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## Reconstituting Grammar: Hagit Borer's Exoskeletal Syntax<sup>1</sup>

### 1 Introduction

Lexicalism is pervasive in modern syntactic theory, and so is the driving force behind lexicalism, projectionism. Syntactic structure is shaped by a projection of lexical properties, and projectionist syntax is a verification procedure of lexical properties. Current lexicalism combines insights from various sources, including Harris' and Chomsky's idea of projecting categorial features, as well as Categorical Grammar's idea that syntactic dependents can be read off the argument structure of a lexical head. Projectionism guides lexicalist frameworks such as early HPSG (Pollard and Sag 1994), where arguments dwell on subcategorization lists, waiting to be identified with syntactic arguments, but also various versions of the minimalist program that endorse the idea of a checking mechanism.

To Hagit Borer, whose 700 page two-volume contribution *Structuring Sense* is going to be reviewed here,<sup>2</sup> these frameworks are very similar, despite their superficial differences: they aim to derive most cases of ungrammaticality as agreement mismatches. As an illustration, consider the apparently ungrammatical examples in (1a, b).

- (1) a. \*The soldiers kills several innocent passers-by.  
b. \*The soldiers kill.

It is obvious that an agreement mismatch causes the ungrammaticality in (1a). But for projectionist models, the same mechanism applies to (1b). The subcategorization requirement of *kill* includes a nominal complement. Projectionist frameworks assume that this subcategorization requirement must be matched with the structure in which the verb is inserted. As there is no nominal complement to be matched in the VP headed by *kill*, the example becomes ungrammatical for the same reason as (1a).

But is (1b) indeed ungrammatical? Many of us will recall the reaction of untrained students of linguistics who protest against (1b) being ungrammatical. They retort that it is not ungrammatical but receives an interpretation that differs from the one in (1a). This reaction provides the pivot for *Structuring Sense*. Borer observes that lexical items, content words in particular, behave much less rigid than typically assumed by projectionist frameworks. She takes the student's reaction seriously and reminds us not to claim ungrammaticality, but instead to ask ourselves why (1b) receives an interpretation that differs from a transitive realization. As dif-

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<sup>1</sup> For comments and discussions, I would like to thank Hagit Borer, Niels Kindl, Claudia Roch, and Stephen Wechsler.

<sup>2</sup> Hagit Borer: *Structuring Sense*, Vol. I: In Name Only and Vol. II: The Normal Course of Events. Oxford University Press, Oxford 2005

fering interpretations are a starting point, Borer equates syntactic flexibility with polysemy. Lexical items are presumed to be highly polysemous. The verb *siren* offers a stunning degree of lexical flexibility, as illustrated in (2):

- (2) a. The factory horns sired throughout the raid.  
b. The factory horns sired midday and everyone broke for lunch.  
c. The police car sired the Porsche to a stop.  
d. The police car sired up to the accident site.  
e. The police car sired the daylight out of me. (INO, p. 8)

It is not that this flexibility remained unnoticed. Starting in the 1980s, a rich body of syntactic and semantic research into lexical classes has been collected. One of the major tenets of this tradition has been to derive lexical flexibility from underlying, possibly semantic or conceptual generalizations. To Borer, this tradition does not take into account that lexical flexibility stands in contrast to syntactic rigidity. The presumably 'intransitive' verb *siren* in (2a) can be coerced into the subcategorization patterns in (2b-e); count nouns can be coerced into mass nouns and vice versa. But a *phrase* like *three wines* cannot be coerced in the same way, nor can *much wine*. And again, a common noun like *cat* may be turned into a proper name (3a), but a noun marked plural that is combined with a determiner eschews a proper name interpretation (3b).

- (3) a. Cat is on the roof.  
b. The Johns will come to dinner.

In a projectionist framework, ambiguities can be accounted for by using lexical rules, by deriving varying subcategorization frames from lexical-conceptual structure, or by merely including highly disjunctive specifications. Such proposals can be called endo-skeletal, referring to the lexical heads that almost entirely determine syntactic structure. Syntax in itself boils down to a mechanism that guarantees that lexical specifications are met when words and phrases are combined – syntax simply repeats what is already provided in the lexicon. Grammaticality then is just another word for complying with lexical specifications.

Borer's *Structuring Sense* suggests a radical alternative: We should give up the idea that the lexicon plays a role at all in determining syntactic structure (and also in determining compositional semantics). At least we shall try to push this idea to its extremes. As the structure determines the behaviour of the elements contained in the structure, the grammar developed in *Structuring Sense* is called exo-skeletal syntax (XS). Exo-skeletal grammar is an independent structure building component into which grammatically inert lexical entries are inserted. Endocentricity plays a far smaller role than typically assumed in projectionist frameworks. Lexical entries are treated by the grammar as airlines treat goods that have been bought on a reduced tax rate (duty-frees) at an airport: The goods will be sealed in a plastic bag and will only be opened (and used) after arrival. Borer assumes that lexical items, which she calls

*listemes*, consist of rich conceptual information and a phonological matrix. The conceptual information remains sealed during syntax (and compositional semantics) and its contents will only be surveyed after the syntactic derivation has been carried out. If the conceptual content is compatible to what the syntactic derivation has suggested for compositional semantics, the derivation is considered grammatical and conceptually probable. But if conceptual content and grammatical derivation part company, the resulting sentence may sound odd, possibly odd to a degree that cannot be distinguished from ungrammaticality. Grammaticality is not a natural object, which can be unearthed through the working of the theory of grammar. Grammaticality is the result of drawing a boundary line in the theory: “*grammaticality judgments do not come in black and white ... and do not wear the cause of their malaise on their sleeve ... it is, ultimately, the nature of the theoretical model employed that determines which shades of grey represent the violation of some formal principle of the grammatical computational system, and which are due to factors external to it*” (TNCE, p. 214).

This is not to say that Borer gives up a distinction between grammatical and ungrammatical examples, it is only that the distinction between the odd and the ungrammatical will not always be apparent to the speaker or hearer (cf. also her discussion in TNCE, p. 249ff.).<sup>3</sup> In certain cases, however, the predictions of the grammar are striking, as can be illustrated by the following contrast:

- (4) a. The climber reached the summit.  
b. \*The climber reached.

If an object is missing from (4b), the predicate could receive an interpretation as an activity, since the predicate cannot be marked as quantity. Being marked as a quantity, however, is condition for an accomplishment interpretation to emerge. One could thus assume that (4b) is indeed grammatical, but that the range of interpretations offered by the grammar is incompatible even with a broadly stretched conceptual content of *reach*. This, however, is not the road Borer likes to pursue. According to Borer, (4b) differs from (1b) in that it is not merely awkward, but ungrammatical.

In Borer’s model, grammaticality is (almost) entirely determined by syntactic operations. Lexical constraints are evoked in very few cases, so we have to give up common distinctions like the one between proper and common nouns, between count and mass nouns, but also between transitive and intransitive verbs.<sup>4</sup> While such terms may be used in a descriptive manner, they do not form part of the grammar proper.

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<sup>3</sup> As I pointed out already, Borer proposes that lexical structures are flexible but syntactic structures are rigid. In addition to this, Borer assumes a second opposition involving syntactic structures: while conceptual structures show a high degree of flexibility in that they can be stretched to meet syntactic demands, syntactic structures will never bend to meet conceptual ends.

<sup>4</sup> One of the very few cases actually involves the ungrammaticality of (4b). Borer assumes that accomplishment verbs like *reach* are lexically related to a quantity variable of type [<sub>AspQ</sub> <e>#] (as for the formal representation of quantities, see below). In (4b), the quantity variable cannot be bound in the absence of an object, and hence the example is ruled out in syntax prior to any meddling with conceptual structure.

Structuring Sense consists of two volumes (a third volume, dealing with the role of morphology, is in preparation). In the following, I will summarize the two volumes, *In Name Only (INO)*, and *The Normal Course of Events (TNCE)*. The term summary is to be taken seriously. It is simply not possible to do justice to the abundance of ideas and discussions found in the two books. After the summary, I will briefly assess some problematic aspects of Borer's *opus magnum*, which in general I consider an extremely valuable contribution to theoretical linguistics.

## 2. Summary

### 2.1 In Name Only, Part I: Exo-Skeletal Explanations

Volume I (In Name Only) consists of three parts. Part I presents the leading ideas in chapter 1 (Structuring Sense: Introductory Comments), and the basic idea of functional heads as variables in chapter 2 (*Nuts and Bolts*).

Projectionist endocentric syntax starts with a lexical item that forces the combination with other lexical items (or phrases). Syntactic derivations in XS start with a lexical domain. This domain contains an unstructured set of categorially unspecified lexical items, that Borer calls *listemes*.

As listemes do not bear syntactically relevant categorial information, it is the task of various functional heads to select an item from the lexical domain and categorize it in syntax. Traditional lexical items such as nouns and verbs are called *Lexical Heads* (abbreviated L-heads), although it remains unclear whether they actually project in syntax without the assistance of functional elements (cf. below). Their category, in any case, is determined by a functional element that selects the L-head. L-heads are conceptual units combined with a phonological matrix that receive a category through selection of a functional element. Functional elements belong to *syntactic* categories and take the form of a variable that requires range assignment by an operator. Hence,  $\langle e \rangle_{\text{functional category}}$  is a functional head where  $\langle e \rangle$  is the variable, and *functional category* is its category.

Range assignment can take three different guises:

1. The range assigner can be a morphological feature. In this case, movement of an L-head is required to provide a host for the morphological feature (cf. the analysis in (6) below).
2. The range assigner can be a functional morpheme. A determiner would be an instance of a functional morpheme (f-morph). It should be noted, however, that Borer does not assume that *determiners* are functional heads, or even have a category. What linguists normally call the category of a determiner is only a reflection of the determiner's function – to bind a certain functional variable. In other words: f-morphs can only be considered as functional heads *together* with the variable that they bind.

3. Finally, range assignment can take place through adverbs of quantification and specifier-head agreement. Specifier-head agreement or binding of a variable through an adverb of quantification is indicated through super-co-scripting.

The last conditions allows an account of the (in-)definiteness of the examples given in (5).

- (5) a. [<sub>DP</sub> [<sub>DP</sub> a dog's]<sup>3</sup> <e<sup>3</sup>><sub>d</sub> [<sub>NP</sub> ear]]  
 b. [<sub>DP</sub> [<sub>DP</sub> the dog's]<sup>3</sup> <e<sup>3</sup>><sub>d</sub> [<sub>NP</sub> ear]]

In (5), the functional head <e><sub>d</sub> marks the L-head *ear* as being nominal. The subscript indicates that the functional head is of type *d* (= determiner), projecting a DP. The specifiers *a/the dog's* are already internally structured as (in-)definite phrases. As such, they can bind the free variable <e><sub>d</sub>, identifying the (in-)definiteness value through the superscript 3.

## 2.2 In Name Only, Part II: Determining Structures

Part II comprises four chapters and is devoted to a syntactic analysis of what is traditionally called the NP. A full-fledged DP in Borer's sense consists of a projection of D, whose complement is a projection of a Quantity Phrase (indicated through #). The complement of the head of the #P, <e><sub>#</sub>, is a Classifier Phrase, the head of which is dubbed <e><sub>DIV</sub>. This latter head finally categorizes an L-head and turns the head into a noun. It should be noted that <e><sub>#</sub> and <e><sub>DIV</sub> are optional. Hence, a minimal DP may consist of <e><sub>d</sub> and an L-head. The head of the DP, i.e. <e><sub>d</sub>, is obligatory because the property described by the NP (Classifier Phrase or #P) must be predicated of *something*. The head of the DP fulfils this function, and the property described by the syntactic complement of <e><sub>d</sub> is predicated of <e><sub>d</sub>.

Chapter 3 (*The Proper Way*) is a comparative analysis of proper names. Proper names are analysed as follows: A DP containing a proper name minimally consists of <e><sub>d</sub> and the proper name, the latter being categorized as a noun (N) by <e><sub>d</sub>. The head of the DP requires a binder, which is an abstract feature called <def-u>. It stands for 'definite and unique'. So, if a functional head <e><sub>d</sub> has selected an appropriate L-head, say *John*, and range has been assigned to <e><sub>d</sub> by <def-u>, the resulting syntactic structure is as in (6a).

- (6) a. [<sub>DP</sub> <def-u<sup>3</sup>> <e<sup>3</sup>><sub>d</sub> [<sub>N</sub> John]]  
 b. [<sub>DP</sub> John.<def-u<sup>3</sup>> <e<sup>3</sup>><sub>d</sub> [<sub>N</sub> JOHN]]

The feature <def-u> belongs to the set of morphological features and hence requires movement of an L-head that hosts the feature. *John* will thus move and attach to <def-u>, yielding (6b). The resulting syntactic structure, which is driven by the functional element <e><sub>d</sub> and its requirements, gives rise to an interpretation of the phrase as definite and (contextually) unique – just as we would require for proper names.

What will happen, if we use a common name instead, say *car*? From the perspective of XS, we do not know whether an L-head is a proper name or not – in other words: *proper name* is a concept that only comes about as a result of exo-skeletal conditions. Consequently, *car* will receive a proper name interpretation in (7a), just as *Johns* will receive a common noun inter-

pretation in (7b). The analysis of (7a) is provided in (8), the corresponding analysis of (7b) will be provided below, as it requires the introduction of the other functional heads in the DP.

- (7) a. Car will leave tomorrow.  
b. Three Johns will leave tomorrow.

(8) [DP car.<def-u<sup>3</sup>> <e<sup>3</sup>><sub>d</sub> [N ear]]

It should be stressed that (7a) is by no means ungrammatical. It is just awkward, as the interpretation forced by the syntactic structure provided in XS complies only vaguely with our conceptual apparatus, as we would not normally use *car* as a proper name, but have to in the present case. This is an illustration of a general position Borer takes with respect to the distinction between rules of grammar and rules of conceptualization: the latter may bend, but the former are rigid.

Chapter 4 is centred on the treatment of the mass/count distinction. Just like the distinction between proper and common names, the distinction between mass and count nouns provides certain problems for a lexicalist approach, which Borer's analysis tries to overcome by deriving the distinction in the syntax.

Borer's basic insight is to assume that a *Quantity Phrase* (which is labelled #P throughout) should be distinguished from a *Classifier Phrase* (labelled CL<sup>max</sup>). The head of the #P is the element <e><sub>#</sub>, which gives rise to an interpretation of quantity. The head of CL<sup>max</sup> is <e><sub>DIV</sub>. In languages like English or German, the prototypical range assigner of <e><sub>DIV</sub> is an abstract feature that Borer calls <div>, but which can be translated as *plural*. In languages like Chinese, the range assigner of <e><sub>DIV</sub> might be a classifier, which explains the name of the whole phrase (and further instantiations are possible in other languages, cf. INO, p. 201). It is crucial for the understanding of Borer's analysis that plural marking in itself does not lead to a quantity interpretation. It only leads to portioning out a mass. Hence bare plurals may receive a non-quantity interpretation, which has wide ranging consequences for the analysis of telicity in TNCE.

The notion of quantity is at the heart of the analysis. Quantity receives a negative definition in INO, p. 127. According to this definition, a predicate is quantity if it is either not divisive, or not cumulative. Cumulativity and divisivity are characteristics of true mass predicates (and of bare plurals, given a certain condition, as will be explained immediately).<sup>5</sup> A predicate P is cumulative if adding P to P yields P. Adding *water* to *water* yields *water*, but adding *three apples* to *three apples* does not yield *three apples*. A predicate P is divisive if any subset of P is P. A subset of *water* is *water*, but there are subsets of *three apples* that are not *three apples*. It suffices for a predicate to be either not cumulative or not divisive to be quantity. This causes a problem for bare plurals. While Borer wants bare plurals to be non-quantities, they

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<sup>5</sup> While many analyses of the count/mass-distinction rely on the concepts *cumulativity* and *divisivity*, it should be noted that this characterization has been recently severely challenged by Rothstein (2010).

would turn out as quantities because they could be analysed as not being divisive, if we assumed that atomic singular entities are part of the extension of bare plurals. So for *apples*, if an individual apple is part of the extension of *apples*, then *apples is not divisive*, and hence *quantity*. But then, we would not be able to derive the distinction between (9a) and (9b).

- (9) a. John ate three apples in an hour/\*for an hour.  
 b. John ate apples \*in an hour/for an hour.

Borer assumes that the extension of bare plurals does not include singular individuals. Formally, this is encoded as follows: A bare plural like *apples* receives a structure as in (10a), where only uncounted portions of apples are syntactically represented. *Three apples*, on the other hand – as in (10b), consist of a DP that contains a Classifier Phrase, yielding portions, and a counter phrase (i.e. #P), yielding exact quantities for these portions. From the exact quantities, we can infer subsets of quantities that contain individual apples, but we cannot do this from portions.

- (10) a.  $[_{DP} \langle e \rangle_d [_{CL_{max}} \text{apple} \langle div^2 \rangle \langle e^2 \rangle_{DIV} [_N \text{apple}]]]$   
 b.  $[_{DP} \langle e \rangle_d [_{\#P} \text{three}^3 \langle e^3 \rangle_{\#} [_{CL_{max}} \text{apple} \langle div^2 \rangle \langle e^2 \rangle_{DIV} [_N \text{apple}]]]]]$

While the distinction between portioning out and counting heads works nicely with plurals,<sup>6</sup> singulars require special treatment. Range assignment to  $\langle e \rangle_{DIV}$  can also take place through an f-morph like *a* or *one* in English. One would expect that an indefinite article assigns a counter (of 1) to a portion just as *three* does this in (10b). But singular indefinites live a double life in Borer's analysis: They emerge as range assigners of  $\langle e \rangle_{DIV}$ , but simultaneously as range assigners of  $\langle e \rangle_{\#}$ . Hence, *one apple* receives the analysis in (11), where  $DIV(\#)$  and  $\#(DIV)$  indicate the fusion of functional heads of type  $\langle e \rangle_{\#}$  and  $\langle e \rangle_{DIV}$  due to being bound by the same element.

- (11)  $[_{DP} \langle e \rangle_d [_{\#P} \text{one}^2 \langle e^2 \rangle_{\#(DIV)} [_{CL_{max}} \text{one}^2 \langle e^2 \rangle_{DIV(\#)} [_N \text{apple}]]]]]$

The role of indefinites is further elaborated in Chapter 5. Weak indefinites are defined as DPs containing a functional head – i.e.  $\langle e \rangle_d$  – that is not bound DP-internally. Consequently, the examples in (10) and (11) are handled as weak indefinites. And yet,  $\langle e \rangle_d$  remains to be bound. The following options are available: it can be bound by Existential Closure, it can be bound by a covert generic operator, and – as will be discussed in TNCE – it can be bound by a locative operator.<sup>7</sup> Strong, i.e. quantificational DPs differ from weak ones in that an element which originated as a range assigner to  $\langle e \rangle_{\#}$  (or even as a range assigner to  $\langle e \rangle_{DIV}$ ) moves into the left periphery of DP and binds  $\langle e \rangle_d$  DP-internally. Hence, a phrase like *three apples* may receive two different syntactic structures, the first as given in (10b), and the second as given in (12).

<sup>6</sup> Bale (2008) shows that English bare plurals seem to entail the existence of singular individuals. But this does not seem to carry over to Armenian. If correct, such a difference between bare plurals in English and Armenian is surely in need of an explanation, and it does not follow from XS as it stands.

<sup>7</sup> The last option is actually a variant of the first one as Borer assumes that existential binding is always locative.

(12) [<sub>DP</sub> three<sup>3</sup> <e<sup>3</sup>><sub>d</sub> [<sub>#P</sub> three<sup>3</sup> <e<sup>3</sup>><sub>#</sub> [<sub>CLmax</sub> apple.<div<sup>2</sup>> <e<sup>2</sup>><sub>DIV</sub> [<sub>N</sub> apple]]]]

Chapter 6 deals with the role of the definite determiner, and answers the question why definite and indefinite determiners cannot co-occur in the same DP, an option that becomes available in XS due to the layered structure of the DP. Basically, definite DPs are treated as anaphoric expressions, with the consequence that quantity is inherited from the antecedent of the DP. As quantity is inherited from an antecedent, it follows that the definite determiner in a DP is not only a binder of <e><sub>d</sub>, but also of <e><sub>#</sub>, and consequently, the parallel realisation of a definite determiner (a range assigner to <e><sub>d</sub> and <e><sub>#</sub>) and an indefinite determiner (a range assigner to <e><sub>#</sub>) is blocked.<sup>8</sup>

We are now able to provide a structure for the subject of (7b): it does not differ from the analyses in (10b) and (12). The syntactic analysis of (7b) once again illustrates the workings of a model that omits lexical specifications. In a projectionist analysis, one would have to assume that while *John* is lexically marked as a proper name, it is used as a common noun in (7b). In XS, *John* is not marked at all. If inserted into a structure like (7a), it will receive a proper name interpretation, but if inserted into (10b) or (12), a portioned and counted common noun interpretation will be the result of the workings of exo-skeletal syntax.

### 2.3 Volume I, Part III: Another language, another system

The third and final part of INO (Chapters 7 to 9) applies the model developed so far to Hebrew, in particular to the Hebrew numeral *ʿexád* (*one*) and to an analysis of Measure Phrases and Grocerese – the language normally used to tally up a bill at a grocery. Both applications illuminate properties of the model, but also show that extensions are necessary: the introduction of phonologically abstract features in the first case, and the introduction of recursive embeddings of the same functional structure in the second case. The very short last chapter summarizes the most important assumptions of INO.

### 2.4 The Normal Course of Events, Part I: Setting Course

The first part of TNCE presents a recapitulation of the general assumptions and results of INO. As a summary, Chapter 1 repeats parts of INO, but contains new material as well, particularly section 1.4 on idioms. Its main purpose is to allow readers to follow the general story who may not have consulted INO before.

Not surprisingly, the major topic of TNCE is the interpretation of sentences. Verbs and VPs are analyzed as constraints on possible event types, and the internal structure of the VP plays a major role in determining the distinction between telic and atelic events.

Chapter 2 lays out the basic assumptions and arguments in favour of an event-based analysis, in which neither external nor internal arguments are lexically selected by an L-head.

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<sup>8</sup> Obviously, this does not answer why *the three stars* is possible, but I will leave it to refer to INO, p. 169-174 for that puzzle.

Borer does not only aim to replace the lexical distinction between intransitive and transitive verbs by constraints on event-types, but also replaces traditional role names by argument names that function as conditions on event structure. Hence ‘arguments’ in her sense are elements that play a role in determining the event structure of the sentence. These elements cannot be selected by L-heads since L-heads do not enter as active factors into syntactic computations. Thus, constraints typically derived from subcategorization frames and its kin have now to be derived from requirements of event structure.

## 2.5 The Normal Course of Events, Part II: The Projection of Arguments

Why do verbs realize syntactic complements at all (subjects and objects)? As such, the question does not make sense in XS, since verbs do *not* realize complements. Functional projections combine verbs and other phrases, yielding structures that lead to inevitable interpretations. In XS, verbs (and their complements) are constraints on event structure. Events are temporally anchored and temporal anchoring requires the syntactic realization of a Tense Phrase (TP), the head of which is a variable.<sup>9</sup> Hence, a potential binder (= DP) must be present in syntax. Objects, fulfil a similar purpose. In the absence of other mechanisms, an object is a syntactic indication of telicity, and the analysis of telicity starts in chapter 3 of TNCE. Borer assumes that telicity comes about through a functional phrase called  $Asp_Q^{max}$  the head of which being a variable of type quantity, i.e.  $\langle e \rangle_{\#}$ , sometimes represented as  $[_{AspQ} \langle e \rangle_{\#}]$ . The kind of head clearly indicates a parallelity to the head of  $\#P$ , and indeed  $Asp_Q^{max}$  in the verbal domain can be related to  $\#P$  in the nominal domain. The head of  $Asp_Q$  is a quantity ( $\langle e \rangle_{\#}$ ) that selects a L-head and turns this head into a verb. It requires a range assigner. But English (which we take as an example here, cf. below) does neither show overt nor abstract morphological reflexes of telicity. And we do not find any f-morphs to mark telicity. Consequently, range assignment to  $[_{AspQ} \langle e \rangle_{\#}]$  must take place through specifier-head agreement. A possible binder can only be a DP that is marked for quantity (i.e. contains a  $\#P$ ). This DP moves into the specifier position of  $Asp_Q^{max}$ . Telicity thus may emerge if range is assigned to  $Asp_Q$  through a DP that is quantity.<sup>10</sup> The DP in turn is interpreted as *subject-of-quantity* of the selected verb. In this way, Borer captures Verkuyl’s Generalization, which says that telic predicates require quantized objects. It is this generalization that explains the contrast between purportedly ungrammatical (1b) and presumably truly ungrammatical (4b). While INO has focussed on structural representations, TNCE also provides representations at the syntax-semantics interface. If e.g. a DP binds  $[_{AspQ} \langle e \rangle_{\#}]$ , the whole  $Asp_Q^{max}$  is taken to

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<sup>9</sup> Note, however, that T does not seem to play a role in anchoring tenses at all, cf. section 3.

<sup>10</sup> It should be noted that this is not the only way for telicity to emerge, as Borer discusses in some detail in chapter 6, 7, 9, and 10 of TNCE. But telicity may only emerge if  $[_{AspQ} \langle e \rangle_{\#}]$  is present in a clause, and the presence of  $[_{AspQ} \langle e \rangle_{\#}]$  entails that it be bound in some manner, be it through a specifier or through other ways of marking.

be a Quantity Phrase, the predicate of which (i.e. VP) constrains the event, while the DP is taken to be the subject-of-quantity, as indicated in (13).

(13) The flower wilted (intermediate representation of  $Asp_Q^{max}$  only)

$[_{AspQmax} [_{DP} \text{the flower}]^2 <e^2>_{\#} [_{VP} \text{wilt}]]$

$\exists e[\text{subject-of-quantity}(\text{the flower}, e) \ \& \ \text{quantity}(e) \ \& \ \text{wilt}(e)]$

The presence of the property *quantity(e)* follows from the presence of  $[_{AspQ} <e>_{\#}]$ , and  $Asp_Q^{max}$  is always a *quantity predicate* (cf. TNCE, p. 219f.).  $Asp_Q^{max}$ , however, does not have to be included in a syntactic representation. This does not only mean that a structure like (14) can be derived as well, but it also means that in such a structure, no quantity predicate is realized, and consequently, an atelic interpretation will emerge (as for atelic transitives, cf. below).

(14) Anna ran. (intermediate representation of  $T^{max}$  only)

$[_{Tmax} [_{DP} \text{Anna}] [ \text{T} [_{VP} \text{ran}]]]$

In this case, the subject is realized as a specifier of T, tense phrase. Without an  $Asp_Q^{max}$ , it would not give rise to a telic interpretation, which is a nice result in itself, as the analysis of (13) and (14) captures the relation between aspect and the unergative/unaccusative distinction (cf. Dowty 1991, Van Valin 1990). Note, however, that the relation between the subject and the event has not been established in (14). Borer thus suggests that  $T^{max}$  is selected by EP – the Event Phrase, the head of which is  $<e>_E$ . This head can be bound by any specifier (an analysis which will be refined in the final part of TNCE), and any specifier that has not yet been related to the event structure will be assigned the role *originator*. Hence, the role representation of (14) is given as in (15).

(15)  $\exists e[\text{originator}(\text{Anna}, e) \ \& \ \text{run}(e)]$

We have seen in (13) and (14) that intransitive structures may choose to project  $Asp_Q^{max}$ , with the consequences as illustrated. Chapter 4 deals with atelicity. In Borer's terms, atelicity is the lack of telicity, i.e. the lack of an  $Asp_Q^{max}$  in the grammatical derivation. While this conclusion seems to be unproblematic for intransitive structures, one wonders how transitive structures can be derived. Borer assumes that for languages like English, the only way to evoke telicity is to let the head of  $Asp_Q^{max}$ , i.e.  $<e>_{\#}$ , be bound by a quantized specifier. Non-quantized DPs must not appear as specifiers of  $Asp_Q^{max}$ .

Instead of  $Asp_Q^{max}$ , a Functional Shell Projection  $F^sP$  will be the locus of direct objects in atelic sentences. The  $F^sP$  will not only host the direct object, but will also relate it to the event structure by assigning it the role of 'default participant' (as opposed to subject-of-quantity in  $Asp_Q^{max}$ ). Borer adduces evidence from Finnish, where partitive case inherently leads to atelic transitives, to conclude that even in languages like English (or German), partitive case is assigned to the specifier of  $F^sP$ . The structure of an atelic transitive would thus be like (16).

(16) Robin pushed the cart. (p. 109)

[<sub>EP</sub> [<sub>DP</sub> Robin] <e><sub>E</sub> [<sub>Tmax</sub> [<sub>DP</sub> Robin] T [<sub>FsP</sub> [<sub>DP</sub> the cart]<sub>2</sub> F<sup>s</sup><sub>2</sub> [<sub>VP</sub> push]]]]

∃e[originator(Robin, e) & participant(the cart, e) & push(e)]

As Asp<sub>Q</sub><sup>max</sup> will only host DPs that are quantity, the emergence of telicity with bare plural objects in English is blocked. Bare plurals may only appear as specifiers of F<sup>s</sup>P. This move, however, will not answer the question why (17) is much more likely to receive an atelic interpretation than a telic one.

(17) Robin pushed a cart.

If partitive case is abstract (as it is in English or German), we cannot read (a)telicity of the sentence. Hence examples like (17) become genuinely ambiguous. In one interpretation, the object *a cart* receives partitive case, thus blocks a telic interpretation of the predicate. The other interpretation, however, is surprising. The case of the object could be accusative, and the object could be a subject-of-quantity, and consequently, a telic interpretation could emerge. Chapter 5 is in large parts devoted to this problem. What Borer tries to show is that a telic interpretation can in fact emerge (and also, that competing analyses do not fare much better). Borer suggests that this is not a problem of the grammar: “*all ... transitive verbs should be ambiguous between a telic reading and an atelic reading, and that any anomalies which emerge are attributable to conflicts with world knowledge*” (p. 140).

Chapters 6 and 7 deal with direct range assignment. According to Verkuyl’s generalization, telicity should only emerge in the presence of a subject-of quantity. Recall that a subject-of-quantity, in the model presented here, is only one mode of range assignment, others being range assignment through morphological features or adverbs of quantification.

With regard to morphological features, Borer assumes that verbal perfective prefixes are direct range assigners in Slavic languages. With regard to adverbs of quantification, Borer proposes that frequency adverbs lead to telic interpretations even in the absence of a subject-of-quantity, as can be seen in (18).

(18) Robin danced *once* in five hours.

While this proposal neatly accounts for telicity in the absence of an object in (18), Borer is forced to note that the analysis runs into problems when transitive structures are considered. The diverging behaviour of the examples in (19), (20), and (21) illustrate the problem:

(19) a. Kim loved her *three times* last summer.

b. Kim loved cats *three times*.

(20) a. Kim pushed the cart to London.

b. Kim pushed carts to London \*in several hours.

(21) a. I wrote the letters up.

b. \*I wrote letters up.

In (19), a telic interpretation is entirely dependent on the presence of a frequency modifier, i.e. a telic interpretation emerges even in (19b) with an existentially interpreted bare plural

object. This is different in (20). The locative PP *to London* acts as a delimiter and conspires with the quantity object in (20a), leading again to a telic interpretation, but in the absence of a quantity object, the PP in itself is not sufficient to yield a telic interpretation. The predicate receives an atelic interpretation, as can be witnessed from the ungrammaticality of the time measure phrase. The situation is again different in (21). While the presence or absence of a quantity object determined (a)telicity in (20), example (21b) does not become atelic in the absence of a quantity object, but simply ungrammatical.

This is not just an empirical problem. Borer treats frequency adverbials, locative PPs, and particles as range assigners, and following the analogy with adverbs of quantification, there should be a variable available for each range assigner. We are forced to accept two range assigners (*her, three times*) in (19a), as (19b) shows that *three times* must act as a range assigner in the absence of a quantity DP. Borer explicitly acknowledges the problem, and that no easy solution is imminent.

Chapter 8 looks again at arguments and roles in event structure: roles can only be constraints on events. Borer establishes the representation for telic intransitives and transitives in (22), and for atelic intransitives and transitives in (23).

(22) a. telic intransitive (unaccusative): *Kim arrived*.

$\exists e[\text{quantity}(e) \ \& \ \text{subject-of-quantity}(\text{Kim}, e) \ \& \ \text{arrive}(e)]$

b. telic transitive: *The cat climbed the tree*.

$\exists e[\text{quantity}(e) \ \& \ \text{originator}(\text{the cat}, e) \ \& \ \text{subject-of-quantity}(\text{the tree}, e) \ \& \ \text{climb}(e)]$

(23) a. atelic intransitive (unergative): *Kim ran*.

$\exists e[\text{originator}(\text{Kim}, e) \ \& \ \text{run}(e)]$

b. atelic transitive: *The cat climbed the tree*.

$\exists e[\text{originator}(\text{the cat}, e) \ \& \ \text{participant}(\text{the tree}, e) \ \& \ \text{climb}(e)]$

This chapter mainly centres around the question whether a syntactically derived semantic representation of the concept *activity* should be included in the representations in (23). Borer decides against this option, and offers syntactic evidence for her conclusion in the remainder of chapter 8. Basically, while evidence can be found for the modification of the concepts *originator*, *quantity*, and *subject-of-quantity*, no such evidence can be adduced for a modification of the concept *activity*. This does not mean that the concept *activity* in itself is called into question, but only that it does not derive from the formal component of grammar.

Chapter 8, and hence Part II of TNCE, ends with a reminder to the reader that the basic assumption of the present work is the primacy of constructed structure over lexical material. Syntactic subcategorization in particular is taken to be an epiphenomenon of conditions on event structure. Variable behaviour of individual content words should thus be the rule. She acknowledges, however, that not every verb is as flexible as *siren* (cf. (2)) and achievements and intransitive manner verbs seem to be particularly rigid. The last section of chapter 8 con-

siders intransitive manner verbs and their reluctance to appear in structures that induces a quantity interpretation of the predicate. Her conclusion might be surprising, for in the end, it is the conceptual structure of the *listemes*, which ultimately leads to ungrammaticality, channelled through conventionality. But the conclusion follows the idea that grammaticality is what the model defines and that oddity may occur if grammatical and conceptual concepts clash.

## **2.6 The Normal Course of Events, Part III: Locatives and Event Structure**

The last part of TNCE, chapters 9 and 10, focuses on several loose ends, the major topic being postverbal nominatives in languages like Italian and Hebrew. Postverbal nominatives are problematic insofar as they give rise to telic interpretations in the apparent absence of quantity, be it a subject-of-quantity, i.e. a DP object which is quantity, or an affix, or an adverbial or particle. Borer also addresses the role of the event variable  $\langle e \rangle_E$  in much more detail. It turns out that telic predicates with postverbal nominatives can be included into the system if overt locative inversion is treated on a par with direct range assignment through Perfective affixes in Slavic languages. *True* postverbal nominatives without overt locative inversion receive an analysis based on covert locative affixes.

The last chapter of TNCE reassesses the role of listemes in determining grammatical structure. Borer makes use of a special concept of idiom – an idiom being a combination of a listeme with functional marking. As functional marking may be tied to listemes, listemes may determine syntactic structure in parts. While one might read this as a partial retreat in favour of lexical selection, Borer makes clear that the XS approach allows to specify precisely those areas, where lexical specifications have to enter the domain of grammar, instead of handing over grammar to lexical specifications altogether.

## **3. Discussion**

How do we properly assess a work of roughly 700 pages, which contains interesting analyses, new insights, and an original method to approach well-known problems? In my opinion, *Structuring Sense* is one of the very few linguistic monographs that really keep the reader attentive, but in some cases, attention is just not enough. Let me start with a minor issue, which still may confuse readers. *Structuring Sense* is clearly not a formal work in the sense in which Gazdar et al. (1985) is formal. But still, why is it that *Structuring Sense* employs a variety of different formal conventions to represent the same kind of entity? As readers of this review may have already realized, we have DP, #P, and EP alongside with  $CL^{\max}$  and  $T^{\max}$ . Are they perhaps ontologically different? I couldn't say! We find superscripts to indicate variable binding in INO, but subscripts in TNCE. A lot of energy is spent to explain that functional heads are variables that require binding, but the head of T is not even formally

presented.<sup>11</sup> Which reason guides the assumption that simultaneous binding of  $\langle e \rangle_{\text{DIV}}$  and  $\langle e \rangle_{\#}$  leads to fused heads, i.e.  $\langle e \rangle_{\text{DIV}(\#)}$  and  $\langle e \rangle_{\#(\text{DIV})}$ , while simultaneous binding of  $\langle e \rangle_{\text{d}}$  and  $\langle e \rangle_{\#}$  does not?

This might be a problem of minor concern. Yet, it adds to the general inaccessibility of *Structuring Sense*, which seems to be much more of a problem. In a nutshell, Borer presents an original theory in *Structuring Sense*, a particular version of Construction Grammar. While she points out that the theory in fact belongs to the larger family of Construction Grammars, she does not seem to acknowledge that *original work* requires some illustration. What syntacticians want to do at the end of the day is to provide structures for example sentences, structures that remain without doubt at least in those areas of grammar that seem to have received enough attention. I do not think that many syntacticians take *Structuring Sense* as a guidebook for syntactic analysis – which might turn out to be a shame. Let me point out three aspects:

Detailed and complete analyses could have been provided for complex DPs and clauses (ideally including DPs with prenominal and postnominal modification, and clauses with post-verbal modification). In many cases, the lexical domain (L-D) does only contain a single element, and it remains unclear how additional elements in L-D are related to elements in the functional domain.<sup>12</sup>

While this might be orthogonal to the questions handled in *Structuring Sense*, it would have been useful to indicate whether specifiers are base-generated or emerge from phrases that are built in the lexical domain.<sup>13</sup> To make this concrete, take again a look at (16) above, which can be found on p. 109 of TNCE. Specifier movement from [Spec,  $T^{\text{max}}$ ] to [Spec, EP] is indicated. But do  $[_{\text{DP}} \text{Kim}]$  and  $[_{\text{DP}} \text{the cart}]$  emerge from the lexical domain which contains the verb? Is there an initial lexical domain that contains every lexical element, or does every functional phrase come with its own lexical domain?

Finally, the attentive reader finds related material scattered throughout the volumes. As one illustration consider Borer's analysis of bare plurals and their implications for mass nouns in chapter 4 of INO. Recall that bare plurals introduce portions that are not necessarily counted. Thus bare plurals are analysed as divisive, and eventually, as non-quantities. As a point of reference, the reader may use the summary on p. 97 of INO, which suggests a complete listing of possible non-quantity and quantity structures. Looking at the non-quantity structures in particular, one notes a slight divergence: bare plurals show a classifier phrase, but mass nouns do not. As Borer points out, it is the presence of a Quantity Phrase that al-

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<sup>11</sup> The head of T (call it  $\langle e \rangle_{\text{T}}$ ) is not required to temporally anchor events (as events have to be anchored in the absence of temporal marking e.g. in derived nominals). The whole T projection is required for reasons of case, but I did not understand in which sense the presumed head of T is bound by its case-marked specifier.

<sup>12</sup> Exceptions to this rule are found in INO, p. 177, where the lexical domain seems to contain a noun and an adjective, and in TNCE, p. 90.

<sup>13</sup> The discussion around p. 89 seems to answer this question: specifiers move from the lexical domain.

lows to distinguish between quantity and non-quantity, and not the presence or absence of a Classifier Phrase. Given this result, one wonders whether the system would allow for mass nouns with Classifier Phrases, but without Quantity Phrases. This is not just an academic question, as can be illustrated by the following discourse:

(24) Question to the proprietor of a fish restaurant: *Do you still offer sole?* Proprietor's answer: *One is left!*

The answer suggests that we arrive at a specific quantity of portions of sole in this example, although we seem to start out with a pure mass term – in other words: we are dealing with a hidden packager here. That we end up with specific portions of sole here seems to suggest that the absence of a mass noun structure with Classifier Phrase but without Quantity Phrase is not a mere accident, but that Classifier Phrases selecting mass nouns require selection by a Quantity Phrase. Interestingly, a very similar conclusion is drawn in INO, chap. 6.4, on p. 179ff., but without any reference to the initial classification of quantity and non-quantity contexts on p. 97. While this is a criticism more directed to the mode of presentation than to the model, let me point out some challenges for XS.

Consider the treatment of adjectival modification of proper names in Italian and English, introduced in INO, p. 70f., and reconsidered in INO, p. 176f. English differs from Italian in that the latter requires the order [PN Adj] while the former requires [Adj PN]. As we learn from Fn. 11 on p. 72, the difference in order does not follow from requirements of functional projections, but from the stipulation that the highest copy will be realized phonologically in Italian, while in English it is the lowest copy whose phonological matrix becomes active. Apart from this consideration, the syntactic structure of modified proper names seems to be identical in English and Italian, so that we can assume the following structure for both (cf. INO, p. 177).

(25) [<sub>DP</sub> Kim.<def-u> <e><sub>d</sub> [<sub>#P</sub> Kim.<def-u> <e><sub>#(DIV)</sub> [<sub>CL<sup>max</sup></sub> Kim.<def-u> <e><sub>DIV(#)</sub> [tall [<sub>NP</sub> Kim]]]]]]

Borer (ibid.) points out that the exact position of the adjective does not play a role. It could be adjoined to CL<sup>max</sup> or even to a higher position, and still the resulting output would not be affected. I am not convinced that this is correct. We should be aware that the lowest instance of [<sub>NP</sub> Kim] inside the lexical domain does not bear the specification <def-u>, and hence is not identical to specifier of CL<sup>max</sup>, #P, and DP. If the lowest [<sub>NP</sub> Kim] is not identical to the upper NPs, then the lowest copy bearing the specification <def-u> to be phonologically spelled out would be the specifier of CL<sup>max</sup>. That would lead to the order \**Kim tall*. The same reasoning applies to modified bare plurals such as *green apples*. The minimal structure for an unmodified bare plural such as *apples* would be [<sub>CL<sup>max</sup></sub> apple.<div> <e><sub>DIV</sub> [<sub>NP</sub> apple]]. With plurals, the situation is even worse, as plural morphology becomes phonologically visible. So it cannot be denied that *apple.<div>* is actually phonologically realized. For a phrase like

*green apples*, the plural marking again is present at *apple.<div>* in [Spec, CL<sup>max</sup>], but this position is upward and left to the presumed position of the adjective.

What about assuming that adjectives occupy a position between #P and CL<sup>max</sup>? I assume that lexical selection of functional elements should be prohibited in XS, and hence, a further functional element would have to relate between the adjective, CL<sup>max</sup>, and #P. Such a relation could be established by assuming that the adjective (indeed, an AP) occupies [Spec, DegrP]. Now it depends very much on what types of movement are allowed, but it seems to me that the AP in the specifier position would prohibit movement of an indefinite singular range assigner (*a, one*) from CL<sup>max</sup> to #P, i.e. a derivation of *one green apple*, where *one* starts below *green*, and ends above it, would presumably crash.

We have pointed out that in case of competition between grammar and conceptual knowledge, the latter will stretch, but the former will break. This view has been attacked by Wechsler (2008), pointing out examples like the one (26).

(26) How much chopped nuts did we sell yesterday?

Wechsler (2008, p. 303) assumes that “[a] listeme like *chopped* converts a plural like *nuts* into a mass”. Listemes should not act as massifiers, and in particular, they should not be able to change syntactic structures. Under closer scrutiny, it turns out that the participle *chopped* is *not* required to make the example grammatical, as was pointed out to me by Hagit Borer:

(27) a. How much potatoes did you have for lunch?

b. How much green beans did you put into the salad?

Borer and Wechsler agree that singular agreement – which would be expected if the phrase would be a mass term – is strictly prohibited.

(28) Too much chopped nuts \*is/?are going stale in my cupboard.

What is more, it is somewhat surprising that phrases like *much potatoes* almost never show up without either being specified by *how* or *too*.<sup>14</sup> It is thus perhaps too early to judge whether (26) to (28) constitute genuine counter-examples or merely point out to ill-understood parts of the grammar of mass quantifiers.

But actually, Borer does not always keep to the proposed strict separation between conceptual knowledge and grammar. A striking example is her discussion of Hebrew manner intransitives not allowing telic interpretations on TNCE, p. 246ff. Here, she suggests that the grammatical contrast between structures including verbs like *zaz* (*to move*) and *hitnadned* (*to rock*) “resides ultimately in an understanding of the relations that hold between *concepts in a*

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<sup>14</sup> It turns out that the constructions shows further effects that await explanation. *Too* or *how* are mandatory, but that does not make (28) perfectly grammatical, even if plural agreement is used. Constructions like *too much potatoes* do not seem to be grammatical as objects of transitive verbs, cf. *\*I ate too much potatoes for lunch*. But ordinary mass terms do not feel well in the same position either: *??I ate much oatmeal for lunch*. and also cannot be passivized: *??Much oatmeal was eaten*. Strangely, *work* seems to be a better candidate here: *Much work has to be done*. I would like to thank Stephen Wechsler for discussion on these examples.

*properly formulated theory of concepts*” (TNCE, p. 247, emphasis mine). She continues to explain that *move* – being a hyponym of *rock* – contains less conceptual information, and in particular that *rock* adds reference to the origin of movement, thus requiring the verb to become a modifier of *originator*, and thus being unable to bind [<sub>AspQ</sub> <e>#]. Now one should consider that this is an answer to a question posed on TNCE, p. 70: “*How ... can we prevent any event structure based exclusively on the syntax of arguments from overgenerating wildly?*” It looks as if the answer to this question suggests that the predominance of syntax is sometimes based on conceptual grounds.

This last point may be considered a blow against a framework that proposes a strong independence of grammar from conceptual knowledge, but one can also see it as an emerging border of such a proposal, a border that would not become visible without such a vision. My last point goes into the same direction.

It seems to be a kind of syntactic triviality that languages typically show intransitive, transitive, and ditransitive verbs. If conceptual relations are considered, however, it cannot be denied that relations between four and more participants can be established and expressed. But natural language confines itself to not more than three *obligatory* participants in an event, and in many languages, obligatory realization is even restricted to a single argument (be it subject or object, cf. Gerdts’ (1988) One-Nominal-Interpretation Law). There is a clear tension between conceptual relations on the one hand, and obligatory realizations of participants in syntactic structure, on the other. This tension offers a challenge to projectionist frameworks, as they can only stipulate that subcategorization lists (or similar means) must not contain more than three elements. We are not just sporting an academic exercise here, as can be illustrated with the peculiar behaviour of English verbs like *bet*.

(29) I bet you 25 € that you cannot jump that high.

From the perspective of conceptual structure, a *bet*-event requires someone who bets, someone to bet with, a stake, and a wager, all in all at least four participants. But verbs like *bet* never require the realization of each participant. Given the voice system of English, the realization of the subject in active clauses is required, but the remaining arguments are optional. Only one additional argument must be realized to make a grammatical sentence with a verb like *bet*. It seems to be accidental from the perspective of a model of grammar that relates conceptual structure to subcategorization frames that verbs like *bet* never require a realization of every conceptual participant.

The discrepancy between conceptual relations and syntactic realizations would make a fine target for XS. XS eliminates the necessity to stipulate that verbs have subcategorization frames containing either no element at all or a single element, and hence accounts for erga-

tive, intransitive, and transitive verbs. But the picture is incomplete, as the obvious next step, i.e. ditransitives, is not addressed in XS.

While the answer is imperfect, we should be aware that XS allows us to ask the question at all. We should not only judge this model by the answers not provided, but also by the questions it allows us to raise. In recent years, theoretical syntax has only seen a few original, innovative and substantive models that merit attention, provoke criticism, and raises new questions. *Structuring Sense* clearly belongs in this class.

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