

# A BI-POLAR THEORY OF NOMINAL AND CLAUSE STRUCTURE AND FUNCTION

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Grammar encodes meaning (Wierzbicka 1988). “Grammar is simply the structuring and symbolization of semantic content” (Langacker 1987). Grammatical variation is largely the result of a compromise between the differing requirements for the encoding of both semantic and discourse pragmatic aspects of meaning (Givón 1984). “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” (Jackendoff 1983).

The above statements all support the position that there is a close relationship between form and function, between syntax and linguistic semantics. The statement by Jackendoff is called the *Grammatical Constraint*. In its strongest form—the form adopted in this paper, although not by Jackendoff—linguistic representations of form and function, syntax and linguistic semantics, are not distinct. There are no syntactic representations that are purely formal, lacking functional and semantic content. Such representations would fail to capture the functional and semantic generalizations that allow us to make sense of linguistic form.

Two key dimensions of meaning that get grammatically encoded are *referential meaning* and *relational meaning*. The key claim is that, 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 grammatical function of a specifier is to identify the referential type of an expression—in 1, an *object referring expression* or *nominal*. The grammatical function of a head is to identify the relational (or objective) 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 dog.

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.

Construal is a basic cognitive process defined by Langacker (2000) as “our ability to conceive and portray the same situation in alternate ways...linguistic elements – both lexical and grammatical – impose particular construals on the conceptual ‘content’ they

evoke”. The use of a verb as the head of a nominal is an example of grammatical construal. Whether a word describing some concept is prototypically a noun or a verb (in a given language) is a form of lexical construal.

In allowing words describing 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*

There are also more specialized constructions in which verbs can head nominals. Dixon (1991) discusses a collection of constructions which he calls the “GIVE A VERB, HAVE A VERB, and TAKE A VERB” constructions. In the expression

6. He gave the ball a kick

Dixon treats “kick” as a verb heading a noun phrase as sanctioned by the “GIVE A VERB” construction. Dixon surveys about 700 verbs and concludes that “about one-quarter of them can occur in at least one of the constructions HAVE A VERB, GIVE A VERB, and TAKE A VERB”.

Numerous expression forms may also head nominals. In

7. His *giving money to strangers*

the verbal expression “giving money to strangers” functions as the head of a nominal (Pullum 1991). Given examples like 2-7, any strong notion of *endocentricity* (Bloomfield 1933) common to *uni-polar* theories wherein the head always determines the type of the larger expression in which it occurs (X-Bar Theory—Chomsky 1970), needs to be relaxed.

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

8. The bull is *running*
9. The *running* bull
10. The *running* of the bull

would be categorized as a verb (participle) in 8, an adjective in 9, and a noun in 10. Yet there is no obvious difference in the meaning of “running” across these expressions. A better approach is to treat “running” as a verb (participle) that functions as the head of a clause in 8; that functions as a modifier in 9; and that functions as the head of a nominal in 10. Based on these examples and others to follow, it is argued that purely syntactic representations fail to make important grammatical generalizations. It is only in recognizing the grammatical functions of lexical items and expression forms that the

generalizations follow. The representations proposed in this paper integrate form and function in a manner that embraces the functional labels used by Chomsky in his description of X-Bar Theory (and the semantic intuition underlying the choice of these functional labels), but which are avoided in his purely formal notation. Chomsky (1995) notes that “the notions specifier, complement, and adjunct are functional (relational)”, but in his formal notation he uses the formal labels Z, W, and Y stating that “we call Z the *specifier* (Spec) of  $X^2$ , the elements of W the *complements* of  $X^0$ , and Y...an *adjunct* of  $X^2$ ”. Jackendoff (1977) is less circumspect in this respect, introducing the classic tree structure representation of X-Bar Theory:

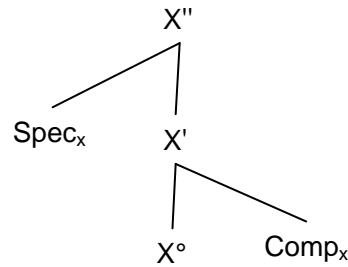


Figure 1: A variant of X-Bar Theory from Jackendoff (1977)

This tree structure representation effectively mixes the functional labels specifier and complement with the formal labels  $X^0$ ,  $X'$  and  $X''$  which range over formal lexical and phrasal categories. However, in Jackendoff’s formulation of X-Bar Theory,  $\text{Spec}_x$  and  $\text{Comp}_x$  are treated formally and are not accorded functional status.

The key advance made in X-Bar Theory is the distinction between specifiers and modifiers (called adjuncts by Chomsky). Chomsky (1970) realized that the specifier played a different syntactic role than adjuncts. The specifier combines with a non-maximal head ( $X'$ ) to form a maximal projection ( $X''$ ). Unfortunately, the syntactic basis of X-Bar Theory leaves this distinction unmotivated. In the bi-polar theory, a maximal projection corresponds to a referring expression and the specifier typically determines a referring expression.

Rejecting a purely distributional basis for determining the part of speech of words leads to a return to a more traditional method for their definition which considers semantic information, grammatical function, morphological and distributional information and information about frequency of use. The part of speech of a word is defined in terms of the prototypical function of the word in a given language. Words that prototypically function as clausal heads in English describe relational concepts that are subcategorized as verbs, (predicate) adjectives and (predicate) prepositions. (Attributive) adjectives also prototypically function as modifiers in nominals. Prepositions function as the heads of modifying prepositional phrases and as predicate modifiers (often called verb particles in this function). Verbs have special inflectional forms like the -ing and -ed participles which distinguish them from adjectives and prepositions. (Singular count) nouns prototypically function as nominal heads with a separate specifier. Pronouns and proper nouns prototypically function as full nominals. Providing an example of a word describing an action which functions as the head of a nominal does not defeat these part of speech definitions. There is no claim that the criteria for membership in a part of speech are exceptionless. Action words that are frequently used as the heads of nominals

may come to have the status of a noun. In this case, the action described by the word is construed objectively and the noun sense of the word is separately represented from the verb sense in the *mental lexicon*—the repository of entrenched words, fixed expressions and learned constructions. There may even be languages in which all words describing actions are construed objectively and expressed as nouns or all words describing objects are construed relationally and expressed as verbs (Talmy 2000). Languages provide a *base lexical construal* which reflects the prototypical, unmarked use of the words in the language. But grammar provides mechanisms for framing alternative construals.

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

- |                       |                                  |
|-----------------------|----------------------------------|
| 11. <i>The</i> dance  | <i>to</i> dance                  |
| 12. <i>The</i> splash | <i>to</i> splash                 |
| 13. <i>The</i> dog    | <i>to</i> dog ( <i>someone</i> ) |

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. From the perspective of the hearer or reader (if not the speaker or writer), the specifier “the” picks out an objective (or noun) sense of “dance” and “splash” in forming a nominal, whereas the specifier “to” picks out an action (or verb) sense in forming an infinitive phrase. The word “dog” is relationalized by its co-occurrence with “to” such that the base meaning of “dog” as a category of object is extended to support reference to relational attributes of the object (persistent pursuit).

In describing specifiers and heads as the 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 or the other. In particular, there is an important grammatical function of *modification* that serves to constrain the range of referential and relational meaning as expressed in heads and specifiers. Also, when the relational pole is headed by a relational lexical item, the relational lexical item establishes conventionalized expectations for the occurrence of one or more *complements* to express the participants involved in the relation, resulting in the description of a situation as expressed by a *situation referring expression* or *clause*.

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

14. The book is on the table

and the nominal expression

15. 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 14 referring to a situation and 15 referring to an object. This difference in referential meaning is reflected in the grammatical realization of the two expressions.

1. RELATIONAL POLE HEADS. Lexical items of numerous parts of speech can function as the heads of nominals and clauses.

1.1. NOMINAL HEAD (LEXICAL ITEM).

- Noun
  - The *book*
- Proper Noun
  - The *Donald*
  - The *Fillmores*
- Verb
  - He gave the ball a *kick*
  - The *running* of the bulls
- Adjective
  - The *quick* and the *dead*
  - The *noblest* of motives
- Preposition
  - “It is the pause between, the no-man's land, the dark of light, the *in* of *out*, the light of dark, the *in-between*” (<http://www.chabad.org/library>)

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. 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 as heads of nominals is not common in English, but such uses do occasionally occur.

1.2. CLAUSE HEAD (LEXICAL ITEM).

- Verb
  - He is *running*
- Adjective
  - He is *sad*
- Preposition
  - He is *out* (of the office)
- Adverb
  - He is *there*
- Noun
  - He is *president*

When there are two verbs in a clause as in “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” in sentences like “he is running” reflects its more peripheral role in the clause. On the other hand, it is the auxiliary verb which provides the tense. Tense performs a referential function in identifying the situation being referred to with respect to the context of use of the text. The important referential function of auxiliary verbs (and determiners) has led to the treatment of the auxiliary verb (and determiner) as the head in some linguistic theories. With respect to modern generative grammar which promotes all sorts of functional categories to head status (e.g. determiner, tense, negation, agreement), McCawley (in Cheng and Sybesma, 1998) laments that “...all sorts of things ... get represented as heads of things they aren’t heads of”. The treatment of the auxiliary verb as the head of a clause forces a treatment of the main relational element as something else—typically a complement. Although the switch to treating auxiliaries (and determiners) as heads emphasizes their important grammatical function, the reduction of main clausal relations (and main nouns in nominals) to the subordinate status of complements is inadequate to represent their equally important contribution. No uni-polar theory can adequately represent the contribution of both the auxiliary verb (or determiner) and the main relational element (or main noun) to the overall meaning of a clause (or nominal).

Once the referential function of the auxiliary verb is understood and distinguished from the relational function of the main relational element, 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. There are languages (e.g. Russian, Chinese) that allow adjectives to head clauses without an auxiliary verb to mark tense. It is a fact about English that relations other than verbs must be accompanied by an auxiliary verb to mark tense when they head clauses. If we allow adjectives to head clauses, then the conjoining of a verb and an adjective as in

16. He was *laughing* and *happy* (Grootjen, Kamphuis & Sarbo 1999)

is unproblematic—two clausal heads are conjoined, rather than a verb head being conjoined with an adjectival complement. As Grootjen et al. note, many of the problematic cases of conjunction which on the surface appear to involve the conjunction of different types of constituents, are resolved if it is grammatical functions that are conjoined and not the parts of speech or forms of expression of the constituents fulfilling those grammatical functions. Accepting that adjectives can head clauses, the extension to prepositions, adverbs and untensed relations more generally, is straightforward. Likewise, although the use of a noun as the head of a clause is uncommon in English, it occurs more regularly in other languages (e.g. Russian).

1.3. NOMINAL HEAD (EXPRESSION). 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

Several other researchers have suggested that any strong notion of endocentricity needs to be relaxed to deal with constructions like those above (cf. Pullum 1991).

1.4. CLAUSE HEAD (EXPRESSION). Clauses may also be headed by expressions:

- Nominal
  - He is *a child*
- Prepositional phrase
  - The book is *on the table*
- Verb phrase
  - 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” and allowing salient attributes of the nominal to be ascribed to the subject. However, there is also an *equational* analysis in which the auxiliary verb “is” is functioning as a main verb and equating two nominals “he” and “a child”. Both analyses are consistent with the basic principles of the bi-polar theory and humans make well vary in their linguistic 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 arguments “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 argument 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. Unlike the fully determinate X-Bar Theory which posits that every expression will have a single syntactic representation, the bi-polar theory is underdetermined and multiple functional representations are possible.

Many linguistic formalisms treat “eating a sandwich” in “he is eating a sandwich” as a verb phrase constituent and may even assume that every clause has a verb phrase constituent (at least in English). In the bi-polar theory, verb phrase constituents are not universal in clauses (even in English). This follows from the claim that the head of a clause can be an adjective, preposition, prepositional phrase, adverb, noun or nominal in addition to being a verb. For example, if “sad” is the clausal head of “he is sad” with “is” functioning as a specifier, there is no verb phrase constituent.

If verb phrases are a possible, but not necessary, clausal constituent, then it is also possible that “eating” can first combine with “is” rather than “a sandwich”. The combination of an auxiliary and main verb is called a *predicator*—consistent with the SPO or SVO schema of functional grammar.

Conjunctions provide additional evidence against the universality of the verb phrase constituent in English and in favor of the use of functional categories. Consider

19. The rock is *on* and *scratching* the table
20. The rock is *on the table* and *scratching it*
21. The rock *is on the table* and *was scratching it*
22. The rock *is on* and *was scratching* the table

In 19, a preposition and verb participle are conjoined independently of the object “the table” that they share. Functionally, two clausal heads are conjoined. In 20, the objects of the preposition and verb participle are distinct (albeit co-referential) constituents. The term *predication*—corresponding to an untensed clausal head and post-head complements—is used to indicate this grammatical function. In 21, the predicate “is on the table” is conjoined with the predicate “was scratching it”, where *predicate* is a grammatical function corresponding to the tensed clausal head and post-head complements. In 22, the auxiliary verb which indicates tense and the clausal head are conjoined separately from the post-head complement, providing additional evidence for the grammatical function *predicator*. Finally, in

23. She is *laughing, happy, a friendly person, and always in a good mood*

the conjoining of a verb participle, adjective, noun phrase and prepositional phrase is explained by their common grammatical function as predications.

2. REFERENTIAL POLE SPECIFIERS. Lexical items of different parts of speech and at least one expression form may function as specifiers.

### 2.1. NOMINAL SPECIFIERS.

- Determiner
  - *The* 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 definite instance of an object (“the book”) or objectified relation (“the kick”), to a collection of instances (“some books”), to a mass (“some rice”), to an indefinite instance (“a book”), and even to a questioned instance (“what book”), and a non-existent instance (“no book”). The possessive nominal indicates reference to an object with respect to a *reference point* (e.g. “Joe”) which is itself an object reference (Taylor 2000).



## 2.2. CLAUSE SPECIFIERS.

- Auxiliary
  - He *is* running
- Infinitive marker
  - I like *to* sleep
- Complementizer
  - *That* he ran is good
- Relativizer
  - The book *which* you read
- Mood (subject + auxiliary)
  - *He's* going

The auxiliary verb “is” in “he is running” establishes reference to a definite situation via tense marking. The infinitive marker “to” typically specifies an indefinite situation. The *complementizer* “that” objectifies the reference to a definite situation, allowing the situation to function as a complement in a matrix clause. The *relativizer* “which” supports the use of a clause in a modifying role. In “he’s going”, the auxiliary verb “is” cliticizes with the subject “he” forming a referential unit composed of a reference point + specifier and providing evidence for the grammatical function called *mood* in Halliday & Matthiessen (2004).

3. INTEGRATING MORPHOLOGY AND SYNTAX. The bi-polar theory provides for a cleaner integration of morphology and syntax than uni-polar theories which adopt a strong notion of endocentricity. Morphology is full of derivational suffixes that take a word of one part of speech and create a new word of a different part of speech.

Root	Derivational Suffix	Word
Adjective Quick	-ness	Noun Quickness
Adjective Quick	-ly	Adverb Quickly
Adjective Quick	-en	Verb Quicken

Despite the change in part of speech, the resulting word retains the essence of the root. The addition of “-ness” to “quick” has the effect of objectifying the adjective “quick” and allowing the concept it describes to be construed as a noun (i.e. objectively). The addition of “-ly” to “quick” allows the adjective which normally functions to modify objective heads to function to modify relational heads or relational modifiers—the typical function of an adverb. The addition of “-en” to “quick” adds a progressive aspectual dimension of meaning to the stative adjective “quick” converting it into a verb.

There is no suggestion that “quick” in “quickness” is a noun because it is the root of “quickness” or that “quick” in “quickly” is an adverb or that “quick” in “quicken” is a verb. Yet this is essentially what is done in grammatical approaches which adopt a strong notion of endocentricity. The reality is that neither morphology nor syntax is, in general, endocentric. Modification in grammar is the closest one gets to endocentricity. Heads

combine with modifiers to form expressions that have essentially the same distribution as the unmodified heads.

Once a strong notion of endocentricity is rejected, the integration of morphology and syntax follows. Heads and roots are the primary semantic elements of the expressions and word forms of which they form a part. However, heads are coerced by the specifiers, complements and modifiers, and roots are coerced by the affixes, with which they combine. This coercion makes it possible for heads and roots to be used in different grammatical contexts.

4. SUMMARY. The following graphic summarizes the representational commitments of the bi-polar theory:

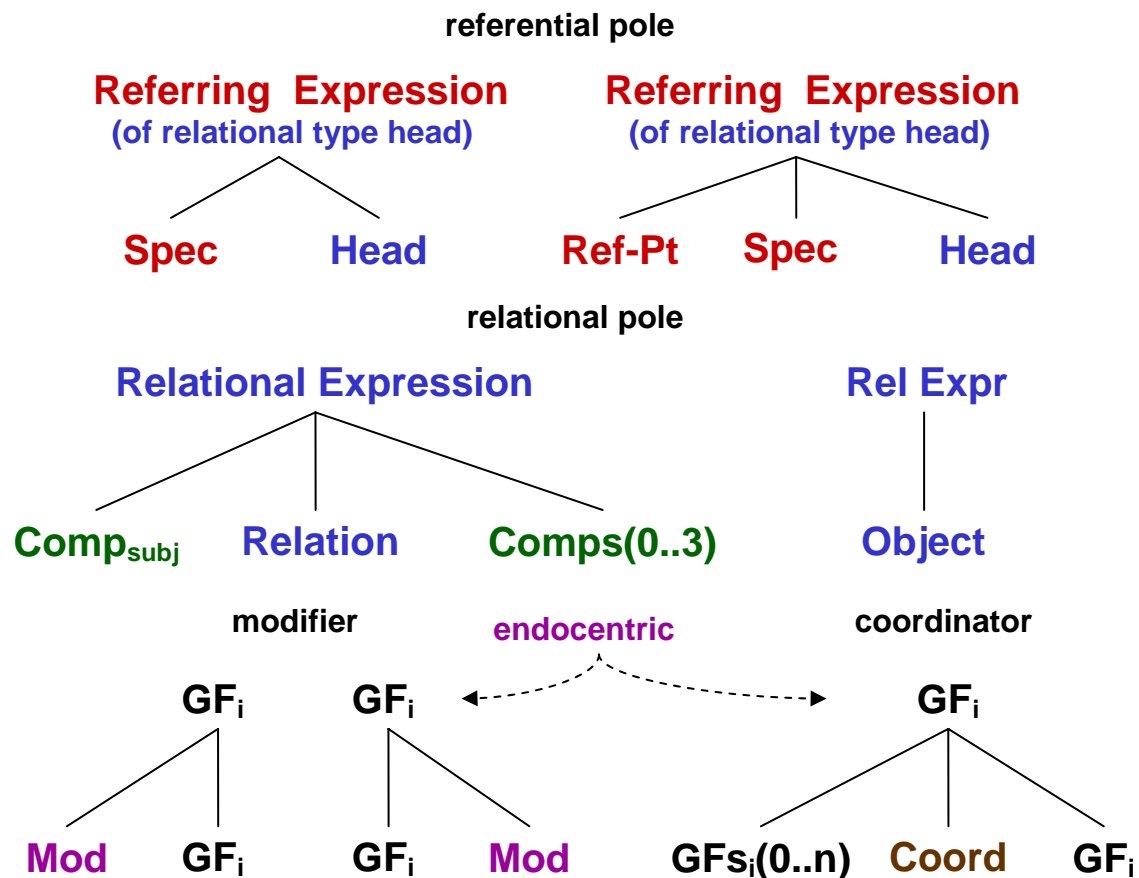


Figure 2: The Bi-Polar Theory

A specifier and a head combine to form a referring expression whose referential type—nominal, clause, objectified clause, relative clause—is determined by the specifier and whose relational type—relation, objectified relation, object—is determined by the head. The referential type determines the grammatical contexts in which the expression can be used. It is undetermined in the bi-polar theory whether a relational head combines with its specifier before or after the relational head combines with its complements. It is also undetermined whether the relation combines with its non-subject complements before

combining with the subject complement. This underdetermination allows the wider discourse context, and, in spoken language, intonation, to influence the linguistic representation of clauses and phrases. Modifiers and coordinators combine with all grammatical functions (GF<sub>i</sub>) not just heads.

The functional categories specifier, head, modifier, complement, reference point and coordinator are very abstract linguistic categories which represent functional aspects of meaning at a high level of abstraction. More specialized, less abstract subtypes of these categories exist and take part in linguistic representations of form and function. For example, the number and type of complements a relation takes is not stipulated in the very general graphical depiction of relational expressions in Figure 2. For any particular relational lexical item, there will be a collection of more specialized constructions identifying the number and type of the complements with which it combines. Likewise, the specifier of a nominal may be subcategorized as an object specifier and the specifier of a clause as a predicate specifier. Further, the [reference-point specifier head]<sub>referring-expression</sub> construction generalizes over the more specific [reference-point<sub>nominal</sub> object-specifier object-head]<sub>nominal</sub> (e.g. “John’s book”) and [reference-point<sub>subject</sub> predicate-specifier predicate-head]<sub>clause</sub> constructions (e.g. “John’s happy”).

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