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A Bi-Polar Theory of Nominal and Clause Structure and Function

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Abstract

Two key dimensions of meaning that get grammatically encoded are *referential meaning* and *relational meaning*. In English, these two dimensions are typically encoded in distinct grammatical poles—a *referential pole* and a *relational pole*—with a *specifier* functioning as the locus of the referential pole and a *head* functioning as the locus of the relational pole. Specifiers and heads combine to form *referring expressions*. Lexical items and expressions functioning as *modifiers* are preferentially attracted to one pole or the other. One or more *complements* may be associated with relational lexical items. The grammatical functions *specifier*, *head*, *modifier* and *complement* are generally adequate to represent much of the basic structure and function of nominals and clauses.

Keywords: meaning; refer; relation; head; specifier; grammar

Introduction

In *Cognitive Linguistics* (Langacker, 1987, 1991; Lakoff, 1987; Talmy, 2000) it is axiomatic that grammar encodes meaning. According to Langacker (1987) “grammar is simply the structuring and symbolization of semantic content”. This axiom is related to Jackendoff’s *Grammatical Constraint* (1983) “...one should prefer a semantic theory that explains otherwise arbitrary generalizations about the syntax and the lexicon...a theory’s deviations from efficient encoding must be vigorously justified, for what appears to be an irregular relationship between syntax and semantics may turn out merely to be a bad theory of one or the other”. In its strongest form—the form adopted in this paper, though not by Jackendoff—syntactic and semantic representations are not distinct and the grammatical constraint and cognitive linguistics align closely.

Two key dimensions of meaning that get grammatically encoded are *referential meaning* and *relational meaning*. In English, these two dimensions of meaning are typically encoded in distinct grammatical poles—a *referential pole* and a *relational pole*—with a *specifier* functioning as the locus of the referential pole and a *head* functioning as the locus of the relational pole. At this level of description, relational pole is used generally to encompass objective (noun, pronoun, proper noun) as well as relational (verb, adjective, adverb, preposition) heads. For example, in the expression

1. The dog

the determiner “the” functions as a specifier and the noun “dog” functions as the head. The function of a specifier is to identify the referential type of an expression—in example 1 an *object referring expression* or *nominal*. The function of a

head is to identify the relational type of an expression—in 1 a type of object. The specifier and head combine to form a *referring expression*—in 1 an object referring expression that refers to a type of object.

Contrast example 1 with

2. The kick

in which the specifier functions to identify an object referring expression even though the head describes a type of relation—more specifically, a type of action. The specifier dominates the head in determining the referential type of the expression. The effect is the construal of an action as though it were an object. In this objective construal, the participants in the relation are suppressed. In allowing relations to head nominals, English grammar provides a fairly general mechanism for construing relations as though they were objects. This is particularly true of words describing actions which occur instantaneously and are easily objectified:

3. The *hit*

4. The *strike*

5. The *crunch*

It is important to distinguish the inherent part of speech of a lexical item from its grammatical function in any particular text. Insisting that the head of a nominal is necessarily a noun only leads to confusion resulting from the confounding of grammatical function with part of speech. Further, the methodology of using syntactic location to determine part of speech exacerbates the effects of this confusion. Based on syntactic location and the confusion of grammatical function with part of speech, the word “running” in

6. The bull is *running*

7. The *running* bull

8. The *running* of the bull

would be categorized as a verb (participle) in 6, an adjective in 7, and a noun in 8. Yet there is no obvious difference in the meaning of “running” across these expressions. A better approach is to treat “running” as a present participle verb that functions as the head of a clause in 6, a pre-head modifier in 7, and a nominal head in 8.

The important grammatical function of specifiers is evidenced by the following contrasting examples:

9. *The* dance *to* dance

10. *The* drink *to* drink

11. *The* kill *to* kill

12. *The* splash *to* splash

13. *The* cat *to* cat (about)

14. *The dog to dog* (someone)

The head has the same word form in each contrasting expression, and there is no basis for the head determining the grammatical function of the expression. Rather, it is the specifier—either the determiner “the” or the infinitive marker “to”—that determines the function of the expression. The specifier “the” picks out an objective sense of “dance” and “drink” in forming a nominal, whereas the specifier “to” picks out an action sense of these words in forming an infinitive phrase. Even in the case of words which have a strong action preference, the specifier “the” forces an object reading as in the case of “the kill” or “the splash”. “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. The words “cat” and “dog”, 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” are extended to support reference to relational attributes of the objects and not the objects themselves.

The combining of the referential and relational poles in creating a referring expression provides semantic motivation for the syntactic notion of a *maximal projection*. A relational pole alone does not constitute a referring expression and is not a maximal projection. However, there are lexical items in English (e.g. pronoun, proper nouns, deictic words, tensed verbs) that combine the referential and relational poles in functioning as referring expressions and constituting maximal projections. Further, there is no claim that the division of referential and relational meaning into distinct poles is universal and there may be languages (e.g. Chinese) in which this division does not occur. However, it is claimed that referential and relational meaning are two dimensions of meaning that are likely to be universally encoded by some mechanism in the grammar and lexicon of all languages.

In describing specifiers and heads as the loci or poles of referential and relational meaning, it is implied that additional grammatical elements may surround these two poles and may be preferentially attracted to one pole or the other. These grammatical elements perform the important grammatical function of *modification* which serves to constrain the range of referential and relational meaning as expressed in heads and specifiers. In addition, relational lexical items establish expectations for the occurrence of one or more *complements* to express the participants conventionally involved in the relation.

The grammatical functions *specifier*, *head*, *modifier* and *complement* are generally adequate to represent the basic structure and function of nominals and clauses. These grammatical functions can be further subcategorized (e.g. *object specifier*, *predicate specifier*, *object modifier*, *relation modifier*, *subject complement*, *object complement*, *indirect object complement*, *clausal complement*) to explicate the structure and function of nominals and clauses in more detail. The general terms are borrowed from X-Bar

Theory (Chomsky, 1970). It is acknowledged that X-Bar Theory captures an important grammatical generalization, with the distinction between specifiers and modifiers representing an important advance in linguistic theorizing, but these categories are in need of semantic motivation which, when provided, necessitates certain modifications to the basic X-Bar schema.

The focus of this paper is on the joint encoding of referential and relational meaning. The following sentence and nominal expression

15. The book is on the table

16. The book on the table

have essentially the same relational meaning. They both describe a relation *on* existing between *a book* and *a table*. However, they differ in their referential meaning with 15 referring to a situation and 16 referring to an object. This difference is reflected in their grammatical realization. In English, reference to a situation is typically expressed by predicating a relation functioning as the head of a clause and expressing the conventionalized participants of the relation as nominals functioning as the subject and object complements of the relation. On the other hand, reference to an object is typically expressed by a nominal consisting of a specifier and head and, in 16, an optional prepositional phrase modifier. The requirements for the joint encoding of referential and relational meaning often lead to grammatical variation like that evidenced in 15 and 16.

Relational Pole Heads

Although a noun typically functions as the head of a nominal, and a verb typically functions as the head of a clause, lexical items of numerous parts of speech can function as the heads of nominals and clauses. Consider the following nominal heads:

- Noun
 - The *book*
- Proper Noun
 - The *Donald*
- Verb
 - He gave the ball a *kick*
 - The *running* of the bulls
- Adjective
 - The *quick* and the *dead*
 - The *noblest* of motives
- Preposition
 - The *up* (and *down*) of the elevator
- Adverb
 - The *eyes* have it

Although it is uncommon for proper nouns to be preceded by a determiner in English and the expression “the Donald” has the effect of referring to a specific person even out of immediate context (namely Donald Trump), specifiers often precede proper nouns in other languages (e.g. Portuguese, German) reflecting the fact that proper nouns do not, in general, pick out specific individuals out of context. It has

already been argued that verbs like “running” and “kick” can function as objectified heads of nominals. In “the quick and the dead” it may be argued that the heads of the nominals “the quick...” and “the dead...” are missing and must be recovered from the context. However, it may also be argued that an adjective can take on the function of a head when no other candidate is available. When an adjective functions as the head of a nominal, the effect is to objectify the adjective and construe it as referring to an individual or type of individual. The use of prepositions and adverbs as heads of nominals is not common in English, but such uses do occur.

Consider the following clausal heads:

- Verb
 - He *runs*; He is *running*
- Adjective
 - He is *sad*
- Preposition
 - He is *out* (of the office)
- Adverb
 - He is *there*
- Noun
 - I am *woman*; Jesus is *Lord*

Verbs are the typical heads of clauses. However, when there are two verbs in a clause (e.g. “is” and “running” in “he is running”) which one functions as the head? Since the clause “he is running” is essentially about “running” and not about “being”, “running” is the obvious candidate to be the head—if the grammatical function *head* is to be semantically motivated. The common use of the term *auxiliary verb* to refer to “is” reflects its more peripheral role in the clause. On the other hand, it is the auxiliary verb which provides the tense that marks a tensed clause. Tense performs a referential function in identifying the situation being referred to with respect to the context of use of the text. When the referential and relational dimensions of meaning are distinguished, the functions of the auxiliary and main verb become clear. And once the referential function of the auxiliary verb is made clear, the occurrence of relational heads in clauses that are not verbs becomes unproblematic. For example, “he is sad” is essentially about being sad, and “sad” functions as the head despite the occurrence of the auxiliary verb “is” in the clause. It is a fact about English that relations other than verbs are uninflected for tense and must be accompanied by an auxiliary verb to provide that tense when they head clauses. The alternative treatment of “sad” as a complement of the auxiliary verb “is” with “is” functioning as the head (cf. Quirk et al. 1985) distorts the notion of what a head (and complement) is. Unlike English, Russian and Chinese allow adjectives to head clauses without the occurrence of an auxiliary verb or tense marking. Once it is accepted that adjectives can head clauses, the extension to prepositions, adverbs and untensed relations more generally, is straightforward as the above examples show. Even the use of a noun as the head of a clause (common in Russian) is explainable. Similar to the

way that a relation which heads a nominal is construed objectively, a noun which heads a clause is construed relationally. Typically, some attribute of the noun is made salient and is ascribed to the subject of the clause.

In addition to lexical items of different parts of speech heading nominals, there are numerous forms of expression that can function as the heads of nominals:

- Verb + Particle
 - The *buy out* of the corporation
- Gerund
 - Our *going to the movies* was fun
- That clause
 - That *you like him* is nice

Other researchers have suggested that any strong notion of *endocentricity* as in X-Bar Theory where the head (e.g. Noun) always determines the type of an expression (e.g. Noun Phrase) needs to be relaxed to deal with constructions like those above (e.g. Pullum, 1991; Malouf, 2000).

Like nominals, clauses may also be headed by expressions

- Nominal
 - He is *a child* vs.
 - He is *a child*
- Prepositional phrase
 - The book is *on the table* vs.
 - The book is *on* the table
- Verb phrase
 - He is *eating a sandwich* vs.
 - He is *eating* a sandwich

One analysis of “he is a child” treats “is a child” as a *predicate nominal*. Under this analysis the predicate specifier “is” has the effect of *predicating* the nominal “a child” allowing it (or salient attributes) to be predicated of the subject. There is also an *equational* analysis in which the auxiliary verb “is” is functioning as a main verb that equates two co-referential nominals “he” and “a child”. Both analyses are reasonable and humans may well vary in their representations of such constructions.

Two analyses are also possible for prepositional phrases. The question of whether the prepositional phrase “on the table” is functioning as the head of “the book is on the table” or whether the preposition “on” is the head taking the complements “he” and “the table” hinges on the integration of referential and relational meaning. If “on the table” is functioning as a referential unit that refers to a location, then the treatment of “on the table” as the head is supported. On the other hand, if the relation “on” is the focus of the clause, then the two complement relational representation is supported. English supports both possibilities as is evidenced by the question forms:

17. Where is the book?
18. What is the book on?

In 17 a location is explicitly referenced by “where”, whereas in 18 the object of the relation “on” is explicitly referenced

by “what” and the reference to a location is less salient. On the assumption that a single representation is constructed during the processing of this text, one or the other will dominate depending on the context. From a processing perspective, the resulting representation depends on whether the specifier “is” combines with the relation “on” before the nominal “the table” combines with “on”.

Referential Pole Specifiers

The typical specifier of a nominal is a determiner, and the typical specifier of a clause is an auxiliary verb. However, there is a range of lexical items of different parts of speech and a few expression forms that may function as specifiers.

- Determiner
 - *The* book; *A* book
- Quantifier
 - *Some* books
- Negative
 - *No* book
- Wh-word
 - *What* book
- Possessive pronoun
 - *My* book
- Possessive nominal
 - *Joe’s* book

The specifier in a nominal in combination with the head may indicate reference to a specific instance of an object (“the book”) or objectified relation (“the kick”), to a collection of instances (“some books”), to a mass (“some rice”), to a non-specific instance (“a book”), and even to a questioned instance (“what book”), a non-existent instance (“no book”) or a type (“a dog is a type of animal”). The possessive nominal indicates reference to an object with respect to a reference point which is itself an object reference. Reference as used herein is to objects, relations and situations in a *situation model* (Zwann & Radvansky, 1998) which is a mental representation that may or may not correspond to actual objects, relations or situations in the real world. An expression like “no books” in “no books are on the table” establishes reference to a collection of objects of type book, but indicates that the collection is empty. The negation is handled within the context of an object referring expression in accordance with the grammatical constraint rather than being propagated to the clausal level as is done in quantificational logic.

Consider the following clausal specifiers:

- Auxiliary
 - He *is* running
- Infinitive marker
 - I like *to* sleep

The auxiliary verb “is” in “he is running” establishes reference to a specific situation via tense marking. In so doing, the situation referred to by the expression is predicated as actually occurring. In English, there is no distinction between predicate specification and situation

specification for isolated clauses. The predicate specifier indicates reference to a relation and predicates that relation as occurring. The predicated relation when combined with its complements refers to a situation without additional specification. Note the implication that the predicate specifier combines with the relational head before the relational head combines with its complements. The predicate specifier combines with the relational head to form a *predicate referring expression* which refers to a relation. This predicate referring expression then combines with its complements to form a *situation referring expression* which refers to a situation consisting of the relation and associated participants.

The infinitive marker “to” typically functions to specify a situation that is not predicated as actually occurring. This is essentially a generic reference to a non-specific instance or type of situation, rather than to a specific instance of a situation. The infinitive clause can function as a complement in a matrix clause with the subject of the infinitive clause typically being provided by the matrix clause.

Modifiers

While specifiers and heads are important determinants of the basic character of referring expressions, modifiers play a more peripheral and optional role. A modifier adds information that may serve to further refine the category of the head, but does not typically determine the base relational category or the referring category. For example, in the expression

19. the *old* man

the modifier “old” further refines the category “man”, but does not establish the base category. “Old man” may be a subtype of “man”, but “old man” is still a type of “man”. Nor does the addition of “old” to “man” determine a referring expression.

Consider the following modifiers:

- Adjective
 - The *old* book
- Quantifier
 - The *three* books
- Noun
 - The *bird* dog
- Proper Noun
 - A *Bin Laden* confidant
- Verb Participle
 - The *running* bull
- Prepositional Phrase
 - The book *on the table*
 - His *in your face* manner
- Relative Clause
 - The book *that I told you about*

Pre-head modifiers in nominals typically function to constrain the type of the unspecified head, perhaps creating a subtype, but the head determines the profile of the

resulting combination, not the modifier. Post-head modifiers usually modify referring expressions and not just the unspecified heads of those expressions. In “the book on the table”, “on the table” modifies the referring expression “the book” and not just the head “book”. This position is motivated by consideration of relational meaning. The complements of relations are assumed to be referring expressions that refer to the participants in the relation. In “the book on the table”, the preposition “on” is a locative relation that relates the two complements “the book” and “the table”. It is unclear from a relational perspective what it would mean for the arguments of a relation not to be full referring expressions, since the arguments would fail to indicate reference to the participants in the relation. From a relational perspective “the book” is an complement of “on” and not just the non-referential word “book”. On the other hand, from a referential perspective, “the book” refers to some object and that reference is subsequently constrained by the modifier “on the table”. The integration of referential and relational meaning is facilitated if post-head modifiers modify referring expressions and not just the unspecified heads of those expressions.

In pre-head modification, the unspecified head is not a complement of the relational modifier, since the head is not a referring expression. The relationship between a pre-head modifier and a head is essentially a modifier-head relationship resulting in a modified head and not a relation-argument (or head-complement) relationship.

The referential function of a specifier need not be filled by a single lexical item. Predicate specification may include a modal auxiliary, up to three other auxiliaries, and a negative. Consider the expression

20. He could not have been hitting the ball

In 20, the predicate specifier consists of the modal auxiliary “could”, the negative “not”, and the auxiliary verbs “have” and “been”. The modal auxiliary is the locus of the predicate specification with “not” “have” and “been” functioning as modifiers. That the negative “not” combines with the modal auxiliary is suggested by the contracted forms of negation (e.g. “couldn’t”, “shouldn’t”, “won’t”) and by the requirement for *do-support* in negation (e.g. “he does not run” vs. “he runs”) where the auxiliary verb “do” is inserted as the locus for attachment of the modifying negative.

A processing argument can also be made for the combination of the negative and additional auxiliary verbs with the first auxiliary verb. If the auxiliaries and negative combine with the main verb, then the auxiliaries and negative will need to be retained in memory as separate linguistic units until the main verb occurs. On the assumption that short-term working memory only has the capacity to retain a few distinct linguistic units, this is likely to lead to an overloading of the capacity of short-term working memory which should result in processing difficulty. Such difficulty is unattested in adult native speakers of English.

Object specification may also consist of more than one lexical item or morphological marker. Consider the expressions

21. books
22. two books
23. first two books
24. the first two books

The word “books” by itself can function as an object referring expression (or nominal) (providing a morphologically based indefinite specification) as in “books are fun to read”. Adding the cardinal quantifier “two” constrains the range of the object referring expression, but does not change its grammatical status as an (indefinite) object referring expression as is evidenced by “two books are on the table”. On the other hand, the addition of an ordinal quantifier changes the grammatical status and “first two books” in “first two books are on the table” is not a well-formed object referring expression. If “first” is functioning as a modifier of the head “two books” this is unexpected, since a modifier does not change the grammatical status of the head it modifies (i.e. the modifier-head relationship is endocentric). However, if ordinal quantifiers function as modifiers of specifiers and not modifiers of heads, the awkwardness of example 23 is explained since there is no specifier for “first” to modify. In example 24, “first” in “the first” further constrains the definite reference indicated by “the” and “the first” combines with the indefinite expression “two books” to form a definite object referring expression.

Complements

A complement is a referring expression that describes a participant in a relation as part of a situation referring expression or clause. The complement does not determine the referential type of the expression in which it participates, nor does it determine the relational type of that expression.

The relationship between a head and its complements is primarily relational in nature. Only relational heads take complements and those complements are full referring expressions. The number and type of complements that a relational word or expression takes is a conventionalization of the situation that the word or expression is used to describe. That conventionalization provides a particular perspective on the situation (Fillmore, 1977) that may vary from language to language (and within a language), but is nonetheless meaningfully motivated. Such conventionalization may be driven in part by psychological limits on the number of separate chunks of information that can be separately entertained at one time (i.e., short-term working memory limitations).

The relationship between a specifier and a relational head and between a relational head and its complement(s) is largely, though not entirely, orthogonal. The specifier-head relationship is primarily referential, whereas, the head-complement relationship is primarily relational. Grammatically, there is often a closer affinity between a

specifier and a relational head than there is between a relational head and its complements. The closer affinity of a predicate specifier and relational head is suggested by the fact that the infinitive marker “to” which specifies a non-finite predicate referring expression, also sanctions the non-occurrence of the subject complement (an example of the interdependence of referential and relational meaning). Although, the infinitive marker sanctions the non-occurrence of the subject complement, that complement is typically retrievable in the context of use of the expression. On the other hand, in the expression “the book is on the table” the relationship between the predicate specifier “is” and the relational head “on” may be subordinated to the relationship between “on” and its object complement “the table.” If so, “on” first combines with “the table” to form a higher order relation (that takes one less complement) before combining with the predicate specifier “is” (and the subject complement).

The complements in a clause can be further subcategorized into *subject*, (*direct*) *object*, *indirect object*, and *complement* (e.g. clausal complement). From a relational perspective, the subject complement has the same status as the other complements of the relation. However, many linguists treat the subject as distinct from other complements, often according it the status of external argument (i.e. external to the verb phrase which includes object complements, but not the subject). In extreme cases, the subject is not even treated as a complement of the relational head of a clause—distorting the notion of what a complement is. For example, some variants of X-Bar Theory treat the subject as a specifier (of IP) and not a complement (external or otherwise). The treatment of objects as internal arguments of the verb and the subject as an external argument of the verb is deeply entrenched (at least for syntactic analyses of English). In part, this is based on the occurrence of subjectless constructions like gerunds and infinitive clauses which suggest the existence of verb phrase constituents. Clearly, there is some merit to this position. Further, it may be that there are pragmatic reasons for treating subjects as distinguished from other objects (e.g. topicalization, saliency). However, from a relational perspective, subjects and objects have equal relational status. To the extent that the notion of an external subject is legitimate, it is presumably tied to dimensions of meaning like topicalization and saliency, or to processing considerations (e.g. retaining the subject as a separate unit in short-term working memory) which are not currently addressed.

Conclusion

The bi-polar theory presented in this paper (and in more detail at www.DoubleRTheory.com) resolves problems that have plagued uni-polar theories like X-Bar Theory (Chomsky, 1970) and Dependency Grammar (Hudson, 2000). The shift to functional “heads” in X-Bar Theory leads McCawley to lament “...all sorts of things...get represented as heads of things they aren’t heads of” (in

Cheng and Sybesma, 1998). For example, in “the dog” treating “the” as the head of a DP (determiner phrase) taking the NP (noun phrase) complement “dog”—when “dog” by itself isn’t even an NP. Likewise, Hudson’s strongly endocentric version of dependency grammar leads him to suggest that “the” is a pronoun that just happens to take a complement.

The grammatical functions *specifier*, *head*, *modifier*, and *complement* are generally adequate to represent much of the basic structure and function of nominals and clauses—especially with respect to the encoding of referential and relational meaning. Lexical items of different parts of speech and various forms of expression may fulfill these grammatical functions making it important to distinguish the grammatical function of a lexical item and expression from its inherent part of speech and expression form. Additional grammatical functions may be needed to represent other dimensions of meanings that get encoded in language and to handle noncanonical forms of expression.

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