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Related topics

- Chapter 12, Lexical decomposition; Chapter 22, Event semantics; Chapter 24, Compositionality; Chapter 26, Acquisition of meaning.

1 Introduction

How do people glean meaning from language? A principle of compositionality is understood to entail that the meaning of every expression in a language must be a function of the meaning of its immediate constituents and the syntactic rules used to combine them. Frege (1892) is often credited with the principle that natural languages are compositional, although no explicit statement has been found in his writings (and it is not entirely clear he even embraced the idea) (Pelletier 2001: section 3). Partee (1984: 153) states the principle of compositionality thus: “The meaning of an expression is a function of the meanings of its parts and of the way they are syntactically combined” (cf. also Dowty (2006: 3)). Cann (1993: 4) notes, “The meaning of an expression is a monotonic function of the meanings of its parts and the way they are put together.”

Montague (1970) stated the condition that there must be a homomorphism—a preserving mapping—from syntax to semantics. That is, the meaning of the whole must result from applying the meanings of the immediate constituents via a semantic operation that corresponds directly to the relevant syntactic operation (Dowty 1979; 2006). This represents the claim as follows in (1), where σ is understood as a function that maps syntactic expressions to meanings.

$$(1) \quad \sigma(x +_{\text{syntactic-composition}} y) = \sigma(x) +_{\text{semantic-composition}} \sigma(y) \quad (\text{Goldberg 1995: 13})$$

Dowty provides the following example for the phrase, *Fido barks* (2006: 11):

- (2) meaning-of (Syntactic-Combination-of (Fido, barks)) = Semantic-Function-of (meaning-of (Fido), meaning-of (barks))

Although what is intended by “meaning” and “syntactic combination” are not unproblematic, it is clear that the principle of compositionality espouses a bottom-up building block model of meaning: the meaning of the whole is built from the meanings of the parts. The principle is typically assumed to further imply that the syntactic composition (“+_{syntactic-composition}”) must be straightforwardly related to semantic composition (“+_{semantic-composition}”) (although see section 2 for more complicated ways in which syntax and semantics can be related). Because the principles of semantic combination are so widely assumed

be transparent, it is easy to overlook the fact that there are any substantive principles at all. Carter (1988) observed, “In a strictly compositional language, all analytic content comes from the lexicon, and no semantic rules . . . are needed to account . . . [for] adding meaning to the sentence which is not directly contributed by some lexeme of the sentence.” Even Jackendoff (1992) who has recently explicitly challenged the principle of compositionality (Culicover and Jackendoff 2006) had said “[f]it is widely assumed, and I will take for granted, that the basic units out of which a sentential concept is constructed are the concepts expressed by the words in the sentence, that is, lexical concepts” (Jackendoff 1992: 9). Compositionality implies that words are the key conveyers of meaning, and there is much to be said in favour of this idea. *Hypochoandria*, *football*, *exam*, *bodice*, *lemonade*, *anaconda*, *wedding* and *death* certainly evoke particular meanings, however we are to construe the notion of “meaning.”

Before discussing various problematic issues that compositionality faces, we first motivate why the principle has been so compelling to so many. The reason seems to be that compositionality is widely assumed to follow from the fact that we can assign meanings to new (i.e. productively created) sentences (Dowty 2006: 3; Groenendijk and Stokhof 2004). That is, it is assumed that people would be unable to glean meaning from new combinations of familiar words unless there exist predictable ways in which meaning is derived from the words and the way those words are combined. Paraphrasing the reasoning of Dowty (2006: 3–4) for example:

Standard argument in favour of compositionality (based on Dowty 2006: 3–4)

- a Speakers produce and listeners parse sentences that they have never spoken or heard before.
- b Speakers and listeners generally agree upon the meanings of sentences.
- c Since there exists an infinite number of sentences, they cannot all be memorized.
- d There must be some procedure for determining meaning.
- e Sentences are generated by some grammar of the language.
- f The procedure for interpreting sentences must be determined, in some way or other, by the syntactic structures generated by the grammar together with the words.

The principle of compositionality is widely acknowledged to be a foundational claim in formal semantics (Groenendijk and Stokhof 2004; Partee et al. 1990), which is compositional by design. Insofar as natural languages lend themselves to description within a formal language, they too should be compositional. And yet, there are many ways in which natural languages depart from formal languages. Several of these divergences present challenges to strict claims of compositionality.

2 Challenges to compositionality: critical issues and topics

2.1 Idioms

If we define idioms to be phrasal patterns in which the meaning of the whole is more than a simple combination of the meanings of the parts, then idioms are, by definition, noncompositional. Expressions such as those in (3), for example, convey something above and beyond what the words mean:

- (3) a *Get hitched* ($\approx$ “become married”)
- b *Keep a straight face* ($\approx$ “prevent oneself from laughing”)
- c *Stay the course* ($\approx$ “continue doing what has been done despite difficulties”)

To preserve compositionality, one could deny that such idioms have internal compositional structure, and instead assign the meaning directly to the whole (Hodges 2012), but there is ample evidence that idioms do have constituent structure. For example, the involved can typically be inflected for tense and agreement, and in many cases idiomatically *deformable* in that they allow, for example, modification, passivization or conjunction. There has been observed that deformable idioms are typically “compositional” in the sense that the constituents that are semantically modified or appear in non-canonical positions are interpretable (Nunberg et al. 1994; but cf. Fellbaum (2011)). *To pull strings* is an idiom of a deformable idiom, since it can passivize and *strings* may be modified as in (4).

- (4) A lot of strings were pulled to get him the part in the movie.

The quantification of *strings* indicates that *strings* is interpreted to mean “connections,” so that the meaning of the idiom in this case can be assigned in part to the interpretation of the words that make it up. To preserve compositionality, then, we might adopt the position that each of the words of a deformable idiom is assigned a part of the meaning of the whole. But of course *strings* only means ‘connections’ when it is pluralized and is the theme argument of *pull* (and *pull* means ‘use of’ but only in the context of *strings*). The reliance on context for determining intended senses of words within idioms appears to violate compositionality; meaning of *strings* depends on its linguistic context, not simply on the constituents immediately dominating it (*a lot of strings*).

As noted above, the primary argument in favour of compositionality relies on the existence of linguistic creativity: since we can produce and understand sentences never heard before, meanings must be arrived at compositionally. Although the principle of compositionality, as generally understood and as stated at the outset, is a statement about *all* of language, the possibility of creativity does not demand that all of language be strictly compositional. If we weaken compositionality to the claim that *some* of language is compositional, idioms need not present a problem. We can allow idioms to be noncompositional, and recognize that they may not be interpreted correctly if heard for the first time. However, there are other, potentially more serious challenges to compositionality.

2.2 Discontinuous semantic units

The principle of compositionality does not specify whether it applies to the surface structure or the “underlying” structure of sentences. Pelletier (1994) points out certain cases of lexical ambiguity, e.g. *Every linguist knows two languages* could be viewed as presenting a compositional ambiguity if two distinct underlying structures are posited. In fact, the existence of semantic units that appear discontinuously in the surface string requires that Compositionality must hold of some level other than surface structure. For example, free word order languages allow meaningful semantic units to correspond to discontinuous syntactic phrases (e.g. a woman’s dog” in (5)); and even fixed word order languages like English occasionally allow discontinuous semantic units (6):

(5) Walpiri (Austin and Bresnan 1996):

Kupuju-lu	<i>kaparla-nha</i>	yanga-lkin	<i>warirra-ku-nha</i>
Child-erg	dog-acc	chase-pres	woman-dat-acc

“The child chased the woman’s dog.”

(6) *The man walked across the tightrope with a monkey on his shoulders.*

The need for compositionality to apply to some sort of underlying structure raises the issue of just how complex and distinct from surface structure the underlying structure is allowed to be. Without limits, just about any meaning could be attributed to any overt linguistic string (Janssen 1986). Moreover, there is a risk of circularity if we assume that speakers know the meanings of new sentences because of the way those sentences are put together, and yet we also assume that the way sentences are put together depends on the meanings of the sentences.

(7) Circularity in appealing to underlying structure to retain compositionality:

- The agreed-upon meaning of a sentence is determined by the meanings of the words and the way those words are put together underlyingly.
- The way the words of a sentence are put together underlyingly is determined by the agreed-upon meaning of the sentence.

What would be needed to escape the circularity is a further assumption that speakers are able to “read off” the underlying structure(s) of a sentence on the basis of the sentence’s surface structure. But as we will see in section 3, a sentence’s surface structure is generally quite underdetermined and/or ambiguous.

2.3 Aspects of morphology

It is unclear whether the principle of compositionality is intended to apply within the word level, but the same “Standard argument in favour of compositionality” outlined in section 1 above would seem to apply equally well to productive morphology. If speakers can create new words they have not witnessed before, and the meanings of those words is agreed upon by other speakers, the meanings of new words would seem to need to be derivable from the component parts and the way those parts are put together. However, Gurevich (2006: section 3.2) provides a compelling case of productive yet noncompositional morphology in Georgian, a language notorious for its complex morphology. Consider Table 24.1 below.

Notice that based on the interpretations in 1 and 2 of Table 24.1, it would seem that *-av* is a second-person subject agreement marker, and that *da-* is a future tense marker. However, we find the same form, *-av*, followed by *-di* used in a sentence with third-person subject agreement in 3. One might hypothesize that *-avdi* is interpreted as third person, but in 4 we see the same suffix interpreted with a second-person subject. Moreover, in 5, we see a second-person interpretation assigned to a combination of a preverb *-da* together with a new suffix *-e*. Gurevich (2006) ultimately makes sense of this complex Georgian morphology by appealing to morphological templates that provide top-down interpretations. There simply is no compositional way to assign consistent meanings to the individual morphemes in Table 24.1. The interpretation of individual morphemes relies on the appearance of other morphemes in a non-monotonic (non-additive) way. Thus we see that morphemes do not necessarily combine in a compositional way, even in a highly agglutinating language like Georgian.

Table 24.1 Georgian morphological paradigm based on Gurevich (2006: section 3.2)

	Pre-verb	Agreement	Version	Root	Thematic suffix	Screvee
1 you draw				<i>xat'</i>	<i>av</i>	
2 you will draw	<i>da</i>			<i>xat'</i>	<i>av</i>	
3 he was drawing				<i>xat'</i>	<i>av</i>	<i>di</i>
4 if you would draw	<i>da</i>			<i>xat'</i>	<i>av</i>	<i>di</i>
5 you drew	<i>da</i>			<i>xat'</i>		<i>e</i>
6 you should draw	<i>da</i>			<i>xat'</i>		<i>o</i>
7 you have drawn	<i>da</i>	<i>g</i>	<i>i</i>	<i>xat'</i>	<i>av</i>	
8 you should have drawn	<i>da</i>	<i>g</i>	<i>e</i>	<i>xat'</i>		<i>a</i>

The issue in morphology is a general one with the majority of morphologists in favour of a templatic or *realization-based* approach, as opposed to a compositional arrangement view (e.g. Ackerman and Nikolaeva (2004); Blevins (2001); Aronoff Booj (2010)). But if compositionality does not apply at the word level, it is not clear it must apply at the sentence level. In both cases, new forms can be created and are interpreted.

2.4 Argument structure constructions

Recall that the semantics associated with syntactic combination is widely assumed straightforward and direct. That is, the syntax should directly determine which argument where in the sentence (e.g. an agent is subject in an active sentence, but in an adjective phrase in a passive), but it is typically assumed that the contentful relational meaning from the specifications of the main verb. It is the main verb, for example, that determines that there is an agent; more generally, the main verb is assumed to determine who to whom. Almost any traditional grammar book, or beginning logic or linguistics course likely begin a discussion of sentence types with a classification of verbs according to many arguments they “take.” It is generally taken for granted, for example, that *intransitive*, *kick* is transitive, and *give* requires an agent, a theme, and recipient arguments. In this way, basic sentence patterns of a language are believed to be determined by syntax and semantic information specified by the main verb. For example, the sentence *Pat put the ball on the table* appears to be due to the specifications of *put*:

- Pat put the ball on the table.

That is, *put* is a verb that requires an agent, a theme and a location, and it is *put*’s syntax that determines that the agent “puts” the theme on or in a location (see Chapter 23).

But if argument structure were *always* projected exclusively from the main verb’s syntax, we would need special verb senses for each of the verbs in the expressions in Goldberg (1995, 2006), Jackendoff (2002):

- (9) a “he was drinking the heart right out of a fine spring afternoon.” (James Crumley, *The Last Good Kiss* [1978])
 b “The people of this small town [...] have been unable to pray Mrs. Smith’s two little boys home again.” (Mark Turner, personal communication)
 c “his thousands of travelling fans [...] had roared him into the Thomas and Mack Center ring.” (www.topix.net/wire/world-soccer/manchester-united)
 d “She tried to avoid blinking the tears onto her cheeks.” (Anne Tyler, *Dinner at the Homesick Restaurant* [1992])
 e “Demi Moore thinks this will Halle Berry her back to the B List.” (personal communication 2007)
 g “I actually had a moth go up my nose once. I [...] coughed him out of my mouth.” (bikeforums.net/archive/index.php/t-292132)

That is, we would need a sense of *drink* that meant roughly “to spend time by drinking”; a special sense of *pray* “to cause to move by praying,” a special sense of *roar* that entails motion and so on. These senses are implausible in that one doesn’t find languages that devote unique stems to these meanings. For example, it is unlikely that one would find a word *kamo*, meaning “to cause to move by coughing,” because this is not a situation that is likely to occur regularly enough to warrant a lexical meaning (Goldberg 2010).

To avoid such implausible verb senses, it has been proposed that argument structure patterns are associated with abstract meanings independently of the verbs that appear in them. On this view, verbs can occasionally combine with argument structure constructions on the fly to create novel sentences like those in (9). Examples of such *argument structure constructions* are given in Table 24.2.

There exists theoretical and experimental evidence in support of argument structure constructions. Theoretical arguments have typically emphasized the ad hoc and implausible nature of certain verb senses that would otherwise be required, as just mentioned (see Goldberg (1995, 2006, 2013) for further details. Other work has noted that learners use the semantics associated with syntactic patterns to figure out what new verbs mean (Fisher 1996; Gillette et al. 1998; Landau and Gleitman 1985); this “syntactic bootstrapping” process presupposes the idea that the syntactic patterns are associated with meanings independently of the main verb. More recent work based on a sorting paradigm (Bencini and Goldman 2000), off-line comprehension (Kaschak and Glenberg 2000; Goldwater and Markman 2009; Kako 2006), on-line priming (Johnson and Goldberg 2013), and neural representations (Allen et al. 2012) provides further evidence that argument structure patterns are associated with contentful semantics. It is possible to posit multiple senses for each verb, but to determine which sense is involved, the comprehender must attend to the phrasal array of grammatical relations. That is, even if one did wish to posit a special sense of *drink*, for example, that meant

Table 24.2 English argument structure constructions (Goldberg 1995)

Ditransitive: (Subj) V Obj _i Obj ₂	X CAUSES Y to RECEIVE Z
Caused-Motion: (Subj) V Obj Oblique _{path}	X CAUSES Y to MOVE Z
Resultative: (Subj) V Obj Pred	X CAUSES Y to BECOME Z
Transitive: (Subj) V Obj	X ACTS on Y; X EXPERIENCES Y
Removal: (Subj) V Obj Oblique _{source}	X CAUSES Y to MOVE from Z
Way construction: (Subj) _i V [poss _i way] Oblique _{path}	X CREATES PATH and MOVES Z _{path}

“to spend time drinking” to account for (9a), it is clear that that sense could only be fixed by the comprehender by observing the complement array. Therefore, at least in English, the pairing of argument structure patterns with meanings is not arbitrary. The comprehension point of view, the pairing of argument structure patterns with meanings, is primary. As Goldberg (1995) points out, it is possible to preserve compositionality in these cases by recognizing that the syntactic means of combination can be paired with semantics such as the meanings suggested in Table 24.2. Nothing rules this out, or an assumption that the rules of composition must be trivial. Montague (1970), Gazdar (1985), and Jacobson (2002) allow for multiple rules of composition that could in principle be richer than is often assumed.

2.5 Intonation

Intonation would seem to provide part of what we generally think of as the “meaning” of an utterance. The meaning of a sentence with default intonation in (10) is not the same as the meaning of the same sentence with question intonation in (11), sarcastic intonation in (12), or sarcastic intonation in (13) as these are all felicitous in distinct contexts.

- (10) Sam CALLED again.
 (11) Sam called again? (question intonation)
 (12) Sure, the President called for you. (sarcastic intonation)
 (13) SAM called again. (sentence focus, possible answer to “what happened?”)

If intonation is incorporated into what is intended by “syntax” in claims about compositionality, these sorts of distinctions could be accounted for. Alternatively, intonation could be included as part of “context,” which clearly plays a role in the determination of interpretation (see Chapter 10).

3 Context

Oddly enough, given that he is often credited for the principle of compositionality, Frege is the author of a distinct principle of contextuality. The principle of contextuality requires that the meaning of each part relies on the meaning of the whole: “[o]nly in the context of a word does a word stand for anything” (Frege 1884: xxii; cf. also Wittgenstein (1961 [1921]). As compositionality requires that word meanings exist in isolation, and contextuality requires that they do not, the two principles appear to contradict one another (Janssen 1986, 1997; 2001; Filip 2012). The principle of contextuality argues that context is used in the full interpretation of utterances, and there are many ways in which this clearly holds true.

3.1 Quantifiers

As is widely recognized, the interpretation of quantifiers often relies on context (Wittgenstein 1985). For example, the quantifiers in the following examples do not refer to *all* entities, but instead refer to some contextually determined set of entities:

- (14) a They fixed all the roads. (= all the roads that need to be fixed)
 b When it snows in Aspen, everyone is happy. (= everyone in Aspen)
 c No one is here. (= no one other than the speaker; or no one who the speaker wants to see)

4 Attempting to reconcile context and compositionality

From the discussion of quantifiers, ellipsis, deixis, and polysemy, it is clear that the way words combine into constituents does not deterministically convey the entirety of the *interpretation* or thought that is conveyed by utterances. Inferences that are drawn in particular contexts contribute importantly to the relevant range of a given quantifier, the intended referents of definite noun phrases, pronouns and all deictic terms, the intended interpretation of unexpressed or polysemous arguments, and all conversational inferences. As Gilles Fauconnier has described it, if the interpretation of a sentence is an iceberg, the sentence itself provides only the above-the-water-line peaks of the iceberg. People supply the rest of the meaning on the basis of shared context and world knowledge.

This recognition has led different researchers to differing conclusions about the fate of compositionality. Groenendijk and Stokhof argue that thoughts or intended interpretations of sentences are not what is expressed by sentences (2004: 11). They thus draw a distinction between “thoughts,” and the “meanings” of sentences, the latter being vague or underspecified. Sentential “meaning” is assumed to be context-free and compositionally determined. On the other hand, interpretation or thought is not conveyed directly by the “meaning” of an utterance and is not compositional. If “meaning” is not equivalent to interpretation or thought, then meaning would seem to be a formal construct created by theorists. In this way, compositionality is not a claim that is open to empirical verification or falsification.

Returning to the deductive argument put forward in the “Standard argument in favour of compositionality” outlined in section 1, however, it seems necessary that whatever “meaning” is, it must be accessible to ordinary speakers, since that is an important assumption in the argument (see “Standard argument” (b): “Speakers and listeners generally agree upon the meanings of sentences”). That is, what speakers recognize and agree on (more or less, most of the time) is the *intended interpretation of utterances in contexts*. Thus it would seem that “Standard argument” (b) actually presupposes access to contextual cues to meaning, since it is a combination of an utterance *and a context* that results in the agreed-upon interpretation. This motivates Fodor’s (2001) conclusion that meaning and thought are one and the same and are simply not compositional, since “language is strikingly elliptical and inexplicit about the thoughts that it expresses and as a simple matter of fact, in the general case, sentences are remarkably inexplicit with respect to how the thoughts they express are put together.”

To see just how powerful context can be in the determination of intended meaning, consider the fact that a simple pointing gesture is typically readily understood in a given context.

4.1 Pointing is understood, but the meaning does not reside in the point

The reasoning in favour of compositionality in the “Standard argument” seems to assume that the meaning of an expression must reside in the expression itself for the expression’s meaning to be shared across people. And yet, humans are remarkably good at gleanng others’ intended meanings even when language is not used. For example, we generally share an understanding of what is meant when someone points at something. If two boys are walking down the street and point to a hoagie restaurant, it could mean “let’s get something to eat,” “that place is still there!,” or “let’s cross the street because the school bully hangs out there.” Oftentimes, no words need to accompany a pointing gesture as the intended interpretation

is often recognized as obvious in context; and yet clearly, the meaning is not in itself (Tomasello 2009). Instead, the shared common ground provided by the conversational background knowledge helps to determine what is intended. Language can be viewed entirely unlike pointing in that the language itself typically only offers incomplete information about the overall interpretation of sentence.

5 Current contributions and research

Piantadosi et al. (2012) point out that the underspecification inherent in language is a feature, not a bug. They note that utterances routinely underspecify meaning, relying on contextual information to fill in the gaps. This is not a problem for efficiency, as it would be needlessly long-winded to specify every aspect of intended meaning, or the intended sense of every potentially ambiguous word. Instead, context supplements the cues provided by utterances. This allows listeners to arrive at a shared interpretation while minimizing the redundancy that would otherwise be required.

Although the principle of compositionality is generally interpreted as entailing that the meaning of each constituent be determined only with reference to its immediate domain, the “Standard argument” does not entail that this is the only way for meaning to be determined. Instead, language could involve a network of formal patterns, which may be learned. Some of these slots may be defined recursively, and this in itself would allow for infinite creative potential. The argument structure constructions in Table 24.2 are examples of formal patterns with open slots. Another example is the English *The Xer, the Yer* construction exemplified in (22) (see Fillmore et al. (1988)):

- (22) The larger the audience, the easier the show. (COCA corpus, Davies 2008)

The construction requires that the comprehender construct a relationship between the variables, one independent (determined by the first comparative phrase), and the other dependent (determined by the second comparative phrase). The rule of compositionality thus nontrivial, in that syntax itself is quite unusual—it is not even clear what phrase *the larger the audience* is—and the linked variable interpretation does not follow from any particular word, at least in any obvious way. Still, the construction licenses an open-ended set of sentences.

The original argument suggested in favour of compositionality does not require that the rules of combination be trivial, that world knowledge and context be irrelevant. Meaning is determined in a strictly bottom-up way on the basis of the words and the immediate constituents. Shared interpretation can be arrived at by recognizing the existing constructions that can contribute nontrivial aspects of semantics, and by recognizing that people come to the task of interpretation with a vast amount of shared world knowledge. This allows for interpretation to involve a top-down component, moving from the building block metaphor of meaning.

Kirby (2000) has investigated *why* languages tend to involve component pieces that be reconstituted in new ways (or why languages involve templates with open slots that be combined). He creates simulations of computer “agents” that aim to maximize expressive power while minimizing the number of rules. The simulations begin by generating forms that correspond to intended meanings, but over time, as multiple agents interact, they aim to express new meanings, a type of compositionality emerges. Namely, the simulations

eventually settle into a system that involves component pieces that can be reassembled in new ways. Intuitively, it is clear that learning a completely noncompositional language—wherein each distinct meaning would correspond to a wholly unique form—would not only be extremely cumbersome but would fail to allow agents any way to express or comprehend any new meanings.

The issues involved in any approach to meaning are complex and quite daunting. A measure of the difficulty involved is evident in the fact that the field of machine understanding has made little progress over the past half century. Both Piantadosi et al. (2012) and Kirby (2000) provide computational models that aim to motivate how and why new utterances are interpretable, and this promises to be a rich arena for additional research.

6 Conclusion

It is often debated whether the principle of compositionality is an empirical claim (Fodor 2001; Pelletier 1994) or a methodological assumption (Barker and Jacobson 2007; Dowty 2006; Groenendijk and Stokhof 2004; Janssen 1983; Partee 1995). The present overview tends toward the position that there exist empirical questions that need to be addressed for the principle of compositionality to be upheld.

An understanding of how humans interpret language has been a goal of philosophy, literature, and linguistics for hundreds of years. The present chapter does not pretend to solve the problem in any way, but only to present evidence that the issues involved are complex. The apparently noncompositional meaning evident in idioms, discontinuous semantic units, and complex words must be addressed, and the contribution of argument structure constructions, intonation, and non-linguistic context to our shared interpretation of sentences must be taken into account.

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Further reading

- Dowty, David 2006. *Compositionality as an Empirical Problem*, 1–62. <http://www.ling.ohio-state.edu/~dowty/context-free-semantics.pdf>. Outlines the basic argument in favour of the idea that language must be compositional.
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- Kirby, S. 2000. Syntax without natural selection: how compositionality emerges from vocabulary in a population of learners. In C. Knight (ed.) *The Evolutionary Emergence of Language: Social Function and the Origins of Linguistic Form*. Cambridge University Press, 1–19. Provides a demonstration that a certain degree of compositionality serves the function of reducing ambiguity.

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Related topics

Chapter 5, Cognitive semantics; Chapter 15, Semantic shift; Chapter 23, Participant roles.