the subject pronoun, as predicted. There is a simple explanation for this: as a stress on the pronoun implies the increased pertinence⁹ of this item, it is because the referent (here the utterer is referred to by “I”) can be considered as unique (in relation to other enunciator-locutors who may have an opinion). When one doubts, one doubts alone. It is only in modalizing, that is evaluative modality, that a contrast in prominence is possible on the subject pronoun.

A third type of configuration, “radical alterity” (*altérité radicale*) is identified by Doro-Mégy (2008, 31) in those cases where the enunciator can be represented abstractly as a contesting subjective pole of alterity, in relation to the subject of the utterance S₁ (different to S₀), and whose position he rejects as being “not the case.” We will address our remarks to this configuration in section 3.2.3. below.

2.3. Underlying what has heretofore been observed as the grammatical expression of parenthetical or comment clauses is the semantic structure of the two verbs *know* and *think*: both are subject to constraints on any “subjective” predicate as a mode of presenting an inner state. These verbs do not function in quite the same way when used with a first- or second-person pronoun subject, to the extent that one cannot assert what another knows (or thinks). When the utterer uses *I think* or *I know* (which do not reflect the same degree of certainty), the propositional content governed by these verbs is seen to reflect a subjective view, or “stance.” On the other hand, when an utterer uses *you know* (or *you think*), he or she can have no certainty of the validity of the point of view attributed to the other, i.e., cannot assume responsibility for the subjective state of the other, and therefore cannot assert. We will see that this is the case, no matter which sentence position the comment clause may occupy. The use of this construction as an introductory clause will therefore be interpreted as a supposition (“you know what the police will say...”), as a request for confirmation of a contested affirmation (“you think you’re smart?”) or as an modulated reproach (“you know you can’t treat people like that”), thus a particular type of modalization in each case. The role of the *otherness* (“alterity”) constructed relative to the interlocutor is at the heart of a number of such expressions, and as I will argue, at the heart of all *you*-parentheticals as well. In this example taken from the London-Lund corpus (with a modified transcription), *you know* cannot directly introduce a subjective view assumed by the other, as the expression *you must* reflects the utterer’s own view; hence the prosodic break after the initial comment clause and the indirect implication of the other in the reasoning behind this advice (Peter is not being directly addressed here):

- (6) I’ve been telling Peter / as I’ve been telling several [er] people / *you know*—you must get into—into [er] permanent jobs / and I’ve been urging Peter / Peter to go back into school teaching/ *LLC 3-3*

A manipulated or contrived subjective point of view is attributed to the other with parenthetical *you know*; to the extent that the disjunction of the comment clause disengages the responsibility of the utterer and creates a false positioning of what the other “knows,” the utter can endorse the proposition content of the predication framed by *you know*, but in the sense only that this is presented as being a “shared view.” This has come to be the most widely accepted definition of parenthetical *you know* seen from the pragmatic view of wanting to share information or find common ground (Schiffrin 1987, 268). Though this interpretation is not entirely incorrect, it cannot account for other “functions” of the discourse marker.

- (7) A: I have a coupla parents I keep sending messages to, call the *officina*, fill out this form, because your kid can't have free lunch. ...Like for my first week, I had, like, five dollars to my name, or something like that. ... I gave it all to the kids... all week long...
 B: Mm.
 A: ...because their parents, were too lazy to come, ... and, and fill out the stupid form, ...*you know*, an application.
 SBC008

In this example, the pragmatic interpretation lies somewhere between sharing knowledge (or presenting it as such) and making a term more explicit, that is, an enunciative operation of notional adjustment in relation to the co-enunciator which is introduced by the comment clause.

3. Discussion: a Combinatorial analysis

3.1. The data sources for the following analysis of the two discourse markers *I think* and *you know* come from four separate corpora: a selection of five recordings from the London-Lund Corpus, another selection of six from the Santa Barbara Corpus, a Radio 4 interview with Tony Blair, former British Prime Minister, following the publication of his memoirs and a BBC radio programme, *Start the Week*. The type of discourse is more or less informal conversation between equals, although some portions of LLC include professor–student relations; the radio programmes are thematic and slightly more formal, as intended for broadcast on specific topics. The comment clauses under discussion were retrieved from existing transcriptions of the larger corpora, though the shorter radio corpora were transcribed by hand.

Corpora used:

- London-Lund Corpus of British English (1969–73): LLC 1-3, 2-1, 2-2, 2-3, 3-1
- Santa Barbara Corpus of American English(1990–95): SBC0001, 0002, 0003, 0004, 0005, 0008
- Tony Blair Interview on Radio 4 (2010)
- *Start the Week*, BBC Radio 24.01.2012

Overall, out of some nine hours of recorded material, 115 tokens of *I think* and 310 tokens of *you know* were identified. Of this total, nearly half were isolated after auditory analysis and a shorter list was established of the tokens of the highest acoustic quality, without crosstalk phenomena which tend to obscure the intonational melodies. Instrumental analysis was

done with Praat software, which was used to for the visualization, annotation and presentation of intonational contours. This also involved consideration of segmental information, parameters of length, f_0 , and amplitude contributing to boundaries of prosodic domains, as well as stress phenomena. Marking of melodic movement (recoded maxima and minima interpolated into IU groupings) was done following the British tradition of O'Connor and Arnold (1973, 7–30) which identifies prosodic grouping around a nuclear stress movement (Prehead – Head)—Nucleus—(Tail) where the nucleus can take one of four basic forms: the fall (high and low variations), rise (high and low variations), rise-fall and fall-rise, identified as complex tones.

3.2. Our interest in this study was to subject all tokens of these parentheticals to spectrographic analysis, in order to answer some of the following questions: Does the prosody of the sequence derive from sentence position, or the opposite? Can the epistemic form carry nuclear—or pre-nuclear—stress? How are the distributional constraints on focus accent within the comment clause to be explained? In the present study, a combinatorial approach is applied to the prominence profile typically corresponding to an epistemic or stance-marking form of the phrase, whether in initial, median or sentence-final position. We will examine in turn a number of examples of both discourse markers first when they occur in a prosodically separate comment clause (constituting its own intonation unit or IU), followed by examples where the comment clause is integrated into the prosodic domain of the proposition in its scope, and finally more complex prosodic configurations. We have admittedly less to say about intermediate cases where the context lends itself to hesitations and disjointed utterances, and where the marker assumes a more clearly “grammatical” or pragmatic function. If there is any “semantic bleaching” in such cases, it is because the hesitations prevent any semantic content from being expressed at all, and there we find the comment clauses are used to express affect.

3.2.1. The comment clause in a separate prosodic unit

For reasons of comprehensive treatment, both markers in initial position will be examined—even *I think* which is not generally thought to be parenthetical in initial position preceding its scope:

- (8) A: Why did that have to be a big announcement? (about the publication of the memoirs)
 Couldn't you have done it quietly?

B: I think, w- we came to the conclusion it was never going to remain quiet...

and therefore you might as well just be open about it...you know, and.. I did it for the reasons I stated.

T. Blair Interview

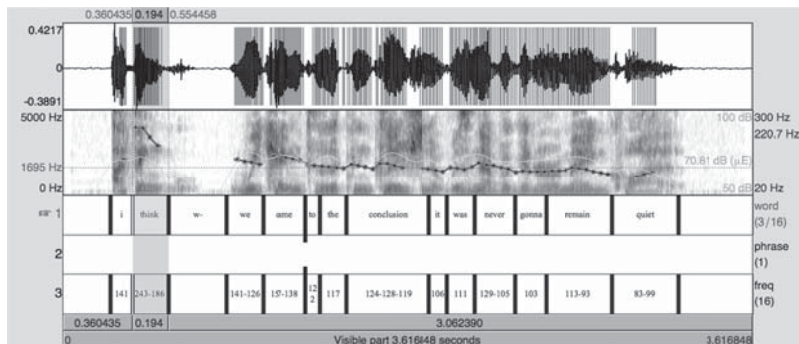


Fig. 8-2. *I think, w-we came to the conclusion it was never going to remain quiet – T. Blair Interview.*

It could be objected that this is an example of hesitation following an introductory matrix clause, although the prosodic separation of *I think* from what follows corresponds to a semi-filled pause of 0.25 ms; moreover, the high fall (heavy dotted line in lower field) on *I think* is not perhaps unrelated to the melody contour continuing on *we*. In any case, the modalization due to the “comment clause” seems to indicate some degree of reservation as to the validity of <we came to the conclusion that it was never going to remain quiet> which seems to be an approximation, and I think may be glossed as “it seems to me.” Other examples beginning with “I think certainly/possibly, etc.” followed by a pause argue in favor of an initial comment clause with *I think*.

The following two examples involve the positioning of two protagonists, a young woman being prepped to testify against a flasher in the San Francisco rapid transport system, and the woman lawyer representing her. The lawyer remarks that flashers don’t bother other men.

- (9) A: .. a man would never do that.
 B: [Mhm].
 A: Because, number one they pick out, .. *I think* .. more vulnerable people.
 B:[Mhm].

A: But if,.. um,... a man .. were to be exposed to, they would ... laugh, .. or, .. you know, be disgusted, or be mad, but they wouldn't necessarily feel .. scared .. or threatened.

SBC0008

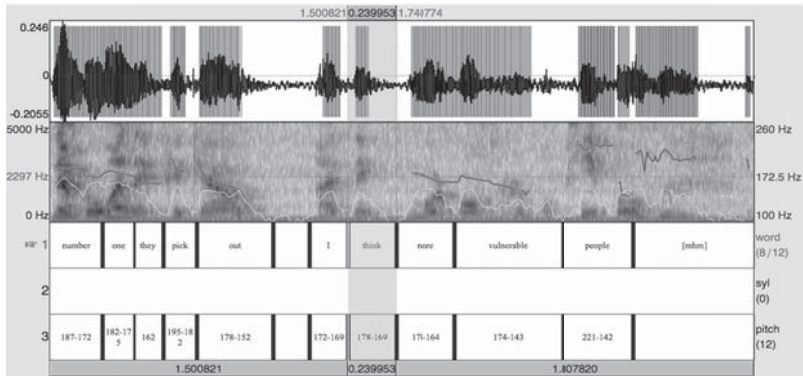


Fig. 8-3. *Number one they pick out – I think – more vulnerable people – [mhm]*
SBC0008.

In fig. 8-3 we find *I think* in medial position, clearly set off by pauses. (The high pitch at the end is due to the backchannel [mhm] which overlaps with *people*. The prosodic realization is similar to that described by Bolinger (1989), though the pitch level of the clause is at the same level as the rest of the proposition. This may be due to hesitation, interrupting the flow of the melody to make the insertion more noticeable. As the proposition occurs in an enumeration of characteristics for “flashers” or exhibitionists, the comment clause denotes a relaying of the opinion being expressed, and therefore a relative high degree of certainty.

- (10) A: that's what it look like,
 B: ... *I think* that's, I think he finds somebody that's isolated,
 A: [Mhm].
 B: and he ... goes for a certain age group, *I think*.
 A: Yeah.
 B: Um, ... and, *you know* like, for some reason *I think* he likes students, or people who look like students.
 A: [Unhunh].
 SBC0008

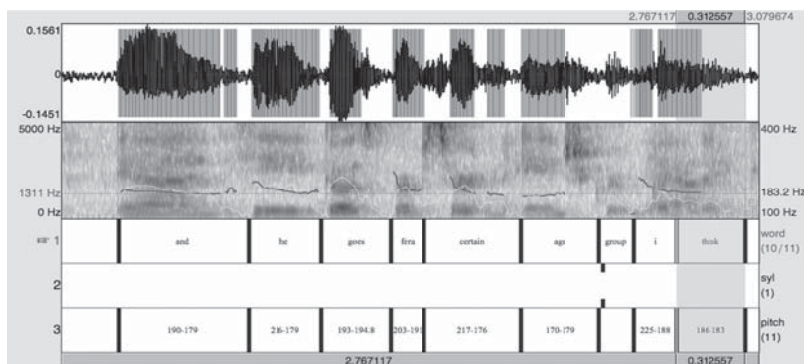


Fig. 8-4. *and he goes for a certain age group, I think. SBC0008.*

In fig. 8-4 we find *I think* in final position, clearly set off with a change in pitch direction. Following two instances of initial *I think* earlier in the passage, the utterer (the actual speaker is a woman lawyer) is advancing her hypothesis of how the flasher operates; although she has no absolute certainty, this is nevertheless the content of her considered opinion, relayed by the final *I think* and attributed as an afterthought to herself as enunciator-origin.

As regards *you know*, it is found much more often than *I think* in a separate intonation unit in our corpus, as the following examples show. In certain cases of repair, or reformulation, *you know* is inserted medially in the on-going utterance, though technically the comment clause is separated from what follows by pitch direction:

- (11) A: .. And then, our job, is to shape the shoe, .. to the horse's foot....
 And that, it d- it sounds easy, .. but it's really hard to do. ... I mean,
 some of 'em you have to, *you know*, like say, okay, say your shoe's
 like this?.. and your horse's foot is just really wide or something? ..
 Well then you have to put it on the anvil, and get the shoe stretched
 out, well then once you stretch the shoe out, ..well then, the two
 corners...they go out, too. *You know*, okay your shoe's like this? ...
 You stretch this out, well then it's gonna make these go way out, too,
 and they get like this?
 B: Right.
SBC0001

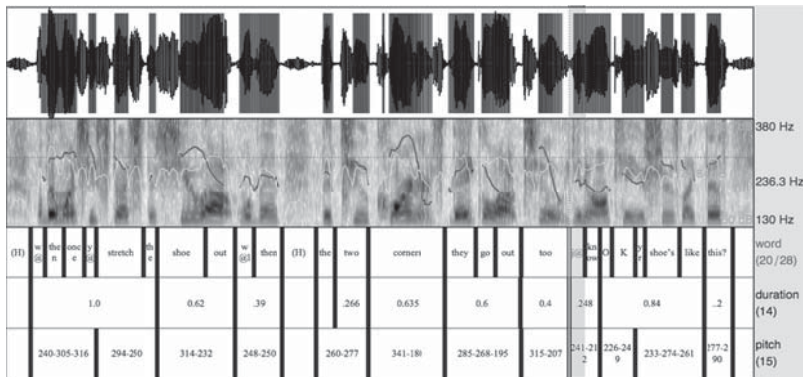


Fig. 8-5. (H) well then once you stretch the shoe out, ..well then, (H) the two corners...they go out, too. you know, okay your shoe's like this? SBC0001.

In what is certainly the longest monolog in our corpus, rarely punctuated by backchannels, an American girl gives a detailed description of what blacksmithing involves, especially for a young female *ferrier*. Over a practically uninterrupted stretch of some twenty minutes, she continues to elicit the attention of her interviewer, who rarely responds with more than a short question on a detail. There are over a hundred tokens of *you know* used by this speaker, accompanied by a predilection for what is known as *upspeak* (cf. final affirmative phrase above, *Okay your shoe's like this?*). In this utterance of course she is showing as much as describing, and her discourse bears clear signs of ostension. *You know*, which links the preceding description via the attributive transition to a demonstration, is prosodically separate here with a raised reset value (207hz -> 241hz) after a high fall on *too*, and the pitch (dark) contour changes direction on *okay*, also characteristic of a prosodic boundary. The symbol @ in the transcription (fig. 8-5) corresponds to the reduced centralized vowel “schwa” [ə].

Other examples of *you know* in medial position are set off by longer pauses, but with a pronounced degree of pitch movement on the comment clause:

- (12) it's fr- it's very very cold erm ... the obvious answer is well they have to cooperate and you immediately start thinking about places like Antarctica places where where you're entirely dependent on technology to survive if technology doesn't work you're gonna die erm...if you don't cooperate with your - with everybody around you

and if they don't cooperate with you again, *you know*, you're not gonna survive you're gonna die.

STW 9

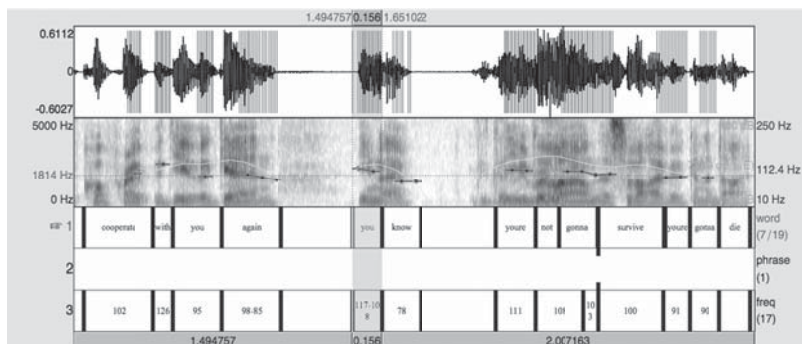


Fig. 8-6. ...cooperate with you again, you know, you're not gonna survive you're gonna die. STW 9.

The speaker here uses *you know* in parenthetical position to link the protasis of his conditional proposition with the “shared” conclusion in the apodosis, which is in part attributed to the interlocutor. The choice of intercalation for placing *you know* allows the utterer proceed as the *origo* of the fictive situation introduced by *if*, cooperation being presented as a generic condition for survival in extreme conditions (in Antarctica, or as he argues, on other, distant planets). This kind of “sharing of knowledge” runs counter to the sort of accommodating role played by this marker in the irenic vision espoused in most versions of pragmatic theory: here the co-enunciator is made partially responsible for the conclusion that follows, inasmuch as he is made to realize the grim consequences of non-cooperation. Once again, this linking function of *you know* is essential to the local meaning of the utterance, giving the comment clause a linear role as connector.

3.2.2. The comment clause included in a prosodic unit with the proposition under scope

We find *I think* in final position in over 40 examples, and most commonly included as the last stressed material in the intonational contour:

- (13) A: Tony Blair, good afternoon!
 B: Hi!
 A: Er, welcome welcome to the programme, good to see you.
 B: Thanks very much
 A: Er, I enjoyed the book, er I mean that sincerely. It's quite refreshing *I think*. It's unlike... other political memoirs. *T.Blair Interview*

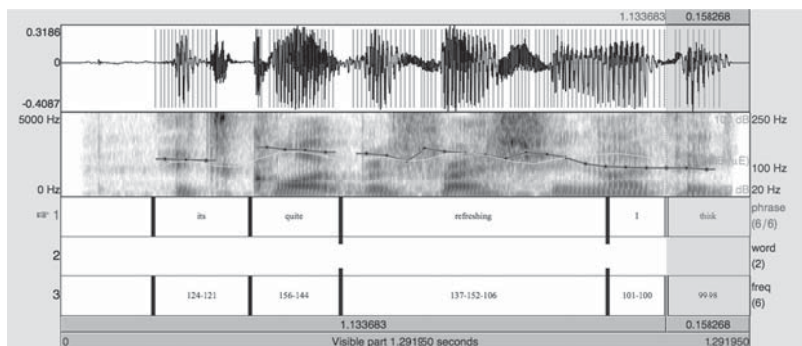


Fig. 8-7. *It's quite refreshing I think.* T. Blair Interview.

The contour in fig. 8-7 shows *I think* in final position with relative little pitch movement in the tail of the contour, post-nuclear but still bearing stressed syllables (as confirmed by the relative level of amplitude combined with the duration of the syllables). In this sense it is prosodically quite similar to other “afterthought” comment clauses cited earlier. As for the local meaning however, it is evident that *I think* is conveying a point of view expressed in the matrix proposition, *refreshing* (referring to the memoirs) which corresponds to a valiative modality; in that sense, we have an example of what Doro-Mégy (2008, 31) calls “Qualitative alterity”: the modality in the proposition is located relative to the enunciative origin ‘I’ (= S₀).¹⁰ Further to our discussion of Kärkkäinen’s arguments that *I think* conveys personal conviction and commitment in some cases, but depending both on sentence position and on the presence of prominence on the pronoun in the intonation contour: our corpus shows that such findings are inconclusive, as our examples show this value for *I think* in all positions and with most contours, and only exceptionally with stress on the pronoun. An exception to this may be *I think* in a separate IU and carrying a fall-rise, where the double nature of the contour (I → E → IE) favors the boundary of the notional domain, and the inability of asserting one value, although there is a common ground or proposition

marked as the locator for both S0 and S'0, enabling another, different value to be distinguished.

- (14) A: Oh by the way, when you went to the Cabinet Room, I just like this detail, as Prime Minister, that was the first time you'd ever been in there.

B: Yeah...

A: That was the first time you ever did... I was reading Peter Mandelson's book recently, erm, he went in there when he was eleven... (chuckles) I mean he was friends with Harold and Mary Wilson...and that was the first time you'd been in there.

B: Yeah, cause Peter's grandfather of course was a very famous Labour Minister in the 1940s, but - No, I, I...I'd never, I'd only been to Downing Street once, for a dinner *I think*, before going in, and I'd never been to the cabinet room.

T.Blair Interview

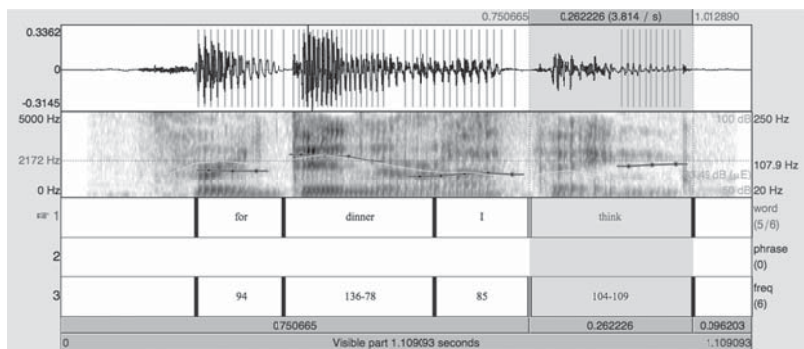


Fig. 8-8. *I'd only been to Downing Street once, for a dinner I think, before going in...* T. Blair Interview.

Here the placing of *I think* at the end of a prosodic group is essential to local meaning, and proof contrary to Kärkkäinen's claims that *I think* is only IU-initial. The prepositional adjunct of purpose *for dinner* specifies why the speaker was invited to No.10, Downing Street, and as such is retroactively qualified as being tentative, as the speaker asserts on the one hand "I'd only been to Downing Street once" as certain, but is uncertain as to the reason for the visit. The delimitation of scope as applying only to the purpose is neatly accomplished by this structuring of IUs, whereas an inclusive IU might have been ambiguous as to the scope of uncertainty.

- (15) I well I started with a couple of novels erm... thinking about all the er looking at all the lovely pictures that came back from Cassini erm about the moon- of the moons of Saturn and wondering what it would be like to walk around there \ there seems if you put a human being there \ you see you immediately have this kind of, kind of tre- ... how did they get there, erm why are they there and, *you know* how do they live ...— *STW 8*

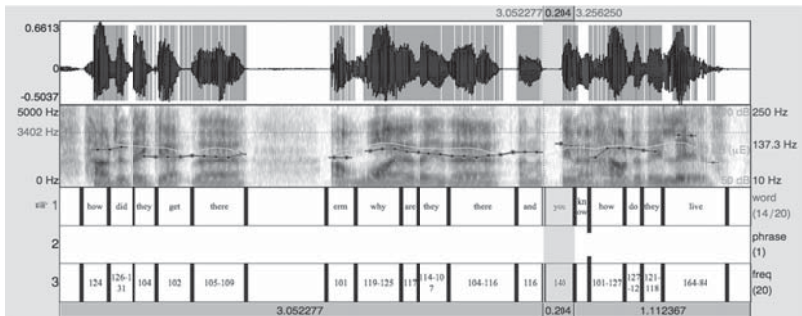


Fig. 8-9. ...how did they get there, erm why are they there and, you know how do they live... *STW 8*.

The placing of *you know* in this coordinated structure is prosodically marked as a step up (from 116hz on *and* to 140hz on *you*, following a short pause of about 0.1s) as the head of the third intonational phrase of the utterance.

Speaking of a hypothetical setting for his novels, the speaker explains what sort of considerations the writer is led to entertain. With *you know*, the utterer constructs a link between the first two clauses which is anchored in the shared enunciative space; he seems to attribute an acceptance of the third part of the series to his co-locutor (the radio interviewer), who is posited by him, the enunciator, as being able to admit that the last part of his questioning logically follows from the first two. Is this a form of politeness, a reduction of social distance, or an invitation to share background information? Perhaps in a sense, this “sharing” opens the world of the writer up to his interlocutor (and to the radio audience), and if he includes the latter in his musings, then he is constructing the enunciative domain as an “open” space, equally accessible to *S’o* and for that matter (with a reading of *you* as generic), any virtual enunciator capable of endorsing his utterance as his own.

3.2.3. The comment clause in other prosodic configurations - focalization

We cannot exclude a (condensed) presentation of specific prosodic focalizations here, especially with the confusion we have found in the literature concerning the place of stress in the comment clause. It is our contention that a prominence on the pronoun rather than on the verb serves to mark an additional enunciative operation by making that element more perceptually prominent:

- (16) A: but did the German army pick the elite of the sort of intellect out of Germany in those times or was it just a ... (co-)
 B: ceremony *I think*
 A: \ *you / know*
 B: yes
 A: or were they just sort of pretty intelligent people and, and a smattering of the best people in the thing
 LLC 2-3

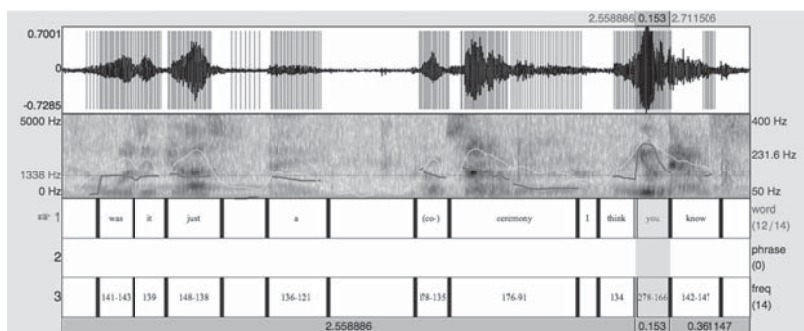


Fig. 8.10. – *was it just a (co-) – ceremony I think – you know ...* LLC 2-3.

In this exchange, the first speaker (A) searches for an expression, which is completed by (B) as *ceremony* with a tentative, final *I think* as a suggestion; (A) continues (with *you know*) by implying that (B) should certainly admit his reasoning—although (B) has in fact completed his interrupted proposition. The comment clause *you know* marked as a separate intonation unit with a fall-rise movement of intonation, often associated with reservation or referring, seems here to assume another function, that of targeting the co-enunciator (*you* focalized as a unique referent) as co-responsible for an established “truth” or here, supposition (A is enumerating the possibilities for explaining the German army’s ability to organize itself so efficiently in World War I). In another passage

of the same conversation centering on the rapid mobilization of armies in the First World War, speaker A recounts the unbelievable story of how Germany was obliged to carry out a planned attack on France, because of the extensive preparations that had preceded the War:

- (17) A: *you know* there was this business at the / outbreak of the First World War / when the Kaiser / the Kaiser said / just as they were about to launch their attack on Belgium / which had been planned for fifteen years / *you know* / and it couldn't be stopped / the Kaiser said - all right / change everything/ don't attack Belgium / we're going to attack Russia instead/ and they tried to explain to him / *you know* / that the whole the the plan/ had taken control/ years before / and there wasn't the slightest chance / (laughs) / of changing anything whatever / and / anyway / after the war / when the -/ general- / who was in charge of the railway section of / the German Staff / heard about this/ and wrote an immense book/ to prove that it was wrong / and that in fact his brilliant railway section / *could* have done it all / at the drop of a hat / *you know* / with endless schedules / and annexes / of timetables / how he would have re-altered it / on the spur of the moment / sending everyone to Russia / instead of into France /
B: *I* think that would've all been possible actually.

LLC 2-3

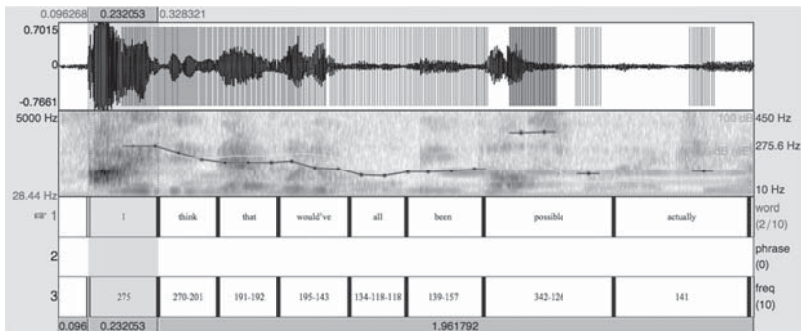


Fig. 8-11. *I think that would've all been possible actually* LLC 2-3.

Here we find a pitch prominence on the pronoun *I* rather than on *think*, which is what we have seen in other examples. The choice of stressing the pronoun marks the utterer as distinct from other potential enunciators, as the expression conveys a qualitative difference: his point of view is presented in the matrix proposition—as an expression of the possibility that the claims in the book were credible. (The high pitch value on *possible* is an error in calculation by Praat, giving rise to a jump of an

octave.) The presentation of this unlikely story, and the more unlikely claim by the general is treated lightly by (A), and so “clears the way” for an interpretation (position in IE with movement towards E); however (B) takes an opposing tack and, countering the expected position, chooses (IE), but with I as the preponderant value—marking his position prosodically as “weakly unique.” In such exchanges where different points of view are exchanged freely, the utterer may be induced to specify that his point of view is his alone (weakly unique), and still it can be accepted by the other. When *I think* is seen as a form of “qualitative alterity” the possibility arises for the speaker to stress the pronoun. As we have seen, with an epistemic use of *I think*, the stress must fall on *think* (if there is any stress on the comment clause at all).

- (18) A: Have you spoken to him since he became Prime Minister? Has he called you?
 B: Erm....no.
 A: No? You’ve not spoken at all?
 B: No; I mean there’s no particular reason why we, we would, but I mean I...
 A: *Well I think there’s a reason why you would*
T.Blair Interview

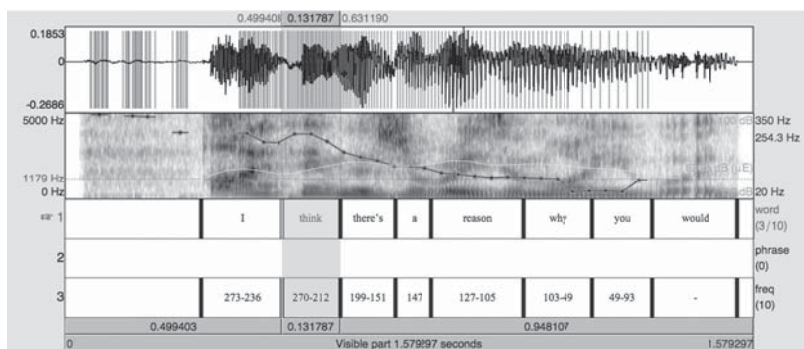


Fig. 8-12. *Well I think there's a reason why you would...* T. Blair Interview.

The utterance in fig. 8-12 features *I think* in initial position introducing the matrix proposition *there's a reason why you would*—which is a direct rebuttal to the preceding evasive answer furnished by the co-locutor (Blair) and a direct answer to the interviewer's own question. In so doing, the enunciating subject *So* explicitly positions himself as the modal subject of the utterance < *there's a reason why you would* > directly contesting the

co-enunciator who has asserted < there's no reason why we would >. Such cases of *radical alterity* we have been discussing are prosodically marked by a focalizing pitch prominence, here on the pronoun *I*.¹¹ However, there is a difference with the cases of *radical alterity* proposed by Doro-Mégy, where the subject of the utterance (*S*₂) was different to the utterer *S*₀, and marked prosodically as “other” on the basis of the rejection of the reported utterance.¹²

3.3. Discussion

We have taken as our starting point a reflection on the influence of prosody relative to the functioning of comment clauses, and have found both other linguists' conclusions concerning this role, as well as the linguistic analysis they propose, wanting in several ways. By exploring the hypothesis that all of these expressions are to some extent parenthetical, and that they typically retain the same interactive function regardless of position, we might conclude that their relative position is less important than was once supposed. In fact, the sense of parenthesis is here an enunciative intervention, not just in a strictly linear sense. The point of intervention (position of *S*₀), is variable, basically linking—and opposing—comment clause and proposition on the one hand, but this intervention also functions within the relationship (and affective rapport) between *S*₀ and *S'*₀. Finally, this intervention plays out in the semantics of logical sequences as well, where the comment clause takes its scope in preceding, following or encompassing propositions.

In addition to its essential (intersubjective) locating function, *you know* often assumes a linear linking function or combinatorial compatibility with other syntactic positions or logical operators in enumerations (see ex. 15), with coordinating expressions of cause and consequence, option, etc. This is true of the discourse marker in all positions; *you know* can anchor proactively, retroactively (postposed, possibly as a form of recrimination) or in mid-utterance, so that it links an assertion to what follows, effectively presented as shared information (11).

However, many of the pragmatic functions that are supposed to be covered by the uses of *you know* e.g. monitoring, addressee responses or backchannels, repair or other organizational functions have little to do with *inference*. What these contexts for the placing of *you know* do have in common is their enunciative structure: the anchoring or locating of the utterer's discourse in relation to his image of the co-enunciator. The position of the enunciator *S*₀ presents his utterance, regardless of its content, as attributable in part to *S'*₀, and as being a priori admitted by *S'*₀.

By constructing the presence or image of the other in his utterance—as the one who *accepts* the validity of what is being predicated, the utterer aims primarily at the appearance of a consensus. In contexts where the semantic proposition remains uncontested, this builds *rapport*. In polemical contexts however, by employing *you know* the utterer seems to be in a sense subverting the relation of equity between himself and his interlocutor by attributing a position of acceptance to the latter, regardless of the interlocutor's real attitude: whether or not the other (*S'o*) knows, suspects, regardless of any theory of common knowledge, the utterer imposes responsibility for knowing. This construction by *So* of a false (virtual) consensus, using parenthetical *you know* to present one's discourse as if admitted by the other, depends often on a disjointed locating operation of the proposition relative to a (partly) fictive *S'o*. This establishes the parameter (*you*) as not only a specific person, but as any other person, the *generic* you; it only becomes co-referent with the co-enunciator and interlocutor if *you* is stressed (focalized). This is clear from Tony Blair's exchanges in the polemic context of his interview, where as utterer, he manipulates his responses to hard (face-threatening) questions which are thus avoided by venturing an opinion on a related matter, only to implicate his interlocutor—the interviewer—in his assertions by means of *you know*, as if no disagreement were possible, and although the question originally posed by the interviewer remains unanswered.

When *you know* is in final position in relation to a proposition and carries a rising tone, it has been argued that it corresponds to a question (checking the interlocutor's attention and/or comprehension). However, this type of occurrence has been seen to elicit few responses or backchannels. We find that in our corpus at least, it does not function as an interrogative form; indeed, backchannels occur at other junctures in discourse, especially following expressions like *You know what I mean?* or *You know what happened?* Fox Tree and Schrock point out that *you know* with a final rise is rarely found to provoke backchannels or short responses (in only 12% of contexts examined in the literature) whereas “you know what I mean?” is regularly accompanied by a response (again, in the literature). Out of the thirty cases of this combination that we found, confined to two selections from the Santa Barbara Corpus, and used by only three speakers, there were only two backchannels out of nineteen occurrences for one (SC0001) and one backchannel out of six occurrences for another (SBC0008). It is worth mentioning these two exchanges both involve a marked solicitation of sympathy on the part of the speaker, and no response seems generally expected: in fact the utterer generally continues unimpeded, without waiting for a reply.

At the enunciative level of complex interactive organization, which has been theorized as the enunciative space, we can correlate the *adjustments* between the subjective positions underlying enunciators' exchanges in discourse. This space is organized as a notional domain with assertion of the utterance corresponding to an Interior, non-assertion (mitigated assertion) corresponding to IE at the domain boundary and refusal to assert (and therefore refusal to validate the predicative relation considered as a complex notion) corresponding to the Exterior. To simplify the configuration for the purposes of this paper, the endorsement by *S'o* of an utterance asserted by *So* will result in agreement, where *adjustment* consists in the co-enunciator as interlocutor endorsing the position of the other (as in ex. 11). More often, the co-enunciator will merely admit the position of the enunciator (adopting the domain boundary IE) with limited responses (backchannels in pragmatic terminology) which will not commit him or her either way. Last, the co-enunciator may openly take issue with the enunciator's position in I, and move to a position E with a contrary assertion. When the marker *I think* is present, then the position will be based on a mitigated assertion (non-validatable) and the enunciator's position will again be a movement to the boundary, but with I as the selected value (E not being entirely excluded). The nature of the construction of the proposition in scope (as an external event or property), as we have seen will condition this movement, allowing for uncertainty (the strong possibility of the Exterior) although the proposition is in the affirmative. If the modalization inherent in *I think* is constructed as an alterity to the position of an enunciator *S'o*, then *So* can choose the contrary value (IE with I or Interior chosen as the preponderant value, as in BBC interviewer Richard Bacon's repartee to Tony Blair in (18) as a radical break with the position *I mean there's no particular reason why we, we would* pre-constructed in IE with E chosen as the preponderant value (by Tony Blair).

Conclusion

I have tried to show in this brief analysis how discourse markers or comment clauses interact with position in discourse, prosodic factors and contending points of view, conceived of as subjective enunciative positions which help structure, at an abstract level, the linguistic exchange in an interactive space.

A number of factors which are of a social nature and certainly a part of language use have been barely sketched out here. Some involve pragmatic considerations of an interpersonal nature, and often related either to

“speaker strategies,” to assumptions and inferences or to “stance” in the literature. As for interpersonal hedges, monitoring and repair, what makes these all possible? What do they have in common? Whether the utterer seeks to build rapport, to seem to check replies, or to repair hesitations, it is still with language forms that he does this, not just with intentions, to which we have no direct access. However the main thrust of my paper is based on prosodic analysis, which confirms much of what has been claimed in similar studies on authentic speech use in corpora. Intonation units have been seen to construct functionally and cognitively coherent sequences of spontaneous speech whereas they have traditionally been thought only to echo the syntactic structure of language. Little by little, new research has revealed to what extent these prosodic units obey other constraints and forms of organization.

The most difficult phenomena to account for are possibly the grammaticalized forms of these markers, which through use as verbal fillers, that is, without a stable propositional semantic anchor, are seen to be “empty.” This is also observed with filled pauses, *er* and *uhm*, used in hesitations, but which have no pretense of (semantic) comprehensibility, only of securing some level of affective rapport with the other, since the comprehension of the other, and his or her acceptance, is posited in the utterance as being admitted. A longer study with a much larger corpus is proposed as a continuation in this direction.

NOTES

Introduction

1. Acknowledging the need to emphasise the role played by discourse and social interaction in the analysis of language, Langacker (2007, 450) wrote: “In principle, Cognitive Grammar is a theory of *énonciation* (Culioli 1990). Its future development should make this increasingly more apparent in practice.” This recognition of the theme of discourse and social interaction is preceded by the mention of the concepts of dynamicity and fictivity, all three being seen as major themes “pivotal to Cognitive Grammar in the coming years.”

Chapter One

1. Under this type (i) terminological move, anything ‘meta-linguistic’ is *ipso facto* also ‘metalinguistic’ (as pertaining to ‘metalinguistic discourse’), but the converse is not always true.

For example, to say of the object-language formulas ‘ $p \rightarrow (p (\sim p))$ ’ and ‘ $p \leftrightarrow (p \supset p)$ ’ in the Propositional Calculus that they are tautologies, one may write ‘ $p \Rightarrow (p (\sim p))$ ’ and ‘ $p \equiv (p \supset p)$ ’ (respectively), where ‘ \Rightarrow ’ and ‘ \equiv ’ are part of the meta-language and not of the object-language, contrary to ‘ \rightarrow ’ and ‘ \leftrightarrow ,’ for which the converse is true (on the relations between the material conditional [\rightarrow] and logical implication [\Rightarrow] and between the biconditional [\leftrightarrow] and logical equivalence [\equiv] or, we may add, [\Leftrightarrow], see Wall 1972, 6 and 38, respectively).

In French, a ‘language’/‘langue’ distinction is available which is unparalleled in English and can be used to coin an equivalent of our ‘metalanguage’/‘meta-language.’ Thus, without resorting to the hyphen, Jean-Pierre Desclés and Zlatka Guentchéva-Desclés distinguish between “*métalangue* (partie d’une langue naturelle chargée de décrire soit une langue, soit une partie d’une langue, soit un langage artificiel)” and “*métalanguage* (langage artificiel chargé de décrire soit une langue, soit un langage)” (Desclés and Guentchéva 1977, 1–62, quoted in Arrivé 1985, 7, note 1).

For Janus-like effects of (object-language) use and (meta-linguistic) mention of the same symbol, see note 99 *infra* and related text.

2. Or ‘scriptorial,’ if one wishes to avoid Biblical overtones.
3. ‘Referential,’ should one be wary of phenomenology

4. Or 'symbolic,' the more indicative 'full-fledged typographical' being much too cumbersome. For more detail, q.v. note 47 *infra*.
5. Or 'geometry-like,' or again 'schematic,' if one is not afraid of familiar or derogatory connotations (respectively).
6. In the sense, for instance, of Martin (1964, 88–189), and Barbault and Desclés (1972, 25–26).
7. In the sense of Desclés (1990a, 1023–24).
8. As in the case of Euclidean geometry, in which "such representations as a straight line or a circle drawn on paper to figure ideal mathematical entities" (Martin 1964, 10–11: "représentations qui, comme la droite ou le cercle tracé sur papier, figurent les êtres mathématiques idéaux").
9. "La puissance d'analogie des schémas" (Blanché 1990, 956).
10. "Encombrée de trop de recours à l'intuition" (Martin 1964, 7).
11. "Une langue artificielle" (Michel 1990, 1024–25).
12. "Système formel" (idem *supra*). For a synthetic presentation of some such logistic systems and of standard results about the hierarchies between types of formal grammars and types of generated languages, see Pamiès (2001, 100–28 and 226–43, respectively).
13. See Vandamme (1990, 1022).
14. "Un calcul de type algébrique"; "expressions"; "formules"; "thèses," "règles de formation et de dérivation" (Michel 1990, 1024–25).
15. "La signification des termes joue un rôle important dans la manière dont ils sont employés et dont ils sont combinés entre eux." (Vandamme 1990, 1022)
16. That is to say "at least in the case of complete formalisation" ("du moins dans le cas où il s'agit d'une formalisation complète," *ibid.*).
17. "Est complètement éliminé" (*ibid.*).
18. "Par le moyen de transformations des formules d'après certaines lois prescrites," (Blanché 1990, 956, quoting and translating "Leibnitz, *Phil.[osophische] Schriften*, VII, 206").
19. "Passer d'une configuration de signes à une autre en vertu de règles préalablement définies, sans qu'on ait à considérer autre chose que des signes et à faire intervenir les propriétés des êtres que ces signes peuvent représenter" (Martin 1964, 6).
20. "Un 'calcul' (*calculus* dans la terminologie anglaise) [...] c'est-à-dire un système qui est entièrement caractérisé par sa syntaxe" (Vandamme 1990).
21. "La constitution d'un système formel à partir d'une théorie naïve serait un simple jeu si on ne pensait pouvoir montrer que le système formel admet une ou plusieurs interprétations naïves" (Martin 1964, 7).
22. Jean-Pierre Desclés (1990a, note 7): "*l'interprétation* reprend chaque formule du système formel et tente de leur attribuer un contenu exprimable dans la théorie formalisée."
23. "Éviter tout recours à des évidences non contrôlées"; "fai[re] correspondre des symboles par eux-mêmes dépourvus de signification"; "aux objets de la théorie [naïve], étudiée et aux relations qui les lient" (Martin 1964, 10).
24. "Opération qui consiste à considérer *séparément* une propriété d'un certain type d'objet (concret ou idéal) ou une relation liant entre [eux] des objets

d'un même type ou de types différents; ou encore qui consiste à détacher une propriété ou une relation du ou des objets qui lui servent de support (en lesquels elle se réalise ou par lesquels elle est 'satisfaite')" (Ladrière 1990, 11).

As is apparent at the end of the above quotation, currently accepted terminology may fluctuate a little to designate this type of correspondence between objects and properties or relations: the former may be said to be "bearers" of the latter, or the latter may be said to "be satisfied by the former," unless the former be held to "realise" the latter.

25. "Les propriétés structurales"; "exprim[ées] de façon symbolique" (Martin 1964, 7).
26. For instance, in the case of linguistics, it is Desclés' contention that "aside from formalising a global theory, it is often more fruitful to [concentrate on] mathematis[ing]" such "language-related concepts" as time or aspect ["à côté d'une formalisation d'une théorie globale, il est souvent plus fructueux de mathématiser"; "concepts relatifs au langage" (Desclés 1990a, note 7).
27. By way of example of various degrees of abstractness, for a critical assessment of Bernard Roy's formalisation of the intuitive notion of 'graph' as arguably less 'abstract' than Nguyen Huy Xuong's (because of a relative failure, in its choice of primitive concepts, to disengage itself from naïve modes of apprehension of ink and paper material inscriptions), see Pamiès (2001, notes 294, 540–46, 757, related text and indicated further internal reference). See also Pamiès (2001, 2: Annexe 3, 397, note 40).
28. For an illustration of how surreptitious the unwitting intrusion of the naïve back into the formal can be, and hence of how difficult it is to maintain a high degree of abstraction, see Pamiès (2001, 256, note 757). For a contention that total abstraction is unattainable, cf. Gonseth's view that "in any abstract construction, there is an intuitive residue that cannot be eliminated" ("dans toute construction abstraite, il y a un résidu intuitif qu'il est impossible d'éliminer" [Gonseth 1974, 107, quoted in Paul Foulquié 1992, 4]).
29. Or 'derivable formula' or 'demonstrated wff.'
30. See Martin (1964, 55): "démontrer 1) que toute proposition théorique et intuitive de la théorie naïve est démontrable dans le système formel (c'est-à-dire [...] [a pour homologue] un théorème du système formel [théorème dont cette proposition est une interprétation]); 2) que tout théorème du système formel peut être interprété par une proposition théorique intuitive"; "il y a adéquation." In a terser version, cf. also Desclés (1990a): "Lorsque l'interprétation attribue une signification intuitive (dans la théorie) à toute formule démontrée du système formel et que l'on a la réciproque, on parle d'*adéquation*."
31. "les propriétés structurales sont bien celles de la théorie naïve de départ" (Martin 1964, 16).
32. Thus (see Pamiès 2001 for page references throughout in this note), Chomsky having proposed in the fifties a theory (Tf) to formalise neo-Bloomfieldian empiricist linguistics (Tn), it can be argued that a 'heritage principle' (256)

holds between the filiated strings (formulas) generated (derivable) by the formal grammars (FS) used by Chomsky, and that this principle is in tight correspondence with the key ‘linearity condition’ (324) which the neo-Bloomfieldians were led (291–325) to impose on inter-level relations of ‘representation,’ because of their rejection of the actual (mal)practices of the Bloomfieldians (267–91). And as long as the existence of such a tight correspondence can be maintained, this may be taken to establish that, in this respect, the formalised theory *Tf* adduced by Chomsky did capture (325–27) a fundamental structural property of the neo-Bloomfieldian naïve theory *Tn*—even though there may be serious reasons to otherwise question (328–32) the validity of the way Chomsky used formalisation as a war machine to destroy its empiricist, neo-Bloomfieldian target.

33. For instance, sketchily (for the detail, see Pamiès 2001, 244–45 and 260–64), Martin (1964, 56) chooses as *Tn* “usual logic” “expressed in ordinary language,” which we shall call $\mathcal{L}u$. He then constructs a formal system (“a propositional calculus,” Andler, Martin et al. 1990, 971) S_0 which he claims is an adequate formalisation of $\mathcal{L}u$. But in the demonstration he offers to prove his claim true, he does not confront formulas of S_0 and ordinary language expressions of $\mathcal{L}u$, as the definition of ‘adequation’ would require. Instead, he successfully matches formulas of S_0 with constructs of another (extensional, truth-functional) formal system, *Tf*.

Among others, one reason why this substitution (which is standard practice in ‘formal semantics’) is so convenient is that, in contrast to such formal system as S_0 and *Tf*, the expressive resources of $\mathcal{L}u$ are too hopelessly unfit for precise computation to lend themselves to the type of proof by mathematical induction adduced by Robert Martin when demonstrating the match between S_0 and *Tf*.

But it is our contention that, tempting as it might be, the substitution is little more than a question-begging subterfuge, since the adequation of *Tf* to $\mathcal{L}u$ is presupposed, not proved—and, for the same reasons as in the case of a comparison between S_0 and $\mathcal{L}u$, just as unlikely ever to be.

With the rather unfortunate consequence that, for all the seductive brilliance of the formal game, the link to $\mathcal{L}u$ is severed, and no light is shed on intuitive modes of veridiction and spontaneous reasoning.

34. “Naïveté intuitive” (Michel 1990, note 11).
35. Also in the case of mathematics, where, though (*pace* the early Penelope Maddy [1980], who once grounded knowledge of mathematical objects on “sense perception,” cf. Mark Balaguer [1998, 28]) empirical *sensibilia* are hardly to be on the radar screen, Euclid’s geometry *Tn*, for all its ‘intuitive naïvety,’ provided indispensable grain for Hilbert’s formalism to grind [in his *Grundlagen der Geometrie (The Foundations of Geometry)*, quoted in this connection by Martin (1964, 10–11).
36. See in substance Barbault and Desclès (1972, 25–26) “pour dépasser le niveau des apparences” (et spécifier “entre autres les conditions d’analyse contrôlée de l’observable que l’on veut étudier”), il est “indispensable” d’élaborer une “théorie naïve,” “c’est-à-dire un ensemble de concepts

primitifs (tels sont en physique, la masse, le temps, ...) et des relations primitives entre ces concepts (dans la théorie newtonienne, la loi d'attraction des corps peut être primitive)" à partir desquels "combin[ant], à l'aide d'itérations éventuelles, [ces] relations et concepts primitifs, [...] produire des relations et concepts plus complexes. C'est seulement à ce stade [que l'on peut envisager] une formalisation autre que le codage, car il n'est guère possible de 'calculer' sur des notions aux contours flous et mal définis."

37. Hopefully, *their* structure in case of adequation.
38. In this context, one must be wary of a widespread terminological ambiguity which might obscure the point made in (I). In our disambiguated terms, when a theory T claiming to be open to (self-inflicted) empirical challenge resorts to the formal constructs of some theory Tf, it is common practice to use the same term 'formalised theory' to designate either T or Tf, indifferently. But since it is only *via* some interpretation Tn that Tf can be confronted to empirical data, the terminological corners-cutting expedient of calling T (as well as Tf) a 'formalised theory' is harmless only as long as one keeps in mind that a thus-called theory T must be construed as consisting of a pair (Tf, Tn), and certainly not of just Tf. Thus, in the case in point, failure to distinguish between Tf and T would simply make (I) read as a contradiction—hence the precautionary introduction of 'Tf' in its wording.
39. Stage "1) théorisation" in Desclés (1990a, 1023).
40. See in substance Desclés (1990a, 1022–23): "Formaliser oblige à donner une formulation très précise [...] pour autoriser ensuite des calculs et des traitements formels, puis à pousser la formulation jusqu'à ses ultimes conséquences. En général, le processus de formalisation met en défaut la théorisation proprement dite et la faiblesse de la conceptualisation." "[Ainsi.] *l'interprétation* reprend chaque formule du système formel et tente de leur attribuer un contenu exprimable dans la théorie formalisée ; ce retour à l'intuitif et à la théorie de départ et aux objets empiriques amène alors à *rectifier* les conceptions théoriques initiales, à réorganiser le réseau des propositions théoriques, à entrevoir de nouveaux protocoles expérimentaux, à formuler de nouvelles hypothèses [...] et donc à poursuivre la théorisation."
41. See in substance Desclés (1990a, 1022–23): "Les balancements continuels entre intuitif et formel sont les caractéristiques d'une attitude formalisante oscillant entre, d'un côté, la théorisation reposant sur l'observation et la vérification et, de l'autre, le formel et [l]e mathématique."
42. To be found after the main text.
43. Over-familiarity with such figures as 1-2 may tend to obscure the distinction between self-evidence and engraved lasting impact of a long forgotten process of instruction. But consideration of such figures as 1-14 or 1-13 are most likely to dissipate all illusions of self-legibility.
44. Or "graphic representation."
45. Given the deciphering instructions DI_{FR}, one has access to what the *locus tenens* LT_{FR} stands for—in our (ii) terms couched in function-like notation, one has access to DI_{FR} (LT_{FR}). Fully spelled out then, an FR representation

- may be held to consist in not just an ordered pair (LT_{FR} , DI_{FR}), but expanded into the derivable ordered triple (LT_{FR} , DI_{FR} , $DI_{FR}(LT_{FR})$).
46. Thus, in our type (i) use of the terms, 'scriptural' is used as a cover term for the various artefacts of writing techniques, with 'algebraic' notations a subclass of 'scriptural notations' using a wider range of expressive resources.
 47. I.e. 'algebraic' notations drawing freely on the open-ended typographical attire of fonts and polices (Latin, Greek, Hebraic, Gothic, Embassy, etc.), police styles (italics, bold, etc.), character size, lower case, uppercase, diacritics, dispositional layout, newly created special characters (cascading, multiply stacked), sub⁽ⁿ⁾scripts and super⁽ⁿ⁾scripts, in front, middle or (standard) rear position, etc.
 48. For an elaboration of the distinction, see, in Pamiès (2001 [structuring Index], 2: 526–63), the network of correlated entries <'allographe,' 'alphabet (de caractères scripturaux),' 'assignation scripturale,' 'concret,' 'continuum (de variation),' 'discrétisation,' 'graphème' [= 'caractère scriptural'], 'graphie,' 'pertinence (graphique),' 'polices (d'un jeu de caractères scripturaux),' 'redéploiement (conventions de),' 'représentation graphique'>, with cross-reference to main text and further related entries. See also note 78 *infra*.
 49. To take up just one type of the infinitely many trivial material imperfections or differences in shape, colour, printing or engraving technique or nature of material support, which the reader has been precisely trained to ignore or fail to remark any more as soon as he became literate.
 50. For the distinction between geometrical and geometricised representation, cf. Pamiès (2001, 209, note 545), and note 52 *infra*.
 51. As in the case of fig. 1-2, 1-3, 1-8, 1-18 and 1-20, and also in the case of fig. 1-15 and 1-16, in which the encapsulated formulas are expedient stenographic substitutes for fully-fledged typographical look-alikes of (enriched with nested centred superscript reflecting the genealogy of each occurrence of symbol in a derivation) those featuring in fig. 1-13, see Pamiès (2001, 166, note 288).
 52. More technically (cf. in substance Pamiès 2001, 209–10, and assuming note 27 *supra*), if an oriented graph is chosen as abstract *locus tenens* LT_{FRg} for a geometricised formal representation FRg , then LT_{FRg} may be a graph in the (less abstract) sense of Bernard Roy, or in the (much more abstract) sense of Nguyen Huy Xuong. In the first case, LT_{FRg} is one equivalence class of infinitely many graphs, members of that class being geometrical figures, distinct (each two of them not point-to-point superposable, nor obtainable one from the other by homothetic transformation) but functionally equivalent in their place-holding role. In the second case, LT_{FRg} is just one abstract graph defined without reference to points identified by their coordinates in the Cartesian product R^2 . But in either case, owing to the margin of continuous variation accepted for their realisations, see Pamiès (2001, note 541) the associated possible concrete inscriptional realisation are potentially (non-denumerably in non-digitalised, analogical versions) infinitely many.

53. Not to say “coarse,” cf. Michel (1990, op. cit.): “un formalisme vulgaire, déniait au symbolisme des sciences tout contenu de sens, et contre lequel il arrive à Frege de polémiquer.”
54. See Gauthier (1990, 1026): “la formulation forte du formalisme: les mathématiques sont [...] un assemblage de symboles concrets”—for an example of less ‘strong’ formalist views (i.e. non-committal as to the issue of concreteness), see Kleene and Feferman (1976, 633) “mathematics consist simply of the manipulation of finite configurations of symbols according to prescribed rules.”
55. The claim is commonly attributed to Hilbert, Tarski or Quine (at least in their early writings), see Desanti (1990, 718): “la ‘pensée’ mathématique” selon David Hilbert et l’école formaliste “n’a d’existence que dans les systèmes d’écriture qui la manifestent,” or, more exactly to the point, Martin (1964, 24 and 24–25): “[à la question] qu’est-ce donc qu’un symbole ? [en bonne logique formaliste,] une première réponse consiste à identifier le symbole avec l’objet physique singulier constitué par exemple par une trace de craie sur le tableau, une tâche d’encre de forme particulière sur le papier. Hilbert écrit ainsi : ‘[...] En mathématique [...] l’objet de notre examen ce sont les signes concrets eux-mêmes,’ (Hilbert 1925, 275), trans. Jean Ladrière (1957, 3); cependant que, dans ses premiers travaux, Tarski écrit encore dans la même veine [(1930), reprinted in Tarski 195[6], 361]: ‘il est tout à fait convenable de considérer les énoncés comme des inscriptions et par suite comme des corps physiques concrets.’” See finally Martin (1964, 26), quoting in substance Goodman and Quine (1947, 106 and 112) “les expressions [...] [loin] d’être des abstraits des formes typographiques[, sont] des éléments concrets, les formes typographiques elles-mêmes.”
56. Martin (1964, 25) la “difficulté” est alors que l’on ne comprend plus comment il est possible de considérer deux inscriptions comme des occurrences d’un même symbole, ni de continuer à énoncer des choses apparemment aussi simples que “le symbole a apparaît deux fois dans la formule [$a \supset a$].” En effet, “deux a considérés comme des corps physiques concrets ne sont jamais identiques. De menues différences de tracé, de répartition de l’encre les distinguent toujours.”
57. To use a particularly striking expression of Quine’s, “les plus fervents adeptes du ‘nettoyage des bidonvilles écologiques’ Armengaud (1980, 1230), traduisant une expression de Quine (*Word and Object*),” cf. Pamiès (2001, 199, note 511).
58. See Martin (1964, 25–26), quoting in substance Carnap (1959, §3, 5–8): “si on veut vouloir dire que le même symbole apparaît plusieurs fois dans tel mot donné, il faut renoncer à identifier rigoureusement le symbole auquel a affaire le logicien et son tracé matériel.” See also Martin (1964, 24–25), quoting and commenting on Tarski: “passés ses premiers travaux [cf. Tarski (1930)], Tarski admet [par la suite] sans même le mentionner que c’est le symbole abstrait et non le signe dans sa matérialité qui est l’objet de la logique et que le logicien raisonne non sur la lettre x dans sa matérialité mais sur la classe des objets ayant la même forme que x , puisqu’il écrit, trois ans

plus tard [(1933), reprinted in Tarski (1956, 282)] que ‘nous considérons les expressions de la langue [formelle] non comme des inscriptions concrètes, mais comme des classes entières d’expressions de même forme,’ ce qui revient à faire du symbole logique ou mathématique un être abstrait dont on admet l’existence.”

59. Which, for convenience, we keep using here, though, at this stage, they are not yet supposed to have been cleared of their rejection as meaningless under (VII) and (VIII)—if no such thing as DI_{FR} (LT_{FR}) (q.v. note 45 *supra*) is supposed to exist when the notion of a formal *representation* is rejected, then there can be no such thing as an ‘orphan *locus tenens*’ LT_{FR} because there can be no ‘*locus tenens*’ at all, since under the formalist story under revision, there is just no non-notational entity that a notation could hold the place for.
60. Thus, Roger Martin notes in substance that Hilbert himself had willy-nilly to concede (*X*) (Martin 1964, 26, quoting and commenting on David Hilbert 1922, reprinted in Hilbert 1935, 163): “[dans] un des textes [pourant] où il affirme la primauté du signe, [Hilbert admet que, devant la nécessité de] faire abstraction, en ce qui concerne les symboles, ‘de toutes les conditions particulières de leurs présentation aussi bien que des différences insignifiantes qui peuvent affecter leur tracé,’ le mathématicien postule en outre que le même symbole inscrit à deux endroits différents désigne le même objet abstrait.”

Similarly, Roger Martin notes that Quine also had to concede (*X*) while pleading harmless abstraction (Martin 1964, 26, quoting *verbatim* and commenting on Quine, “Logic and the Reification of Universals,” in Quine 1953, 118), “[in which Quine] accepte qu’on identifie les symboles mathématiquement indiscernables et admet que cela revient à reconnaître la légitimité d’une ‘abstraction sans danger’,” thus finally accepting, contrary to the point made in Gooman and Quine (1947) (q.v. note 53 *supra*) that after all “les expressions sont [bel et bien] des abstraits des formes typographiques.”

Finally, Roger Martin himself subscribes to (*X*) in the following version: “nous admettrons donc pour notre part qu’à proprement parler le symbole est abstrait et que les signes tracés sur le papier ou sur le tableau servent seulement à l’évoquer” (Martin 1964, 27).

61. ‘Weakened’ because the reassuring anchoring concreteness of inscriptional tokens had to be abandoned; but still ‘formalist,’ since the conceded ‘abstraction’ of types could be regarded as “harmless” (q.v. note 60 *supra*) when compared to the Platonist abstract entities claimed to call for metaphysical “cleansing” (q.v. note 57 *supra*).
62. In terms of the notations of note 45 *supra*, though their *locus tenens* $LT_{Figure1}$ and $LT_{Figure2}$ are distinct both as tokens (concrete inscriptions) and as types (abstract graphemes and/or graphs), they represent the same formal object: $DI_{Figure1}(LT_{Figure1}) = DI_{Figure2}(LT_{Figure2})$.
63. On the vital importance of notational experimenting and inventiveness in the development of mathematics, see Gillies (1992) “The Fregean Revolution in Logic.”

64. Pending, of course, unforeseen further emendations or watering-down of the formalist reduction of mathematics to the conventionalised manipulation of nothing but empty, non-representational scribblement.
65. On the fact that the mapping $T_f \rightarrow T_n$ is intended to be minimally a one-to-one, and potentially a one-many correspondence, see Martin (1964, 7) “la constitution d’un système formel à partir d’une théorie naïve serait un simple jeu si on ne pensait pouvoir montrer que le système formel admet *une ou plusieurs* interprétations naïves” (our emphasis). On this issue, cf. also note 100 *infra*.
66. In other words, for which T_f may hopefully be held to provide an adequate formalisation.
67. From this point of view, the use of mnemonic shortcuts to anticipate on some intended naïve interpretation while still working on the formal apparatus may be misleading, as is doubly the case with such famous notations as ‘NP,’ where the twin graphemic choice for what is formally a single empirically uninterpreted symbol, transparently evoked its intended interpretation as ‘Noun Phrase,’ a construct of naïve phrase structure theory.
68. Which we claimed was the task of T_f to extirpate from T_n by abstracting away from the structured, regardless of intuitive contents.
69. Or ‘mathematical configuration,’ see Wall (1972, 141–42): “Structures composed of one or more sets together with one or more relations defined on those sets are known as *mathematical configurations*. Much of current mathematics is devoted to the study of one or another of the endless variety of possible mathematical configurations.”
70. With due consideration, of course, of the distinction between a *locus tenens* and its open-ended class of inscriptional realisations, the distinction in question being graphemic, i.e. taking no account of trivial, non-distinctive variations in the material, inscriptional reality of concrete realisations. For a further distinction between ‘realisation’ and ‘reduplication,’ see Pamiès (2001, 214, note 558).
71. For this definition of ‘notational variant’ not to be question-begging, we need a definition of identity for formal objects as defined in (XIII), ideally insensitive to trivial musical-chairs uniform substitutions of type (i) designations (see Pamiès 2001, 249–50, note 727) and/or intra-isomorphic permutation of type (ii) formal apparatus (for a possible link between this type of concern and mathematical Representation Theory, see Pamiès 2001, 2: 384).

Hence, given two formal objects FO_1 and FO_2 —consisting, for FO_1 , of the class of sets S_1 and the class of relations R_1 defined on the sets of S_1 and for FO_2 , of the class of sets S_2 and the class of relations R_2 defined on the sets of S_2 —, FO_1 and FO_2 are identical *iff* there is a one-to-one mapping Ms between S_1 and S_2 such that for each pair of sets in correspondence *via* Ms , those two sets comprises a same number of members, and there is furthermore a one-to-one mapping Mr between R_1 and R_2 such that for each pair of relations in correspondence *via* Mr , those two relations are respectively defined on sets in

- correspondence *via* Ms and have exactly the same properties (transitivity and/or reflexivity, etc.).
72. We shall not attempt here to give a full account of such other ingredients of algebraic formal representations as ‘improper’ demarcation or scope-indicating symbols (brackets, commas, ...), sub⁽ⁿ⁾scripts, super⁽ⁿ⁾scripts, etc., but we shall have occasion to touch on the issue when we get to (XXII).
 73. See *Webster’s Third New International Dictionary of the English Language* (Gove, editor in chief, 1966, unabridged, 15th ed.), defining ‘algebra’ as “a branch of mathematics in which arithmetic relations are generalized and explored by using letter symbols to represent numbers, variables quantities, or other mathematical entities (as vectors and matrices), the letter symbols being combined, esp. in forming equations in accordance with assigned rules [...]”
 74. In chap. 3 of Wall (1972, 56–57).
 75. Robert Wall uses ‘represents’ and ‘denotes’ as synonyms (for crystal-clear instances, 62). For an argumentation introducing the distinction in order to conclude on the impossibility of dissolving representation into designation (or ‘presentation,’ to mention a non-starter), see Pamiès (2001, Annexe 3, 391–92, note 58).
 76. For an example of such indifferent (provided the arbitrary ordering of note 79 *infra* is kept constant) all-round musical-chair uniform substitution, see Pamiès (2001, 2: 392–94).
 77. One might for a second think that there is nothing so special about formal symbols here. After all one could imagine similar musical chairs or move-over games for the letters of ordinary texts. If the word is ‘one letter up!’ in conventional spelling, then ‘spelling’ will re-write ‘tqfmmjh,’ if two, ‘urgnnki,’ etc. But on second thoughts, the difference is striking. Formal symbols are introduced by some decree of the form ‘let *X* be ...’ and the choice of grapheme *X* rather than *Y* is suspended in the thin air of arbitrary decision. But with orthographic notations for natural language (see Emilio Alarcos Llorach 1968 [the full contribution]) no such freedom of casual change of heart is conceivable: not to mention the formidable inertia of pre-existing archives and hostility of non-consenting fellow-users, should one try spelling ‘spelling’ ‘tqfmmjh’ (and so on and so forth for all the rest of the lexicon), good luck with the graphophonemics.
 78. For a fuller defence and illustration, see Pamiès (2001, Annexe 3, 376–94) structuring index, entries “symbole,” “vocabulaire,” “formalisation,” and correlates (to be added to the references of note 48 *supra*).
 79. To put it differently, relative to a given arbitrary strict ordering of V, a given formal symbol can be identified to just an exclusive rank in the natural number sequence 1, 2, ..., *n* (for details, see Pamiès 2001, 393, note 62). This type of one-to-one mapping between (arbitrarily ordered) V and the first *n* natural numbers should not be confused with the into function from strings of occurrences of symbols (strictly ordered by concatenation) into an unordered alphabet of graphemes (for details, id. *supra* and Martin 1964, 28, note 1).

80. For an early programmatic sketch, see Emilio Alarcos Llorach 1968a.
81. On the complexity of the correspondence between the class of possible vocabularies of formal symbols and the class of possible one-to-one scriptural assignments for those vocabularies (shown not even to be a function) and on the feature reshuffling potential in the constitution of graphemic bundles, see Pamiès (2001, 2: 380–81, note 15).
82. And hence, for want of a suitable *locus tenens* in natural language to serve as the flexible, omni-purpose *viva voce* homologue of a bare written character adjustable to all metalinguistic needs—i.e., to put it in a nutshell, without the major scriptural tool of what Auroux et al. (1996) call “la littéralisation.”
83. Cf. in essence Sylvain Auroux (Auroux et al. 1996, 190–92) which, with explicit reference to Jack Goody 1977 (*La raison graphique. La domestication de la pensée sauvage*) underscores (together with the perspectives opened by the full displaying resources of the bi-dimensional space) “l’extrême importance” “[de] l’accès à l’écriture” “dans le développement intellectuel de l’humanité.” “Cette nouvelle forme de technologie intellectuelle [...] permet de nouvelles performance cognitives” “[et, grâce à la littéralisation,] la formalisation” “[et] la pensée symbolique,” “[ouvre ainsi à] une nouvelle forme de rationalité” “[à laquelle] les traducteurs de Goody [*The Domestication of the Savage Mind*] ont donné le nom de raison graphique.”
84. For a synthetic (agnostic) presentation and discussion of the pros and cons of Anti-Platonist claims, see Mark Balaguer (1998, 93–98). For a synopsis of modern philosophical views on mathematics as in part reminiscent of realist, nominalist and conceptualist stances in the fierce medieval quarrels over the status of Universals, see Pamiès (2001, 190, note 472).
85. Though we shall not attempt here a vindication of Platonist views, we wish to draw attention to what strikes us as particularly problematic in one of the most influential attacks on the postulation of self-existing abstract mathematical entities, namely Benacerraf (1973)’s “Mathematical Truth.” As reconstructed in Balaguer (1998) [henceforth here ‘Bal.’ for page references], the attack rests on a number of type (a), (b) and (i) assumptions. As for type (i) terminology, an ‘epistemology’ is defined as (Bal., 24) “an explanation of how human beings could acquire knowledge of abstract mathematical objects.” Concerning type (b) decisions, a fundamental premise is that, in a sense to be explained shortly, (Bal., 23) “the best epistemology” is the causal theory of knowledge (CTK). So that the type (a) delineation of the target is that (Bal., 26) “the epistemological problem with Platonism [...] is the lack-of-access problem.”
 “In its broadest formulation (Bal., 22), CTK holds that in order for a person S to know that p, it is necessary that S be causally related to the fact that p in an appropriate way,” and Benacerraf uses CTK to attack Platonism. The basic idea is that if mathematical objects are taken to be abstract, that is non-spatiotemporal, non-mental and crucially, acausal, it becomes unintelligible under CTK how knowledge of such objects could ever be attained. Under

CTK, then, Benacerraf's conclusion is that the Platonist thesis that there exist abstract mathematical objects is untenable.

More precisely, due to Benacerraf, the epistemological objection (to Platonism) is a form of *reductio* argument: the Platonists claim to know that abstract mathematical objects exist; but if such abstract objects did exist, no one (let alone the Platonists) could ever attain any knowledge of them (let alone learn about their existence); *ergo* no one can sustain that there exist such entities as Platonist abstract mathematical objects. As reconstructed by Balaguer, the full argument (Bal., 22) "buried" in Benacerraf (1973) runs as follows: whenever X (Bal., 23) "acquire[s] knowledge of" Y (*alias*, more metaphorically, [Bal., 28] has "contact with" Y, or [Bal., 26] has "access" to Y), this is taken to mean that X (Bal., 24) "acquir[es] information about" Y. So, 'knowledge of Y' being thus equated with 'information about Y,' it follows that whenever X 'acquires knowledge of' Y, this is a case of "information transfer" (Bal., 25) from Y to X, and 'X has acquired knowledge about Y' is taken to mean 'information about Y has been transferred to X.' So 'knowledge acquisition' being thus equated with 'information transfer,' if one adds that (Bal., 26) "the notion of an information transfer is a causal, spatiotemporal one; it makes sense only when the sender and receiver are both physical objects [...]," it finally follows that 'X acquires knowledge of Y' can only be possible if X and Y are 'physical objects,' and no flesh and blood nor immaterial X is entitled to claim she knows anything about such would-be Y entities as abstract (i.e. [Bal., 3] "non-physical, non-mental, and acausal") mathematical objects, Q.E.D.

Without even going into the validity of the uncontrolled naïve/intuitive-laden metaphorical shift from knowledge acquisition to 'contact,' 'access' or 'transfer,' one might respectfully suggest that, in his metaphysics-bashing zeal, Benacerraf possibly got a bit carried away, and that the *reductio* could easily backfire: so we, as flesh-and-blood entities, could never come to know anything about anything that is not a physical object? We did not know we were so ignorant.

86. As broadly defined in Balaguer (1998, 8, 3) "Platonism is the view that our mathematical theories are descriptions of an abstract *mathematical realm*, that is, a non-physical, non mental, non spatiotemporal" "and acausal" "aspect of reality."

Broad enough to encompass the two varieties of Platonism to be introduced in note 88 *infra*, this definition is in sharp contrast with that given in Penelope Maddy (1990), *Realism in Mathematics*, which defines "platonism" as "a belief in the claim that mathematics is about objectively existing objects, regardless of whether they are aspatial and atemporal." Balaguer (1998, 181), and for which Mark Balaguer offered a refutation (1994, "Against (Maddian) naturalized Platonism").

87. As defined in Balaguer (1998, 5, 6), "*plenitudinous platonism*," "FBP for short"—due to a certain nostalgic tenderness for a previous denomination ("*full-blooded platonism*") which had apparently to be dropped as not

philosophically correct—"can be expressed [...] as the view that *all*" "logically" "*possible mathematical objects exist*." [...] "FBP is [thus] incompatible with non-plenitudinous versions of Platonism that deny the existence of certain sorts of mathematical objects [...] [which they take to be] 'metaphysically impossible'." [6] "The idea behind FBP is that the ordinary, actually existing mathematical objects exhaust all the logical possibilities for such objects; that is, that there actually exist mathematical objects of all logically possible kinds; that is, that all the mathematical objects that logically possibly *could* exist actually *do* exist; that is, that the mathematical realm is plenitudinous." [Therefore,] "I do not think that there are any such things as [mathematical] objects that 'don't exist' or that are 'possible but not actual.' On my view, all [mathematical] objects are ordinary, actually existing objects."

In spite of vague similarities with earlier claims, there can be no doubt that it was Balaguer that coined the concept of FBP. For instance when Henri Poincaré writes that "in mathematics, the word exist ... means free from contradiction," (Poincaré 1913, 454) or when David Hilbert writes that "if the arbitrarily given axioms do not contradict one another with all their consequences, then they are true and the things defined by their axioms exist. This is for me the criterion of truth and existence" (letter to Frege in Frege 1980, 39–40), such passages may "bring [...] to mind" "th[e] picture" [of a] "plenitudinous" "mathematical realm." But the similitude is only superficial: in fact, neither Hilbert nor Poincaré would accept the view "that there are mathematical objects that exist independently of us and our mathematical theories." Which means that neither of them would "endorse any sort of Platonism at all, let alone FBP": not being Platonists at all, neither Poincaré nor Hilbert could have been Platonists of the FBP variety.

88. With such distinguished forerunners as Dedekind (1888), and under the banner of such leading figures as Resnik (1981) "Mathematics as a Science of Patterns: Ontology and Reference" and (1997) *Mathematics as a Science of Patterns*, Shapiro (1989) "Structure and ontology" and (1997) *Philosophy of Mathematics* or Steiner (1975) *Mathematical Knowledge*, (Balaguer 1998, 8) a "version of platonism" claimed to differ markedly from "object-platonism" is "structuralism." "According to [structuralism], our mathematical theories are not descriptions of particular systems of abstract objects; they are descriptions of abstract *structures*, where a structure is something of a *pattern*, or an 'objectless template'—that is, a system of positions that can be 'filled' by any system of objects [sic] that exhibit the given structure." For instance, while Balaguer (1998, 8, 5, 9, 15)'s object-platonists would hold that "the sentence '3 is prime' says that the abstract object that is the number 3 has the property of primeness," "according to structuralists, there is no *object* that is the number 3; there is only the fourth position in the natural-number pattern" shared (Balaguer 1998, 89, 77–78) by many such "progression[s]," *alias* " ω -sequences" as " $\emptyset, \{\emptyset\}, \{\{\emptyset\}\}, \{\{\{\emptyset\}\}\}, \dots$ " and " $\emptyset, \{\emptyset\}, \{\emptyset, \{\emptyset\}\}, \{\emptyset, \{\emptyset\}, \{\emptyset, \{\emptyset\}\}\}, \dots$ ".

For such a structuralist view to count as “a version of platonism,” it must of course be held that “structures and positions are being taken here to be real, objective, and most important, abstract,” that is “exist[ing] outside of spacetime” (Balaguer 1998, 5) “and [...] independently of us and our mathematical theorizing,” as is the case in the references given so far.

However, as in the work of Benacerraf (1965) “What numbers could not be,” or Hellman (1989) *Mathematics without Numbers*, one finds evidence in the literature that the structuralist views presented so far are compatible with Anti-Platonism, when completed accordingly. Combined with a denial that “structures and positions are being taken here to be real, objective,” and a refusal to grant that the fact that they are “abstract” should be taken to mean that they “exist outside of spacetime” (Balaguer 1998, 5) “and [...] independently of us and our mathematical theorizing,” they become a perfect illustration of the fundamental tenet of Anti-Platonism, which rejects any idea of an abstract *mathematical realm*, that is, of a non-physical, non mental, non spatiotemporal aspect of reality.”

89. For a defence of Plenitudinous Platonism against attacks wielding Ockham’s razor, see Balaguer (1998, 144–48).
90. See Wall (1972, 57, 58 and 82).
91. Technically, as a first approximation, (cf. in substance, Wall 1972, 57, 58), in standard Predicate Calculus, all and only the individuals comprising the universe of discourse for a particular discussion may serve as constants to instantiate both free (i.e. unbound) variables [as in such ‘propositional functions’ as the formula $H(x)$] and bound variables [as in such ‘propositions as the formula $(y) H(y)$ where no variable is free]. So that, instantiation, quantification and variables playing a crucial role in the functioning of the Predicate Calculus, and the Predicate Calculus playing a crucial role in the formalisation of mathematics, it follows that the ‘individual’ is a major cornerstone for formalisation. Further on, the definitions of ‘universe of discourse’ and ‘universal’ will be questioned and revised when we get to (XXVIII)-(XXXI) *infra*.
92. As John Bigelow puts it after introducing a possible distinction between ‘individual’ and ‘particular’ (“often the term ‘individuals’ is used interchangeably with ‘particulars,’ though some restrict the term ‘individual’ to those particulars whose existence has more than temporary duration”), given that “modern mathematical logic rests heavily on names and variables which are interpreted as picking out individuals from a domain of discourse[,] In a great many ways, individuals, or particulars, are central to our thinking, not only about this world of impermanence but also about the timeless truths of mathematics (Bigelow 1998, 235–38).
93. The filiation exists, but is not a direct one. Originally, the ‘individual’ was conceived of as a concrete entity. This is only implicit in the illustration adduced to the entry “Individu” of *Larousse du XX^e siècle* “(du latin scolastique *individuus*, indivisible) tout être formant une unité distincte dans une espèce, un genre : *Il n’existe réellement dans la nature que des INDIVIDUS,*” but is more clearly stated in Kaluza, entry “Individuatio

(individuation)” in Auroux et al. (1990, 1276): “Pour les médiévaux, l’individuation est la réalisation d’une espèce dans des êtres concrets.”

To find a transition towards more abstract-friendly modern conceptions of the individual was no easy matter. For instance, in Lalande ([1902–23] 1991, 17th ed.) *Vocabulaire technique et critique de la philosophie*, the main text definition of the entry “Individu” is also tied to concreteness: “Un individu, au sens le plus général de ce mot, est un objet de pensée concret, déterminé, formant un tout reconnaissable, et consistant en un réel donné soit par l’expérience externe, soit par l’expérience interne.” And it took some convolution for Lalande himself to make room for abstractness in a critical note adduced to the original entry: “il est bien vrai qu’intuitivement il n’existe que des individus, c’est-à-dire des tous concrets discrets. Il arrive donc [sic] que par le mot individu nous désignons tantôt la donnée concrète dont la présentation par l’expérience fournit un contenu et une raison d’être aux opérations logiques; tantôt l’unité logique abstraite, nécessaire pour qu’il y ait une compréhension (unité du sujet) et une extension (généralité des prédicats). C’est cette seconde individualité, et non pas la première qui s’applique par assomption à tel ou tel objet de pensée : elle est alors une fonction logique, dont le caractère formel apparaît bien dans certaines opérations, en particulier dans la distinction entre la prédication indivisible [...] ‘Les Muses étaient neuf sœurs’ et la prédication distributive [...] : ‘Les Muses étaient filles de Mnémosynes.’ En ce sens, il est certain qu’un même terme, une même notion, peuvent être pris pour genre, pour espèce, ou pour individu. Mais alors la question ne se pose plus de savoir si ce qu’ils désignent est ou n’est pas un réel donné dans l’intuition.”

Furthermore, not everyone made a similar move. For instance, Lalande adduced his critical note in 1909, but more than fifty years later, the entry “Individu” in Foulquié ([1962] 1992, 6th ed.) is still reminiscent of scholastic claims: “Tout être concret formant un tout reconnaissable. [...] Log. – Être concret qui entre dans l’extension d’une espèce. [...]”

Which is but a small illustration of a more general point made by Bigelow (1998) [q.v. note 92 immediately *supra*]: “The time is not ripe for a consensus to emerge on the nature of [individuals or] particulars.”

94. See note 24 *supra*, and corresponding main text.
95. In our type (i) terms, ‘attribute’ is used as a cover term, and we shall not attempt to draw a line between ‘attribute’ and ‘quality.’ On the distinction which we leave aside here, see Gonthier, in Auroux et al. (1990, 190), entry “Attribut”: “Au sens le plus général, caractéristique attribuée à une personne ou une chose. [...] La signification de la notion d’attribut est en philosophie habituellement plus restreinte que dans le sens courant : l’attribut désigne avant tout les caractéristiques essentielles de la substance; sont rejetées toutes les caractéristiques contingentes. C’est, pour Descartes, ce qui différencie la qualité de l’attribut : la qualité se rapporte à la substance en tant qu’elle est apte à recevoir des changements, alors que l’attribut se rapporte à la substance en elle-même.”

96. The term is often used to talk specifically about Duns Scotus' doctrine, as is the case for instance in the following presentation: "Duns Scotus' doctrine of universals earned him the title "Doctor Subtilis." In his view, universals exist only as abstract concepts, but are based on common natures, such as humanity, which exist, or can exist, in many individuals. Common natures are real, and they have a real unity of their own distinct from the unity of the individuals in which they exist. The individuality of each individual is due to an added positive reality that makes the common nature to be this individual; for example, humanity to be Socrates. Duns Scotus calls such a reality an "individual difference," [...] It is an original development of the earlier medieval realism of universals." (The Reverend Armand Maurer, subsection "Medieval Philosophy," in *The New Encyclopædia Britannica* 1992, 25: 746).

However, we shall use the term 'individual difference' with minimal infestation to specific authors or contentions. That is, in the way the French term 'principe d'individuation' is used in Augé (1931, 4: 53, entry "Individuation"): "[...] *Principe d'individuation*. Caractère intrinsèque qui fait qu'un individu diffère de tout autre individu. (Terme employé par les philosophes du moyen âge. Les uns, comme Albert le Grand, saint Thomas, mettaient ce principe dans la matière; les autres, comme Duns Scot, dans une forme spéciale qu'ils appelaient l'*eccéité* ou *haecceité*." Or again, in the same way the term is used in Kaluza (1990, note 93 *supra*): "[...] Pour les substances matérielles, différents auteurs donnent différents principes d'individuation. [...] [ainsi, selon] Duns Scot et les scotistes," "[c'est] l'*heccéité* (*haecceitas*), c'est-à-dire l'ultime réalité ou la perfection de la forme qui s'ajoute à la nature commune (quiddité) et donne l'unité à l'être en le rendant individuel. [...]"

97. We have chosen the term 'ipseity' (and, in French, its counterpart 'ipséité') because, whereas the term *ecceity* (*alias* 'hecceity,' *alias* 'haecceitas') is irrevocably tied to Duns Scotus' precise views on individuation, its use seems to be as relatively free from rigid association with specific doctrine as what we take to be its (more cumbersome) synonym, 'individual difference.' For a clear illustration of the contrast between the two sets of terms, cf. the following excerpt from Joël Biard, entry "Ipséité" in Auroux et al. (1990, 1375) "[...] l'ipséité caractérise l'individu en lui-même. Elle prend toute son importance dans les doctrines où la nature universelle est première, ce qui pose la question de l'individuation (scotisme). Elle suppose alors l'*haecceité*, par laquelle un individu est un 'ceci' et non simplement un être de telle ou telle espèce. [...]"

Of course, Duns Scotus' contentions are far from devoid of historical value as an attempt to find a solution to paradoxical aspects of the Aristotelian doctrine [cf. Philippe Caspar, entry "Individu (ontologie de l'–)" in Auroux et al. (1990, 1274–75): "[la] synthèse [aristotélécienne] aboutit à un paradoxe [...] que l'on peut énoncer comme suit: il n'existe que des substances individuelles et il n'y a de connaissance que de l'universel. La matière introduit dans la substance une indétermination qui la rend radicalement

opaque à la connaissance conceptuelle. En conséquence, l'individu est le lieu d'opacité ou de négativité du réel.”]; and, in order to find that solution, as an attempt to rehabilitate the ‘individual’ “[en] attribu[ant] à l'individu la même intelligibilité qu'Aristote attribuait à l'espèce et au genre.” (Sylvain Auroux, entry “Eccéité” in Auroux et al. 1990, 719).

But the problem from our present-day perspective is that, even though the *Doctor Subtilis* wanted to emancipate himself from *aristoteles dixit* dogma, his views remain impregnated with unpalatable quiddity-like scholastic apparatus (as the material adduced in the present and previous note amply show). And that is why, not to have our hands tied, we chose to shun such blatant hall-marks of Duns Scotus' doctrine as ‘ecceity,’ ‘haecceity,’ or ‘haecceitas.’

Of course, the term ‘ipseity’ itself is not written on a clean philosophical slate, and by resorting to ‘ipseity’ instead of ‘ecceity,’ if not wary, one could easily leap from the Scotist frying pan into *Dasein* fire [on the connection between ipseity and phenomenology, see Briard (1990): “Dans la phénoménologie, l'ipséité caractérise le *Dasein* dans son existence ou son être-au-monde avant la constitution du moi comme sujet.”; on the connection between ecceity and phenomenology, see Sylvain Auroux (1990 entry “Eccéité”): “Heidegger emploie le terme [d'ecceité] pour caractériser le rapport de l'être à son là, dans le *Dasein*.”]

So that, the ground remaining as slippery here as it was with ‘individual,’ the same cautionary note is in order: as Bigelow (op. cit., note 93 *supra*) would put it, ‘the time is not ripe for a consensus to emerge on ipseity.’

98. In the medieval scholastic context, individuation (ecceity) meant ontological unicity and distinction among the open class of individuals pertaining to the same Aristotelian species [as Baudard and Auroux put it (entry “Individuation [principe d'–]” in Auroux et al. 1990, 1277: “Introduit dans la pensée scolastique par les traductions d'Avicenne [XI^e siècle] le principe d'individuation est ce qui fait qu'un individu se distingue de tous les autres de la même espèce. Il est principe de différenciation [...].”)]

But a formal symbol is by definition one amongst the *n* symbols comprising the finite vocabulary of a formal system FS. So that in the present context of a formalised theory Tf, individuation (ipseity) means ontological unicity and distinction among the closed class of the *n* symbols pertaining to the same formal vocabulary.”

99. In the terms of note 1 *supra* (and associated main text), each such stipulation is a reflexive consideration of type (c) (more precisely, it is a deciphering instructions DI_{FR} in the sense of note 45 *supra* and associated main text) in which the same type (ii) object (namely, *via* the same grapheme *X* scripturally assigned to be its graphic representation, the same formal symbol) is at the same time part of the object-language (since something is said about the type (ii) element *X*) and part of the meta-language (since the type (ii) item used to express what needs to be said is again *X*). In such so-called autonomous meta-linguistic utilisation of a symbol, no effort is made to notationally distinguish between (object-language) use (of the symbol as

forming part of formulas of some artificial language) and (meta-linguistic) mention (of the symbol, in order to say something about it). For more detail on related issues, q.v. the reference given in note 75 *supra*.

100. See note 65 *supra*. For instance, whatever the original intentions of the formaliser, fig. 1-2 *infra* is potentially interpretable as the organigram of a firm, with each of the branches B_1, \dots, B_9 a line of command, each of (B_1, B_2), (B_3, B_4, B_5), B_6 , (B_7, B_8, B_9) the hierarchy of an autonomous department, S, A, B, ..., J employees of the firm, S in over-all command, and S, A, B, C, H and I working in more than one department. Or it could be interpreted as a pattern of infectious contamination between persons, cities, provinces or countries (with each of B_1, \dots, B_9 a line of propagation, each of (B_1, B_2), (B_3, B_4, B_5), B_6 , (B_7, B_8, B_9) the genealogy of the spread of a particular disease, S, A, B, ..., J contaminated persons, cities or countries, S the original contaminator, and S, A, B, C, H and I contaminated by more than one disease; or it could be interpreted a pattern of ideological influence between authors and/or religious movements or political organisations; or, as we shall see, in terms of phrase structure, or as the organigram of an army; or so on or so forth, *ad libitum*.

However, all of the above are under-interpretations if fig. 1-2 is to be viewed as representing a canonical tree, since the precedence relation is left uninterpreted, so that the (very distinct) tree represented by fig. 1-20 would receive the same interpretation. For a complete interpretation, one may imagine a decorative piece of furniture composed of (and decomposable into) arch-like boxes (henceforth 'arches') of quadrangular section, open on three sides (their backs, fronts and bottoms). Disposition-wise, the materialised vertical sides of each arch rest on a horizontal surface (for instance the top of a side-board), and they may both be juxtaposed (in a longitudinal straight row, close-knit side by side) and stacked (in which case a given overarching arch may tightly encompass [henceforth, 'host'] one or more contiguously juxtaposed arches [henceforth 'guests']). Dimension-wise, all the arches are of the same width, the minimal, non-hosting arches are of the same length and height, and the height and length of each overarching, hosting arch is tailor-made to fit exactly the close-knit sub-row of the guests it hosts. Colour-wise, each arch is monochrome, and two arches may be of the same or different colours. In terms of this fancy, colourful piece of would-be design, 'S,' 'A,' '....,' 'J' may be interpreted as 'to be an arch of colour blue, white, red, yellow, orange, green, black, purple, grey, brown and crimson (respectively)'; 'to dominate' as 'to host'; 'to dominate exhaustively' as 'to host all of and (unless hosted by) none other arch(es) than'; 'precedes' as 'is on the left of in the row,' and a branch as a maximal line of successive stacking, starting from the largest, all-encompassing arch to one of the minimal standard arch units. In those terms, the formal object represented by fig. 1-2 (as distinct from fig. 1-20) may be interpreted as the blueprint for the construction of an open-ended class of (wooden, metal, plastic, large, small, ...) material artefacts that may 'realise' it.

101. Q.v., already, note 91 *supra*.

102. See Wall (1972, 52, 58).
103. See Jeffrey (1967, 130, 132), with slightly different conventions for placement of arguments relative to predicates, a more parcimonious use of demarcating brackets and graphemic zero realisation for the universal quantifier in its negative specification as that in the distinctive pair (\forall/\exists) which is not the existential quantifier \exists .
104. Variables comprise a designated subclass of the vocabulary, notationally hallmarked by more or less standard minor graphemic feature ajustements (in actuality, suitable only for a handful of illustrative examples): italics for all graphemic representations of symbols of the vocabulary; for variables, end of alphabetical order, lower case character types; for constant symbols which may be used for instantiation purposes, rest of the alphabet, lower case character types; for constant (predicate) symbols which may not serve for instantiation purposes, upper case character types.
105. Which differ from such wffs as i) or ii) in that they contain at least one free (unbound) variable, q.v. note 91 *supra*.
106. As is remarked in Wall (1972, 52–53), this is just an instance of “a very general condition on the use of variables in mathematics. In algebra, for example, the equation $x+x = 4$ has only one solution; namely, $x = 2$; but the equation $x+y = 4$ has many solutions; e.g. $x = 1$ and $y = 3$, $x = 0$ and $y = 4$; among which is the solution $x = 2$ and $y = 2$, where the variables take on identical values.”
107. See Jeffrey (1967, 130).
108. When spelled out, function c) is seen to incorporate functions a) and b), hence ‘the’ and not ‘a.’ However, the definite description may be justified only as far as the object-language is concerned: for precise instances of the use of a symbol (represented by this or that grapheme under arbitrary scriptural assignment) as a meta-linguistic variable ranging over either object-language constants or object-language variables, see Pamiès (2001, 115, note 31).
109. In such subformulas as ‘ $(\exists x)$,’ ‘ $(\forall y)$,’ or, in the light of note 103 *supra*, (z).
110. On the recommendable, but optional preservation of the monopoly beyond the scope frontier, see Wall (1972, 57): “[In] expressions such as $(\forall x)M(x) \& (\forall x)P(x)$,] occurrences of x in the left and right parts of the conjunction are unrelated, so that we could write equivalently, and less confusingly, $(\forall x)M(x) \& (\forall y)P(y)$.”
111. For the quotations in this paragraph, and the representations adopted in fig. 1-4 and 1-5, see Jeffrey (1967, 131–32). For one similar link notation, see also Wall (1972, 56).
112. In nearly all cases, it can be shown that each occurrence of a variable has at least an indirect link with ontological import, *via* each of its possible instantiations. But even that indirect link is severed in such occurrences as exemplified in the subformulas of note 109 *supra*, which yield formal gibberish when illegitimately replaced by occurrences of constant symbols (for instance, if ‘ c ’ and ‘ d ’ are occurrences of constant symbols, ii) cannot be instantiated as ‘ $(\exists c)(d)(cLd \rightarrow dLc)$,’ because the misguided attempt yields a

monstrous string which is not a formula by the formation rules of the Predicate Calculus), which shows that not all occurrences of a grapheme chosen for a bound variable in a wff fulfil what we have called function a).

113. For instance, it is part of the formal traffic rules signalled by any occurrence of ‘ \forall ’ that, for instantiation purposes, any occurrence of a constant symbol may come to replace, within its scope, all the (bound) occurrences of the variable attached to it. Furthermore, it is part of the formal traffic rules signalled by any occurrence of ‘ \exists ’ that at least one constant symbol may be chosen (*via* its occurrences) to legitimately instantiate all the (bound) occurrences of the variable attached to it. As a result, in cases of overlapping scopes for the two quantifiers, any constant symbol legitimately chosen for existential instantiation may *ipso facto* be legitimately chosen as well for universal instantiation.

So that if, for convenience (but in conformity with note 103 *supra*), we use for i) and ii) respectively, the equivalent notation ‘ $(\forall x)(\exists y)xLy$ ’ and ‘ $(\exists y)(\forall x)(yLx \rightarrow xLy)$,’ then, if ‘*a*’ is a constant symbol, ‘*aLa*’ is a legitimate instantiation of i), and ‘*aLa* \rightarrow *aLa*’ is a legitimate instantiation of ii). Which, as announced, is an illustration of (XXIII), with graphemic distinction between *x* and *y* not reflected in homologous graphemic distinction amongst the instantiating tokens (all of them tokens of the same character type *a*).

114. A formal proof is a finite, ordered sequence of *n* ‘lines’ such that each line is either a wff of the Predicate Calculus which is held to be true (a ‘premise’), or is obtained from the preceding line(s) by application of formal rules of logical equivalence or implication (in the sense of note 1 *supra*). By formal construction of the proof, then, the last line of the proof (the ‘conclusion’) is demonstrated to be logically implied by the conjunction of its premises.
115. For instance, anticipating slightly, and taking for granted a formal apparatus to be presented shortly, given two wffs of the Predicate Calculus like i) $(\exists x)P(x)$ and ii) $(\forall y)(P(y) \rightarrow H(y))$, the logical implication rule of *Modus Ponens* cannot be applied to i) and ii) to yield (iii) $(\exists x)H(x)$, because the implication rules of the predicate calculus are too rigid to grant internal access to sub-formulas of ii). To derive iii), one can resort to Existential Instantiation and (a particular optional way of applying) Universal instantiation to obtain the wffs of Propositional Calculus iii) $P(w)$ and iv) $P(w) \rightarrow H(w)$. Then, and only then, thanks to the Propositional Calculus detour, can we apply *Modus Ponens* to iii) and iv), thus obtaining $H(w)$, whence iii) by Existential Generalisation (on *Modus Tollens*, see, e.g., Wall 1972, 38–39).
116. As presupposed in the formulation of insight ②, the Predicate Calculus PredC incorporates the Propositional Calculus PropC. PredC being an extension of PropC, it incorporates its connectives and is subjected to its formal rules of logical implication and equivalence—which, however, apply only to wff of PredC (or ‘propositions’) but, crucially for the working out of PredC, not to ‘propositional functions’ (where, q.v., already note 91 *supra*, “an expression in the predicate calculus is a proposition if and only if all occurrences of its

variables are bound. If any occurrence is free, the expression is not a proposition but a propositional function” (Wall 1972, 57).

117. In the sense of note 109 *supra*, and associated main text.
118. Following essentially Irving M. Copi (1967), cf. Wall (1972, 80).
119. If, instead of ‘ \equiv ,’ we use, for typographical convenience, the meta-linguistic notational variant for logical equivalence mentioned in note 1 *supra*.
120. Under ‘Complement Law c’ in Wall (1972, 30).
121. On the functioning of Indirect Proof (as a formalisation of *reductio ad absurdum* reasoning), see Wall (1972, 45–46).
122. Or forming part of it, if such notations as ‘ w_1 ’ are held to be digraphs.
123. For a thorough example of the way this style of formal proof actually works, cf. the proof adduced in Pamiès (2001, 2: 398–403), with multiple quantifiers, one indirect proof (lines 8–124) comprising three embedded indirect proofs (lines 45–64, 76–95 and 104–21), and ‘ w_1 ,’ ‘ w_2 ’ and ‘ w_3 ’ (introduced by Existential Instantiation) chosen each several times for applications of Universal Instantiation (lines 24, 29, 98, 102 for w_1 ; 25, 38, 46, 47, 73 for w_2 ; and 26, 28, 68, 74, 77, 103 for w_3).
124. A designation which Wall (1972, 66) offers as an equivalent to our starting-point: “*non-specific constants*, or *variable constants*.”
125. However, one may note that, for want of the distinctions introduced in our (XVII)-(XIX), Wall’s use of the term ‘constant’ fluctuates between representing and represented, i.e. between ‘constant as *locus tenens*’ and ‘constant as that which is represented.’ To show this, we adduce the following excerpt from Wall (1972, 68–69), with our comments added between angled brackets: “A true existentially quantified proposition has at least one true instantiation. Therefore from $(\exists x)P(x)$, we can validly infer $P(w)$ for some constant w in the domain of discourse. In general some instantiations of $P(x)$ will be true and others false, so w cannot represent any arbitrary constant, but a constant (perhaps the only one in the domain of discourse) that makes $P(x)$ true <‘constant’ here does not mean ‘constant as *locus tenens*,’ but some individual represented by a constant symbol>. [...] [s]uppose $(\exists x)P(x)$ and $(\exists x)Q(x)$ are two premises of an argument and that in the proof the former has been instantiated as $P(w)$ by the rule of E.I. It is *not* valid to infer $Q(w)$ from $(\exists x)Q(x)$ because the same constant that makes $P(x)$ true might not make $Q(x)$ true. The correct inference would be to use two different constants, w_1 and w_2 , thus deriving $P(w_1)$ and $Q(w_2)$ from the premises <here, ‘constant’ clearly means ‘constant symbol’ *locus tenens*>. We therefore impose as a restriction on E.I. that the constant [i.e. the constant with its subscript] introduced cannot have occurred previously in the proof.” In this excerpt, one may also notice in passing that for Wall, ‘represent’ and ‘refer to’ are in terminological free variation.
126. If one tries to grope for some such tacit arcane reading of ‘nonspecific,’ one gets nowhere. For instance, noting that by the ‘specifics’ of something is commonly understood a ‘detailed specification’ of that something, one could try stretching in that direction the meaning of the derivatively associated adjective. By thus grappling with the non-specialised vocabulary, one could

try imagining that by ‘nonspecific’ one is somehow expected to understand in this technical context, ‘not fully-fledged ontologically.’ *Via* that desperate move one could then claim that the term ‘nonspecific’ captures the gist of point a). But, crucially, not of point b): by no stretch of the imagination could one grasp, even under the postulated new reading, what might be ‘nonspecific’ about singling out exactly one item in a multitude.

127. Della Summers (ed.), *Longman Dictionary of English Language and Culture*, entry “Specific,” acceptance 2.
128. We know that subset (of the domain of discourse from which valid instantiations of w may be drawn) to be non-null for three reasons: by hypothesis [see ②i], by definition [of ‘premise’ q.v. note 114 *supra*] and by convention, the general precept “*the domain of discourse is never empty*” nipping in the bud all sorts of unpalatable difficulties—for instance if the domain of discourse is the null set, one is currently led to claim that such wffs as $(\forall x)(P(x) \vee \sim P(x))$ are “vacuously true,” but with the disastrous consequence that by the same token, $(\forall x)(P(x) \wedge \sim P(x))$ should also be deemed vacuously true, “play[ing] havoc” with the Complement Law referred to in note 120 *supra* (see Wall 1972, *verbatim* and in substance, 63–64).
129. As inner textual evidence that this is indeed Wall’s intended acceptance for the term, slightly anticipating on developments to come [q.v. formal rule ④ *infra*] and not without a bit of exegesis, we may adduce the following key excerpts (from Wall 1972, 66, 68–69), with ‘refer to’ as a free terminological variant of ‘represent’ [q.v. note 125 *supra*], and with our comments between angled brackets: whereas “[the constant] v [introduced by Universal Instantiation] is like a variable in that it stands for no specific individual in the domain of discourse” <hence v must clearly be deemed ‘nonspecific’>, “[the constant] w (introduced by existential instantiation) is like [...] v [...] in that it might not refer to a specific individual” “in the domain of discourse” <‘might not’ and not ‘does not,’ the embarrassed use of the modal here betraying tacit recognition that, on closer scrutiny, w does not quite deserve the appellation ‘nonspecific,’ because of the ‘at least one’ in the definition of existential quantification does not formally exclude that the (sub)set of available instantiators from which to pick be a singleton>. Thus, w is like the constant v introduced by U.I. in that it might not refer to a specific individual, but it is different in that the range of individuals to which it can possibly refer is not in general the entire domain of discourse but a subset of individuals that form true instantiations of the propositional function in question.” From another angle, we shall return to a small (completed) passage of the above in note 134 *infra*.
130. Losing sight of the fundamental distinction between formal objects and their interpretations in terms of naïve constructs may easily lead to confusion on those issues, because of undue interference of irrelevant encyclopaedic knowledge. For instance, taken as a premise, ‘ $(\exists x) M(x)$ ’ can be instantiated as $M(w)$, and formally, the only thing we know [point a)] about w is its existence as an entity endowed with individual difference [point b)], and all

we know about the number n of its putative valid instantiators is that $n \geq 1$, so that what might then become of w and n under naïve interpretation is totally beside the point.

Of course, under one interpretation (of M as ‘to have composed the music of the *Magic Flute*’) $n=1$. Under another (of M as ‘to be one of Snow-White dwarfs,’ all our schoolchildren could proudly raise their hands to say ‘ $n=7$,’ and so on an so forth, but just as irrelevantly: It will make formal sense to start counting the potential valid instantiators of w (and issues of (non)specificity will be at all relevant) the day it will make sense to start counting hairs on the concept of beard.

131. As was made clear in note 129 *supra*, calling the UFOs of $\{‘w,’ ‘w_1,’ ‘w_2,’ \dots\}$ ‘*nonspecific constants*’ is not only unrevealing, but slightly misleading, because (with ‘specific’ meaning, as we have seen, something like ‘the only one of its kind’) it could foster the false impression that (using the notations of formal rule ③), the conjoined definitions of ‘premise’ and ‘universal quantification’ guarantee that there exist *more than one* [instead of ‘at least one’] constant of the domain of discourse such that instantiating all those variables by that constant yields a valid instantiation of ff_{\exists} .
132. Idem note 117 *supra*.
133. For instance, the fact that such formulas as ‘ $P(v)$,’ ‘ $P(v_1)$,’ ‘ $P(v_2)$,’ ... are propositions and not propositional functions can be adduced to conclude that each of the UFOs of $\{‘v,’ ‘v_1,’ ‘v_2,’ \dots\}$ should be considered as constants, just as we saw could be argued for those of $\{‘w,’ ‘w_1,’ ‘w_2,’ \dots\}$, and for the same reason (see Wall 1972, 66: “ v is a constant term and so $P(v)$ is a proposition, not a propositional function”); and the introduction of two distinct arbitrary graphemes (‘ w ’ for G_E and ‘ v ’ for G_U) is justified by the fact that it would otherwise be impossible to keep notational tract of the crucial difference between what can be done (pick up for instantiation by U.I. any w_i already introduced by some antecedent application of E.I.) and what cannot (pick up for instantiation by E.I. any v_j already introduced by some antecedent application of U.I.).
134. In the light of such passages as (cf. Wall 1972, 66) “ v is like a variable in that it stands for no specific individual,” and of our previous remarks about nonspecificity (note 130 *supra* and associated main text), one is led to believe that when Wall calls our UFOs “variable constants,” he intends “constants picked at random from a set of available instantiators comprising more than one individual.” But, *pace* Robert Wall, the appellation is just as unsatisfactory in the case of v , for the remaining one of the two reasons invoked for w : though the possibility of “nonspecific” unicity of available choice from within a singleton does not arise in the case of U.I., because defining our UFOs (v as well as w) in terms of (non)specificity ignores a crucial determiner [point b)] of the way they are put to actual use in formal proofs: forget nonspecificity, stripped as it may be of all but one of its attributes (its individual difference), each one is demonstrably held to be known as itself and none other.

135. Otherwise, from, say, premises $(\exists x)P(x)$ and $(\exists x)\sim P(x)$ one would fallaciously derive such illegitimately obtained contradictions as $w_1 \wedge \sim w_1$ at stage ②ii of insight ②.
136. The naïve insight behind U.G. is that “to prove that some proposition is true of every member of some class, one can arbitrarily select an individual from the class and prove that the statement holds for that individual. Then if the proof depends only on the fact that the individual is a member of the class and not on any additional properties it may have, it can be validly inferred that the conclusion holds for all individuals in the class. [...] This line of reasoning is made explicit in the rule of Universal Generalisation,” “What is true of an arbitrary selected individual is true of every individual in the domain of discourse” (Wall 1972, 66).
137. See, in substance, Wall (1972, 74).
138. Or, equivalently, ‘ $(\forall y) P(y, y)$.’
139. Which would not result in a fallacy [since $(\forall x)(\forall y)P(x, y) \Rightarrow (\forall x P(x, x))$], but in a loss of expressive resources [since $(\forall x) P(x, x) \not\Rightarrow (\forall x)(\forall y)P(x, y)$]: “ $P(v, v)$ [...] is a legitimate instantiation of $(\forall x)(\forall y)P(x, y)$, and thus $(\forall x)(\forall y)P(x, y)$ logically implies $(\forall x)(x, x)$. The latter does not imply the former, however, and thus in a proof if distinct variables are allowed to merge, the original distinction cannot be subsequently recaptured in the generalization steps” (cf. Wall 1972, 74).
140. The illusion of perfectly seamless blending of the two hypostases is almost complete. However, in cases where a proof comprises such two premises as ‘ $(\exists x)P(x)$ ’ and ‘ $(\exists y)H(y)$,’ the necessity of using $w_1 (\neq) w_2$ for successive applications of E.I. forces one to a slight ontological overstatement, since the definition of Existential Instantiation does not logically exclude the possibility of there existing one individual verifying both $P(x)$ and $P(y)$, as is embarrassingly exposed when (*modulo* the observations of note 130 *supra*) one notes that H and P could be interpreted as ‘to be a prime lesser than 6’ and ‘to be a prime greater than four,’ respectively. But this borderline piece of formal cunning may be considered ontologically innocuous, since no fallacious conclusion may result from the trespassing, given the impossibility of deriving $\sim(\exists x)(P(x) \wedge H(x))$ (or, equivalently, $(\forall x)\sim(P(x) \wedge H(x))$] from just $P(w_1)$ and $H(w_2)$.
141. Cf., in substance, Wall (1972, 57–58, 82) and note 90 *supra*.
142. On higher-order Predicate Calculi in general, and in particular on the object-language of the second-order Predicate Calculus as comprising variables ranging over first-order predicates, cf., in substance, Jeffrey (1967, 228–29).
143. Due to its all-encompassing nature, UD is defined as a ‘universe’ but could not have been defined as a set, because of Russell’s paradox, Bertrand Russell (1903, chapter X). As Wall (1972, 82, 86) puts it, commenting on what we labelled (1) and (3), “The universe of discourse is usually assumed, implicitly, to contain all the specific sets and members that enter in the discussion, all possible collections of these, collections of these collections, etc. [But] it is an unfortunate fact that one cannot assume, once and for all, a

universe of discourse consisting of ‘the sets of all sets,’ [since] [...] accepting the existence of this set leads to a contradiction as a consequence of the set containing not only itself but also its own power set [i.e. the set of all its own sub-sets] as a member”—where the “contradiction” is that if UD was held to be some set I , that set would have to comprise one of its own subsets defined as follows: $B = \{X \in I \mid X \notin X\}$. Thus B would be the collection of all those sets in I that are not members of themselves. [...] [But] when we ask whether $B \in B$, a paradox results. That is, the assumption that $B \in B$ leads to the conclusion $B \notin B$, and vice versa.” More precisely, i) if $B \in B$ is taken as premise, then candidate B to B membership fails to satisfy the defining condition for B membership, hence $B \notin B$, which demonstrates that $B \in B \Rightarrow B \notin B$. Furthermore ii) if $B \notin B$ is taken as premise, then candidate B to B membership satisfies the defining condition for B membership, hence $B \in B$, which demonstrates that $B \notin B \Rightarrow B \in B$. Hence from i) and ii), iii) $B \in B \Leftrightarrow B \notin B$, which is a paradoxical contradiction, since ‘ $B \notin B$ ’ is by definition the negation of $B \in B$.

On a possible link between our extended concepts of “Universe of Discourse” and “individual” on the one hand and, on the other, the related concepts of “domain D ” and “Dinge” (literally, “things”) which Ernst Zermelo (1908), “Untersuchungen über die Grundlagen der Mengenlehre,” quoted in Desanti (1990, 603), introduced to circumvent the paradoxes, cf. Pamiès (2001, 336, note 885).

144. As an example of further entities that could be hosted by UD, one may evoke Noam Chomsky’s “domain D ” *Lectures on Government and Binding*, 324, but we shall not pursue the matter here.
145. Or ‘constituent-structure trees,’ when one is ‘thinking ahead’ of targeting the type of naïve interpretation alluded to in note 32 *supra*.
146. For a demonstration of the equivalence of the definitions presented in this subsection, see Pamiès (2001, 173–84).
147. From Wall (1972, 144–55), both in substance and *verbatim*.
148. Or ‘configuration,’ q.v. note 69 *supra*.
149. A weak partial order being nonconnex, transitive and antisymmetric, the relation of dominance D may be thought to be ‘partial’ because given any two nodes in a given tree T , one does not necessarily dominate the other, and it may be thought to be ‘weak’ because (any node being held to dominate itself) it does not enforce distinction.
150. A strict partial order being nonconnex, transitive and asymmetric (hence irreflexive), the relation of precedence P may be thought to be ‘partial’ because given any two nodes in a given tree T , one does not necessarily precede the other, and it may be thought to be ‘strict’ because it does not tolerate that any node be held to precede itself.
151. Function L is an ‘into’ function because several distinct nodes may be allocated (distinct occurrences of) the same label.
152. See Wall (1972, 150), *Theorem 6-3*. A terminal node in a canonical tree T being defined as a node which dominates no other node than itself in T , if N_T

is the set of the terminal nodes of T , the restriction of relation P to N_T is a strict total order (it is connex, irreflexive, asymmetric and transitive).

153. For the full detail, see Pamiès (2001, 135–42).
154. And by fig. 1-1 as well, since, the explicit indications about branches B_1 - B_9 in the former being fully recoverable from the notations of the latter, on closer inspection (cf. note 160 *infra*), fig. 1-1 is nothing but a redundant version of fig. 1-12.
155. Where, given a formal grammar G , a derivation is a strictly ordered finite sequence $a_1, \dots a_n$ of n finite strings of concatenated occurrences of symbols such that, for $1 < i \leq n$, each string a_i is obtained from the immediately preceding string a_{i-1} by one application of one rewriting rule of G , a_i being then said to 'follow from' a_{i-1} by that application of that rule.
156. The 'semi Thue systems,' which are 'unrestricted' in that they allow the rewriting of (sub)strings of more than one concatenated occurrence of symbol at each application of a rule. For a precise definition, see Pamiès (2001, 110–11). On Chomsky's theorems and the hierarchy of formal grammars and formal languages see Pamiès (2001, 226–43).
157. The restricted sub-class of semi Thue systems thus obtained is the class of 'constituent structure grammars,' which are 'restricted' in that they allow the rewriting of only one occurrence of symbol (exclusively drawn from a designated subvocabulary of 'nonterminal symbols') per application of a rule. For precisions on constituent structure grammars (obtainability from the semi Thue systems, formal definition, essential properties and correlated definitions), see Pamiès (2001, 122–28).
On the definition of a procedure I associating one arboriference to each derivation of each semi Thue system in general and of each constituent-structure grammar in particular, *idem*, 143–47.
158. For a demonstration that the impact of the constraints on rules restricting the broad class of semi Thue systems to the narrower class of constituent-structure grammars consists in a resulting restriction of the broad associated class of arboriferences to the narrow class of canonical trees, see Pamiès (2001, 148ff.).
159. As a rough approximation to the precise content of the references of the last paragraph of note 157 *supra*.
160. In which ' B_1 ,' ..., ' B_9 ' are not part of the object language, but meta-language annotations which can be used for ease of reference in, say, note 100 *supra*, but are redundant in that they introduce nothing not recoverable from the rest of the graphic representation. For instance the notation ' B_1 ' is unnecessary to read into fig. 1-2 that (S, A, C) is a maximal branch terminating in a node preceding all other terminal nodes in the represented tree. As a consequence (and as already alluded to in note 154 *supra*), the presence (as in fig. 1-1 and 1-2) or absence (as in fig. 1-3, 1-8 or 1-12) of those indications is irrelevant for the determination of the formal object represented.
161. Namely, for instance, the derivation represented by fig. 1-17 and fig. 1-7. Where (provisionally ignoring superscripts in the case of the latter [cf. note 175 *infra*]), such notations as ' $(2, R_2)$ ' at the end of line $(2+1=)3$ indicating

which rule has been applied to the preceding line (2) to yield the current line (3) of the derivation <for full detail, see Wall (1972, 217, 9–22) and Pamiès (2001, 246, note 221)> pertain to the meta-language but do not belong to the object-language.

162. Namely the rules R_1, \dots, R_7 of fig. 1-6.
163. Two adjacent joined arrowed segments/links are co-oriented *iff* the arrowed extremity of one is immediately joined to the unarrowed extremity of the other. Thus, in fig. 1-3, the adjacent arrowed links ($S > E$) and ($E > B$) are co-directional, but the adjacent arrowed links ($H < B$) and ($B > I$) are not [–no example of adjacency of type ($X > Y$) and ($Y < Z$) is possible, since cases of downward converging of branches, though not excluded in the wider class of arboriferences, are excluded in the tighter class of canonical trees]. Similarly, in fig. 1-3, none of the paths $\langle (H < B)(B < E)(E < S)(S > J) \rangle$ and $\langle (A < J)(J > C) \rangle$ is a path ‘all the links of which are uniformly co-oriented,’ because of the directionality conflicts at hinges $S)(S$ and $J)(J$, respectively. In the context of these revisions of (XXXII) leading to intermediate results $\boxed{4}$ and $\boxed{5}$, a branch may be defined as a maximal path all the segments/links of which are uniformly co-oriented.
164. Exemplified diversity of graphic representations of nodes: subscripted ‘N’s for fig. 1-10, subscripted-superscripted ‘a’s for fig. 1-1 and 1-12, merged into labels in fig. 1-2, 1-3 and 1-8. Exemplified diversity of graphic representations of relations: straightforward exhaustive extensional algebraic listing in fig. 1-11; mix of conventionalised topological relations and drawing in the notational material of fig. 1-2, 1-3 and 1-8; arithmetic inferiority/equality/superiority relations among the numbers featuring in homologous subscripts or superscripts in the case of fig. 1-1 and 1-12.
165. Each of the represented abstract formal objects in $\boxed{1-5}$ is a mathematical structure comprising two sets [one with 16 elements (or ‘nodes’), the second with 11 elements (or ‘symbols’)] and three relations [the first comprises 50 distinct ordered pairs (of nodes such that the first precedes the second) and is a strict partial order; the second comprises 43 distinct ordered pairs (of nodes such that the first dominates the second) and is a weak partial order; the third comprises 16 distinct ordered pairs (such that the first coordinate, a symbol, labels the second, a node) and is an into function].
166. See for instance the predatory approach delineated in note 32 *supra*.
167. For instance, in Phrase Structure theory, ‘*the man with a red hat*’ may be considered to be a constituent of the Noun Phrase type, ‘*man with*’ no constituent at all, ‘*with a red hat*’ a constituent of the Prepositional Phrase type; and ‘*the man with a red hat*’ may be deemed to be analysable as (Determiner, Noun, Prepositional Phrase), (Determiner, Noun, Preposition, Noun Phrase), or (Determiner, Noun, Preposition, Determiner, Adjective, Noun), but not, say, (Determiner, Verb Phrase), etc.
168. More precisely, by that common terminological extension from nodes to labels, in a given canonical tree T , any relation holding between two nodes N_1 and N_2 (in that order) may be said to hold between the two occurrences of symbols labelling those nodes (in the same order). This extension is

commonly practised for the relations of precedence, of (exhaustive) dominance and for ‘immediate dominance’—where, in a given canonical tree T , a node N_1 immediately dominates a node N_2 iff N_1 dominates N_2 and no node of T distinct from N_1 both dominates N_2 and is dominated by N_1 .

169. Thus, using the notations of step 6. *supra*, if $CEDI_C$ is the cumulative exhaustive dominance index of the canonical tree C represented by fig. 1-2, $CEDI_C = \{(S, AEHJ), (S, AEHABC), (S, AEIJ), (S, AEIABC), (S, ABFHJ), (S, ABFHABC), (S, ABFIJ), (S, ABFIABC), (S, ABGHJ), (S, ABGHABC), (S, ABGIJ), (S, ABGIABC), (S, AHIFHJ), (S, AHIFHABC), (S, AHIFIJ), (S, AHIFIABC), (S, AHIGHJ), (S, AHIGHABC), (S, AHIGIJ), (S, AHIGIABC), (S, CDEHJ), (S, CDEHABC), (S, CDEIJ), (S, CDEIABC), (S, CDBFHJ), (S, CDBFHABC), (S, CDBFIJ), (S, CDBFIABC), (S, CDBGHJ), (S, CDBGHABC), (S, CDBGIJ), (S, CDBGIABC), (S, CDHIFHJ), (S, CDHIFHABC), (S, CDHIFIJ), (S, CDHIFIABC), (S, CDHIGHJ), (S, CDHIGHABC), (S, CDHIGIJ), (S, CDHIGIABC), (A, CD), (E, BF), (E, BG), (E, HIF), (E, HIG), (F, G), (H, I), (J, ABC)\}$.
170. Using the notations of note 155 *supra*, two derivations $\alpha_1, \dots, \alpha_n$ and β_1, \dots, β_m are distinct iff either $n \neq m$ or (with $n=m$) for some i ($1 \leq i \leq n$), $\alpha_i \neq \beta_i$ —by which is meant that at least one occurrence of some rank in α_i or β_i is not matched by an occurrence (of the same rank) of the same symbol in β_i or α_i , either because such an occurrence exists but is not an occurrence of the same symbol, or because it does not exist since α_i or β_i is shorter than β_i or α_i .
171. Defined in note 155 *supra*.
172. *Alias* the ‘dominance’ relation of note 149 *supra* and associated text.
173. As distinct from its possible representations, i.e. as a formal object, a derivation is a mathematical structure (S_V, F_G) , where S_V is a set of strings on a vocabulary V , see Wall (1972, 164–65), and F_G is the relation ‘follows from’ in a grammar G .
174. In constituent-structure grammars the ‘axiom’ is the designated symbol of the vocabulary by an occurrence of which all derivations must begin (see Pamiès 2001, 115–16, notes 130 and 137, and related text).
175. These enriched superscripted annotations are part of the meta-language, not the object-language. They only accelerate the recovery of independently available information and are not used to redefine the conditions of applications of the rewriting rules of constituent grammars—which could otherwise become structure-dependent, transformation-like, rules.
176. In Pamiès (2001), for a precise definition of a purely derivational homologue (in an equivalence class of derivations C) of (in a tree T) ‘analysable as in T ,’ ‘dominates in T ,’ ‘precedes in T ,’ ‘exhaustively dominates in T ’ and ‘cumulative exhaustive dominance index of T ’ [‘bilan des dominances exhaustives’], cf. 128, note 187 [‘être une analyse pour dans C ’]; 211, note 547 [‘domine improprement dans C ’]; 378, Annexe 3, 1; [‘précède séquentiellement dans une séquence de C ’]; 211, note 547 [‘être un constituant de type C dans C ’] and 159–60 [‘bilan des devenus de C ’], respectively.

177. In Pamiès (2001), 1. on the identity stated in step 15. between cumulative filiations indexes—‘bilans des devenus’—and cumulative exhaustive dominance index—‘bilans des dominances exhaustives’— (cf. 248, note 718 and 162–63, note 281); 2. on the irreducible distinction (in the sense of note 71 *supra*) of equivalence classes of derivations C and canonical trees $T <$ because no match for the constitutive nodes of T can be found in $C >$ (cf. 213–14 and 247–48 particularly, note 718); 3. on the four-fold isomorphism between four pairs of mathematical structures (in the sense of note 69 *supra*, and with the relations mentioned in note 176 immediately *supra*), namely between i) (\mathcal{A} , ‘être une analyse pour’ dans C) and (Π , ‘analysable as in T ’), ii) (\mathcal{A} , ‘domine improprement dans C ’) and (Π , ‘analysable as in T ’), iii) (\mathcal{A} , ‘précède séquentiellement dans une séquence de C ’) and (Π , ‘precedes in T ’), iv) ($\mathcal{A} \cup V_C$, ‘être un constituant de type C dans C ’) and ($\Pi \cup (V_T)$, ‘exhaustively dominates in T ’) $<$ where ‘ \mathcal{A} ’ is the set of all strings constitutive of at least one line of at least one derivation of C , ‘ V_C ,’ the vocabulary of symbols occurrences of which may be rewritten by the rules of the formal grammar yielding the derivations of C , ‘ Π ,’ the set of sequences of (labelled) nodes exhaustively dominated by the (labelled) root of T , and ‘ V_T ,’ the set of symbols occurrences of which may be used to label the nodes of $T >$ (cf. 211–13 and 247–48, particularly note 717).
178. To see this, keeping in mind the definition of steps 4. and 6. and the identity stated in step 15. *supra*, see isomorphism iv) and the definition of ‘ \mathcal{A} ’ in note 177 immediately *supra*.
179. For an exhaustive specification of those 240 derivations (with due lack of consideration for a large number of combinatorial impossibilities), cf. Pamiès (2001, 161–62, note 277).
180. Which may be referred to here, since, by step 15., and using the notations of steps 6. and 7., for any derivation Σ_C of C $\Gamma(\Sigma_C) = T$, $\text{CFI}_C = \text{CEDI}_T$.
181. As defined in Pamiès (2001, 168).
182. In which for all non-initial stages the superscript enrichments have been omitted for typographical convenience.
183. For the (recursive) definition of the procedure for obtaining condensed wefts of equivalence classes of derivations, see Pamiès (2001, 169–70 and, for a demonstration of some of its properties, 2: 404–47 and 448–59).
184. Definitions by recursion (and, for exactly the same reasons, proofs by mathematical induction) need algebraic meta-linguistic variables with numbers as indices, superscripts or subscripts, to give some arithmetical grain to grind in the open-ended recursive stipulations or inductive demonstrations of type “if something holds for something of rank i , then it also holds for the next thing of the same kind (ranked $i+1$).” An example of recursive instructions being indicated in note 183 *supra*, for an example of the use of algebraic meta-variables and indices in inductive proofs, see Pamiès (2001, 2: 344–49 [demonstration of corollary d])). On proof by mathematical induction, see also Wall (1972, 194–95).

185. For the recursive definition of procedure Γ (using meta-linguistic variables with numbers as superscripts), see Pamiès (2001, 144–45).
186. We are told the expression now tends to have derogatory ‘lame ducks’ connotations. But we take the parable in the sense intended by Florian in his fable (1792, “L’aveugle et le paralytique”): as a variation on the vital necessity of human kindness, the blindman and the cripple illustrate the need for mutual solidarity and support.
187. A role which formal geometricised representations can only play if the deciphering instructions they comprise are aptly chosen. For instance, the ‘nontangling’ condition iii) of Wall’s definition in step 1. may be visualised as the requirement that branches cannot cross, may diverge downwards, but cannot converge downwards if the orientation conventions for the representation of the relation of ‘dominance’ are those adopted for fig. 1-2, but not at all if they are those adopted for fig. 1-3 and 1-8.
188. From this point of view, Noam Chomsky’s very early practice of leaping from just one derivation to its associated tree (and back again whenever necessary) can be seen in retrospect to have been a notational masterstroke: by just ignoring the existence of the multitude of distinct derivations pertaining to the same class, he short-circuited the parasitical problems associated with (under equivalence) derivational proliferation, benefitted from the exhaustiveness and clarity of geometricised arborescent representations, and yet did not let his hand be tied for formal calculation.
189. In the context of formalisation, a pseudo-formalised theory of this kind would have little chance of going beyond the possibly error-inducing initial seduction of the founding hypotheses of the naïve theory it would thus fail to formalise; and by self-decree it would be unduly quasi-exempted from the empirical constraints of Popperian refutability.
190. For another kind of example, cf. the ‘tree method’ for formal proof presented in Jeffrey (1967).
191. As early as 1965, it was proposed that such a rule as ‘ $A \rightarrow B$ ’ be “interpreted not as an instruction to [...] replace a symbol A by a sequence [sic] of symbols BC , but [...] as an instruction to put two nodes labelled B and C under a hitherto terminal node labelled A .” Introducing “tree-formational rules,” “in place of rewriting rule derivations (sequences of strings of symbols), this proposal substitutes a tree derivation: a sequence of trees, each part of the following one, the first tree of the sequence consisting of a single node labelled and the last tree being a full I[mmEDIATE] C[onstituent] tree” (Stockwell et al. 1965, 8 ff., quoted *verbatim* and in substance in McCawley 1968, 248–49). On the lack of distinction, throughout the above quotations, between notations and represented abstract formal objects, see Pamiès (2001, 188, note 464).

The proposal remained in limbo for a long time, and *via* some pioneering work by Joshi et al. (1975), only received full attention and formal elaboration twenty years later in such work as Kroch and Joshi (1985), Joshi (1987), Kroch (1987) and Frank (1992).

192. When the “tree-derivation” of fig. 1-19 is compared to its purely algebraic fully explicited counterpart in fig. 1-14, the contrast in legibility is striking. For instance, it takes a bit of juggling with subscripts and superscripts to disentangle from the notations of stage 8. in the algebraic derivation of fig. 1-14 what the generated terminal string actually is: if we number from 1 to 9 the constituting occurrences of this terminal string CDHIGIABC, then, in the notations of stage 8., reading from left to right and from top to bottom (because all the branches in the final tree are not of the same length), those occurrences find their algebraic allotment in the following reshuffled order for the unfortunate decipherer: the first (A), then the second (D), then the sixth (I), then the seventh (A), then the eighth (B), then the ninth (C), then the third (H), then the fourth (I), and finally the fifth (G).
- When the “tree-derivation” of fig. 1-19 is compared to its purely algebraic counterpart in fig. 1-17, it appears that the less space-saving largely geometricised notations of fig. 1-19 spare the reader the mental effort of having to read into the compact notations of fig. 1-17 (*via* more or less conscious resort to the typographical lay-out of the page) the tacit, unexplicated dependency links we have represented in the diagram of fig. 1-18.
193. Of particular use will be (I), (II), (XXVIII)-(XXXI), (XXXVII), as well as notes 33, 38, 45, 143 and 144.

Chapter Two

1. McCawley observes that massive spending by the federal government “made it possible for many universities to start linguistics programs that otherwise would not have been started or would not have been started so early, or to expand existing programs much further than they would otherwise have been expanded. Given the situation of the early 1960s, it was inevitable that a large proportion of the new teaching jobs in linguistics would go to transformational grammarians. In the case of new programs, since at that time transformational grammar was the kind of linguistics in which it was most obvious that new and interesting things were going on, many administrators would prefer to get a transformational grammarian to organise the new program; in the case of expansion of existing programs, even when those who had charge of the new funds would not speculate their personal intellectual capital on the new theory, it was to their advantage to speculate their newfound monetary capital on it, since if the new theory was going to become influential, a department would have to offer instruction in it if the department was to attract students in numbers that were in keeping with its newfound riches. And with the first couple of bunches of students turned out by the holders of these new jobs, the membership of the transformational subcommunity swelled greatly” (McCawley 1976b, 25; cit. in Koerner 1983, 151).
2. The paper was published long after it was circulated. Its initial reception ranged from hostility (from Chomsky) to indifference (Harris 1993, 105).

Lakoff himself dates the beginning of GS to his essay in story grammar (a transformational rendition of Propp's theory of fairy tales, published in 1972): "Generative semantics began with my undergraduate thesis in English literature at MIT. The thesis was the first generative story grammar" (Huck and Goldsmith 1995, 107). However, this study is disconnected from subsequent work in GS. GS really gained an audience with the circulation of a manifesto written by Ross and Lakoff (Lakoff and Ross [1967] 1976; cf. Harris 1993, 128s).

3. Fillmore acknowledges the influence of Fries and Pike on his early distributional work (Fillmore 1982).
4. Chafe asserts that "...the *semantic* structure of Onondaga differs from that of English in relatively trivial ways, and that the striking differences between the two languages arise largely as the result of postsemantic processes, which lead to markedly different surface structures" (Chafe 1970a, 268). To linguists from the Boas-Sapir-Whorf tradition, this would have sounded preposterous.
5. Lakoff's penultimate model (before experiential linguistics) was baptized cognitive grammar. However, it had nothing to do with cognitive linguistics. The approach combined elements of relational grammar and augmented transition networks (Lakoff and Thompson 1975a/b).
6. At the time, Lakoff was collaborating with Ross on gradience phenomena in grammar. His paper on fuzzy grammar (1973b) argued that some constructions were ruled by a hierarchy of constraints, whose interaction produced a gradience in grammaticality.
7. Cue validity is a notion introduced by the psychologist Egon Brunswik. In Brunswik's functional probabilism, a proximal attribute is a cue which permits an inference to a property or to the category of an object. This inference is probabilistic. See Fortis (2010a) for details.
8. In a previous critical paper (Lakoff 1974b) had called for a humanistic linguistics, a global approach that would encompass semantics, pragmatics, sociolinguistics, and even studies on "deviant" speech. Such an approach, Lakoff insisted, was in contradistinction to the Chomskyan "nuts-and-bolts" approach.
9. Noppen (1985) inventories around 4900 publications between 1970 and 1985. Here is a list of conferences in the United States: Illinois Conference on Metaphor and Thought (1977). Proceedings in Ortony (1979), *Metaphor and Thought* (the proofs of the introduction were read by Lakoff, see Ortony's preface; the papers by Schön and Reddy are especially close to Lakoff's future views); Interdisciplinary Conference on Metaphor, University of California, Davis (1978); Conference of the Society for Research in Child Development (1975); Conferences of the American Psychological Association (1977, 1978, 1979); University of Chicago Extension (1978), "Metaphor: the conceptual leap," first published in *Critical Inquiry* 1978 5(1), and reprinted in S. Sacks (ed.), 1979, *On Metaphor*.
10. For a history of cognitive metaphor, see also Nerlich and Clarke 2001, Burkhardt and Nerlich 2010. There are also fictionalist overtones in the

theory of Lakoff and Johnson, and the fictionalist strand has links to empiricism (Bentham was a reader of Tooke; see also Vaihinger's *As If Philosophy*).

11. For example, under the assumption that Equi-NP deletion was conditioned by coreference, it was suggested that the notion of coreference be extended to “beheaded NPs” in cases like *Norman Mailer wants to be read on a nationwide TV broadcast*, where the deleted subject of *to be read* is really *Norman Mailer's texts*. This background may explain why, in *Metaphors We Live By*, metonymy is considered to be matter of referential identification.
12. Subject Raising: *Everyone thought Malcom was in Switzerland* \Rightarrow *Everyone thought Malcom to be in Switzerland*; Negative Raising: *I believe that you should not drink vinegar* \Rightarrow *I do not believe that you should drink vinegar*; tough-movement: *it is tough to solve this problem* \Rightarrow *this problem is tough to solve*.
13. More precisely, there are two deep DO, an agentive and a non-agentive one. Langacker's classification of deep “auxiliaries” is adapted from Chafe (1970b), whose influence on Langacker may be significant in other respects, for instance in the field of interrogative constructions or in his notional definition of nouns and verbs (Fortis 2010b).
14. Fillmore's case grammar may also have exerted an influence. Further, Langacker is familiar with Tesnière's theory (Langacker 1995), and Fillmore acknowledges Tesnière as one of his inspirations (Fillmore 1968).
15. “By the term *frame*,” Fillmore says, “I have in mind any system of concepts related in such a way that to understand any one of them you have to understand the whole structure in which it fits” (Fillmore 1982, 111).
16. However, in later studies, Langacker emphasizes that constituency is indeterminate at least for a number of constructions (1995, 2003).
17. Langacker refuses to identify his images with the sensory images of psychology (1986, 6). *Imagery* has for him a wider meaning and refers to linguistic conceptualization.
18. Chafe was the chairman of the Berkeley linguistics department while Talmy was working on his dissertation.
19. There might be an echo of Whorf here: “To compare ways in which different languages differently ‘segment’ the same situation or experience, it is desirable to be able to analyze or ‘segment’ the experience first in a way independent of any one language or linguistic stock, a way which will be the same for all observers. [...] There is one thing on which all observers of the appearance of a running boy will agree [...], that it can be divided into parts—and they will all make the division in the same way. They will all divide it into (1) a figure or outline having more or less of motion (the boy) and (2) some kind of background or field against which, or in which, the figure is seen” (Whorf [1940] 1956, 162–63).
20. Gruber himself says that in his analysis of thematic roles “there is no particular priority intended for the sense of concrete motion” (1965, 48). He is therefore unwilling to declare himself a localist. In practice, however, his

positions are localist, and were taken as such by Jackendoff (see esp. Jackendoff 1983).

Chapter Three

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1. "Level one is a level of representation, in which representation refers to mental representation [...]. We do not have access to all this, in the sense of immediate access [...]. At level two, we have representations that I will call linguistic, which are the trace of the level one representation activity. We have thus second degree representatives and constructions of representatives, but there is no term to term relation between level one representations and level two representations [...] Level three is the level at which we have the explicit construction of metalinguistic representations." (Culioli 1990, 21–22)
 2. "Thought cannot be reduced to pure representation, with no participation of a thinking subject. [...] The explicit sentence thus consists of two parts: one is the correlate of the process which constitutes representation [...]; we will call it *dictum* as logicians do. The other contains the key element of the sentence, namely the expression of a modality, correlated with the action of the thinking subject. The *logical* and analytical expression of modality is a modal verb (i.e. *believe*, *be delighted*, *wish*) and its subject a modal subject; both of them constitute the *modus*, which is complementary to the *dictum*." (Bally 1932, 35–36)
 3. We have kept the symbols originally used in French.
 4. PROC designates the aspectual operator of 'process.'

Chapter Four

1. I wish to thank Jacqueline Léon for her extensive comments on earlier versions of this article. I accept responsibility for any of the inaccuracies this article might contain.
2. "The study of the social process and of single human beings is simultaneous and of equal validity, and for both, structural hypotheses are proved by their own social functioning in the scientific process of dealing with events. Our schematic constructs must be judged with reference to their combined tool power in our dealings with linguistic events in the social process. Such constructs have no ontological status and we do not project them as having being or existence." (Firth 1950, 181)

3. Our chronology was established using the electronic edition of the *Collected Works of M.A.K. HALLIDAY* published by Continuum International Publishing. For Firth's work, we used the *Corpus des Textes Linguistiques Fondamentaux* (http://ctlf.ens-lyon.fr/i_accueil.asp, accessed June 30, 2013) overseen by Bernard Colombat of the HTL Research Unit (CNRS–University Paris Diderot).
4. As mentioned earlier on, Firth's functions can also be phonological or morphological; however, for the discussion at hand, we will be limiting ourselves to syntactic functions.
5. Malinowski identifies two major functions of language: the pragmatic one and the magical one.
6. Our translation of "Ce qui intéresse Bühler, c'est *ce que fait* le langage en étant représentation, expression ou appel" (Bühler [1934a] 2009, 39).
7. The term of "role" might be drawn from Charles Fillmore's work on cases as he also claims that Subject is a surface category (Fillmore 1967).
8. Firth's polysystemic approach is not limited to the systems of the clause. A truly polysystemic approach brings together systems pertaining to many other levels of analysis such as that of the phoneme, the morpheme or the text.
9. On this point—as with many others throughout "Notes on Transitivity and Theme in English"—Halliday's position is quite similar to that of Fillmore: "In general, however, it should be stressed that in English it is the clause types that represent the underlying grammatical selections, and restrictions of particular verbs to occurrence in particular clause types are rarely as absolute as they may at first seem." (Fillmore 1967, 52) More generally Halliday (1967–68) and Fillmore (1967) offer interesting parallels as both attempt to revise the notion of deep structure using some of Whorf's insights—Fillmore thus stresses the importance of "covert categories" and explicitly acknowledges his debt to Whorf on this point (Fillmore 1967, 7). Neither of them however discusses the other's theory in any depth.
10. If Halliday uses the terms "operative" and "receptive" and not "active" and "passive," it is to highlight the fact that voice is a characteristic of the clause and not of the verb.
11. Furthermore, Halliday explains in Part 3 that one should not confuse thematisation and prosody since thematisation can be expressed using other means in different languages (for instance, in Japanese, the theme/rheme opposition is expressed using affixes).
12. While Halliday's structural functions may be reminiscent of the reasoning behind binary features in phonology, there is a major difference worth pointing out: structural functions are not organised in binary oppositions. The sole presence or absence of a function is not meaningful in itself. It is rather the whole path through the system network that will explain how meaning is constructed: the moment when a specific function is selected (ie. the previous choices that led to its selection) and the other functions selected alongside it are just as important as the contrasts into which it enters with the functions which were not selected. Structural functions, unlike binary features, thus have a context and what could be called a history.

13. Halliday's analyses of transitivity and ergativity and the conclusions he comes to concerning the English language's "worldview" bear similarities with modern case grammars and construction grammars. I believe the reason for this is to be found in the fact that both stem from a similar concern, i.e. the desire to revise the notion of deep structure using Whorfian insights. This is true not only of Halliday (1967–68) but also of Fillmore (1967), probably the most influential of a number of similar initiatives taking place at the same time.
14. Most notably the mathetic macrofunction where language is used as a way to think about the world, and the pragmatic macrofunction where language is used to act upon the world.
15. This is explained in Halliday (1994).
16. One might add that Halliday was a less ardent critic of Saussure than Firth: "I've always felt it was rather a distraction in Saussure that he defined linguistics as the study of *la langue*, with *parole* being simply the evidence that you use and then throw away. I don't see it that way. Firth, of course, was at the other end of the scale, in that for him the phenomenon was the text. [...] I don't want to privilege either." (Steele and Threadgold 1987, 603).
17. By claiming that the metafunctions have an empirical grounding we do not mean that they are not influenced in any way by the theoretical framework surrounding them. The collecting and interpretation of any empirical data necessarily always happens within a theoretical framework whose influence is unavoidable. As mentioned earlier on, the question of the influence of Halliday's framework on the metafunctional hypothesis still needs to be addressed.

Chapter Five

1. Although they acknowledge Wittgenstein as a source (Rosch and Mervis 1975, 574–75) for introducing the notion of *family resemblance* in philosophy, the root of which can be traced back to the writings of Brentano (Jean-Michel Fortis, p.c.).
2. This definition has been rejected (although it presumably provides a good approximation) and debate in analytic philosophy has tried to put forward another, more complex, viable set of necessary and sufficient conditions (Sturgeon 1995, 25–26).
3. Yet it should be noted that biologists tend to tweak their definitions as new facts or species are discovered, in order to ensure that their categories do not include unwanted members (without excluding those which they want as specimens of that category).
4. In point of fact, the claims of Rosch's psychological theory are more complex and difficult to assess, and my all-too-brief and partial overview of prototype theory fails to do justice to it—just as that of Aristotelian categorization failed on the same count. I further refer the reader to Kleiber

1990 for an extensive discussion of the theory and Barsalou 1987 for criticism and an alternative psychological account.

5. My translation is from the text in French, as are all the others that follow. The original reads: "Ce n'est pas une échelle et l'attracteur est nécessaire comme constitutif de l'un des pôles permettant, par les opérations possibles des sujets énonciateurs sur les domaines structurés, d'avoir des zones de différenciation s'éloignant du centre attracteur, donc plus faibles par rapport à ce centre."
6. "... vous allez (vous) poser des questions: 'Et si un veau avait 5 pattes, est-ce que cela serait toujours un veau?' Ce n'est pas une fausse question. C'est une question importante dans la mesure où nous attribuons toujours des propriétés typiques; nous travaillons sur des objets typés et la notion de type est fondamentale (elle a été redécouverte récemment en psychologie cognitive avec la notion de prototype) Nous allons travailler sur la construction de prototypes..."
7. "On va construire une *frontière*: c'est-à-dire ce qui a la propriété 'p' et en même temps la propriété altérée, qui fait que ce n'est plus totalement 'p', que cela n'a pas la propriété 'p', mais que cela n'est pas totalement extérieur."
8. See note 4 above.
9. Desclés and Pascu (2007) provide an intellectually stimulating logical account of categorization in terms of conditions and properties, some of which are merely typical (thereby accounting for prototypical effects).
10. "Définition des parties du discours noms, adjectifs, et verbes :
Du point de vue de leur fonction fondamentale, les noms sont des prédicatifs comme les adjectifs et les verbes ; du point de vue sémantique, ils expriment une qualité comme les adjectifs et les verbes (à la différence des substantifs). Mais noms, adjectifs et verbes se distinguent du point de vue sémantique comme ils se distinguent du point de vue morphosyntaxique (affixes et compléments) : les noms expriment des caractéristiques définitoires, les adjectifs des caractéristiques stables non définitoires, et les verbes des caractéristiques dont la validité est limitée à un procès (limites elles-mêmes définies par le système des marques aspectuo-temporelles propres à la langue), sinon à une énonciation."
11. "... ce qu'il est interdit de faire, c'est de les [catégories linguistiques] mettre au même niveau que les catégories référentielles, d'assimiler une 'catégorie' linguistique comme celle de *bayi* [autre catégorie en Dyirbal], qui regroupe, sans être elle-même une catégorie conceptuelle, des sens ou des catégories différents, à une catégorie linguistique comme celle d'*oiseau*, qui constitue une catégorie conceptuelle, en ce qu'elle regroupe non des sens ou des catégories différents, mais des membres ou des référents (individus ou sous-catégories)."
12. Khalifa acknowledges drawing on Bourcier (1981) for this argumentation.
13. Wulfstan: *De Falsis Deis*, Marsden 2004, 206, l. 28. The translation into present-day English is my own.
14. Paraphrase with a relative pronoun is the defining criterion used by Geisler (1995, 12) to define infinitive relative clauses. The infinitive can be replaced

by a finite clause for the test: *I'll give a little money with which you'll be able to buy drinks.*

15. This is very often but not always the case. For more details, see Simonin 2013.
16. The first account of this phenomenon is Chomsky (1964), according to Radford (1981, 220).
17. The first example is from Quirk et al. (1985, 1270), and the observation is made in Simonin 2007.
18. "...en disant, *les hommes qui sont pieux sont charitables*, on n'affirme ni des hommes en général, ni d'aucuns hommes en particulier, qu'ils soient pieux ; mais l'esprit joignant ensemble l'idée de *pieux* avec celle d'*hommes*, et en faisant une idée totale, juge que l'attribut de *charitable* convient à cette idée totale."

Chapter Six

1. One pre-theoretical objection concerns a potential circularity of definition. Modal expressions are defined as quantifying over, or referring to, possible worlds. Possible worlds are then defined using a modal expression: namely as abstract representations of "ways the world *could* be." The limitations of world sets in describing modal relations are, perhaps, an inevitable and foreseeable consequence of this inherent circularity.
2. "The law of the excluded middle" states that a sentence is guaranteed to be either true or false, while "the law of non-contradiction" states that a sentence cannot be simultaneously both true and false.
3. Namely, if a proposition is a set of worlds W , then the premise set, P , is a set of sets of worlds ($P(W)$). The intersection of this power-set is then defined as the set of worlds in which all members of P are true. If this intersection is the empty set, then the premise set is inconsistent. If it is non-empty, then necessity and possibility are defined as universal or existential quantifiers over this set. (A sentence is necessarily true if it is true in every world where every member of P is also true. A sentence is possible if it is true in some world where every member of P is also true. Obviously if there is only one member of the intersection of $P(W)$ then possibility and necessity are equivalent.)
4. There is an obvious parallel between this division of modal bases and the distinction between direct and indirect evidence. Circumstantial modal bases represent the world of evaluation directly. Informational backgrounds represent the world indirectly. However, as this paper will argue, type of evidence is distinct from type of modality (see also Aikhenvald 2004, on the separation of modality and evidentiality), although the two semantic categories are importantly related.
5. Papafragou (2006) points out that subjective epistemics have an indexical character—being tied to the speaker's knowledge at the time of speaking. This makes epistemic modals comparable to performatives, and mental-act verbs such as *think*, *infer*, *conclude*, etc. (Papafragou 2006, 1694–96).

However, positively comparing subjective epistemics to other illocutionary force operators seems counterproductive in arguing against their being illocutionary operators themselves. It seems the key distinction lies in the inscrutability of the relevant information set, rather than any performativity or mental act peculiar to subjective epistemics.

6. It is worth pointing out that Hacquard and Wellwood assume that modal auxiliaries *can* and *might* are unambiguously interpreted consistently as root and epistemic respectively. They also observe some examples of *can* that might be problematic for this assumption. (There are also some idiosyncratic/idiomatic uses of *might* that are potentially ambiguous. For examples, sentences such as: *You might have told me* or *You might have waited for me*, both of which appear to have a deontic character.) However this usually seems to be a robust generalisation.
7. Hacquard and Wellwood also observe that epistemics are unattested in directives/desideratives. They point out that this may be syntactic, seeing as most expressions that convey desires or commands require infinitival complements. However, semi-modal *have to* can appear in desideratives, but always takes a root interpretation, such as in the sentence: *The worker does not want to have to pay taxes* (from Hacquard and Wellwood 2012, 18)
8. The evidence surrounding the syntactic split is varied. Cinque's hierarchy (Cinque 1999) describes the nature of the syntactic divide, others have observed a correlation between epistemics and roots, and raising and control structures (see Ross 1969, Perlmutter 1971, Lightfoot 1979. See also Wurmbrand 1999, for a refutation of this distinction). Bybee et al. (1995) argue that epistemics and roots correlate with a speaker vs. subject orientation, while actuality entailments (Bhatt 1999, Hacquard 2006) suggest that roots scope beneath aspect.
9. This observation was originally made by John Maier (personal communication).
10. This concept of "counterpart events" draws from both a Lewisian concept of "counterparts" (Lewis, 1979a and 1979b), and a Davidsonian concept of events, where events are defined as akin to entities which may be quantified over (Davidson, 1969). Hacquard's definition of an event is specifically that it is an individual-time pair rather than a world-time pair. Such events can then have counterpart versions in a Lewisian sense and be quantified over accordingly, yielding a unified analysis of modal force as universal/existential quantification.
11. As mentioned in the introduction, much depends here on the theoretical standpoint regarding what is linguistically important about meaning. A commitment to a strict semantic/syntactic isomorphism would hold that as the incongruity is merely pragmatic, it is not part of a semantic system. However, it is predictably related to syntactic phenomena, and the theoretical stance of this paper holds that pragmatic rules regarding how context contributes to meaning are not easily isolable from underlying semantic systems.

12. Sharvit's explanation of Free Indirect Discourse is not uncontroversial. A completely different explanation of modality and Free Indirect Discourse (that does not rely on covert attitude operators) is that of Boogart (2007).
13. There is a remaining puzzle, however, that arises from such uses of modal *can* with a dummy subject, such as in the sentence: *It can get very cold*. If *can* is taken to quantify over the property set of the subject, rather than a proposition/world set, but the subject does not in fact refer to any individual, then this solution reaches an obvious impasse.
14. In the case of modal adjectives *possible* and *probable*, their degree scales seem to translate into their noun equivalents, for example: *That is a good/better possibility*, or: *That is a high/low probability*. However, for *probability* this seems more restricted than for *possibility*, and numerically precise measurements are highly marked. For example, the sentence: *#That is a 76% probability* seems awkward, if not totally unacceptable.
15. Portner (2009, 76), for example points out that the English adjective *possible* is not supposed to take *very* as a modifier. As is so often the case, however, actual language does not seem to follow the rules. Such examples are perhaps slightly restricted, but certainly not unattested. Moreover, as Kratzer (Kratzer, 2012, 42) points out, this restriction is not a cross-linguistic fact. The interest here is what is being quantifiably graded: the possibility (i.e. the modal relation itself), or its implied/entailed position on a probability scale. The tentative proposal suggested here is that the latter is the case. The modal relation simply assigns a status: either to a proposition or to an individual. Its probability grade, or specific possibility quality, is implied.
16. Lassiter (2011), by contrast suggests that all modals have "semantic scalarity," even if this is not always evidenced by "grammatical gradability" (Lassiter 2011, 2), this would explain the lack of grading of modal auxiliaries. (Lassiter does provide an example of a graded modal auxiliary, in the following sentence: *There are situations in which concerns of autonomy ought very much to matter* (from <http://prawfsblog.blogs.com/prawfsblawg/2010/10/the-progressive-commitment-to-pornography.html>, quoted in Lassiter 2001, 1). However this is an ambiguous example. The adverbial *very much* may be interpreted as modifying *matter* (namely: *it ought to matter very much*) and if it is applying to the modal *ought*, it seems to be functioning as an intensifier, rather than assigning a grade.
17. Combining Hacquard's event relativity (Hacquard 2010), and Sharvit's covert attitude operators (Sharvit 2008), as suggested in section 1.3, different subjects of such "attitude verbs" could therefore also "code" subjective sources of information other than that of the speaker at speech time. For example, the sentence: *Bob thinks he has lost his gloves*, codes Bob's information/knowledge set as the source of information. (The speaker may well know that Bob's gloves are safely in his pocket, and still utter such a sentence truthfully.)
18. Some argue that epistemics are types of evidential markers (Drubig 2001, McCready and Ogata 2007). In contrast, Aikhenvald maintains the two are

distinct (Aikhenvald 2004). Faller (2012) suggests that evidentials affect the speech act or illocutionary force of a sentence. If this is right, and if epistemics are part of truth conditional content, then evidentials are distinct from epistemics by not contributing to truth conditional content. (It is worth noting that McCready and Ogata 2007) argue that epistemics and evidentials are *both* truth conditional.)

19. An anonymous reviewer has also pointed out that sentences such as *I saw the window had been repaired* might be potentially problematic for such an analysis—the issue being that the sentence could easily refer to the repaired window being directly viewed. The issue is easily explained however, by considering the difference between referring to the *event* of the window being repaired, and referring to the resulting *state* of the window. I may see that a previously broken window is now in a state of repair, but not have actually viewed the act of repairing it being carried out. In other words, I have directly observed a repaired window, and inferred from this that the (complete) event of someone repairing that window has occurred.
20. Jaszczolt argues that epistemic modality is a form of linguistic detachment from the “certainty of now” (Jaszczolt 2009). The relationship between evidentiality, epistemic modality and perfect aspect seems to suggest something similar regarding the interaction of temporality and modality.

Chapter Seven

1. *Argumentative aspects* are expressed as descriptions of particular argumentative movements, and they are schematically depicted as follows, which permits the incarnation of other concrete utterances besides those exemplified in (1): (i) unknown word THEREFORE (big) dictionary; (ii) risk of scattering by wind THEREFORE weight for holding; (iii) realistic disguise THEREFORE cheating.
2. *The Oxford Pocket Dictionary of Current English 2009.*
3. This distinction could be compared to *tones* in the APT framework, in that descriptive use corresponds to *World's tone* and interpretive use to *Other's tone*. This similarity is, however, more apparent than real, because of the fundamental difference between the two theories: RT refers to “representation of states of affairs” which cannot be taken into account in APT. “World” or “Other” in APT do not reside in the referential sphere, but are “tones” the utterance takes on to bring the content into discourse, that is, a linguistic entity (see the following sections for full details).
4. Wilson continues her argument by using this remark to criticize the “pretence” analysis of irony.
5. Presenting even an outline of SBT lies beyond the scope of the present chapter, though this will not affect the understanding of its theoretical and practical discussion of this chapter. See Carel (2011a and b) for details.
6. This term *interpretation* naturally reminds us of Wilson's term *interpretive use*, despite the fundamental differences between the two theoretical standpoints.

7. As Carel recognizes, APT is still in the process of elaboration with repeated terminological modifications; the terminology in this chapter is based principally on Carel (2012).
8. Roughly speaking, *content* can be compared to “sentence meaning” in more classic terms, and APT can be a theoretical setup to output “utterance meaning.” However, this comparison lacks accuracy because APT’s theoretical standpoint is different from the classic semantics/pragmatics distinction.
9. This specific conception of the *speaker* in APT is also one of its fundamental differences from RT, which has a quite ordinary (referentialist) point of view of the speaker.
10. Segments in square brackets are *contents* of corresponding linguistic expressions.
11. These three tones are not an exhaustive list of tones. Carel (2011a) mentions *Hearer’s tone*, and Lescano (2009) presents *Witness’s tone*, and the theory does not claim that tones form a closed set. In this chapter, only the three tones necessary for following the analysis are introduced.
12. The term *textual function* used to be called more simply *attitude* in the theory, and it has to be said that the latter term would be more easily understandable in ordinary linguistic terminology. This renaming is due once again to theoretical considerations. According to the theory, this notion must also be “linguistic,” that is, the term *attitude* could be liable to remind us of a real *physical* speaker’s attitude to the utterance, while *textual function* is an attitude attributed to the content itself. It must be remembered that the *speaker* itself is also an entity residing in discourse.
13. In this notation “NEG-” implies all kinds of syntactic and lexical means which function argumentatively in the same way as negation.
14. The original example is “Quinault is a Virgil (Quinault est un Virgile),” but as in Ducrot’s paper itself, the content of this utterance is presented as [Quinault is a great poet (Quinault est un grand poète)]. I modified it in order to simplify the following discussion.
15. The tone for this rejected content is not specified because it can take any of the tones except the Speaker’s tone.
16. See § 3.4 (example 16) for endorsed contents in Other’s tone.

Chapter Eight

1. In discourse analysis, one most often finds a reference to the speaker as producing his utterance in an act of speech, and the analysis is concerned in the way in which the subject utters: what the speaker intends to say, how his meaning is construed in certain ways by the hearer or addressee, etc. Another manner of conceptualizing the utterance act—which we endorse—is concerned with the process of producing meaning, and considers the linguistic form of the utterance as a cogent system of markers; in such a constructivist theory of meaning, it is the combination of forms and markers which makes the production of meaning possible. There is no meaning

independent of language: enunciativist theory holds that language is what renders meaning visible.

2. This orientation of the speaker's attitude towards knowledge presented as evidentiality has been closely associated with what can broadly be defined as epistemic modality. Whereas the term evidentiality puts emphasis on the source of knowledge as a cognitive category, we are more interested in the use made of the attitude of the utterer as it constructs a subjective position in a discursive exchange.
3. "In RT, thought processes are assumed to be exclusively matters of information processing by a 'device.' Sperber and Wilson operate with the same kind of reductionist conception of human mental processes as is found in transformational generative grammar, namely the 'black box.' This view of the mind severely limits the scope of human mental activity and precludes any sociocultural perspective on the individual's construction of knowledge. Sperber and Wilson's favorite metaphor for the human mind is the computer. They limit their object of enquiry accordingly to how the human mind functions as a computer, i.e., to human information processing." (See Talbot 1997, 47)
4. We note in passing that the analysis made by Benveniste here raises the problem of ambiguity between the descriptive function and the enunciative function, both present in an utterance introduced by *I think*. For a detailed discussion, see Arigne (1994, 141).
5. "Culioli addresses the specificity of the enunciative domain, 'defined with respect to the enunciator *S0* and the moment of uttering *T0*.' *S0* grounds the 'intersubjective space [between it and *S'0*, the co-enunciator] of every situation of uttering,' while *S1* represents 'the first occurrence of a subject in the utterance [...] an utterance subject in relation to [located by] an enunciator-subject,' as opposed to the traditional syntactic view of the subject. If 'I' is identified with (=) *S0*, and 'you' differs from (\neq) *S0*; other components of utterances correspond to more complex values." (Culioli 1995, 88)
6. "The problem of *regulation* is always linked to that of *representation*. What does this mean? Let us imagine that one verbalized strictly for oneself: that language activity would not be at all subject to regulation by another. In a foreign language situation this is exactly what occurs when one's interlocutor is polite. By not interrupting, he does not bring into play the activity of regulation that corresponds to the role of parents 'correcting' their child's language production. [...] One can remark that at every moment in discourse expressions arise such as: *I'm looking for words that can express my thought, if I can put it that way*, etc. This happens through occurrences of notions. One only has access to the notion through text and more specifically through words, but on the other hand, there is no one-notion/one-word relationship. There is always a lack of equivalence." (Ibid., 41).
7. "We shall adapt the concept of 'enunciative space' proposed by Culioli in order to represent the referential values and their interaction as a centered domain consisting of an interior, a boundary and an exterior. Schematically,

the enunciator crosses the boundary of the notional domain and positions himself in the center when he endorses the predicative relation; he stops at or returns to the boundary (IE) when he admits without endorsing. Moreover, in order to fully understand these two concepts in their entirety, it is essential to keep in mind the inverse implication that binds them.” (Laurendeau 1989, 107–29; my translation).

8. “Scholars have attributed two clearly different types of semantic meaning to I think, [...] Now these studies do not make any reference to the potential difference in prosodic realization between the two meanings, but it is conceivable that prosody and especially accent must play a part in distinguishing them: in the first case, ‘belief/insufficient evidence,’ accent typically falls on think (I ^think he’s a carpenter), while in the second, ‘opinion/personal attitude,’ it tends to fall on I (^I think he’s a fool).” (Kärkkäinen 2003, 110).
9. In speaking and constructing utterances, the locutor or utterer (considered as an abstract representation of the origin of the utterance) is led to make a number of choices as to which lexical items will be chosen, and how they will be assembled to constitute a predicative relation. *Pertinence*, conceived of here as what is significant for the utterer in his utterance, can be marked by prosodic means to attract the attention of the interlocutor to this fact, with the aim that he might accept, share this point of view or otherwise be convinced by the locutor (utterer). We can define pertinence as the fact of an element of the utterance being “specifically significant” for the utterer. Every choice made in the construction of an utterance results, for the utterer, in some degree of pertinence for any given element. Pertinence can be considered as a specific locating operation, linking an element directly relative to the utterer. In simply employing a term, a choice has already been made and the element selected will carry some degree of stress; thus when several terms enter into a predicative relation in an ordered manner, another choice of relative pertinence is made as to the manner in which the terms corresponding to arguments of the predication enter into a prosodic relation. The term as I use it should not be confused with relevance as defined by Wilson and Sperber, which is usually translated into French as “pertinence.”
10. Location: this is a fundamental relation in the Theory of Enunciative Operations, in which all terms (Notions, Relations, Enunciative coordinates) are necessarily *located* relative to another term which functions as a locator. The concept of location is perhaps the most central concept in the theory of enunciative operations. It is a linguistic or language operation which is involved in the production and recognition of utterances and constitutes the core of the construction of the referential values of these utterances. The operation of location is the source of the determination of the different notions present in an utterance: it is involved in the very construction of these notions, in the determination of nouns and verbs, in relations between notions, and finally in the construction of an utterance relative to an origin. If the locator is not itself an absolute origin locator (i.e. the situation of uttering), then it is located relative to another term which serves as a locator.

No term is isolated; all terms can only acquire a referential value if they are part of a locating system. The operation of locating is symbolised by “ \underline{x} ” [x is located relative to y] and can have three values: identification (symbolised by “=”), differentiation (symbolised by “ \neq ”) and disconnection or detachment (symbolised by “ ω ”). “English definitions of key terms in the Theory of Enunciative Operations,” *The SIL French/English Linguistic Glossary*, edited by Jean Chuquet, Hélène Chuquet, Eric Gilbert, translated by Hélène Chuquet and Ronald Flinham

http://ftp.sil.org/linguistics/glossary_fe/defs/TOEEn.asp?lang=en.

11. It was proposed in our earlier work that focus placed on *I* as opposed to the verb presented the image of the speaker in a confrontational stance within a paradigm in relation to other (even virtual) speakers, in the context of an enunciative analysis based on the measurement of melodic prominence (or its absence) on either element in sentence-initial position: “for pronouns, Prosodic Level 1 represents the restrictive identity of the referent term, and therefore the construction of a weakly unique path to the element selected in the paradigm concerned. Level 1 designates the choice (weakly unique or suppletive focus) of a path among other possible paths to paradigm elements [...]. Level 2 always corresponds to a specific choice (strongly unique) or oppositional focus which rejects another or other elements in the paradigm, and is dependent on the pre-construction (situational or notional) of the paradigm.” (Schaefer 2002, 824–25)
12. An example proposed for radical alterity was taken from *The Maltese Falcon*, in a line uttered by Sam Spade in the film version: “*She* thinks I shot Miles.” The utterer protests by contrasting the position of the derived enunciator (*S0d*) with his own endorsement as enunciator-origin, rejecting the validity of the reported predicative relation (Doro-Mégry 2008, 25).

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