SYNTACTIC CATEGORIES AND THE AUTONOMY THESIS

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1. Introduction

Jane Grimshaw's book *Words and Structure* is a collection of four independent papers (corresponding to the four chapters): "Extended Projection" (chapter 1), "Semantic Structure and Semantic Content in Lexical Representation" (chapter 2), "Form, Function and the Language Acquisition Device" (chapter 3) and "Datives, Feet and Lexicons" (chapter 4). These four papers in turn embody a good number of papers originally written or presented in varied ways from 1981 to 2000. In this sense, those papers are not new to the present situation of linguistics. Rather, parts of the material in those papers have already influenced the recent discussion of the problems of syntactic/semantic/lexical structure and language acquisition in a substantial way. But the contents presented in those papers are not "old" at all. In this book, Grimshaw gives a lot of fresh insights into the structure of language, and presents a number of interesting and influential proposals to be seriously examined for us to get a better understanding of language and language acquisition.

In this review article, I will take up the first ("Extended Projection")

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and the third (“Form, Function and the Language Acquisition Device”) paper. I will discuss the contents of the two papers and note some problems and interesting consequences.

2. Extended Projection (Chapter 1)

(1) illustrates a phrase marker of the type that is generated by the phrase structure rule assumed in Chomsky (1965):

The recent generative linguistic literature, on the other hand, assumes the following style of phrase structure that is derived by the operations Merge and Move:¹

One of the major differences between the structures in (1) and (2) is that in the latter the “minor” syntactic categories, such as determiner,

¹ In this structure, the movement of the subject DP out of the VP internal position is not expressed, and some details are suppressed.

complementizer, and tense, head their own projections and those “functional” categories (like D, C, and I) take their complement just in the same way as the “major” or “lexical” categories (like V and N) do. In other words, in the current theory every zero level category, whether a lexical or functional one, has the same internal structure in the sense that it heads a maximal projection and takes a complement.

Given this style of syntactic structure, one of the most important theoretical problems to be considered is, Grimshaw argues, the fact that not all of the head-complement relations are allowed. All the head-complement combinations in (3), which involve lexical heads, are possible except for some cases like N-DP that are ruled out by independent conditions such as case theory (cf. Abney (1987)).

- (3) V-PP, V-DP, V-NP, V-CP, V-IP, V-VP,
N-PP, N-DP, N-NP, N-CP, N-IP, N-VP

This indicates that fundamentally, lexical heads take complements of all syntactic categories. On the other hand, while some of the head-complement combinations where the head is functional are possible, others are not. The combinations in (4) are empirically attested, but those in (5) seem to be impossible.²

- (4) C-IP, I-VP, P-DP, D-NP
(5) I-NP, I-DP, I-PP, I-CP, D-VP, D-IP, D-CP, D-PP,
C-NP, C-DP, P-VP, P-IP, I-IP, D-DP

Functional heads, unlike lexical ones, are choosy about what they take as complements. How is this discrepancy between lexical and functional heads to be accounted for?

Grimshaw's answer to this question lies in her proposal of Extended Projection. The crucial notion involved in Extended Projection is the idea that “projections of lexical heads form larger projections of some kind with the functional heads above them” (p. 2). More specifically, in Grimshaw's framework the lexical head V forms an extended projection with the functional heads I and C, and the same category feature [verbal] is assigned to the three heads included in this extended projection. Similarly, the lexical head N forms an extended projection with the functional heads D and P that share the category feature [nominal] with the head N. Under this proposal, the hierarchical structure of CP-

² Grimshaw assumes that P is a functional head. See the discussion below.

IP-VP forms a single verbal extended projection. This is because IP and VP are complements to C and I, respectively, and at the same time both IP and VP are part of the CP projection, and therefore not only C but also I and V are (extended) heads of CP. The same holds for the nominal extended projection: NP is simultaneously a complement to D and part of the extended projection of PP; so N, for that matter D, is an extended head of PP.³

Notice that a head-complement relation included in a single extended projection is distinguished from the relation not included in an extended projection. For example, a VP and the direct object DP contained in it do not form an extended projection, because the head V and the complement DP differ in syntactic category. The relation of the head V and the direct object DP is one of *selection*, or a relation of theta-marking. On the other hand, the relationship between I and VP, for example, is one of *projection*. The head I can take only a VP complement, because the head has no ability to theta-mark the complement and thus needs an appropriate type of verbal projection, i.e. VP, that permits it to enter the verbal extended projection. To generalize, lexical heads like V and N can take any kind of complements that they select, whereas functional heads like C, I, D and P must take complements that they form extended projections with. This gives an explanation for the above-mentioned problem. As shown in (3), lexical heads take complements rather freely on the basis of a selectional or theta-marking relation. Functional heads, on the other hand, occur only with a very limited set of complements: The combinations listed in (4), which form appropriate extended projections, are permitted, but the combinations in (5) are impossible because they can form no appropriate relation of selection or projection. In this way, the theory of Extended Projection can offer a principled account to the fact that lexical and functional heads have distinct complement-taking properties.

Furthermore, an assumption of Extended Projection allows Grimshaw to offer an elegant solution to the so-called locality problems involving selection and agreement phenomena. For instance, consider the sentences in (6):

³ In Grimshaw's view, adjectives and adverbs each form their own extended projection with some degree elements, but her paper does not contain the relevant extensive discussions.

- (6) a. We requested that he leave/?left at 6.
 b. We thought that he left/*leave at 6.

The verb *request* selects a subjunctive (more or less obligatorily), and *think* an indicative. The mood distinction is assumed to be encoded on I, the head of IP, in the embedded clause. On this assumption, the matrix verb cannot locally select for the mood because the complement of the verb is the CP (where the same complementizer *that* is included in (6a, b)) and I is not the head of CP. That is, the maximal projection of CP intervenes between the V and the projection of I, giving rise to an undesirable case of nonlocal selection. Under Extended Projection, however, this locality problem disappears. Information about mood encoded on I (indicative or subjunctive) will project all the way to the embedded CP node because I is an extended head of the CP, and this information can be locally selected by the matrix verb.

Another case that Grimshaw's theory of Extended Projection gives an elegant account to is a phenomenon of pied-piping. When an interrogative-*wh* DP is dominated by a PP, the dominating PP can undergo movement as well as the *wh* DP. Thus the following alternatives are found:

- (7) a. Which stone did they find a note under?
 b. Under which stone did they find a note?

The natural hypothesis relevant here is that only a [+wh] phrase can move in an interrogative construction. Under this hypothesis, the fact that the entire PP can be moved as in (7b) follows straightforwardly from an assumption of Extended Projection. If the D is [+wh], this feature will project up to the dominating PP, because the PP is included in the nominal extended projection. Hence the PP will be [+wh] and eligible for *wh*-movement. In contrast, the DP or VP "pied-piping" is not possible, as shown below:

- (8) a. *A book about which topic did you read yesterday?
 b. *Read which book did you want to?

The crucial difference between (7) and (8) is that in (8) the *wh* feature will never be passed on to the DP or VP dominating the [+wh] PP or DP. This comes from the fact that the dominating DP or VP does not form an extended projection with the nominal complement with the *wh* feature. Thus the apparently idiosyncratic fact that only P seems to pied-pipe is explained in a natural way under Extended Projection. The fact of *wh* pied-piping, Grimshaw contends, provides strong evidence that PP-DP-NP form an extended projection.

Grimshaw presents further evidence for the assumption of Extended Projection including the data of number agreement, complementizer agreement, head-to-head movement, and so on. Her arguments on the basis of these pieces of evidence are fundamentally convincing, suggesting that Extended Projection provides us with a very effective and improved research program in which elucidation of language structure will be performed in a more principled and profitable way.

Before accepting Extended Projection as an improved theory of language, however, we need some examination of the fundamental points that Grimshaw has assumed. To this end, let us compare her framework with the standard theory of syntactic structure, and make clear the main differences between them. Notice that Grimshaw's Extended Projection and the standard generative theory do not differ in assuming that syntactic categories are divided into two groups, lexical and functional categories, and that the two categories are subject to the standard principles of X-bar theory in the same way. More concretely, the two theories have assumed the CP-IP-VP clause structure (Chomsky (1986a)) and the (PP-)DP-NP nominal structure (Abney (1987) and Fukui (1986)).⁴ On this assumption, the maximal projections of VP, IP and NP are taken as complements by the heads I, C and D, respectively. But in the standard theory, there has been no principled answer to the question why the projection of VP, for example, is selected by the head I, but not by another head like C or D. The fact that I selects VP has been only *a stipulation* that is not derived from another deeper principle. This is the essential point about which Grimshaw is critical of the standard theory. In Grimshaw's theory, on the other hand, the CP-IP-VP clause structure and the PP-DP-NP nominal structure come from the assumption that they form verbal and nominal extended projections. As noted earlier, in her analysis the relationship between I and VP, for example, is one of projection, not of selection.

An important question to be asked here is whether Grimshaw's assumption of the verbal and nominal extended projections is *an explanation*, not *a stipulation*, in the true sense. For her assumption to be a true explanation, it needs a deeper principle that strips it of a stipulative character. It seems that Grimshaw believes that her assumption of

⁴ Whether the PP node exists at the top of the nominal structure has been a controversial problem. In this paper, I will not touch on this problem.

extended projections is not a stipulation, and that the element that makes her assumption an explanation is the idea that the formation of extended projections depends on identity of category. Specifically, Grimshaw argues that V, I and C have an identical category feature [+V -N] and N, D and P another identical feature [-V +N]. In other words, the heads V, I and C form a kind of natural class in the sense that those heads are of the same verbal category, once we abstract away from the lexical/functional distinction. Similarly, the heads N, D and P form another natural class in that those belong to the nominal category.

Is Grimshaw's argument in this respect valid? Is there no problem in her claim that the heads V, I and C share the feature [+V -N] while the heads N, D and P have the feature [-V +N]? Asking such a question is very important in evaluating Grimshaw's theory of Extended Projection, because the answer to this question determines whether her theory is a true explanation or only a stipulation.

The crucial question to be asked is: To what extent is her featural characterization of the heads motivated? If her characterization of the heads V, I and C as sharing the [+V -N] feature and of the heads N, D and P as having the [-V +N] feature has a good independent motivation, the verbal and nominal extended projections that are defined as consisting of the former and latter heads, respectively, will gain the explanatory force that makes them more than just a stipulation, and her theory as a whole will be rated superior to the standard theory. If, on the other hand, her featural characterization of the heads has no independent motivation, her theory will be found no better than the standard theory.

Given that Grimshaw adopts categorial specifications like [+V -N] and [-V +N], the feature system that her theory depends on appears to be the traditional one, in which the four lexical categories are distinguished by having different values for the two binary distinctive features +/-V and +/-N in the following way (Chomsky (1970) and Jackendoff (1977)).

- (9)
a. Verb:	[+V -N]
b. Noun:	[-V +N]
c. Adjective:	[+V +N]
d. Preposition:	[-V -N]

In spite of the superficial resemblance, however, the feature system that Grimshaw assumes is not the traditional one. In fact, she cannot adopt a system like (9) at least for the following two reasons. The first

apparent reason is that under the system in (9) the preposition is characterized as $[-V -N]$, but one of the main assertions in Grimshaw's theory is that P(reposition) is a functional head that has the same feature as N and D do, i.e. $[-V +N]$.

The second reason is concerned with her adoption of the notion of category neutrality. She invokes the notion of category neutrality in analyzing constructions like gerunds and copula sentences. Let us look at her analysis of verbal gerunds. As is well-known, gerunds like *their studying this problem* have the external distribution of DPs and their subjects appear as possessives. Nevertheless they have the internal structure of VPs, taking adverbials, not adjectives, as modifiers, and assigning case like verbs. To capture this two-sided property of verbal gerunds, Abney (1987) proposes an analysis in which D takes a VP complement, approximately as in (10):

However, this structure is not legitimate under the framework of Extended Projection, since D and V are of different syntactic categories and therefore the VP and DP cannot form an extended projection. Grimshaw proposes an alternative analysis of verbal gerunds that is consistent with the principles of Extended Projection. Her analysis is based on the notion of category neutrality. She assumes that the *-ing* head of a gerund is N/V neutral. That is, “in a “verbal gerund,” the head that dominates *-ing*, and its projections, are not really verbal; they belong to a category which is neutral between V and N” (p. 32). Under this assumption the representation in (10) is reanalyzed as in (11), where a +Nom indicates a nominal element like D and +/-Nom an N/V neutral element.

In this structure the +Nom head takes the +/-Nom complement and forms an extended projection with it. This is possible because the functional head +Nom is *non-distinct* from the category neutral complement +/-Nom. Hence the existence of verbal gerunds is consistent with Extended Projection, Grimshaw argues.

Grimshaw's relying on category neutrality in the analysis of gerunds and other constructions means that she cannot adopt the traditional feature system demonstrated in (9), under which the two lexical categories Verb and Noun are conceived of as maximally opposing elements with the contrary values for both of the V and N features, and thus do not seem to allow an easy neutralization. For these reasons, we are led to the conclusion that the feature system assumed in Grimshaw's approach differs in important respects from the traditional one, although similar categorial specifications like [+V -N] and [-V +N] are used. What type of feature system does Grimshaw assume, then? Unfortunately, there is no extensive discussion of this question. She says very briefly that "[f]or the sake of concreteness, I will simply designate the feature complex of N, D and P as [nominal], and that of V, I and C as [verbal]" (p. 3). She adds that "[s]ome details are not important, ... provided that identity of category among the relevant heads is preserved" (ibid.). In this way, Grimshaw has not given any substance to the concept of the verbal feature [+V -N] or the nominal feature [-V +N].

If the features in question are not defined in any exact way, why is it possible to assert that the relevant heads have an identical feature? Judging from Grimshaw's statements cited just above, we must say that her featural characterization of heads is only an assumption, or a *stipulation*. Does her featural characterization have factual motivations, then? In other words, is there any good empirical evidence for the assertion that the functional heads I and C have the verbal feature in common with the lexical head V, while the functional heads D and P

share the nominal feature with the lexical head N? No serious arguments for this assertion are found in Grimshaw's account, with the exception of the following informal observation due to van Riemsdijk.

- (12) In support of identity, van Riemsdijk (1990) points out that articles are often similar in form to nominal entities such as clitics, pronouns and demonstratives, and that words which realize inflectional material associated with verbs tend to be verb-like in their properties, auxiliary verbs being an example. (p. 3)

The facts pointed out by van Riemsdijk are interesting, but those facts alone, with no theoretical analyses given, are totally insufficient to establish the assertion. We have to conclude that Grimshaw's account on the basis of the categorial identity is not *an explanation* in the true sense, as she believes it is.

As a possible alternative to Grimshaw's position, let us consider Baker (2003), who proposes an innovative way to define lexical categories. He seriously challenges the traditional convention shown in (9) above in which four lexical categories are defined by the features $+/-V$ and $+/-N$, and presents an alternative analysis including the following definitions of nouns and verbs:⁵

- (13) a. X is a noun if and only if X is a lexical category and X bears a referential index.
b. X is a verb if and only if X is a lexical category and X has a specifier.

As for nouns, Baker pays particular attention to their characteristic property that they can be the antecedents of pronouns and reflexives. He considers that this property of nouns comes from the semantic fact that "nouns and only nouns have *criteria of identity*, whereby they can serve as standards of sameness" (p. 95). That is, only nouns "have a component of meaning that makes it legitimate to ask whether some X is the same (whatever) as Y," and it is this lexical semantic property that qualifies nouns for the job of referring. Baker claims, on the basis of these lines of reasoning, that nouns are syntactically defined as bearers of a referential index, the syntactic annotation associated with the function of reference.

⁵ In Baker's (2003) theory, an adjective is negatively defined as a lexical category that is neither a noun nor a verb, and a preposition is characterized as a functional, not lexical, category.

As for verbs, on the other hand, Baker defines them as licensors of a specifier. That is, in his system, verbs and only verbs take a specifier as well as a complement, and assign thematic roles (Agent and Theme) to those specifier positions. Nouns and adjectives, in contrast, cannot take their own specifiers; when they have “subjects” in predicative constructions (like *Chris is a teacher/hungry*), they need a support of a functional head called Pred (for Predication), and those “subjects” are generated as the specifiers of this functional phrase. In this sense, the subject of verbs is an internal argument whereas the “subject” of nouns and adjectives is an external argument (one that is outside the maximal projections of the heads). Baker has produced ample evidence from a variety of languages in support of this structural difference between the subject of verbs and that of nouns/adjectives.

Given the substantial definitions of lexical categories in (13) instead of the traditional featural definitions with almost no real content, it seems to be possible to capture the relationship between the lexical and functional categories in a principled way. In fact, Baker (2003) makes the following suggestion about the relation between determiners and nouns:

- (14) Determiners are functional heads that for semantic reasons must take a complement that has a referential index and that (I assume) passes that referential index on to the DP as a whole. (p. 112)

This statement is intended to account for the fact that the English articles *the* and *a* take only NP complements, as shown:

- (15) a. John has the/an illness.
b. *John is the/a sick.

On Baker’s view, the determiner is a functional category *for* the noun because the former has a specific function of determining the referential property of the phrase and the latter is the only lexical category that has a referential index. If these characterizations of determiners and nouns are on the right track, we have a principled explanation for the fact that the functional head occurs only with a very limited set of complements, typically only with one. In the case of the head D, only the sequence of D-NP is possible, no other combinations like D-VP, D-IP, D-CP, and D-PP being permitted (see (4) and (5) above). Grimshaw attempts to accommodate this fact in her framework of Extended Projection. In Baker’s system, on the other hand, this fact follows naturally from the functional considerations noted just above.

How about the relationship between the functional head I and the lexical category V? The head I (or T) is taken as a functional category that encodes information about tense and mood. From a semantic point of view, interpretation of tense and mood requires an eventuality (an event or state) that is predicated of them. An eventuality is defined as an entity that involves happening of a kind (like action/situation) and participants (like agent/theme). Under Baker's system, the lexical category that can introduce eventualities is a verb, since only verbs (and the functional Pred) have their own specifier and assign thematic roles to that position. This means that the existence of a verb phrase is the precondition for interpretation of tense and mood. These considerations give an account to the fact that the functional head I can only take a VP complement, whereas such combinations as I-NP, I-DP, I-PP and I-CP are ruled out (see (4) and (5) again). A parallel line of explanation seems to be possible for the relationship between the functional head C and its complement IP. In this way, Grimshaw's observation that functional heads, unlike lexical heads, take only a restricted set of complements can be derived from the substantial definitions of the lexical categories and some "functional" characterizations of the functional heads, without recourse to the principles of Extended Projection.

Before ending this section, I want to make a brief comment on Grimshaw's analysis of verbal gerunds. She presents the following data that indicate that possessive subjects, but not the typical determiners, can combine with verbal gerunds.

- (16) a. Mary's/their eating cookies is enough to ruin anyone's diet.

- b. *One/the/an eating cookies is enough to ruin anyone's diet.

The difference in grammaticality between (16a) and (16b) remains unexplained in Grimshaw's analysis of gerunds illustrated in (11). There is no theoretical reason that true determiners like *one/the/a* are eliminated from the DP position (marked as [+Nom] in (11)). It seems to me that the data in (16) suggest an analysis in which the possessive subject of verbal gerunds differs in its status from that of common nouns (17a) and derived nominals (17b). The possessive subjects in (17) are analyzed in the standard theory as elements occupying the Spec position of the DP on top of the lexical NP.

- (17) a. Mary's picture
b. Mary's development

- (18) a. the/a picture

b. the/a development

As shown in (18), common nouns and derived nominals combine with the articles, which are normally assumed to occupy the D head position. In the case of verbal gerunds, on the other hand, the possessive subject is taken as an argument of the lexical verb. This is the reason that the true determiners are forbidden in (16b), since those determiners have no possibility of being generated as arguments of a lexical verb. On this analysis, verbal gerunds have the entire structure of VP, and this projection of VP is converted to D or N at the outermost shell, hence the nominal distributional properties of verbal gerunds. This is only a sketchy analysis. For it to be a solid account of gerunds, extensive discussion is necessary about the function of *-ing*, the origin of the possessive morphology and the like. Such a task has to be left to future research.

3. Form, Function and the Language Acquisition Device (Chapter 3)

In this chapter, Grimshaw introduces the principle of Canonical Structural Realization (CSR).⁶ The autonomy of syntax, the main thesis of generative linguistic theory, implies that syntactic form and semantico-cognitive notion will not be in one-to-one correspondence in any principled way. A given syntactic form, such as N and V, may correspond to a range of semantic types, and a given semantic type may have a number of different grammatical realizations. It is also an undeniable fact, however, that syntactic form and semantic type have a certain degree of correspondence. For instance, the following statement is intuitively appealing to some extent, although a lot of apparent counterexamples can be given rather immediately: The syntactic category of noun signifies a concrete object and the category of verb an action performed.

Grimshaw proposes to capture this type of loose correspondence between syntax and semantics/cognition in terms of CSR. Specifically, she argues that the CSR of a (concrete) object is Noun and the CSR of an action is Verb. On this view, a semantic concept [BOOK], for

⁶ The concept of CSR is often attributed to Chomsky (1986b). Grimshaw notes, however, that this is because Chomsky, while citing Grimshaw's work in footnote 35, does not mention that it is the source of the concept.

example, is canonically realized as a syntactic category of noun *book*, and a concept [READ] as a syntactic category of verb *read*; in other words, *book* is a canonical or unmarked noun and *read* is a canonical verb. On the other hand, the action noun *destruction* is not a canonical member of the category, and the verb *belong*, which signifies a state rather than an action, is characterized as a non-canonical or marked member of the verb.

Though Grimshaw's idea that a certain relationship between syntactic form and semantic type should be captured on the basis of CSR is very appealing itself, I believe that the most insightful aspect of her proposal lies in her position that CSR is a principle external to Universal Grammar. Grimshaw regards CSR as a guiding principle working in the stage of language acquisition. In her opinion, CSR is used by a child as a language learner in making a "prelinguistic" categorization of the primary data. It is supposed that at an early stage of linguistic development, a child uses semantico-cognitive categorizations like "object" and "action" as the basis for assigning syntactic categories to words.

This position has the following two consequences at least. One is that the first words a child learns should be those that are in accordance with the CSR principle: names of objects, action verbs, and so on. Or more generally, the first grammar a child (or the language acquisition device (LAD)) constructs is one in which "there is a one-to-one mapping between syntactic category or form and semantic or cognitive function" (p. 103). In other words, the child's grammar does not display autonomy as the adult's grammar does, in a way that nouns are names of objects and verbs names of actions.

The second consequence of the position that CSR is a principle external to UG is that the acquired grammar of an adult, on the other hand, has an autonomous syntax. That is, a stative verb like *belong* and an action nominal like *destruction* are contained in the adult's grammar, where it is apparent that a one-to-one correlation does not hold between syntactic form and semantic function. Grimshaw accounts for the process of an autonomous system being acquired, in the following way.

- (19) LAD can construct phrase structure rules for NP and VP by drawing on example sentences whose lexical items can be assigned category labels by the CSR principle. In so doing, LAD will in effect be establishing a set of structural generalizations governing the distribution of N, V, and so on.

These can be used as evidence for the analysis of any new categories (such as Det, Modal) for which no CSR is defined. The rules will also make it possible to assign category labels to words like *belong*: *belong* is a verb because it behaves like one with respect to the phrase structure rules. As for cases that would presumably be misanalyzed by the CSR principle, such as *destruction*, LAD will receive positive evidence about their categorization. (p. 101)

Learning (or evidence) is required for acquiring words like *belong* and *destruction* in which the one-to-one correlation does not hold. The syntactic distributions of the words in question constitute positive evidence for acquiring them. Notice that in a stage of acquiring such “non-canonical” or “marked” words, CSR does not work, because it is a principle of the type that applies unless there is evidence to the contrary. As the result of incorporating a substantial amount of “non-canonical” or “marked” items, the adult’s grammar obtains the property of an autonomous system.

The point is that UG itself is maintained in the simple form; it has the strongest version of the autonomy thesis in that it makes no reference to concepts like “object” and “action,” which are general cognitive notions and not specific to language. The theory of LAD, on the other hand, subsumes principles like that of CSR, which relate cognitive capacity and UG. These considerations give the model of LAD portrayed roughly in (20).

TGR: Theory of Grammatical Representation

EM: Evaluation Metric

CC: Cognitive Capacity

This model claims that language acquisition (or development) is not simply a function of data + UG (TGR + EM), but of data + UG + the child’s cognitive capacity. That is to say, nonlinguistic principles like CSR that pertain to the general cognitive domain rather than to the theory of grammatical representation or an evaluation metric play a significant role in language acquisition.

Given the model equipped with the cognitive domain that accommodates a non-grammatical principle like CSR, we have a natural way to

account for both the fact that we have an intuition that grammatical categories like N and V correspond in some essential respect to semantico-cognitive notions like object and action, and the fact that at the same time grammatical definitions of those categories are not constrained in any exact way by such functional notions.

Another domain in which this model is highly effective, Grimshaw notes, is a theory of complement selection. Grimshaw (1979) convincingly argues that requirements imposed by verbs on their complements have to be expressed in terms of both syntactic subcategorization and semantic selection. For example, the verb *know* is subcategorized for NP and S', and it selects the semantic types of Question (Q), Exclamation (E) and Proposition (P). Some possibilities are illustrated below.

- (21) a. I know the answer. [__NP] <__Q>
 b. I know who he is. [__S'] <__Q>
 c. I know what a fool he is. [__S'] <__E>
 d. I know that he is here. [__S'] <__P>

The few example sentences in (21) are enough to show that the syntactic category of a complement and its semantic type are not in a one-to-one correspondence with each other. The semantic type Q is realized syntactically as NP and S', and the syntactic category S' covers the three semantic types of Q, E and P. Consequently, subcategorization and semantic selection need to be specified in an independent way. This is another instance of an autonomous system.

The claim that subcategorization and semantic selection are autonomous predicts that all possible combinations of the two should be realized in principle. This prediction is correct over the wide range of data, but there is a class of idiosyncrasies that cannot be explained by the autonomous view. Grimshaw observes that although English has predicates like *wonder* that take only *wh* questions and predicates like *ask* that take both *wh* and NP questions, there are no predicates that take NP questions but not *wh* questions. A predicate of the third type could have the following lexical entry, and there is no principle in the theory of complement selection that prohibits this combination of syntactic category and semantic type.

- (22) Predicate: [__NP] <__Q>

Nevertheless we do not find this type of predicate in actuality. This fact indicates that the set of predicates that take NP complements of question is a proper subset of the predicates that take *wh* forms. But

this is not explained by the formal theory of grammar with the autonomous thesis alone.

Grimshaw proposes to resolve this problem by resorting to the notion of CSR embedded in the model of language acquisition. It seems plausible to assume that if a predicate selects a semantic type, it is subcategorized for the CSR of that type. It is also plausible to assume that the CSR for the semantic types P, Q and E is S'. Given these assumptions, the subset relation in question is explicable in the following way. Suppose that LAD receives evidence that a predicate takes NP questions but no evidence that it takes *wh* questions. In such a case, the database will involve (23a) but not (23b).

- (23) a. I asked John the time.
b. I asked John what the time was.

In this case LAD posits a lexical entry like that in (24a) for the verb *ask*, but LAD also knows that the CSR of Q is S'. Thus, by the principle in which a predicate is subcategorized for the CSR of a semantic type that it selects, LAD adds [__S'] to the entry without positive evidence, giving (24b).

- (24) a. *ask*: [__NP] <__Q>
b. *ask*: [__NP/S'] <__Q>

Suppose, on the other hand, an opposite case in which LAD has evidence that a predicate takes *wh* questions but no evidence that it takes NP questions; only data like (25a) are available. In this case only [__S'] and <__Q> can be posited, as in (25b).

- (25) a. I wondered what the time was.
b. *wonder*: [__S'] <__Q>

Notice that the subcategorization frame of [__NP] is not added to the entry in (25b), because NP is not the CSR of Q. Thus predicates that take *wh* questions but not NP questions are possible, as the case of *wonder* indicates. On the other hand, predicates that take NP questions but not *wh* questions are impossible, because *wh* complements are necessarily encoded on the basis of the CSR principle. In this way, the subset relation follows.

Grimshaw's proposal of the CSR principle embedded in the acquisition model is very insightful, and it seems that this principle is applicable to a wide range of phenomena that have raised rather recalcitrant problems for the traditional analysis. In this sense, her proposal has great potential for providing the autonomous theory with improved and expanded coverage of the empirical data. In what follows I will point

out two possible cases of its application.

First, let us consider a case of dative alternation, which is illustrated by the following examples.

- (26) a. I threw John the ball.
- b. I threw the ball to John.
- (27) a. John taught Mary French.
- b. John taught French to Mary.

As is well known, although a double object (DO) frame like those in (26a)/(27a) and a prepositional (P) frame like those in (26b)/(27b) have a fairly similar meaning, the two frames are not exactly synonymous. A number of researchers point out that the DO frame, but not the P frame, has a semantic implication that the transfer of possession denoted by the verb is successful (Green (1974), Oehrle (1976), Jackendoff (1990), Baker (1997) and others). Thus, (26a) suggests that the ball actually reached John, whereas (26b) does not. Similarly, (27a) suggests, more strongly than (27b), that Mary actually learned (some amount of) French. Furthermore, the DO frame is subject to the animacy restriction that the first object must be a living thing (including an organization or corporate body) that can function as a recipient or possessor, as shown below.

- (28) a. John sent Bill/*New York the package.
- b. John sent the package to Bill/New York.

One way to capture this semantic contrast between the DO and P frames is to assume that the first (or indirect) object of the DO frame receives an interpretation as an affected Goal, whereas the prepositional phrase of the P frame has an interpretation as a non-affected Goal. Under this interpretation, an affected Goal corresponds to a thematic role like Recipient and Possessor, in the sense that it denotes an entity that is physically or psychologically influenced by receiving something, while a non-affected Goal only represents a physical place to which or toward which some entity or entities move(s). The following generalizations seem to hold:

- (29) a. An affected role of Recipient or Possessor is realized syntactically as the DP argument.
- b. A non-affected role of Goal is realized syntactically as the PP argument.

An explanation based on these generalizations applies successfully to data like (26)–(28) above. The DP arguments in the (a) sentences exhibit a realization of the role of Recipient or Possessor which brings

about an interpretation that they actually get a Theme object like a ball or some knowledge and therefore are incompatible with a locative expression like *New York*. On the other hand, the prepositional phrases in the (b) sentences are taken as a realization of the role of (simple) Goal with no specific implications and are compatible with a place noun.

Notice, however, that this type of explanation does not necessarily hold good for the entire range of data. Consider the following examples:

- (30) a. John gave Mary a book.
- b. John gave a book to Mary.
- (31) a. Mary donated the van to us.
- b. Mary donated 1,000 dollars to the orphanage.
- (32) The car belongs to Mary.

With the verb *give*, the P frame in (30b) as well as the DO frame in (30a) entails that the book came into Mary's possession. This entailment, which seems to be due to the lexical nature of the verb, runs counter to the generalization in (29a); *to Mary* in (30b) receives an interpretation of an affected Goal (Recipient or Possessor) in spite of the fact that it is a prepositional phrase. Similarly, the prepositional phrases in (31) denote people or organizations that received donations. This suggests that the PP argument of the verb *donate* has the role of Recipient or Possessor, against the above generalization. The sentence in (32) with the verb *belong* also shows an instance in which the *to* prepositional phrase exhibits a role of Possessor, though it does not involve the meaning of transfer.⁷ These examples indicate that the generalization in (29a) is not an absolute principle.

How about the generalization in (29b)? It seems that a non-affected role of (simple) Goal is realized as a PP in most cases. Consider examples of a transitive verb like *enter* and *reach*, however.

⁷ An anonymous reviewer has thrown a doubt on the validity of the arguments based on the example in (32) and the sentences in (33) just below, because those sentences are irrelevant to dative alternation cases. It is important to note, however, that the generalizations in (29) are not intended only for an account of dative constructions. Thematic roles like Recipient, Possessor or Goal appearing in (29) exhibit general notions that are supposed to apply to a broader range of linguistic phenomena. See the general principles in (35).

- (33) a. John entered the room.
 b. John reached the station.

The postverbal elements in (33), which denote a physical place which John came into or arrived at, are thematically characterized as non-affected elements, in spite of the fact that they appear as DPs.⁸ This indicates that there are some examples that do not conform to the generalization in (29b).

The existence of a body of counterexamples to the generalizations in (29) tells us that those generalizations are not solid grammatical principles with perfect generality. Nevertheless, those generalizations cannot be simply discarded as groundless stipulations, because without them the semantic contrast observed in dative alternation data like (26)–(28) would remain a very difficult problem to deal with, and some collateral evidence for an existence of such principles is obtained by looking at other constructions including locative alternations like (34).

- (34) a. John loaded the truck with hay.
 b. John loaded hay on the truck.

As is well known, when the location argument appears as the direct object as in (34a), it receives an interpretation of an affected Theme and the sentence exhibits a “holistic” effect (Anderson (1971), Schwartz-Norman (1976) and others). On the other hand, when the location is expressed as the object of a preposition as in (34b), it does not necessarily have such an interpretation. This contrast would suggest an existence of general principles like (35). The principles in (29), which are essentially parallel in spirit to (35), would be regarded as a subcase of these more general ones.

- (35) a. An affected thematic role is realized as the DP argument.
 b. A non-affected thematic role is realized as the PP argument.

Given these considerations, a natural supposition is that the statements in (29) are more appropriately regarded as principles of CSR in the sense of Grimshaw. That is, the generalizations in (29) do not serve as solid grammatical principles, but as functional ones that are used in the process of language acquisition. On this view, the principles predict

⁸ To be exact, the object DPs in (33) are characterized as having the role of Place or Location rather than the Goal.

the semantic contrast between the DO and P frames in “canonical” dative alternation constructions like (26)–(28), but they do not govern the entire grammatical behavior of the constructions. Once the datives are learned and the two similar, but distinct, constructions of the DO and P frames are established in the autonomous system of grammar, those constructions are not required to be in a one-to-one correspondence to the thematic differences in affectedness. Hence “non-canonical” P frames like (30b) and (31) can appear, in which the prepositional phrase realizes the affected role of Recipient or Possessor, against the principle in (29a), probably due to the lexical-semantic nature of the verbs *give* and *donate*. In this way, an assumption of mapping principles in a CSR style will lead to an elegant resolution of the recalcitrant semantic problem involved in the dative alternation construction.

Another candidate to which an account based on CSR principles applies effectively seems to be a lexical division of verbs into unaccusatives and unergatives. The so-called Unaccusative Hypothesis claims that there are two classes of intransitive verbs, unaccusatives and unergatives (Perlmutter (1978), Burzio (1981, 1986), Rosen (1984), Levin and Rappaport Hovav (1995) and others). An unaccusative verb is syntactically defined as an intransitive verb that takes an internal argument but no external argument, while an unergative verb is one that takes only an external argument. On the semantic view, on the other hand, the two classes of verbs are characterized on the basis of semantic notions like (the lack of) agentivity.⁹ The single argument of unergatives tends to be agentive, while that of unaccusatives tends to be a theme or a patient or an undergoer. Thus, an Italian agentive verb *telefonare* behaves as an unergative, and a non-agentive verb *arrivare* as an unaccusative.

- (36) a. Mario ha telefonato.
 ‘Mario telephoned.’
 b. Mario è arrivato.
 ‘Mario arrived.’

In (36) the unergative-unaccusative distinction is reflected by auxiliary

⁹ The relevant literature involves some other views. Tenny (1987) argues that the crucial semantic factor determining the dichotomy in question is telicity, and Levin and Rappaport Hovav (1995) claim that the notion of internal and external causation is involved in the distinction between unergatives and unaccusatives.

selection. Other phenomena that are sensitive to this distinction, i.e. unaccusative diagnostics, are provided by *ne*-cliticization in Italian, impersonal passives, and prenominal passive participles.

Although there seems to be a certain correspondence between the semantic notion of agentivity (or telicity) and the syntactic notion of unaccusativity, the correspondence is not of a one-to-one character at all. A good number of “unaccusative mismatches” are observed within and across languages. That is, verbs with similar meanings in and across languages can be classified differently with respect to unaccusativity. A well-known case is the fact that in Italian, a verb of bodily process *russare* ‘snore’ manifests unergative properties, whereas another verb of bodily process *arrossire* ‘blush’ manifests unaccusative properties. A cross-linguistic case is provided, for example, by the fact that the verb corresponding to *die* behaves like an unaccusative verb in Italian, but like an unergative verb in Choctaw (Rosen (1984)). These kinds of mismatches are amply observed and extensively discussed in the literature (see Alexiadou et al. (eds.) (2004) and the references therein). In this paper we are not concerned with examination of individual data any more, but a significant observation that has emerged from the accumulation of empirical and theoretical researches seems to be this: The mapping of verbs with the typical agent argument or the typical undergoer argument to unergative or unaccusative syntax is rather consistent within a language and is largely invariant across languages, whereas the mapping of non-typical verbs with an intermediate character with respect to agentivity and/or patienthood to the syntax is not consistent and varies cross-linguistically.

This situation fits in with an explanation based on CSR. The relevant CSR principles should be something like (37):¹⁰

¹⁰ The principles in (37) are reminiscent of Dowty’s (1991) prototypical approach to argument selection. He posits the following principle in terms of the two proto-roles, i.e. Proto-Agent and Proto-Patient.

(i) Argument Selection Principle:

In predicates with grammatical subject and object, the argument for which the predicate entails the greatest number of Proto-Agent properties will be lexicalized as the subject of the predicate; the argument having the greatest number of Proto-Patient entailments will be lexicalized as the direct object.

- (37) a. The semantic role of agent is realized as an external argument.
 b. The semantic role of patient is realized as an internal argument.

The child acquiring a language introduces the syntax of unergative or unaccusative on the basis of the principles in (37). In this stage, the semantic notion of agent or patient has a one-to-one correspondence with the syntactic distinction between unergatives and unaccusatives. Once the unergative and unaccusative syntax is established in the autonomous system, however, this one-to-one correspondence need not hold. When non-prototypical verbs with respect to agentivity and patienthood are acquired, their classification is determined not by the canonical principles in (37), but by some complex, less principled considerations based on relative judgment. Consequently, the class of unergatives includes verbs that are not agentive in the exact way, and that of unaccusatives includes verbs that have the apparent non-patient argument. It seems reasonable to argue that in the acquisition of non-prototypical verbs with an intermediate character, inconsistencies and cross-linguistic variations with respect to unaccusativity tend to come about, because acquisition of those verbs needs to take into consideration some contingent factors like volitionality, causality, and stativity. In this way, the CSR approach can provide a promising way of accounting for the so-called unaccusativity puzzle.

By citing the cases of dative alternations and unaccusativity, I have shown that Grimshaw's proposal of the CSR principle embedded in the acquisition model has great potential for resolving a variety of problems that have been difficult to deal with in terms of purely grammatical principles alone. I conclude that the CSR approach deserves to be discussed more extensively and in detail in generative syntactic research.

4. Conclusion

In this review article, I have taken the first and third papers of Grimshaw (2005). As for the former, I have pointed out that her theory of Extended Projection is not *an explanation* in the true sense, due to the fact that her arguments do not involve enough discussion of syntactic categories like noun and verb. As for the latter, I have shown that her CSR approach has great potential for providing the autonomous theory with improved explanations and more expanded coverage of the

empirical data.

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