

Seeing Red: Terminal Description and Explanation in Linguistics *

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Résumé : Dans cette étude, je propose une approche de la sémantique linguistique dans laquelle la valeur des éléments substantifs (le fait d'être adjectif, nom propre, nom commun, etc.) n'est pas une spécification lexicale, mais découle de l'application des règles qui combinent ces éléments dans la phrase. Au niveau du terme, les éléments substantifs ont tous la même valeur d'*atome* (c'est-à-dire, d'unité indécomposable), leur dénotation dans le lexique – la notion à laquelle ils renvoient dans le domaine conceptuel – ne servant qu'à les différencier. Les distinctions catégorielles associées aux adjectifs, noms propres et noms communs émergent de la manipulation de valeur atomique du terme par la syntaxe, la félicité du résultat dépendant du type de réalité que le terme dénote dans le monde conceptuel. Avec cette approche, je montre comment on peut rendre compte de différentes valeurs catégorielles de l'expression *red* 'rouge' de l'anglais à partir d'une description lexicale unifiée. La sémantique des substantifs dans ce modèle est donc dérivée, émergeant de l'application de règles combinatoires. Le vocabulaire terminal, qui en principe ne peut être dérivé, est optimal, chaque forme étant associée à un seul sens dans la définition des expressions substantives.

* This paper explores issues that are central to my research, but that often get relegated to the background in papers dealing with specific problems of analysis. I would like to thank Bob Mercer, Barbara White and Jennifer Ormston for their patience and helpful advice during our many discussions over the last few years. I also want to thank the anonymous reviewers for their comments, and helpful and constructive criticisms. Responsibility for any omissions and errors is of course my own. This study was partly supported by an Academic Development Fund grant from the University of Western Ontario.

The difference between terms and constructions in natural language constitutes a natural division between what can and what cannot be explained. Arguably, knowledge about terms does not belong to the domain of explanation, but to the domain of description. The sound-meaning relations that characterize terms are arbitrary, and must thus be learned case by case. In contrast, knowledge of constructions requires a more powerful mode of description, since speakers can have judgements about a potentially infinite number of form-meaning relations at the level of the construction. This fact rules out an account of knowledge of constructions by mere listing, and requires some sort of rule system. In this paper, I want to show that the natural division between terms and constructions correlates with two different types of semantics, a hypothesis that clearly defines the line between what linguistic theory can and cannot explain in semantics. More specifically, I argue that aside from the functional vocabulary of a language, the meaning associated with substantive terms - their denotation - lies outside of grammatical inquiry per se. It belongs to conceptual knowledge and could be called “conceptual semantics”. Its function at the lexical level is simply to distinguish terms from one another. In contrast, the aspects of meaning that are relevant to grammar are a function of syntactic combination, so that whether an expression is simple or complex has a direct consequence for its semantic value. Accordingly, this type of semantics, call it “logical” or “grammatical” semantics, belongs to the domain of explanation in grammatical analysis because it exists at the level of grammatical constructions.

I argue in this paper that a grammatical theory that makes such a distinction is in principle more explanatory than one that does not, because complexity is completely removed from the grammatical lexicon, and assigned where it should be: to the cognitive domain, and, in the grammar, to the level of constructions. What constrains the distribution of a substantive term in this theory lies in the capacity to establish a felicitous mapping between the denotation of the

term in the conceptual domain and the meaning of the construction where the term appears. It might seem, at first, that I am simply avoiding many problems of analysis by pushing them outside of grammar and, in so doing, hiding the explanations in the conceptual domain. However, my position here is not to deny the importance of the conceptual domain for linguistic interpretation, but rather to argue that it is wrong from a theoretical standpoint to use the distinctions that exist in that domain to distinguish lexical classes in grammar.¹ In fact, as I shall show, a clearer understanding of how grammatical meaning interacts with conceptual meaning opens up the possibility of using grammatical semantics as a means of uncovering the organisation of the conceptual domain.

Although the correspondence between terms/constructions and the conceptual/logical domains can be applied to a wide range of facts in linguistic, in this paper I concentrate mainly on one specific case, the expression *red* in English². In the first section, I present the case that illustrates the issue in this study and outline how I see the relation between the two types of semantics, before outlining the rest of the paper.

1. Two types of meaning

Two distinct types of meaning play a role in the interpretation of *red* in the sentences in (1) and (2).

¹ Borer (2005) takes a similar stance regarding the role of lexical projection in syntactic theory, and the role of the conceptual domain in general in grammar. However, as I discuss in section 6, her approach to syntax and meaning is fundamentally different than the one proposed here, where I argue that rules of syntax actually create semantic distinctions as they build structure.

² I choose to illustrate the issues with *red* because the distinctions involved are simple and (I believe) uncontroversial. The arguments made extend to a multitude of examples.

- (1) a. A *red* table.
- b. A bright *red*.
- (2) a. Mary's favourite car is *red*.
- b. Mary's favourite colour is *red*.

The first relates to the concept that the expression “evokes”, namely a certain range of frequencies in the visible light spectrum³. Let me use the label RED to talk about this notion, and use the term *denotation* to talk about the relation between the expression *red* and this notion. The second concerns the grammatical category of the expression: whereas *red* has an adjectival interpretation in the (a) examples, it has a nominal interpretation in the (b) examples.

Grammatical categories are generally not taken to be truly “semantic” categories, but clearly the syntactic category of *red* correlates with its logical status in the sentence. For example, when *red* is interpreted as a noun, it is arguably the argument of something else, for example, the determiner *a* in (1b) and the verb *be* in the identity reading (2b); and when it has an adjectival value in (1a) and (2a), it is unequivocally a predicate.⁴ The syntactic category value of the term is thus directly correlated with the logical value of the expression in the sentence.

My claim is that, of these two types of meaning, only the first—the one identified by the label RED—is relevant for the definition of the term. On the other hand, the syntactic value, the fact that *red* is used as an adjective in (1a) and (2a) and as a noun (common noun in (1b) and

³ As an anonymous reviewer has pointed out, it might be more relevant to call the notion associated with *red* a *precept*, rather than a concept.

⁴ One might argue that because *red* is a common noun in (1b), it is a predicate and not an argument, since common nouns denote sets. The goal of this paper is to question the assumption that the denotation of a term determines its logical value, arguing instead that type is a function of syntactic combination. In any case, independently of this position, it remains clear that the adjectival and nominal values of *red* in (1) are directly correlated with different logical values: for example, whereas *red* is definitely a predicate with respect to the argument *table* in (1a)—whatever type this term might be—*red* is an argument with respect to the predicate *bright* in (1b). No matter how one wants to formalize the issue, it remains true that the difference between adjectives and common nouns correlates with logical value since it is always the common nouns that are arguments of an adjectives, and never the opposite.

proper noun in (2a)), is not a descriptive property of the term *red*. I argue below that these values arise from the combination of the term in syntax. But first, let me discuss the relevance of the notion RED in the definition of the term.

My hypothesis is that the function of RED in the lexicon is to allow the identification of the term *red* as an *atom*, that is, an indivisible entity. To put it differently, my claim is that the grammatical meaning of a term is not its Saussurean *signifié*, but rather the fact of being a sign: being an indivisible object in a grammatical expression has a meaning. The indivisibility of the term can be defined at two levels: first, with respect to the term's status in the expression (the smallest meaningful unit); and second, at the level of the association between the form /red/ and the notion RED. Under this view, then, the significance of RED for the definition of *red* does not lie in the details of RED itself—its *signifié*, a property of the visual field related to a certain value of the light spectrum—but in the fact that the expression *red* always denotes this reality in context: this is how speakers know that the expression *red* is what it is. I assume that the notion RED exists outside of grammar, in the cognitive domain, and that details about this notion have no bearing on the value of the expression *red* in the grammar.⁵ In other words, *red* behaves in the grammar as an atom, a unit whose internal content is not accessible. All substantive terms, I argue, are such indivisible entities with this same grammatical value of atom. Their denotation at the lexical level serves only to distinguish the different atoms from one another.

The denotation of terms only becomes relevant to linguistic meaning at the level of construction, when terms have been combined in a sentence. In the lexicon, substantive terms denote different kinds of notions in the conceptual domains, e.g., individuals, properties,

⁵ In this I agree with Borer (2005), who also argues that the denotation of substantive terms plays no role in the grammar.

categories, substances, etc. The use of substantive terms in sentences depends on the capacity of the grammatical system to relate the notion of atom with the notion denoted by a term. For example, in section 4, I argue that proper nouns are bare terms because individuals, in the cognitive domain, can be understood as atomic entities: just like a grammatical atom, they are indivisible, unique and autonomous. Given this, a term in its bare state is sufficient to identify an individual, and bare terms like *Mary*, *Peter*, *Sue*, etc. can all be used to refer to individuals in a grammatical context. In contrast, the atomic value of a term cannot relate to a denotation that corresponds to the notion of category, because a category is a set of things. The grammatical system must thus alter the atomic value of the term, for example by combining it with a determiner (*a cat*) or the plural (*cats*).⁶ Once the atom is combined with another expression, it belongs to an object that is no longer atomic: it can thus receive other values through syntactic combination.

A truth-value, under this view, is obtained when the value a given term acquires in a grammatical context can be associated with some well-formed state of affairs in the conceptual domain (the reality denoted by the expression). Clearly, the denotation of a term is bound to constrain its use in contexts (if something denotes a property, it might be more difficult to use it to refer to an individual, a category, etc.). However, this is not an absolute, as the case of *red* above shows. An important issue then, for this theory as for any other, will be to determine how denotation interacts with grammatical representation to yield truth-value. I will say a bit more about this important issue below, but full resolution of this question is beyond the scope of this paper. The main goal here is first to explore the reasons behind this view of semantics, and second to argue that it leads in principle to a more explanatory theory of grammar. The reason, I

⁶ This view of the bare plural fits nicely with Carlson's (1980) hypothesis that they are names of kinds.

believe, is because it keeps the complexity of the cognitive domain outside of the grammatical lexicon and assumes that the complexity within grammar is in the one area where it is necessary in any case, namely, in the domain of syntactic combination.

I first argue (section 2) that under the most basic axioms of linguistic theory, a descriptive feature of a term should be constant across all uses of the term. I then show (section 3) that under this requirement, what defines the term *red* is simply the association between the form /red/ and a notion RED, which exists outside of grammar: this association defines the notion of atom. In contrast, the syntactic category value of the term cannot be a terminal property of *red* because it is not constant. I outline an approach under which syntactic category value is the outcome of the manipulation of the notion of atom through syntactic combination (section 4), and then discuss how these constructed categories interact with conceptual information to yield truth-values (section 5). Finally, I look at differences between the proposed approach and other functional and formal frameworks (section 6), and argue that this analysis is in principle more explanatory because it minimizes the content of the terminal level of description.

2. Form and Meaning Correspondence in Linguistic Description

Unlike form (sounds or signs), meaning has no concrete reality. Determining the actual nature of meaning is thus in itself a difficult task. As I have argued elsewhere (Lamarche 1998), the most basic axioms of linguistic theory provide a criterion for determining whether a meaning property can be associated with a given form. In short, if a property is specific to a construction (i.e., it is true only of a construction), then it cannot be associated with any part of that construction. The corollary of this constraint is that for a meaning property to be associated with an expression, it must be a property of all the constructions where the expression appears.

Although this might appear to be too strong a position, in that it could lead to the postulation of

empty content for a term, I argue that this is not the case: there must be something constant about an expression if it is to be recognized as an expression at all. However, what is constant with substantive expressions is not the details of their content, but the fact that the same content is always evoked in all contexts where the terms are used. Let me look more closely at the claim that a description must be constant.

Minimally, a linguistic expression, whether simple or complex, is an association between a form and a meaning. Describing linguistic expressions thus consists in establishing an association between a meaning and a form, for each expression of a language. At a certain level, these form-meaning relations are arbitrary, which implies that they must be learned case by case by speakers. But the theory must also be able to account for the creative nature of linguistic knowledge. Since speakers have the capacity to produce and understand an infinite number of expressions of their language, an adequate account of linguistic knowledge must also include a system of rules that generates complex expressions. Given that the means available to speakers are finite (language knowledge must somehow fit in a finite space, the brain), it seems inevitable that an adequate theoretical account of linguistic knowledge must make a distinction between two components in a grammar: a finite list of terminal expressions (a lexicon) and a recursive system that combines expressions to create more complex expressions (a morpho-syntax)⁷.

Under these basic axioms, the lexicon is essentially a list of form-meaning associations that, given their arbitrary nature, must be learned. Clearly, lexicons in contemporary linguistic theory tend to include more than a simple list of terminal form-meaning relations. For example, the subcategorization frames and selectional restrictions introduced in Chomsky (1965) are not,

⁷ None of this is new, of course. I merely restate here some relatively uncontroversial axioms of linguistic theory that are generally agreed on in contemporary linguistic analysis.

strictly speaking, about terminal information: they refer to information about the context where the term appears. Construction Grammar (Fillmore and Kay, 1993; Goldberg, 1995; Croft, 2001) assumes that chunks of syntax are directly listed in the lexicon. In the Generative Lexicon of Pustejovsky (1995), the lexicon is seen as a system of rules, a hypothesis that effectively contradicts the idea that the lexicon is the place for non-derivable facts about language.

Regardless of where, exactly, one wants to divide the syntactic from the lexical, the fact remains that there must be a terminal level of analysis at some point, a level where arbitrary form-meaning relations are listed. The importance of this level to the theory is not to be underestimated: statements made at the terminal level have an inherent cost because they cannot be derived. The more one assumes to be at the terminal level, the greater the cost for the theory. In contrast, semantic properties of constructed expressions should in principle be derivable, and thus explained as much as possible, because there are an infinite number of form-meaning relations at the level of the construction. This makes an account of knowledge of constructions by listing theoretically impossible⁸.

The architecture of the theory implies a natural order. Given that the terminal level is the basic level of the theory, the one that is required in the construction of complex expressions, the starting point of any analysis should be to establish the nature of the form-meaning relations at that level. This task turns out to be challenging, however, because terms are rarely used in isolation. More often than not, they are presented to us “packaged” in sentences (that is, in complex expressions). Thus, whereas the task is to determine what meaning is associated with a

⁸ This does not preclude the listing of certain constructions (for example idioms) in the lexicon. The expressions I discuss in this paper are not idioms; notice, however, that if my approach is correct, it suggests that the notion of idiom itself should be reconsidered, since the traditional view of the meaning of terms turns out to be quite different than what is usually assumed.

given terminal form, what is generally observed is meanings associated with constructions that include that form.

The axioms of the model, if strictly followed, provide a solution. Under these axioms, the goal is to associate a terminal form with a terminal meaning and ensure that there is no mismatch: for example, I would not want to associate a form that is about a complex expression with what I assume is the meaning of a term (e.g., the form /redkar/ would not be the form associated with the notion RED). Conversely, a meaning that characterizes a complex form would not be associated with a form that is assumed to be terminal (RED CAR would not be the meaning associated with the form /red/). If this reasoning is taken to its logical extent, the conclusion is that if a meaning is *only* associated with a complex form, then it should never be associated with a term. The corollary is that a property associated with a given term must appear in every complex expression that includes that term. In other words, what is terminal is a relation between a form and a meaning that is constant across all constructions, i.e., independent of context.

My research program is based on taking this basic axiom of linguistic theory—that the properties of a term should be constant across all contexts where the term appears—and letting it determine what is a possible description for terms. Considering the constructions with *red* in (1) and (2), I can conclude that syntactic category value is not a terminal property of *red*, since the term has different values depending on the context. This raises the question of where syntactic category value comes from, if it is not a property of the term. I return to this question in section 4, but first the following question: under the assumption that a terminal description is constant, what is terminal with the expression *red*? In the next section, I argue that what is terminal with *red* is the systematic association between its form and a reality in the conceptual domain. This

unbreakable association, I argue, is the source of the meaning of the expression in the grammar, namely, its value “atom”.

3. Conceptual Semantics and Terminal Description

The most salient notion that can be associated with the expression *red* relates to a range of frequencies in the visible light spectrum, which was referred to as the notion RED. Under the assumption that a terminal property is a constant property, it becomes clear that the intrinsic properties that define this concept have no bearing on the definition of the term, since it is impossible to find a constant value for RED that would be true of all contexts in which the expression *red* appears. The notion RED is has no clear boundaries. There is a range of reds, with borderline cases where one might doubt whether the colour identified is a red or not. This makes it impossible, by definition, to find a constant content in the domain where this range is defined.⁹ Furthermore, the notion is easily subject to contextual modulation. For example, depending on the nature of the noun that *red* modifies, it is possible that the colour referred to by *red* in context is closer to a value that would otherwise be associated with a different colour. To illustrate this, consider the cases in (3):

- (3) a. My sunscreen did not do the job. My skin is red.
- b. He has red hair.

The colour of sunburned “white” skin is often closer to pink than to red, and red hair often refers to a colour that is more typically in the range of brown. This shows that the range of colour that

⁹ For this reason, colours are often described in terms of a centrality condition, where a given colour is understood as a focal value, which gradually fades towards less and less central values. For relevant discussions of this and related issues, see Jackendoff (1983), chapters 7-8, and Lakoff (1987), chapter 2.

can be identified by the term *red* is something that might lie outside the range defined by the notion.

This appears to lead me to a dead end: my approach states that if a property of meaning is to be associated with a term, this property must be constant across all contexts where the term appears. But in a simple case, such as the term *red*, the basic notion that intuitively seems to define the term (a certain focal value in the visual field) does not appear to be constant; it can be modulated depending on the context, to a point where it corresponds to a value that could be called something else. How am I to reconcile the descriptive goal of my methodological assumption (a terminal property is constant across all contexts) with the fact that no constant value can be isolated in a case like (3)?

Following my criteria means, quite simply, that the details of the description of the notion cannot be relevant for the terminal description of the term. Although the notion RED cannot be defined precisely, it can be shown that the association between the form *red* and the notion RED *is* constant. To know that expression *red* is what is talked about, there must be an evocation of the notion RED.

In the most obvious case, the evocation of the notion is quite straightforward. Thus, if *red* is used to talk about an object that is truly red, or about the notion of “redness” itself, then the relation between the term and the notion in the context poses no problem. In many cases, the relation is not so direct, and it is in these cases that contextual modulation occurs. Consider for example the case of red skin in (3a). Skin colour in white people is generally a sort of beige-pink (*white* being itself modulated in talking about skin colour). When white skin is sunburned, the colour tends toward a deeper pink, thus closer to red. Given the colour of skin, *red skin* evokes a colour of skin that is closer to the concept RED than is “normal” for skin. Note that although *red*

skin is not actually “red”, nevertheless one can only use “red” for “white” skin when the change from normal is towards redness. Consider, for example, that one would not use *red* to talk about the colour of the skin of someone with stomach flu, because in this case, the change from normal skin colour is not towards redness (*Are you sick? You look green!*). Thus, even if *red* does not necessarily denote the actual range of colours labelled RED in this context, it must nevertheless evoke this notion if it is to be used to talk about skin.¹⁰

The evocation can be even more remote, as in the case of metonymy. Consider for example the sentence in (4):

(4) This city is red.

In such a sentence, *red* is used to identify a political association. This follows from the fact that parties in many political systems are associated with specific colours. Given this association, the term is then used to express that the citizens of the city voted for the party that is associated with the red colour.¹¹ This type of extension is symbolically encoded in other “metaphorical” uses of the expression. In Western culture, *red* is often used as the colour that symbolizes danger (in road signs for example). I am speculating that this symbolic association gives rise to expressions like *red alert*. In another example, the Oxford dictionary claims that the use of *red* in the domain of finance (*the company is in the red*) has its origin in the convention of using red ink to indicate debts in a ledger.

¹⁰ Contextual modification might also be dependant on a specific situation. As Bouchard (2002) points out, a white house that has a red door might not qualify as ‘a red house’: however, in a situation where this house is located in a row with six other houses that are all white, then it could be referred to as *the red house*.

¹¹ Such uses are also clearly modulated by cultural knowledge. For example, *red* in Canada is nowadays mostly associated with the political mainstream party called the Liberals; but in other cultures, it is often associated with the communist wings of the political spectrum.

Each time the term *red* is used, there is thus an evocation of the notion RED. In contexts where the object that is said to be red is truly red, then the evocation is direct: but if the object is not really red, then it will imply that there is something about the object which, in comparison to the domain of knowledge that is defined by this object, will justify the evocation of the concept RED.¹²

Perhaps the most direct evidence for the conclusion that what is significant for *red* in grammar is not the definition of the notion RED but rather the *association* with the notion comes from cases where the presence of the form /red/ in an expression cannot be associated with the notion RED in any obvious way. If this occurs, then the conclusion must be that the expression does not contain the term *red*. The form is either just the same sequence of sounds as a subpart of another expression (as in *readily*) or it characterizes another expression of the language (for example, the verb *read* in the past tense, which has the form /red/). For an object to be qualified as *red* by a speaker, there must be some association with the notion RED even if it is not obvious. Imagine, for example, witnessing the following situation: Mary asks a co-worker to give her the red file, and the co-worker responds by handing Mary a white folder. If you have no idea what the red file is, you would still assume that there is a relation with the notion RED. If an appropriate context is provided—for example, the file is about the specifications for a new colour in a paint company, it contains a red alert protocol, its contents used to be in a red folder, etc.—then the relation to *red* becomes obvious. This provides further confirmation that it is the *association* with RED that is significant, and not the definition of RED.

Let me assume, then, that the notion RED exists somewhere in a domain of knowledge outside of grammatical knowledge (general cognition or world knowledge). This notion is likely

¹²The form-meaning relation is also present in morphologically complex words like *reddish*, *redder*, *reddening*.

impossible to unequivocally define. What is significant for the definition of *red* in English is that the form /red/ is systematically associated with the notion RED. Each time the term *red* is used in context, an evocation of the notion RED will need to be found. Otherwise, the sentence will not contain the expression *red*.

I should perhaps clarify my position regarding the different uses of *red*. I am not claiming that there is a more central, grammatically relevant, meaning for *red* (its literal meaning), which is to be contrasted to some less central meaning (or metaphorical meaning), which is somehow derived from the central meaning. My position is that the notion RED is always defined outside of grammar, and the question of metaphorical versus non-metaphorical reading is a question of “proximity” to the notion in the context of use. Thus, a reading is more metaphorical if the notion evoked by the term is not directly or obviously accessible in the immediate context of use: some association to the notion must be found given the nature of the other terms combined with *red* (more specifically, the notions associated with these terms). As far as grammar is concerned, the notion remains the same: a notion that is identified somewhere in cognition, relating to a perception in the visual field. And if the term used is *red*, then the notion is necessarily evoked in the context.

Consider the classical example of reference transfer in (5) (example (6) from Jackendoff 1997, p. 54, originally attributed to Nunberg, 1979), as an illustration of what I mean by this:

- (5) Waiter A talking to waiter B:
The ham sandwich in the corner wants some more coffee.

In this context, *the ham sandwich* is used to talk about an individual in a restaurant who asked for more coffee. My point is that it must be the case that to interpret this sentence correctly, the notions defining *ham* and *sandwich* are the same as the ones used in the sentence in (6).

(6) John ate a ham sandwich.

The difference is that in (6), the referent in the discourse would have a rather direct (and obvious) relation with the notions *ham* and *sandwich* (John would actually have eaten a ham sandwich) whereas in the case of (5), the relation is defined with respect to a specific situation regarding an individual who ordered a ham sandwich in a restaurant. The fact that in (5) a hearer is lead to assume that what is talked about is not the sandwich itself, but a person, depends on the context, both grammatical (the use of a VP *wants some more coffee*) and extra grammatical (waiters talking in a restaurant). But this does not lead us to assume that *ham* and *sandwich* correspond to different notions in the two cases: the expression *the ham sandwich* in (5) cannot be used to talk about someone who ordered a spinach quiche or an onion soup. The terms *ham* and *sandwich* must relate to the same notions in both contexts. It is in this sense that the association between the term and the concept is constant.

So, there *is* something constant about terms in all contexts, even in such an extreme case, which is the *association* between the term and the notion, as opposed to the details of the nature of the notion. The constant nature of this association contrasts with the categorial values that the term *red* has in examples (1) and (2), where the term can be interpreted either as an adjective or a noun. Given my assumption about terminal description, I must conclude that this syntactic value is not a property of the term. Significantly, the evocation of the notion RED remains part of the interpretation even if the term's category is different.¹³ This observation provides an interesting

¹³ In general, contextual modulation of the notion RED is totally independent of the category of the term, as the following contrasts show:

- (i) a. They raised a red flag.
- b. My skin is red.
- c. A red agenda.

argument against an analysis of *red* based on homonymy. The assumption that there are two words *red* in English, one an adjective and the other a noun, is directly refuted by the observation that the term evokes the same reality RED in both sentence. It must therefore be the same term, and to assume homonymy is to ignore a significant empirical generalization.

If the syntactic category of the expression is not lexical, it must come from somewhere else. My contention is that the syntactic category is a function of how the term is combined in the sentence.

4. Syntactic Category as a Constructed Notion

Recall that in (1) and (2), *red* has different syntactic values: it can be interpreted either as an adjective or a noun. Under my view, this means that the category cannot be a property of the term. I assume that the category of the term is the result of a formal manipulation by the grammar. The term, as I suggested before, is considered an “atom” in grammar by virtue of its indivisible nature. The hypothesis is that morphosyntax provides the means to alter a term’s atomic value so that it can relate to realities that are not atomic. The rationale is that once an atom is combined and put in context, the resulting expression is not itself an atom: thus, it becomes possible to assign non-atomic values to the term in the representation of the complex expressions.

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- (ii)
- a. Mary favourite’s hair colour is red.
 - b. The company is in the red.
 - c. For me, red is danger.
 - d. Reds (American communists in the movie by that name)
 - e. The name of the team is in red.

Whereas the contextually modulated uses in (i) have a predicate/adjectival value, similar contextually modulated uses in (ii) have a nominal value (either common noun or proper noun).

Let me clarify some assumptions I make about the different types of conceptual notions that *red* relates to in its different uses in (1) and (2), repeated in (7) and (8).

- (7) a. A *red* table.
 b. A bright *red*.

- (8) a. Mary's favourite car is *red*.
 b. Mary's favourite colour is *red*.

It seems that in these readings, *red* can distinguish three different types of notions in the conceptual domain: when *red* is an adjective in (7a) and (8a), it relates to the notion of property in the conceptual domain: it says something about a characteristic of a specific object. In the case of (7b), where *red* is treated like a common noun, it relates to a category in the cognitive domain: the expression implies a category of *bright red*. With the identity sentence (8b), *red* directly relates to the individual notion RED and is treated as the name of a specific colour (*Mary's favourite one*), much like a proper noun.¹⁴ Although the three conceptual notions (property, category and individual) that I assume here are likely a simplification of a more complex picture, they will suffice to show how the basic grammatical value of atom might be modified to relate to different conceptual notions.

To successfully relate the value of atom to some of these notions will require a modification of one of the basic characteristic of the atom. Let me assume that aside from its indivisibility, an atom is also autonomous and unique. Again, these values can be related to the notion of sign in the grammar. The term *red*, a free morpheme, is autonomous in that when used on its own, outside of a proposition, it still manages to identify the notion RED. The term is also unique: there is only one expression *red* that associates the form /red/ to the notion RED. As I

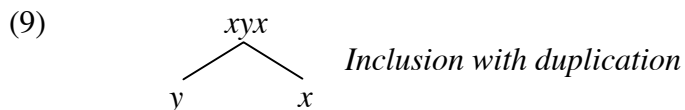
¹⁴ The identity nature of the sentence (8b) is made clear by the fact that inverting the subject and complement, as in (i), does not affect the grammatically or truth-value of the sentence.

(i) Red is Mary's favourite colour.

argue below, these properties of the atom can be associated directly with the notion of individual. However, for the atom to relate to the notions of property and category, either its autonomy or uniqueness will need to be altered.

When the term is used as an adjective, as in the examples in (7a) and (8a), the atom must lose its autonomy: an adjective, the identifier of a property in a sentence, is always in a relation of dependency with respect to something else, the things it is a property of. Let me assume that a substantive atom becomes a dependent element when it is included in another element in the representation of a complex expression. Once an atom appears included in something else, it is then no longer autonomous, but rather dependent on whatever it is included in. The two cases illustrated in (7) and (8) represent inclusion in different elements. In (7a), the denotation of *red* must be included in the atom *table*. In the case of (8a), the relation of inclusion is mediated by the copula *is*.

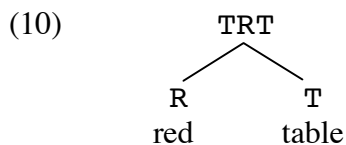
Inclusion is obtained in the representation of a complex expression by a syntactic rule: a term is included as it is combined. Whether inclusion can be obtained directly, or some modification is required first, depends on the nature of the element with which the term is to be combined. Consider for example the case of *table* in (8a): being a term, *table* is an atom. As such, it has no “inside” within which another atom could be included. I assume that an atom can be duplicated if necessary to allow inclusion. I represent the operation “inclusion with duplication” as in (9):



The effect of the syntactic combination is to duplicate the atom *x* in order to include the atom *y*, which then becomes a part of *x*. I assume that when duplication applies to include an atom, the

result remains atomic in the sense that the two x 's are not understood as separate atoms, but as parts of the same atom. As discussed below, duplication can also separate atoms, in which case they relate to a set (or a category).

The complex object xyx can be seen as the equivalent of a syntactic projection, but is in fact a semantic representation. From two terms that have the same basic value, syntax creates a representation of the combination where the atom y has a new value, the value I associate, by hypothesis, with the category adjective. Assuming that the expression *red table* in (7a) is combined by the rule in (9), the representation in (10) obtains (where the atom is represented by the first letter of the notion it denotes):



This means that the atom R is included inside the duplicated T . In the representation, the denotation of *red* is then dependant on the denotation of *table*: this configuration corresponds to the adjectival interpretation of *red*¹⁵.

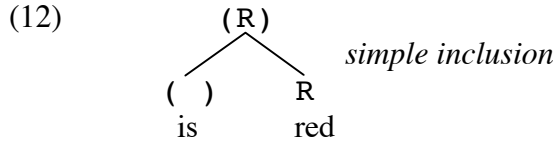
In the copular construction (8a), the included atom does not relate directly to the atom that includes it. Instead the relation is mediated by the copula *be*: the included term is thus interpreted as a property of the argument of the copula. Following Lamarche (2003a), I assume that the function of *be* is to provide a temporal slice by which it is possible to locate one piece of information in the discourse. Formally, this is represented by the brackets in (11), which delimit the temporal boundaries occupied by the piece of information in the discourse.

¹⁵ Because it would take me beyond the issue of relating an atom to different conceptual notions, I leave aside the question of what determines the order of the terms (which is to be included and which is to be duplicated). I assume that this issue relates to the grammatical number parameter discussed in Bouchard (2002).

(11) $be: ()$

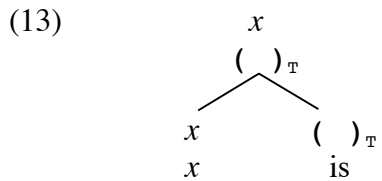
Given that *be* is a region, as opposed to an atom, it is possible to directly include material in it.

Thus, the expression *is red*, where *red* is included, has the representation in (12):



The expression *red* is then interpreted as a dependant of whatever the argument of *be* is.

For the current purposes, it is sufficient to assume that the argument of a tensed verb is necessarily the subject, if the subject is not an expletive. Simplifying somewhat, I assume that there is a rule—call it *identification of the subject*—that turns the subject into the argument of the element that bears the tense marker. Representing the tense marker by the subscript T in (13), I assume that an expression that is stacked above the functor that bears this marker is interpreted as the argument located by the verb *is*:



If *red* is combined with *is* by inclusion prior to the identification of the subject, then the representation in (14) for the expression *x is red* emerges:



In this representation, the atom is interpreted as something that is about the subject *x*. Just as in (7a), then, the atom *R* in (8a) is included in something: this, I assume, is an adjectival interpretation of a term. The difference between (7a) and (8a) lies in the fact that the inclusion is

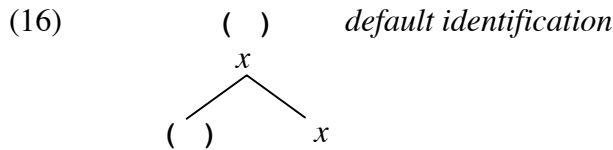
mediated by a tensed verb in (14), whereas in (10) it directly characterizes the element denoted by the expression *table*.

I should point out that the presence of the complement *red* in (14) is not assumed to be dependant on selectional properties of *be*. I do not assume that *be* requires a complement. Indeed, the assumption that *be* requires a complement cannot be sustained because the verb can appear without one in its existence use (for example, *to be or not to be* or *I think, therefore I am*). Under the basic assumption that what is attributed to a lexical item must be constant across all uses of the term, the existence use tells us that the presence of a complement with *be* is not the reflection of lexical specification. Instead, I assume that the complement with *be* is a free element: its presence depends on what the speaker wants to convey about the piece of information that is located in the discourse by *be*. The syntactic category value of the complement is not restricted by the verb's lexical description in the grammar, but by the rules that are available in syntax to combine complements.

Let me now consider the use of *red* in (8b). Given that *red* in (8b) does not have the adjectival value it has in (8a), I have to assume that there is another rule of combination available in English to combine a complement. This rule, I assume, combines a functor to its argument. In (8b), the sentence has an identity reading akin to the one in (15).

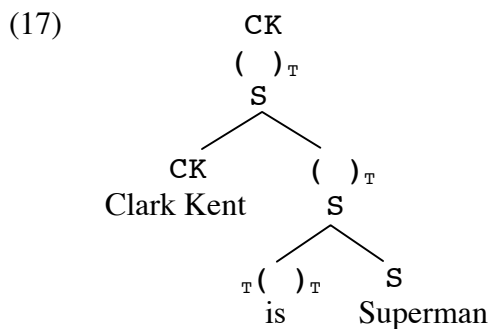
(15) Clark Kent is Superman

In this case, the complement is taken to have the same value as the subject of the sentence: it is thus an argument. My position is that this value arises from a rule of identification. Let me assume that there is a rule of *default identification*, which formally stacks the content of an expression below the functor that it combines with.



In English, default identification is done from left to right (the functor takes its argument to its right). Assuming that both identification and inclusion are available in English, it becomes possible to combine the complement of *be* in two different ways, yielding two possible values for the complement.

Let me now return to the fact that the complement in (15) is a proper noun. Proper nouns, the rigid designators of Kripke (1971), denote individuals. If I assume, quite reasonably, that an individual is indivisible, autonomous and unique, then an atom should be able to relate directly to an individual given its indivisibility, autonomy and uniqueness. Thus, no formal manipulation is required to get an individual reading out of an atomic term. The atom used as a proper noun can thus be combined directly – without any formal alteration – by identification. Sentence (15) receives the representation in (17) (for the sake of simplicity, I am treating *Clark Kent* as an atom here).



I argue in Lamarche (2003a) that the identity reading of such sentences arises from the fact that *be* introduces a single piece of information in the sentence. That two distinct atoms relate to this single piece of information means that their denotations must, at some level, be about the same thing.

Having said that the value of the complement of *be* is a function of what combination operations are available, when two operations are available to combine a complement, I expect an expression like *x is red* to be associated with two representations, as in (18):

$$(18) \quad \begin{array}{ll} \text{a.} & x \\ & (R)_T \\ \text{b.} & x \\ & (\quad)_T \\ & R \end{array}$$

(18a) is the one associated with a copular construction where *red* has an adjectival value, i.e.

(8a), where *red* is combined by inclusion. (18b) is the representation associated with a identity value, i.e. (8b), where the rule of identification is used to combine *red*. Before discussing how to relate these representations to sentences and truth-values, I need to complete this discussion and tackle the use of *red* as a common noun of (7b).

In this case, I assume that *red* identifies a category. If a category, by definition, relates not to an atom but to a set of objects, the uniqueness of the atom must be altered to allow it to relate to a category. I already have an operation that duplicates an atom (rule (9)). I now want to duplicate the atom so that it creates atoms that are separate from one another. The function of grammatical number can be interpreted as doing just that: it takes an atom and duplicates it into separated atoms. The plural of *cats* could thus be represented as in (19), where the function of the inflectional element *s* not only duplicates but also separates the atom.

$$(19) \quad C \ C$$

Let me assume that unless there are explicit boundaries added to a representation, the two atoms separated by a space in (19) identify an infinite set of atoms.

The indefinite article can also identify a category of things. Let me assume that the indefinite article is a functor that defines a region that is wider than one atom, but narrower than two, from within a set of atoms. Let me represent this region by curly brackets in (20):

(20) a: { }

An atom is combined with this functor by duplication and inclusion, with the functor appearing inside the duplicated atom in the result, as in (21):

(21)

$$\begin{array}{c}
 x\{ \}x \\
 \swarrow \quad \searrow \\
 \{ \} \quad x \\
 a \quad x
 \end{array}$$

Because the functor identifies a region that is wider than an atom, the duplicated atoms are necessarily separated from one another: they therefore cannot be understood as part of the same atom, but instead form a set. Let me assume a rule of interpretation such as the following:

(22) In an ordered sequence a, b, c where a, b , and c are separated atoms,
if a and c are x s, then b is also an x .

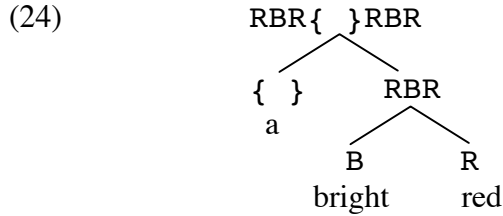
With this, I ensure that an element included inside the set of bracket will be an element that is also a member of the same set of things to which the duplicated atoms belong. For example, if I assume that the verb *be* can be included in the space defined by the expression *a cat*, and then identified by a subject that denotes an individual, the representation in (23) for the sentence *Puzzle is a cat* obtains.

(23)

$$\begin{array}{c}
 P \\
 C\{ (\)_T \}C
 \end{array}$$

This means that the atom *Puzzle* belongs to the set of atoms *cats*.

Returning to the case of *red*, the representation in (24) for the expression *a bright red* looks like (7b):



The red is first duplicated in order to include bright, giving the complex notion *bright red*; at this level, although *red* is no longer an atom, the whole expression still has the status of an atom because it has not been duplicated and separated. Separation occurs once *bright red* is combined with the determiner *a*, to create the set of bright reds. This representation could then be used to identify a single member of that set (as in *this is a bright red*).

Although more could be said about most of the hypotheses just outlined – how to formalize the rules, how to apply them to describe other phenomena, how to constrain them – their purpose here is to illustrate how an atomic value can be manipulated so that it can relate to the interpretations of *red* in (7) and (8). The relevant aspects of these representations appear in (25) and (26):

(25) a. $xRx\{ \}xRx$ b. $RxR\{ \}RxR$

(26) a. $\begin{matrix} x \\ (R)_T \end{matrix}$ b. $\begin{matrix} x \\ (\)_T \\ R \end{matrix}$

The adjectival interpretations in (7a) and (8a) are accounted for by assuming that the atom is no longer autonomous, but is instead included in another element (the argument *x* of the indefinite determiner in (25a) for (7a), and the copula in (26a) for (8a)). The common noun interpretation of (7b) is represented in (25b), where the atom is duplicated and separated as it is combined with the indefinite article. Finally, the proper noun interpretation of (8b), shown in (26b), follows from the combination of *be* by identification, as its indivisible, autonomous, and unique character is sufficient to identify a specific colour.

These representations are constructed independently of the denotation of the term *red*: in fact, the atom R could be replaced by a variable in the representations in (25) and (26), without affecting the essence of the analysis. The denotation of *red* is only significant to the assessment of whether the value assigned to the expression by syntax can receive a truth-value. I turn to this issue in the next section.

5. Truth-value and Grammatical Semantics

In the analysis just sketched, morphosyntax is a mechanism that builds different semantic configurations – such as the ones in (25) and (26) – which can then be related to different types of notions in the conceptual domain. These configurations are constructed without any reference to the denotation of the term. The denotation serves only to determine whether an interpretation in syntax is possible given the nature of the context where the expression is placed. Let me address the role in the analysis of the conceptual domain – where the denotations of the terms are defined – by first discussing the different interpretations of the copular sentences in (8), and then elaborating on the interaction of grammatical semantics with this domain.

The sentences in (8) are superficially similar, but have different readings. Under my view, the difference in reading is not related to the nature of the denotation of *red*, but depends on the use of different rules of syntax to combine the term with the verb. In (8a), *red* is combined with the verb by inclusion to yield something like (26a), an adjectival reading, whereas in (8b), *red* is combined by identification to yield (26b), a proper noun reading. The obvious question is why does it have to be that way? What would prevent the construction of the representation (26b) for sentence (8a), or the construction of the representation (26a) for (8b)? Within the system of rules outlined previously, nothing in the combinatorial system would prevent these associations. The problem with these associations lies in the mapping of the representations to

the conceptual domain: such representations would not, under normal circumstances, yield a truth-value.

The nature of the conceptual notion evoked by the head noun in subject position, *car* in (8a) and *colour* in (8a), determines whether a given mapping will yield a truth-value. *Car* denotes a category of things that have a visual reality and *red* denotes a property of objects in the visual field, so a representation like (26a) would yield a truth-value. On the other hand, *red* in (8b) cannot be combined as an adjective because the result would not receive a truth-value. In this sentence, the head of the subject, *colour*, evokes the set of notions to which RED belongs. The subject, on the other hand, distinguishes a single member of that set (Mary's favourite one), so combining *red* as a predicate would not yield a truth value: the subject here cannot be construed as something that has the property RED, because it identifies a specific member of the set of notions to which RED belongs. The only way to combine *red* that will yield a truth-value in this context is to treat it as a proper noun, as in (26b): it then identifies the specific colour that is said to be Mary's favourite one. Notice that the description for *red* is then unified: it has a unique relation to a certain reality in the cognitive domain. Furthermore, the denotation itself is never altered by syntax. For example, *red* in all the readings discussed above always evokes the same notion RED.

This analysis, then, ultimately relies on the capacity to uncover the nature of the organization of the conceptual domain, for example, establishing the type of relation the notions RED, COLOUR and CAR have with one another in that domain. Truth-values of propositions are thus rooted in the conceptual domain. In this sense, the analysis might appear similar to approaches where interpretation is based on a model-theoretic world, or where grammatical categories are cognitive prototypes. Notice, however, that I am not arguing that the conceptual

domain plays no role in interpretation, I am questioning the level of grammatical analysis to which this domain relates. In standard approaches, whether formal or functional, the notions of the conceptual domain are used to describe the terms (Borer, 2005, is an exception). In my approach, the role of the conceptual domain at the terminal level is strictly to distinguish atoms from one another. The actual value of a denotation in the conceptual domain is only used at the output of syntax, once elements have been combined. In effect, the syntax in my system constructs representations totally independently of the nature of the denotation of terms, and is thus truly a ‘formal’ system: it creates representations (or logical formulas) that only have a reality at the level of the form, independently of conceptual meaning. The constructed representations, however, are made to relate to the conceptual domain: the role of syntax is to create distinctions that can be mapped to conceptual notions.

Given that grammatical representations are constructed to formalize relations in the conceptual domain, they should provide a tool to discover how this domain is organized. Let me look first at the building blocks of grammatical representation, atoms. An atom is a formal object that can isolate notions that are not easily isolatable (properties, sets, functions, etc). Even a fuzzy notion like a colour can be isolated into an atom (a word). The distribution of a word in a grammatical context should also tell us something about the notion with which the word is associated. For example, let me suppose that RED, fundamentally, is a property in the cognitive domain: this accounts for its capacity to appear as an adjective, where it is understood in relation to something else. But the fact that *red* can also appear as a noun indicates that this notion can be individualized independently of the nature of any object (think of the little cards available at paint stores). The possibility of nominalization is thus an overt manifestation of the possibility of individualizing the notion in the conceptual domain. Compare this to the case of the expression

small, which denotes a size. A size is a relative notion and its value is directly dependent on the type of object it relates to (a small elephant is bigger than a big butterfly). It is thus an expression that will require something to relate to and will have the tendency to be used in an adjectival context. This does not necessarily preclude the use of the notion in a ‘nominal’ way, but a special context might be required. Examples like *small is beautiful*, or the tautology *small is small* are such contexts. On the other hand, in an environment where *small* relates to a category (*a small* or *small*s), then it tends to be used with a specific and more conventionalized interpretation (a size of clothing). In that same context, *red* poses no problems (*a red* or *reds*) since it can be individualized quite easily.

To say more about issues related to adjectival modification would take me beyond the scope of this paper. See Bouchard 2002 and references therein for a recent discussion. The implications of the discussion, however, should be clear: a theory of grammar that is based on the sort of approach proposed here should provide insight into the nature of the conceptual domain.

I should close this section with the observation that an adequate understanding of the relationship between the conceptual and grammatical domains will undoubtedly require looking at more than one language, because different languages use different morphological and syntactic means to identify seemingly identical concepts. Under my view, I expect the cross-linguistic differences to be motivated by differences in the functional systems of languages. Functional content is in a sense the formal support provided by grammar for the construction of logical formulas. If the pieces of functional content differ from language to language, then I would expect differences in the means used to express similar conceptual denotations from language to language.

The architecture I have just described follows directly from the requirement that terminal descriptions be constant. Taking this requirement as primary leads to the seeking of answers in the combinational system of grammar for issues that would otherwise be considered strictly lexical. The last section of this paper discusses the significance of this consequence.

6. Syntax out of the Lexicon, Conceptual Knowledge out of Grammar

The approach to form-meaning relations sketched here leads to a leaner grammatical theory than approaches that describe terms using non-terminal properties, that is, properties of terms that are not constant across contexts. I address in this section two issues that highlight the cost in complexity for a theory that uses such properties to describe terms.

The first issue relates to the cost that results from the use of syntactic notions at the terminal level. As I have said throughout this paper, form-meaning relations at the terminal level cannot be derived from anything because they are arbitrary. They must be learned and thus have an intrinsic cost. In contrast, form-meaning relations at the level of constructions should be derivable, because their number is potentially infinite, and it is thus impossible to learn them all. Given that terms can appear in an infinite number of constructions, any mention in the description of a term of a property that is only true of some constructions where the term appears will require additional statements to account for the term's interpretation in constructions where it does not exhibit that property. For example, if the value adjective is assigned as a terminal property of *red*, then some extra statement will be required to account for the other values that *red* has in contexts.

Lexical homonymy is one example of an additional statement that is required because a property of a construction is used to describe a term. Type-shifting rules are another type of statement used to account for the change in categorial value of expressions (see Partee 1987 for

an overview of type-shifting principles). Although these rules appear to be more motivated than straight homonymy because they apply in the syntax (instead of the lexicon), the fact remains that the very need to postulate these rules arises from the assumption that terms have a type to start with. Furthermore, stating the type at the terminal level is a cost in itself. For example, a term like *red* then requires two associations – one with a conceptual marker, as assumed here, and another with a type.

If a terminal description must be constant across contexts, type cannot be a property of terms. It therefore has no existence at the terminal level, and only emerges as the result of syntactic combination. Consequently, the same term can appear with two interpretations without alteration of its basic content. Moreover, no matter how syntactic categories are defined (the binary features in Chomsky 1970 or Jackendoff 1977, the prototypes in Croft 1991, the syntactic definition proposed in Baker 2003, etc.), a theory that assumes their existence at the terminal level necessarily requires more statements than one in which these categories are built up by the syntactic component.

The second issue that is significant for the complexity of the theory relates to the “division of labour” between grammar and conceptual knowledge. It seems inescapable that conceptual knowledge is inherently complex, and must include an intricate web of associations that allow human beings to recognize perhaps millions of distinctions. Clearly, these associations are stored somewhere in the brain. In my approach, this information has no relevance for the construction of meaning in grammar. Individual parts of conceptual knowledge are associated with individual linguistic forms at the terminal level. But these associations are all formally identical – grammar treats them as atoms – and the inherent complexity of the concepts has no bearing on the computation of the logical formulas at the level of the proposition. Information

about concepts is only solicited to determine truth-value once terms have been combined in a grammatical structure.

In contrast, the complexity of conceptual knowledge becomes directly included in grammar when descriptions are not terminal. A discussion of type/categorial value in formal semantics illustrates this consequence. Formal semantics assumes a principled separation between conceptual knowledge and the formal system that is relevant for the logical interpretation of sentences. The type value of terms is one way this separation is established. As Partee (1980:62) points out,

“a semantic interpretation rule for [constructions with a common noun and an attributive adjective or a relative clause] makes predictions about an infinite class of expressions, and these predictions can be tested for correctness and with respect to truth conditions and entailment relations without the need to consider *anything of the semantic content of particular lexical items besides their logical type*” (the emphasis is mine).

But I would ask the question: why is a given type value assigned to a given term? For example, why would *red* be considered a predicate, as opposed to, say, an individual constant? It seems to me that the answer lies in the nature of the reality denoted by these terms, that is, the nature of the concept that they identify: *red* denotes something that is conceptualized as a property in the visual field. If this is so, then the justification for the logical type in formal semantics is in fact a property of the concept itself. And as I have argued here, distinctive properties of concepts do not belong to the term, or to the domain of grammar. If this view is correct, the model used in

formal semantics for natural language is flawed, since it uses properties that exist outside grammar to determine the selection of logical relations inside grammar.

Using non-terminal properties thus blurs the division between grammatical knowledge and conceptual knowledge, because it leads to the importing into the grammatical system of information that, under my view, has no relevance for linguistics (this echoes Bouchard's claim [Bouchard 1995] that linguistic theory is generally based on the wrong type of semantics). As a result, the grammatical lexicon becomes much more than a list of form-meaning associations. As Pustejovsky's *Generative Lexicon* illustrates (Pustejovsky 1995), such a lexicon contains complex webs of information that I believe belong to general cognition but not to linguistics.

This perspective is similar in spirit to that proposed in Borer (2005). Borer writes that "properties of substantive vocabulary (...) are creatures born of perception and conceptualization" and are "thus fundamentally not grammatical" (p. 7)¹⁶. She assumes that meaning in grammar is a matter linguistic structure. For her, grammatical semantics and substantive content are compared in "a place which is neither the grammar nor the conceptual system, call it the 'making sense' component (...)" (p.8) where a felicitous linguistic result is dependent on the degree to which the two types of meaning can be matched with one another.

At this general level, there is thus a clear resemblance to what I proposed here. The difference between the two approaches lies in the grammatical system itself, and more specifically, in how "grammatical meaning" is defined and formalized. Under my view, meaning is a function of composition, so that semantic values have no reality at the level of the term.

¹⁶ The page numbers for the citations are those from the unpublished manuscript, which was available online at <http://www-rcf.usc.edu/~borer/download.html> before the book was actually published.

substantive term is combined with the content I attributed to *be* above:¹⁷



The x in (27a), because it is combined by identification, is interpreted as a proper noun, or the name of an individual; in (27b), where x is combined with *be* by inclusion, x is interpreted as an adjective. The distinction is not expressed at the terminal level (the x in (27) has no value) but at the level of the combination (or, to put it differently, at the level of the syntactic projection). Thus, the different values that can be attributed to the term x only exist at the level of the complex expressions. There is no symbol associated with these distinctions at the terminal level of grammar.

In Borer's approach, much of the structural meaning comes from a complex functional structure – which is in part abstract – that is ultimately rooted in specifications located in terminal nodes of the structure. In other words, even if the conceptual notions associated with a term have no bearing on its categorial value in the sentence, complexity remains at the terminal level of the analysis in the form of functional specification. The issue can be more easily illustrated by discussing Marantz's (2000) suggestion that the categorial value of a root (the element that denotes a conceptual notion) is dependent on a functional node 'small *n*' or 'small

¹⁷ A third value – mass noun – can be associated with the bare singular noun in English. In Lamarche (2003b), I account for this fact by assuming that mass interpretation results from combining the node where grammatical number appears (the head noun in English) with what is the equivalent of an argument position (the content of *be*, for example) by inclusion with duplication, as in (21). This yields a representation like the one in (i):

(i) $x(\quad)x$

What the argument position locates in the discourse in (i) is only a subpart of something wider, hence the impression that it is unbounded.

a' that would take the term as its complement.¹⁸ The grammatical value of the term is then independent of its conceptual denotation, and a given root can appear with different values independently of its denotation. This system still associates the grammatical value to a terminal node of the analysis: it requires a separate notion of adjective and noun somewhere prior to syntactic combination. Thus a distinction that, in my system, is constructed (the distinction between adjectives and noun), still has a reality at the terminal level in both Marantz's and Borer's systems. In this sense, the idea that linguistic meaning is a function of combinational operations, and not terminal descriptions, is not truly respected, and the cost associated with the terminal description, which in principle cannot be derived, would thus remain.

7. Conclusion

I have argued for a view of the correspondence between form and meaning based on the assumption that terminal descriptions must be independent of context, that is, they must be constant across contexts. This assumption, I believe, is a fundamental requirement of any linguistic theory that seeks to explain how a grammar can generate a potentially infinite number of possible form-meaning relations out of a finite number of arbitrary form-meaning associations.

Under this view, a significant part of the lexicon (the substantive part, excluding functional content) is simply a list of constant relations between a form and a conceptual notion. The complexity associated with the conceptual distinctions has no relevance for grammatical analysis: as far as grammar is concerned, only the association with the concept is relevant. This

¹⁸ Marantz (2000) is an unpublished manuscript cited in Baker (2003). Although fairly different in many respects, his analysis shares Borer's perspective that syntactic category value is dependant on the functional structure in which a root is inserted.

relation defines the notion of atom in the grammar. The lexicon that emerges is thus optimal, because it is based on a unique association between a form and a conceptual meaning. All semantic distinctions that are significant for linguistic form are a function of combination, and thus only exist at the output of syntax.

Although these consequences have been illustrated through a single example that highlights a categorial distinction, the general reasoning applies to a wide range of linguistic facts. The implications of this conclusion are profound. If the position advocated here is correct, it raises a multitude of new problems for linguistic theory, because just about every distinction used to describe terms in contemporary linguistic theories is not terminal in the sense implied here. In some cases, these distinctions do not belong to linguistic analysis but to conceptual knowledge; in others, the distinctions do belong in the grammar, but need to emerge as a result of rules of combination as opposed to being listed in the lexicon. The challenge is thus to imagine a formal system in which what has long been taken as basic is actually derived.

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