

# Specifiers, Not Heads, Determine Phrase and Clause Type

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## Abstract

The idea that the head of an expression determines the type of that expression is a deeply entrenched axiom of modern linguistics. It is the basis of X-Bar Theory and Dependency Grammar and a key notion underlying Head Driven Phrase Structure Grammar (HPSG) and Generalized Phrase Structure Grammar (GPSG). It has a long history dating back at least to Bloomfield's notion of endocentric constructions. There are only a few criticisms of this important axiom. Very different linguistic theories accept it as central (e.g. Minimalist Program and Transformational Grammar, Dependency Grammar, HPSG and to a lesser extent GPSG).

Despite the wide acceptance of this axiom within modern linguistics, it is argued in this paper that specifiers, not heads, determine the grammatical type of expressions in which they occur. After considering the evidence for treating specifiers as the phrase and clause type determining elements, some theoretical and computational ramifications of this position will be considered.

## Introduction

The idea that the head of an expression determines the type of that expression is a deeply entrenched axiom of modern linguistics. It is the basis of X-Bar Theory (Chomsky, 1995; Jackendoff, 1977) and Dependency Grammar (Hudson, 2000) and a key notion underlying Head Driven Phrase Structure Grammar (HSPG) (Sag & Wasow, 1999) and Generalized Phrase Structure Grammar (GPSG) (Gazdar, Klein, Pullum & Sag, 1985; Borsley, 1996). It has a long history dating back at least to Bloomfield's (1933) notion of endocentric constructions. However, it should be

noted that Bloomfield's endocentric constructions contrast with exocentric constructions where the head does not project the type of the expression—although X-Bar Theory and Dependency Grammar exclude this possibility. There are only a few criticisms of this important axiom (Pullum 1991; Borsley & Kornfilt, 2000; Malouff, 2000; Cann, 1999; Dixon, 1991). Very different linguistic theories accept it as central (e.g. Minimalist Program and Transformational Grammar to the extent they are based on X-Bar Theory, Dependency Grammar, HPSG and to a lesser extent GPSG, Autolexical Grammar, Lexical Functional Grammar (at least for English).

Despite the wide acceptance of this axiom within linguistics, it is argued in this paper that specifiers, not heads, determine the grammatical type of expressions in which they occur. I use grammatical type here in preference to syntactic type to allow for that type to include semantic content.

Specifiers are short, frequently occurring functions words. They combine with heads to form phrases and clauses. The classic specifier is the determiner. It combines with a head noun to form a noun phrase. It functions to specify the referential status (e.g. definite or indefinite) of a noun phrase. In this paper, the term "specifier" is extended to include all function words and morphological markers that establish the referential status of expressions. The specification role transcends the borders of syntax and morphology. The range of specifiers includes determiners, quantifiers, inherently specified pronouns, proper nouns and deictic words, possessives, the first auxiliary or modal verb, the infinitive marker "to", morphological marking of tense (and perhaps aspect) on verbs and plurality on nouns, and complementizers, relativizers (i.e. relative pronouns), and wh-words. All these grammatical categories and morphological

markers are involved in specifying the referential status of expressions.

Within X-Bar Theory, specifiers are often defined configurationally as a daughter of the maximal projection which is sister to a non-minimal head. However, there is also some recognition of the referential function of specifiers. For example, Speas (1990, p. 37) notes that in one use "...the term 'specifier' refers to closed-class elements such as degree words and determiners, which in some intuitive sense specify the reference of the phrase" but goes on to say that "this semantic sense of the term 'specifier' is irrelevant." Stowell (1989) suggests that "the special relation between D [determiner] and N [noun] might be a function of the status of CNPs [Common Noun Phrase] as referential expressions." Chomsky (1995, p. 240) suggests that "D may be the locus of what is loosely called 'referentiality'." Although, Stowell and Chomsky now treat D as the head of DP and not a specifier, accepting Abney's (1987) DP Hypothesis, others (e.g. Ernst, 1991; Jackendoff, 2002) continue to argue for the treatment of D as a specifier.

More typically, the configurational definition of specifiers is accepted and they are considered to be purely syntactic, making little or no contribution to meaning. I have even heard a transformational grammarian argue that the purely syntactic nature of specifiers provides evidence for the independent reality of syntax. In this paper, it is argued that specifiers have an important referential function that is the major determinant of phrase and clause type.

Within computational linguistics, especially statistically motivated approaches, the meaningfulness of specifiers is similarly disparaged and they are often put on stop lists that eliminate them entirely from analysis. In this paper, it is argued that specifiers provide significant grammatical and functional information not typically available from other linguistic elements.

## 1 Evidence

As evidence that it is the specifier and not the head that determines the type of a phrase or clause consider

**The dance; to dance**

**The drink; to drink**

**The kill; to kill**

**The splash; to splash**

**The farm; to farm**

**The cat; to cat (about)**

**The dog; to dog (someone)**

**The father; to father**

It seems clear in these examples (that the specifier—either the determiner "the" or the infinitive marker "to"—determines the grammatical type of the expression. It is not the heads that do this since the heads are the same word form in each contrasting pair. Thus, the specifier "the" picks out an objective (or noun) sense of "dance" and "drink" in forming a noun phrase, whereas the specifier "to" picks out an action (or verb) sense of these words in forming an infinitive phrase (or clause). Further, even in the case of words which have a strong action preference, the specifier "the" forces an object (or noun) reading as in the case of "the kill" or "the splash." That is, "the" has the effect of objectifying the following head, often forcing action words to be interpreted as one of the typical participants in the action, rather than the action itself. Likewise "to" has the effect of relationalizing the following head. Thus, the words "cat" and "dog"—words which are almost always used in expressions that refer to particular kinds of objects—are relationalized by "to" and the base meanings of "cat" and "dog" as categories of objects are extended to support reference to relational attributes of those objects and not the objects themselves.

The ability of a word which is typically used as a verb to occur after a determiner, and a word which is typically used as a noun to occur after the infinitive marker "to" is highly, if not fully, productive. Where a contrasting noun or verb form exists, it is less acceptable as in

**The argument; \*to argument**

**\*The argue; to argue**

Pinker's (2000) argument that irregular past tense forms block the use of regular forms may be extended to cover such cases. That is, if a distinct noun form is available, it will block the use of the corresponding verb form in a noun phrase and vice versa. One can, of course, construct examples

that seem to be acceptable, if odd, as in “I don’t like to argument with you”. It is part of the creative use of language to use words outside their typical grammatical context. Clark’s (1983) nonce expression “he porched the newspaper” which I take to mean “he threw the newspaper on the porch” is a classic example. Or the language learner may lack the appropriate verb form and resort to the verbal use of a noun form as in the example above. It also appears to be the case that verbs expressing an instantaneous action are more easily objectified and used after a determiner (e.g. “the kick”, “the hit”, “the bite”) than other verbs. Verbs like “argue” which do not express instantaneous actions are less acceptable following a determiner.

In what Dixon (1991, p. 337) calls the “give a verb,” “have a verb” and “take a verb” constructions, he notes “I have examined about 700 of the most common English verbs and about one-quarter of them can occur in at least one of the constructions.” He (ibid. p. 339) defines the form of such constructions as “the base form of the verb...as head of a post-predicate NP, preceded by the indefinite article a ~ an.” Note especially Dixon’s description of the expression following the main verb as an NP which only follows if the specifier (i.e. indefinite article) determines the phrase type.

Pullum (1991) argues that in expressions like

**Your** giving me money is nice

the NP “your giving me money” is headed by the VP “giving me money.” He limits this construction to expressions in which a possessive (e.g. “your”) is followed by a VP with the verb being a present participle. In such expressions, called “poss-ing” constructions by Borsley & Kornfilt (2000), it is suggested here that the possessive fills both the role of specifier of the overall expression and the role of subject of the embedded VP. In general, possessives fill multiple referential roles as in

My book

where the possessive pronoun “my” contains an inherent reference to the speaker in addition to specifying the referential status of the overall

expression. This dual specifying role capability appears to license the poss-ing construction.

Several authors have provided alternatives to Pullum’s treatment of poss-ing constructions. Borsley & Kornfilt (2000) argue for the existence of “mixed extended projections.” Malouf (2000) argues for the possibility of mixed category constructions which are at once NPs and VPs. All these treatments require relaxation of the idea that the head always projects the type of the parent node, but do not make the leap to suggesting that the specifier fills this role.

Cann (1999) comes somewhat closer to the position espoused in this paper in arguing that specifiers are secondary heads whose features combine with the features of the head in the formation of a new category which is not, strictly speaking, a projection of either the primary or secondary head.

The suggestion that the head determines the type of an expression can only be maintained through a circular argument that the head is necessarily of the same type as the embedding expression whenever a difference in type is apparent. Consider

The **running** of the bulls  
The **injured** were taken to hospital  
The **sad** are in need of cheering up  
The **red** is nice  
The **murder** was shocking  
The **cheering up** of the sad  
The **buy out** of the corporation

The status of the head as the determinant of a noun phrase can only be maintained if we insist that the heads in these examples are nouns. That is, since we know that these expressions are noun phrases (because of the determiner), their heads are necessarily nouns and these nouns determine the type of the expressions. This circular argument has the unfortunate side effect of allowing most any word or expression to be a noun and clouds consideration of the important notion “part of speech.” Forced into this position by accepting as axiomatic that all expressions are endocentric, Hudson (2000) suggests that “reading” in “he passed the exam by not reading anything quickly” is both a noun and a verb.

If specifiers and not heads determine phrase and clause type, then how can they be optional in

many expressions? Some words are inherently specified and function to combine the head and specifier roles—obviating the need for a separate specifier. This is true of pronouns, proper nouns, and deictic words. Also, the larger context may redundantly encode the referential type of an expression making the need for a specifier optional. Thus, the complementizer “that” (a specifier) in “I believe (that) he likes you” is optional since the verb “believe” subcategorizes for a clausal complement. The relative pronoun (another specifier) is also optional in some forms of relative clause. For example, the relative pronoun “which” in “the book (which) I gave you” is optional. In this case, the occurrence of the clause “I gave you...” following the subject “the book” establishes the clause as a relative clause and allows the specifier to be optional.

On the other hand, the optionality of specifiers is less rampant than is assumed under some analyses. For example, on some analyses, “red” in “the red book”, is assumed to have the status of an AP (adjective phrase) with the optional specifier not appearing. But if “red” is not the maximal projection of an AP, being instead just a modifier of the head “book”, then there is no optional specifier. In fact, it is not clear what the “optional” specifier could be in this example. Sadler & Arnold (1994) argue that attributive adjectives and adverbs that modify them (e.g. “very” in “the very red book”) are both bar zero. On their analysis, since they are not maximal projections, there is no missing specifier. In general, the assumption that all non-head sisters are maximal projections (e.g. Jackendoff, 1977) results in a proliferation of phrase types where the specifier is at best optional, if even possible. In this regard, the suggestion that degree adverbs are specifiers in APs within NPs can be seen as an attempt to find something that can be an optional specifier where no specifier is possible (or needed).

Likewise, for the complementizer “that”. In a declarative sentence, the complementizer is not optional. Adding a complementizer would make the sentence ungrammatical as in

\*That the man hit the ball.

The complementizer is only used in contexts where a complement clause is expected and where

the complement establishes the grammatical type of that clause.

Gerunds are perhaps the best example of phrases that typically occur without a specifier. Consider

Going to the movies is fun

How does the expression “going to the movies” come to be the nominal subject of “is fun”? The fact that this expression occurs in subject position may license its use. On the other hand, there is a correspondence between this expression and

To go to the movies is fun

which contains the explicit specifier “to”. This correspondence suggests that the progressive morpheme “-ing” has some of the characteristics of a specifier. However, neither the gerund nor the infinitive clause is of the appropriate grammatical type to occur as the subject of “is fun” and it must be the subject position of these expressions which licenses their use as subject complements.

If heads do not determine phrase or clause type, what do they do? They determine the semantic category of object or situation to which the phrase or clause may be used to refer. For example, in “the murder,” “murder” determines the semantic category that “the murder” may be used to refer to, whereas, “the” determines the phrase to be an object referring expression—despite the fact that “murder” is an action category. Likewise in “he is sad,” “sad” determines the semantic type of situation that the expression may refer to, whereas “is” determines the expression to be a situation referring expression. Thus, the specifier determines the referential type of an expression, whereas, the head determines the semantic type to which the expression may be used to refer. It is referential type (e.g. object referring expression or situation referring expression) which corresponds most closely to the syntactic notion of phrase (e.g. noun phrase) and clause type. That is, it is the specifier and not the head which projects the syntactic type of the expression.

## 2 Theoretical Implications

Recognizing the important role of specifiers leads immediately to a revision of X-Bar Theory that

resolves some important issues. The confusion over whether Tense or V is the head of a TP (i.e. tensed phrase) results from the assumption that the head projects the category of TP. But if this is true, then Tense must be the head of TP as is assumed by Chomsky (1995). On the other hand, V is the central semantic category determining element of TP, with Tense filling a more peripheral role. That is, V has a prominence that does not hold for Tense. This leads Jackendoff (1977, 2002) to assume that V (projected thru VP) is the head of TP and not Tense. Recognizing that the role of a specifier and the role of a head are different, it is easy to see that Tense projects the type of TP, although V is the central semantic element. Similarly, for COMP. If COMP projects the type of CP, then COMP must be the head according to Chomsky (1995). But COMP is clearly a peripheral (and optional) element of CP with V (projected thru TP) being the central element. This conflict is resolved by making COMP the specifier which fulfills a peripheral, but type determining role, while making V (projected thru TP) the head or central element of CP.

Failure to recognize the type determining role of specifiers leads Chomsky (1995, p. 246) to claim that “the” is the head of the expression “the book” contrary to most traditional treatments. This follows from his assumption that only the features of the head project and since it is the determiner “the” which determines the phrasal category DP, “the” must be the head of DP.

However, since categories like DP and NP are eliminated in the minimalist program in favor of “bare” representations, Chomsky (ibid.) represents “the book” with a bare representation in which the lexical item “the” projects.

Chomsky notes that “the” and “book” are stand-ins for collections of features in bare representations. Unfortunately, the bare representation is syntactically (not to mention semantically) inadequate since it fails to project the agreement feature of the traditional head “book”. The problem stems from the assumption that only features of the head project. If we allow features of both the specifier and head to project then “the” can project the feature that Chomsky (1995, p. 240) calls “referentiality” and “book” can project the agreement feature as well as semantic category features. Chomsky (1995, p.

244) excludes the possibility of both the specifier and the head projecting features arguing that “the union will be not only irrelevant but ‘contradictory’ if  $\alpha$  [specifier] and  $\beta$  [head] differ in value for some feature, the normal case.” There is certainly a possibility that features will conflict as in

These book are funny  
A books is funny

where the feature [ $\pm$ singular] is in conflict. However, in the normal case, this feature will not conflict. Whether or not other features will conflict in the normal case depends entirely on the feature set. Chomsky is probably thinking about features like [ $\pm$ N] and [ $\pm$ V] in suggesting the possibility of conflict since the binary oppositions of these syntactic category features are mutually exclusive. If we add the syntactic category feature [ $\pm$ D] for determiner, a conflict will result if both the specifier and the head project features and [+D] is considered inconsistent with [+N] or [+V]. Given syntactic category features and assuming they project, some mechanism for avoiding or resolving conflicts will be needed. Despite Chomsky’s suggested treatment of “the book”, he makes it clear that he intends features like agreement to be available for checking at the appropriate level. Thus, he allows non-head features to “raise” to the appropriate level and thereby provides a mechanism for non-head features to project. Given this feature raising capability, a better bare representation for “the book” would allow features of both “the” and “book” at the parent node. Cann (1999) proposes that the features of the specifier (what he calls a secondary head) and the features of the head unify in the formation of the parent node. With respect to syntactic category features he (ibid. p. 25) notes that “if, as sometimes suggested, functional categories are not inherently verbal or nominal, then incoherence will not normally arise where one of the labels is a functional expression.”

Note that if we allow semantic category features for representing the meaning of expressions as is done in HPSG, Chomsky’s position is tantamount to suggesting that only the meaning of the head is projected. If we don’t allow something like semantic category features, then it is unclear how meanings can be compositionally constructed in a minimalist approach.

Hudson's (2000) solution to the treatment of DP's is equally striking to that of Chomsky. Since determiners, common nouns, proper nouns and pronouns can all head DP's in his approach to Dependency Grammar, he proposes to "fix the classification so that all four head-types...belong to the same word class, namely Noun. This involves classifying determiners as pronouns (not the other way round!), and pronouns as nouns." Hudson is forced into this position since there are no levels (akin to the levels in X-Bar Theory) in his Word Grammar variant of Dependency Grammar. All expressions headed by a noun are themselves nouns and, conversely, all expressions which are nouns must be headed by nouns.

The counter-intuitive syntactic treatments of Chomsky and Hudson can be avoided by according the specifier its proper role as the determinant of the phrase or clause type of an expression. This means having at least two levels of representation contrary to Hudson: unspecified head, and specified head, but requires no commitment beyond these two levels and in this respect accords better with the two levels posited in HPSG than with Word Grammar's single level or X-Bar Theory's typically three levels. At the unspecified level, the head does in fact determine the type of an expression. For example, a modifier combines with a head to form an expression which has the same type as the head. In expressions lacking a specifier which are not inherently specified, the type of the head will carry more weight in determining the status of the overall expression as a referring expression—although unspecified referring expressions are assumed to be atypical.

The suggestion that there are two levels of representation—specified and unspecified expression—ignores the relationship between heads and complements which is accorded its own level in X-Bar Theory. The relationship between a specifier and its head is referential in nature, whereas the relationship between a head and its complements is relational in nature. These two dimensions of meaning are largely orthogonal (though not entirely) and their conflation in X-Bar Theory leads to certain overgeneralizations (e.g. assuming that nouns which are nonrelational take complements). The inability to provide an adequate treatment of conjunction in X-Bar Theoretic terms is another example of the

conflation of relational meaning with referential meaning. Conjunction is an essentially relational notion. Trying to map a relationally conjoined expression to the referential relationship between a specifier and its head is at best misguided. The treatment of relational meaning and the relationship between heads and complements is not further considered in this paper due to lack of space. A linguistic theory called Double R Grammar (for Referential and Relational Meaning) is under development which explores the grammatical integration of referential and relational meaning and the trade-offs which result from the dual encoding of these two important dimensions of meaning in the linear stream of language.

Recognizing the role of the specifier opens up the possibility of returning to meaning based definitions for parts of speech (cf. Dixon, 1991). Distributional arguments against meaning based definitions do not hold sway when it is realized that specifiers can override the inherent meaning of heads in establishing the type of an expression. Returning to Hudson's (2000) example, the word "reading" in "he passed the exam by not reading anything quickly" may in fact be a present participle even though it functions as the head of the object of the preposition "by". Thus, we are not forced to consider "reading" a noun on distributional grounds and the havoc that doing so wreaks on meaning based definitions of parts of speech is avoided.

It was noted above that at least one transformational grammarian believes that specifiers provide evidence for the independent reality of syntax. This follows from the assumption that the role of the specifier in combining with a head to form a maximal projection in X-Bar Theory is a purely syntactic function. However, treating the specifier as a purely syntactic element leaves unexplained why its occurrence results in a maximal projection of the head. Further, since the specifier is optional for most phrasal types (in X-Bar Theory) and the phrase can form a maximal projection with or without the specifier, it is unclear why specifiers exist at all. Acknowledging the phrase and clause determining function of specifiers, we can see that unspecified expressions are non-maximal since they lack the specification needed to make them

referring expressions, and referring expressions correspond to maximal projections.

From a structural perspective, the specifier is the leftmost element of the expressions in which it occurs in English. This (or something along these lines) leads Chomsky (1995, p. 55) to the position that “the specifier of IP [TP] is the *subject of IP*” since the subject is the leftmost element of an IP. HPSG also adopts this treatment of the subject (Sag & Wasow, p. 83). Unfortunately, the subject has nothing to do with establishing the referential status of a situation referring expression and it is a poor candidate to be a specifier on other than purely structural grounds. Rather, the subject is a complement of the head of a situation referring expression as is suggested by its correspondence with object complements.

Distinguishing the role of specifiers and heads also brings syntax into closer alignment with morphology. It is clear for a word like “kindness” that the root (or semantic category determining element) is “kind” which is the central morphological element, whereas the part of speech (or type) determining element “-ness” is more peripheral. Addition of the inflection “-ness” to “kind” has the effect of objectifying “kind” allowing “kindness” it to be a noun. With respect to inflectional morphology, the tense marker on a tensed verb provides the specification for the tensed verb in very much the same way that a separate auxiliary verb provides the specification for non-tensed relational types (e.g. present and past participles of verbs, predicate adjectives). The realignment of syntax with respect to morphology opens up the possibility of a unified system of grammar—where grammar encompasses both syntax and morphology and takes account of meaning. Of course, there is still a distinction between morphology and syntax in English since the type determining element of a word is the rightmost morpheme whereas the type determining element of an expression is typically the leftmost element. However, it is common to treat the past-tense morpheme “-ed” as a syntactic marker despite its morphological basis and it represents an instance of specifier as does the auxiliary verb “was” with which it corresponds.

In logical approaches to natural language semantics, specifiers correspond to variable binding mechanisms like existential and universal quantification. For example, the specifier “the” is

typically translated into the existential quantifier and the specifier “a” may be translated into the universal quantifier (in at least one use). These logical quantifiers bind expressions to individuals in the domain being modeled. Thus, in logical treatments, specifiers, and not heads, determine the referential binding of the expressions they occur in. In an extended logical approach like Situation Semantics (Barwise and Perry 1983) which includes situations as individuals, auxiliary and modal verbs can be seen as binding a clause to a situation—where situations are first class entities in the domain being modeled. Thus, auxiliary and modal verbs function to specify the referential status of the situation referring expressions in which they occur.

In logical approaches, nouns are often assumed to refer to (or denote) a class of individuals. However, from a grammatical perspective unspecified nouns do not typically refer and the meaning of a noun should not be explicated in referential terms. Allowing a noun to denote (rather than refer to) a class of individuals (e.g. Lyons, 1977, 206ff) avoids this problem, but suffers from the psychological unreality of suggesting that humans can mentally entertain potentially large sets of individuals—unless it is assumed that classes (or collections) are first class entities in the domain (not a common assumption in logical approaches).

In an article on the learning of artificial languages, Gomez and Gerken (2000) suggest that the learning of linguistic categories depends on perceptual clues. That is, humans do not appear to be good at learning abstract linguistic categories that aren’t perceptually marked. Specifiers, coming from a closed class may provide the perceptual clues needed to learn open class categories like noun and verb which are not perceptually marked due to the wide variation in the form of such words. Thus, the determiner “the” and the plural marker “-s” provides the perceptual clues for learning the noun category, the members of which have no consistent perceptual basis. Given this, if an action word like “murder” occurs frequently after the determiner “the” in the experience of a language learner, the word will come to be categorized with other nouns, despite its meaning. That action words can be objectified and used as nouns is not in dispute, but that the category noun has no

semantic basis is. Nouns are words that can be used in referring expressions to refer to objects, but those objects may be objectified actions as well as the more basic physical objects.

If specifiers provide perceptual clues, they cannot be entirely covert. There may be instances which are covert (e.g. present tense forms other than 3<sup>rd</sup> person singular in English), but there must also be instances where the specifier is explicit (e.g. past tense; present tense, 3<sup>rd</sup> person singular). There may be languages where specifiers are not distinct from heads (e.g. Chinese), but the specification role is no less covert in such languages than the head role is. In English there are words (e.g. pronoun, proper noun) that combine the specifier and head role. Their correspondence with expressions in which the specifier is explicit (e.g. noun phrases with a determiner) provides the basis for learning these categories with combined roles. Tensed verbs and prepositions also combine the specifier and head role. The tense marker on the verb provides the perceptual clue for verbs and the fact that prepositions are a closed class makes it possible for them to combine the specifier and head role.

In languages lacking explicit specifiers, Jackendoff's (1983, p. 70) Referentiality Principle wherein phrases are referential by default may hold. This default does not appear to hold for unspecified phrases in English, but does hold for major phrasal categories or maximal projections (i.e. those phrasal categories including a specification function).

### 3 Computational Implications

Specifiers are undervalued grammatical elements which are often ignored in computational treatments, especially statistically based treatments. This paper demonstrates the importance of specifiers for determining phrase and clause type. When a specifier combines with an atypical head (e.g. definite determiner + action word like "murder"), the specifier dominates the head in determining the overall expression type. Given the importance of specifiers, they can only be ignored at substantial loss of information in computational treatments.

The fact that most any action verb can be objectified and appear after a determiner creates a dilemma for computational approaches. Should

action words be treated as both verbs and nouns, or should a process of objectifying action words which are encoded lexically as verbs and treating them as nouns be introduced. If action words are treated as both verbs and nouns, then the context of use (i.e. whether they are preceded by a determiner or subject) will determine which form is appropriate. Most dictionaries include "act of verb-ing" entries for action verbs, calling them nouns. Of course, this means that parsers cannot rely on the part of speech of action words to guide parsing. Given this, having a single verb entry for action words and allowing them to be nominalized on the fly after determiners may be preferable. Further, since this is a productive process and it is not possible to predict in advance which verbs will actually be used after determiners, even if many verbs are given a noun entry in the lexicon, a mechanism for handling novel cases will still be needed.

Specifiers are the key to determining the referential status of expressions. The referential dimension of meaning is often ignored in computational approaches to meaning where the focus is often on establishing the propositional content of linguistic expressions. On the assumption that reference to the external world is not something that is conducive to the kinds of symbolic processing typical of computational approaches, it is often ignored. However, Jackendoff (2002, 1983) presents an approach to reference which is consistent with symbolic processing in that reference is to representations in the mind which are ground in perceptual experience of the world, but are nonetheless in the mind. Computational approaches which adopt an approach to reference along the lines of Jackendoff will need to take seriously the role of specifiers in establishing the referential status of expressions.

### Conclusion

Specifiers are the key determinants of the phrase and clause type of the expressions in which they occur. The basic function of a specifier is to determine the referential status of an expression. Expressions lacking specification cannot typically be used to refer. Recognizing the important role of specifiers leads to improvements in linguistic theories for which the notion "head of expression"



is central since both the specifier and the head contribute to the overall meaning of the expression.

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