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Chapter **7**

The Emergence of the Semantics of Argument Structure Constructions

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In the traditional view of argument structure, the main verb directly determines the overall form and meaning of the sentence. That is, the verb is assumed to *project* its argument structure. This view has been widely accepted on the basis of basic sentences such as the following:

(1) a. Pat went down the street.
b. Pat did her homework.
c. Pat gave Chris a cake.
d. Pat made Chris happy.
e. Pat put the book on the table.

In la, for example, the main verb *go* seems to be responsible for the fact that the sentence has a subject and a prepositional phrase complement, and *go* also seems to be responsible for the interpretation of motion. In 1b, *do* is arguably responsible for both the transitive form and transitive meaning. Similarly, *give* in 1c is a three-argument verb and lexically specifies the meaning of transfer apparent in the overall expression. *Make* in 1d is arguably responsible for the resultative form and interpretation, and *put* insures the particular three-complement configuration in le and the interpretation of caused motion.

However, if we look beyond these basic sentences, we find other cases in which it is not as natural to attribute the overall form and meaning to the main verb. For example, consider the following:

(2) a. The truck rumbled down the street.
b. Pat eyebrow'd her surprise.
c. We will overnight you that package.
d. He kissed mother unconscious.
e. They couldn't manage to pray the two little girls home again.

Rumble in 2a, for example, is a verb of sound emission, not motion, but the sentence nonetheless entails motion. *Eyebrow* and *overnight* are not even normally verbs and yet they appear in 2b and 2c as verbs with transitive and ditransitive argument structures, respectively. *Kiss* normally has a simple transitive form, but in 2d appears with a causative interpretation and the resultative complement. *Pray,* normally an intransitive verb, is used in 2e with a directional phrase in an expression that implies caused motion. In none of these cases is it plausible to attribute the overall form and meaning of the sentence to the main verb.

Another reason why it is not always useful to attribute the overall form and meaning directly to the main verb is that verbs generally appear in multiple argument structures. That is, verbs typically underdetermine the overall form and meaning of a clause. For example *type* appears in at least the following five argument structures:

(3) a. She typed for 3 hours.
(intransitive construction)
b. She typed a letter.
(transitive construction: creation)
c. She typed her fingers raw.
(resultative construction)
d. She typed 40 characters onto the page.
(caused-motion construction)
e. She typed her way to a promotion.
(*way* construction)

Similarly, *sneeze,* a parade example of an intransitive verb, can appear in at least the following five different argument structures:

(4) a. Pat sneezed.
(intransitive construction)
b. Pat sneezed the foam off the cappuccino.
(caused-motion construction)
c. She sneezed a terrible sneeze.
(cognate object construction)
d. She sneezed her nose red.
(the resultative construction)
e. She sneezed her way to the emergency room.
(the *way* construction)

TABLE 7.1
English Argument Structure Constructions

Construction/Example	*Meaning*	*Form*
1. **Intransitive motion** The fly buzzed into the room.	X moves to Y	Subj V Obl
2. **Transitive** Pat cubed the meat.	X acts on Y	Subj V Obj
3. **Resultative** She kissed him unconscious.	X causes Y to become Z	Subj V Obj XCOMP
4. **Double object** Pat faxed Bill the letter.	X causes Y to receive Z	Subj V Obj Obj2
5. **Caused-motion** Pat sneezed the foam off the cappuccino.	X causes Y to move Z	Subj V Obj Obl

At the same time that the verb is not reliably responsible for the form and meaning of the clause, there are clearly regularities between the form and meaning themselves. For example, Subj V $\text{Obl}_{location}$ is associated with the interpretation of motion; Subj V Obj Obl is associated with the meaning of caused motion; Subj V Obj1 Obj2 is associated with the meaning of transfer, and so on (see Goldberg, 1995, for discussion). One way of capturing the contribution of form and meaning that is not attributable to the main verb is to posit abstract *constructions* that pair form with meaning, independently of the verbs that appear in them.[1]

The following is a definition of *construction:* C is a CONSTRUCTION iff_{defn} C is a pairing of form and function such that some aspect of the form or some aspect of the function is not strictly predictable from C's component parts. Knowledge of language in general is understood as the knowledge of interrelated constructions (see Fillmore & Kay, in preparation; Goldberg, 1995; Langacker, 1987, 1991; Pollard & Sag, 1987).

A partial list of the constructions that correspond to basic argument structures in English is given in Table 7.1.

The argument structures listed in Table 7.1 are constructions because their form and associated meaning are not necessarily predictable from the words that appear in them (cf. examples 2a-e, and discussion in Goldberg, 1995). The rest of this chapter offers an account of how the meaning associated with argument structure constructions is acquired: The meaning can be understood to emerge from generalizing over lexical instances. That is, constructions associated with basic argument structure patterns can be seen to be learned through a process of categorization and generalization over the input. No innate linking rules need to be posited.

[1]See also Hovav and Levin (1998) for a related way of capturing these generalizations by allowing a distinction between a verb's core meaning and the meaning associated with argument structure frames.

It should be mentioned that the emergentist framework adopted here differs from that advocated by Hopper (1987). Whereas Hopper viewed grammar as constantly emerging during ongoing discourse, this present account takes the position that grammar emerges primarily during initial acquisition, from a combination of linguistic input, the functional demands of communication, and general cognitive abilities and constraints. Once grammar is acquired, it is assumed that it has a highly conventionalized status, and that although minute changes in the system constantly occur, the system as a whole is fairly stable.

THE EMERGENCE OF ARGUMENT STRUCTURE MEANING

Initial acquisition of argument structure patterns has been widely argued to be on a verb-by-verb basis (Akhtar, 1998; Akhtar & Tomasello, 1997; Bates & MacWhinney, 1987; Bowerman, 1982; MacWhinney, 1982; Schlesinger, 1977; Tomasello, 1992; Tomasello & Brooks, 1998; see also Gropen, Epstein, & Schumacher, 1997, for discussion of the somewhat more productive use of nouns). Children initially tend to conservatively produce the patterns they have heard.

At the same time, it is clear that children cannot continue to learn argument structure patterns on a verb-by-verb basis indefinitely or we might expect to find a language in which argument structures varied on a verb-by-verb basis in an unrestrained way. For example, we might expect to find a language in which the transitive form is expressed by SVO word order for the verb *see,* but by SOV word order for *kiss,* and by case-marking for *hate:*

(5) a. Pat saw Chris
b. Pat Chris kissed
c. Hate Pat-nom Chris-ace

However, languages do not vary in this way; they are much more regular, having a few argument structure constructions that are systematically related. Moreover, semantically similar verbs show a strong tendency to appear in the same argument structure constructions (Fisher, Gleitman, £ Gleitman, 1991).[2]

[2]Possible exceptions are mental experience or *psych verbs,* which often do vary within a single language in the way the arguments are expressed. For example, in English we say *It pleases her,* with the experiencer as object, but *She likes it,* with the experiencer as subject. Yet even this class has been widely argued to vary in a fairly systematic way, with causative psych verbs encoding the stimulus as subject, and stative psych verbs encoding the experiencer as subject (see Grimshaw, 1990, and references therein).

Further evidence that children generalize over particular instances to form more abstract representations comes from their ability to use constructions productively. For example, by the age of 3 or 4, children produce spontaneous overgeneralizations such as *Don't laugh me* or *She failed me down* (Bowerman, 1982). They are also able to successfully manipulate and comprehend new or nonsense verbs in unmodeled constructions in experimental settings (e.g., Akhtar & Tomasello, 1997; Gropen et al., 1989; Naigles, 1990). Because children do not hear such sentences in the input, their occurrence is evidence that children recognize an abstract pattern in their language and know how to productively exploit it for new cases. Therefore, it seems that learners must be attempting to categorize the instances they hear into patterns (cf. also Alien, 1997; Morris, 1998; Tomasello & Brooks, 1998).

Akhtar (1998) provides experimental evidence that nicely demonstrates both the strategy of learning on an item-by-item basis and the growing trend toward generalization. Children aged 2, 3, and 4 were taught novel actions for two novel verbs modeled in SOV or VSO orders:

(6) a. Elmo the car gopping.
b. Dacking Elmo the car.

Recording spontaneous productions of these verbs and elicited responses to queries of *what happened?,* Akhtar found that 2- and 3-year-olds matched SOV or VSO patterns roughly half the time and corrected order to SVO order roughly half the time. The fact that the 2- and 3-year-old children produced the modeled, non-English orders of the novel verbs so often demonstrates that they were willing to learn the argument structures of these verbs on an individual basis. This finding supports the idea that initial acquisition is highly sensitive to word-specific patterns. At the same time, the fact that these same children corrected the order for these same verbs half the time to make it standard English SVO order demonstrates that they were also aware of and making use of a generalization over the instances they had already learned. The language-particular SVO generalization played a much greater role for the 4-year-olds. These older children rarely matched the modeled order and were much more likely to correct to SVO order.

In a control condition, Akhtar performed the analogous experiment with familiar verbs, for example *push* and *hit:*

(7) a. Elmo the car pushing.
b. Hitting Elmo the car.

This condition was designed to test whether children might have been simply accommodating the experimenter's strange word orders for pragmatic reasons that did not necessarily have to do with acquisition. If so, then we might expect the children to produce these known verbs with the novel word orders as well, because the same experimental context applied. On the other hand, if the children were truly learning how to use the novel verbs in the earlier experiment, the production of known verbs should be different. We would expect that the children would be more likely to change to SVO order, because this order of arguments was already mastered for these verbs. The latter scenario is exactly what Akhtar found. In the control condition involving known verbs, even the youngest children were far more likely to correct to SVO than to use the order that was modeled.

The Basis of Constructional Meaning

Returning to the argument structure constructions listed in Table 7.1, it is worth considering more specifically how their meaning emerges from learned instances. I would like to suggest that the generalization to constructional meaning is based largely on the meanings of highly frequent "light" verbs: verbs with very general meanings. Notice that the meanings of the light verbs *go, do, make, give,* and *put* correspond closely to the meanings associated with argument structure constructions (see Table 7.1) as given in Table 7.2.

Clark (1978) noted that these light verbs are among the first verbs to be learned cross-linguistically, citing Bowerman (1973) for Finnish, Grégoire (1937) for French, Sanches (1978) for Japanese, and Park (1977) for Korean. Children were observed to use these verbs with a general meaning close to that of adults.

The following are examples of early uses of these verbs, with data from the Howe (1981) and Bloom (1970) corpora on CHILDES (MacWhinney, 1995):

(8) a. put it there (Kevin, MLU 1.87)
b. make @ car under bridge (Kathryn, MLU 1.92)
c. go back # Mum (Ian, MLU 1.53)
d. give it brush (Kevin, MLU 1.87)
e. Daddy do that (Ian, MLU 1.53)

TABLE 7.2
Light Verbs and Corresponding Constructions

go	X moves Y	Intransitive construction
do	X acts on Y	Transitive construction
make	X causes Y to become Z	Resultative construction
give	X causes Y to receive Z	Ditransitive construction
put	X causes Y to move Z	Caused motion construction

TABLE 7.3
Frequencies From Carrol et al. (1971)

do	1,2695	take	4,089	eat	1,616
make	8,333	put	3,942	hold	1,192
find	6,916	give	3,366	fall	824
get	5,700	read	3,057	sit	549
go	5,388	play	2,113	fit	461
come	4,676	draw	1,623	fix	156

Clark (1978) also noted that these verbs are the most frequent verbs in children's early English. The high frequencies of these verbs reflect the children's input. That is, the relatively high frequency of the set of light verbs in children's speech is mirrored by the high frequency of the same set of verbs in the input. The following raw frequencies are from the frequency list of Carroll, Davies, and Richman (1971), based on a 5-million-word corpus of texts used for third through ninth graders: The light verbs *do, make, find, get, go, come, take, put,* and *give* are more frequent than other early verbs.[3]

Eaton (1940) provided word frequency counts for French, German, and Spanish as well as English. Translations of the previously mentioned light verbs all appear in the list of the 1,000 most frequent words in each of these languages.

Why is it that light verbs tend to be so frequent cross-linguistically? Bybee (1985; Bybee, Perkins, & Pagliuca, 1994) observed that there is a strong correlation between high frequency and general semantics, because lexical items with more general meanings are applicable in a larger number of situations. Comparing *go* with *amble, crawl, limp, run,* or *waltz,* for example, or comparing *put* with *shelve, box, hide, tuck in,* or *stuff,* we can see that *go* and *put* apply in a wider range of contexts. Importantly, light verbs also code meanings that are highly relevant to daily human experience: scenes of motion, action, causation, transfer, and so on. These basic scenes are arguably the building blocks for much of human cognition through processes of metaphorical extension and abstraction (Goldberg, 1995; Lakoff, 1987).

High frequency in the input begets high frequency in children's speech for several reasons. Slobin (1997) noted that high frequency is a necessary condition for automatization and facilitates accessibility, leading to ease of production and comprehension. High frequency also correlates strongly

[3] *Read* is the next highly frequent verb on the list, but this may be the result of a bias of the corpus, as the corpus consists of children's school texts. *Do* is especially frequent because it can be used as an auxiliary as well as a main verb; however, in a small corpus study I performed on the CHILDES database, *do* is used as frequently as other light verbs by children who are not yet using this or any auxiliaries.

with shorter forms (Zipf, 1935), leading highly frequent verbs to be shorter and therefore easier to learn and use. Slobin (1997) observed that these factors, in addition to (or instead of) input frequency per se, encourage language learners to rely heavily on light verbs in their own speech.

In fact, children's reliance on light verbs goes beyond the frequency in adult speech to some extent. Clark (1994, p. 29) observed that children seem to use light verbs in circumstances when adults would generally select a more specific verb. For example:

(9) a. You . . do . . doing that
(as adult builds blocks into a tower)
b. Uh oh, I did.
(as he turned off the tape-recorder by pushing a knob)
c. make name!
(telling adult to write the child's name)

This fact is most likely explainable by the same factors that lead to the light verbs' early acquisition. Because the light verbs are more frequent and thus easier to produce, it is natural that children sometimes use a light verb instead of a more specific verb that may be somewhat harder to retrieve.

The fact that children learn the light verbs so early and use them so frequently may play a direct role in the acquisition of argument structure constructions in the following way. Children are likely to record a correlation between a certain formal pattern and the meaning of the particular verb(s) used most early and frequendy in that pattern. This meaning would come to be associated with the pattern even when the particular verbs themselves do not appear. Because light verbs are more frequent than other verbs and are also learned early, these verbs tend to be the ones around which constructional meaning centers.

For example, the syntactic frame, Subj V Obl_{loc}, is associated with the meaning of intransitive motion. This explains the interpretation of sentences like the following, which do not involve verbs that lexically designate motion:

(10) a. The truck rumbled down the alley.
b. The runner huffed and puffed up the hill.

The expressions in 10a–b entail motion when put in the constructional frame associated with motion, roughly the meaning of *go.*

It turns out that the verb *go* accounts for a full 53.8% of the tokens (105/195) of this syntactic pattern in the Bates, Bretherton, and Snyder (1988) corpus of 27 children at 28 months of age.[4] Other verbs appear in the pattern, but with much less frequency, for example, *fall* (6.2%), *get* (5.6%), *look* (4.1%), and *live* (4.1%). Similarly, the syntactic frame Subj V Obj Obl_{loc} is associated with the meaning of caused motion, which accounts for the interpretation of the following expressions:

(11) a. She sneezed the foam off the cappuccino.
b. We will overnight you that package.

Put is the verb that encodes the meaning of caused motion most directly, and *put* accounts for a full 38.1% (16/42) of the tokens in the corpus. Again, odier verbs appear in this pattern, but with much less frequency. The next most frequent verbs are: *get* (19%), *take* (9.5%), *do* (7.1%), *throw* (4.8%).

The ditransitive form, Subj V Obj1 Obj2, is associated with the meaning of transfer, roughly the meaning of the lexical verb, *give* (e.g., Goldberg, 1995). The present hypothesis predicts therefore that *give* should be the most frequendy used verb in the ditransitive frame. Because the ditramsitive construction does not appear to be frequently used at 28 months, relevant data reported in Gropen et al. (1989) were reanalyzed to test the current hypothesis.[5]

Gropen et al. (1989) collected ditransitive utterances in longitudinal corpora from the Brown (1973) corpus of Adam, Eve, and Sarah's speech, and MacWhinney's (1995) corpus of the speech of his two sons, Ross and Mark. Adam was recorded in 55 two-hour samples taken every 2 to 4 weeks between the ages of 2;3 and 5;2. Eve was recorded in 20 two-hour samples taken every 2 to 3 weeks between the ages of 1;6 and 2;3. Sarah's speech was recorded in 139 one-hour samples taken at 2- to 19-day intervals between the ages of 2;3 and 5;1. Ross and Mark were recorded in 62 samples of varying sizes at varying intervals, between the ages of 2;7 and 6;6 in the case of Ross, and 1;5 and 4;7 in the case of Mark.

A chart of the most frequent verbs recorded in the ditransitive construction, together with the percentage of tokens, are given in Table 7.4.[6]

As the current hypothesis predicts, *give* was the most frequent verb for four out of the five children. In fact, it appeared more than twice as frequendy as the next most frequent verb for each of these children. In the case of one child, Mark, 10 instances of *give* were observed as compared

[4] I am indebted to Nitya Sethuraman for collecting this data by hand from the Bates et al. corpus (which is part of the CHILDES database).

[5] The ditransitive construction appeared a total of only six times in the Bates et al. corpus.

[6] Uses determined to be idiomatic would have increased the overall frequency of *give;* we nonetheless excluded them from the following analysis.

TABLE 7.4
Most Frequent Verb Used Distransitively for Each Child

Chile	*Verb Used*	*Percentage of Distransitives*
Adam	*give*	52.7% (59/112)
Eve	*give*	36.4% (4/11)
Sarah	*give*	43.3% (29/67)
Ross	*give*	43.1% (69/160)
Mark	*tell*	32.4% (11/34)
	(give)	29.4% (10/34)

Note. Based on data summarized in Gropen et al. (1989).

with 11 instances of *tell.* Thus, *give* was also among the first or second earliest recorded verbs in the ditransitive frame for each of the five children.

The claim is that because the light verbs are the most frequent verbs used in their respective syntactic patterns and are also among the earliest verbs to be used in those patterns, the interpretations of expressions with light verbs act as a center of gravity for other expressions having the same form. The end result of this categorization is the direct association of the meaning of the light verb with the formal pattern, giving rise to the constructional meaning. The strong effect of early acquisition and frequency has been documented in connectionist net simulations (Elman, 1993; Elman et al., 1996; see also Alien, 1997, for connectionist modeling of argument structure constructions).

It is likely that the categorization and generalization into more abstract patterns is driven by an increase in vocabulary size. That is, in order to learn an ever increasing vocabulary and the associated syntactic patterns, it may be necessary to categorize individual instances into classes. This idea is supported by Bates and Goodman (1997) (chap. 2, this volume), who argue that syntactic proficiency is strongly correlated with vocabulary size. In particular, they argue that the single best estimate of grammatical status at 28 months, which is when syntactic encoding becomes produced more regularly as measured by the MacArthur Communicative Development Inventory (CDI), is the total vocabulary size at 20 months, which is the heart of the vocabulary burst. In fact Bates and Goodman (1997) showed that grammar and vocabulary stay tightly coupled across the 16- to 30-month range. This correlation would be expected if the increasing vocabulary size is in fact directly forcing certain syntactic generalizations.

Further empirical support for the present view of the acquisition of argument structure comes from Ninio (1996). Ninio noted that children often begin using a single verb in a particular grammatical pattern long

before other verbs begin to be used in the pattern. In particular, the first uses of SVO and VO patterns were studied in two Hebrew-speaking populations: 15 children in a longitudinal study and eighty-four 18-month-old children in a cross-sectional study.[7] Ninio noted the overwhelming tendency for the "pathbreaking" verbs to be drawn from the set of light verbs. In particular, in both the longitudinal and cross-sectional studies, the children tended to use the following verbs transitively before other verbs were used: *want, make/do, put, bring, take out,* and *give.*

In the longitudinal study, Ninio further observed that SVO and VO patterns were initially produced with only one or at most a few verbs for a prolonged period lasting between 2 and 15 weeks. More and more verbs came to be used in an exponentially increasing fashion; that is, there seemed to be more facilitation after 10 verbs than after 5, and so on. She suggested that this increase stems from the fact that children gradually abstract a more general syntactic pattern on the basis of the early verbs, and that the growing generalization allows them to use new verbs in this pattern more and more easily.

These facts accord well with the account proposed here. Patterns are learned on the basis of generalizing over particular instances. As vocabulary increases, so does the strength of the generalization, making it progressively more and more easy to assimilate new verbs into the patterns. With Ninio, it is proposed here that the instances that play an initial, crucial role are those involving light verbs.

Ninio's (1996) explanation for the early acquisition of the light verbs is somewhat different from the present account. She suggested that the tendency for light verbs to be used early in the VO and SVO patterns stems from a high degree of semantic transitivity in these light verbs.[8] She stated that "the 'pathbreaking verbs' that begin the acquisition of a novel syntactic rule tend to be generic verbs expressing the relevant combinatorial property in a relatively undiluted fashion; this is what makes them such good candidates for acquisition" (p. 25).

The account seems to assume that the semantics of the verbs match the semantics of an independently existing "combinatorial property" and

[7] Ninio (1996) includes data from one English-speaking child in the longitudinal study as well.

[8] That these light verbs are all highly semantically transitive is not entirely clear. As Ninio (1996) noted, they are not according the transitivity criteria laid out by Hopper and Thompson (1980). In the present account, meanings of constructions emerge from generalizations over particular verbs; because the transitive pattern appears with a range of highly frequent verbs, including verbs with low semantic transitivity, such as *get* and *want,* the association of semantic transitivity with simple syntactic SVO status is predicted not to be overwhelmingly strong. In fact, a good number of SVO sentences are not highly transitive (including statives and generics as well as expressions with main verbs such as *gel* and *want).*

that it is this correspondence that results in the verbs' early use in the construction. The combinatorial property and its associated semantics is in effect a schematic construction: a pairing of form and meaning. The account seems to assume, therefore, that a construction exists prior to the first verbs being used in it; verbs whose meanings match the constructional meaning are used earliest. We might call this the Match Proposal.

If semantic transitivity is associated with the language's two-argument construction from the start, and if it is the match between the meaning and form that facilitates the early use of particular verbs, we might expect that all verbs that are semantically transitive should be acquired equally quickly and easily. That is, it is not clear exactly why or how the early use of light verbs should facilitate the use of the construction with other verbs, as it seems to do according to Ninio's (1996) empirical data. The Match Proposal also does not explain why the verbs that are learned earliest are the most frequent verbs in children's (and adults') speech.

The present account suggests that the semantics that comes to be associated with a syntactic pattern emerges from early uses of the pattern with particular verbs. Thus, it is an account of how the construction itself, that is, the pairing of form with meaning, comes to exist in the minds of speakers. The child categorizes learned instances into more abstract patterns, associating a semantic category with a particular formal pattern; the meaning of the most frequent and early verbs occurring in a particular pattern form the prototype of the category.[9] In the present account, then, the simple transitive pattern is associated with the semantics of certain light verbs as the result, and not the cause, of these verbs being used so early and frequently in this pattern.

The fact that light verbs are used so early and frequently in turn results from their high frequency in the input language, which stems from their generally applicable meanings. The early acquisition and high frequency of light verbs are correlated because high frequency facilitates acquisition.

This account generalizes to other light verbs that are not transitive, but are also very frequent, and can be seen to form the basis of argument structure meaning. For example, we have seen that the verb *go* is the most frequent verb used in the intransitive motion construction and corresponds to the meaning of that construction. The same is true of the ditransitive pattern, Subj V Obj1 Obj2, which comes to be associated with the meaning of *give*, the caused-motion pattern, Subj V Obj Obl, which comes to be associated with the meaning of *put*, and so on. More generally, the specific formal patterns associated with particularly frequent verbs come to be associated with the meanings of those verbs. The Match Proposal would need to assume that each of these constructions and its associated meaning were known to the child at the time of the child's first verbs. How the constructions themselves come to exist is not explained. Finally, the Match Proposal predicts cross-linguistic uniformity in the acquisition of verbs and argument structure patterns. The present proposal allows for some cross-linguistic variability given the central role of input frequencies.

[9] See Goldberg (1995) for discussion of the family of related meanings typically associated with constructions.

Cross-Linguistic Variation

It was noted earlier that light verbs are very frequent and among the first to be learned cross-linguistically. It is therefore expected that light verbs should form the basis of the argument structure constructions in a number of languages (including, e.g., Hebrew and English). In other languages, a small set of light verbs is used in conjunction with nominal, adjectival, or participial hosts to form the basis of all verbal meaning (cf., e.g., Mohanan, 1994, for Hindi; Mohammad & Karimi, 1992, and Karimi, 1997, for Persian).

At the same time, the idea that constructional meaning emerges from generalizing over lexical instances allows for some variation cross-linguistically as well. Whereas we expect general verbs to be highly frequent, and we further expect highly frequent verbs to form the basis of argument structure constructions, which frequent verbs actually form the basis of constructional generalization may be somewhat idiosyncratic and language specific (see Bowerman, 1990, for discussion of cross-linguistic variability in the linking between form and meaning).

Conclusion

This chapter proposed an account of how constructional meaning emerges from the categorization and generalization of the input. Although verbs and associated argument structures are initially learned on an item-by-item basis, increased vocabulary leads to categorization and generalization. Light verbs, because they are typically acquired early and are highly frequent, act as a center of gravity, forming the prototype of the semantic category associated with the formal pattern.

The relation between the main verb and the constructional pattern in the basic sentences given at the outset (examples 1a–e) was argued to play an important role in the acquisition of the constructions associated with these basic argument structures. Although such a direct relation is not representative of all verb–construction combinations (cf. examples 2a–e), the frequency of examples such as those in (1) allows speakers to record a correlation of form and meaning that ultimately gives rise to the abstract construction that can then be used in novel ways with new verbs.

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Chapter 8

The Emergence of Language From Embodiment

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"Man is the measure of all things."

-Protagoras

The basic function of language is communication. When the listener succeeds in decoding the message intended by the speaker, the communication has been a success. But exactly how does the speaker package information to make sure that the listener will succeed? What does the listener have to do to build up a mental representation that echoes the original representation in the speaker's mind?

The traditional approach to this problem is one that has focused on the construction of propositional representations (Clark & Clark, 1977; Kintsch, 1974; Levelt, 1989; Schank & Abelson, 1977; Sowa, 1984). In this standard model, a message is represented by a directed graph in which words are joined together by labeled arcs. Although these graphs allow for multiple attachments to a single node, they otherwise resemble the phrase structure tree used in linguistics. This standard, graph-based approach provides a good way of depicting patterns of connectedness between words, but it fails in terms of providing a deeper account of meaning. There is a big gap between the schematic representation provided in a propositional graph and our actual understanding of the activity underlying a sentence. When we look at a picture of a boy letting a frog out of a glass jar, we can form a dynamic representation of the boy turning the lid of the glass jar and the frog hopping out of the jar. Although we could notate structural