

FRAME SEMANTICS

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FRAME SEMANTICS is a research program in empirical semantics which emphasizes the continuities between language and experience, and provides a framework for presenting the results of that research. A FRAME is any system of concepts related in such a way that to understand any one concept it is necessary to understand the entire system; introducing any one concept results in all of them becoming available. In Frame Semantics, a word represents a category of experience; part of the research endeavor is the uncovering of reasons a speech community has for creating the category represented by the word and including that reason in the description of the meaning of the word.

Similar or comparable notions have developed and are employed in other fields, particularly artificial intelligence and cognitive psychology. (The near simultaneity and mutual recognition of the use of the concept among scholars in different fields are worth noting.) Perhaps of greatest influence for artificial intelligence was Minsky's work that presented *frame* as a cover term for "a data-structure representing a stereotyped situation" (1975:212). The work included a characterization of several types of frames, some of which corresponded to other uses by linguists (including Fillmore, 1968) and psychologists. Among the latter were Schank and Abelson (1975) in whose work on story understanding the term *script* (comparable to Minsky's *frame*) refers to knowledge structures for sequences of events, a well-known example being the restaurant script. (See Tannen 1979 for a more detailed overview of the concept as used by other researchers, including anthropologists and sociologists, and an exposition of *frame* as "structures of expectations" (1979:144). See also Fillmore 1985a for additional citations of later works employing the concept.)

The frame notion used in Frame Semantics can be traced most directly to case frames (Fillmore, 1968). In case grammar, the semantic roles of the arguments of predicates were considered crucial to the characterization of verbs and clauses. Case frames were understood as "characterizing a small abstract 'scene' or 'situation', so that to understand the semantic structure of the verb it was necessary to understand the properties of such schematized scenes" (Fillmore 1982:115). In the early papers on Frame Semantics, a distinction is drawn between *scene* and *frame*, the former being a cognitive, conceptual, or experiential entity and the latter being a linguistic one (e.g. Fillmore, 1975). In later works, *scene* ceases to be used and a *frame* is a cognitive structuring device, parts of which are indexed by words associated with it and used in the service of understanding (e.g. Fillmore, 1985a). (See Petruck (forthcoming) for a fuller account of the development of the frame idea in lexical semantics.)

The notion can be exemplified with the Commercial Transaction Frame, whose elements include a buyer, a seller, goods, and money. (Note that these frame elements have been designated in terms of situational roles; this contrasts with the notion of semantic roles as articulated in case grammar.) Among the large set of semantically related verbs linked to this frame are *buy*, *sell*, *pay*, *spend*, *cost*, and *charge*, each of which indexes or evokes different aspects of the frame. The verb *buy* focuses on the buyer and the goods, backgrounding the seller and the money; *sell* focuses on the seller and the goods, backgrounding the buyer and the money; *pay* focuses on the buyer, the money, and the seller, backgrounding the goods; and so on. The idea is that knowing the meaning of any one of these verbs requires knowing what takes place in a commercial transaction and knowing the meaning of any one verb means, in some sense, knowing the meaning of all of them. The knowledge and experience structured by the Commercial Transaction Frame provide the background and motivation for the categories represented by the words. The words, that is, the linguistic material, evoke the frame (in the mind of a speaker/hearer); the interpreter (of an utterance or a text in which the words occur) invokes the frame.

A complete description of these verbs must also include information about their grammatical properties and the various syntactic patterns in which they occur. What elements or aspects of the frame may be realized as the subject of the verb, as its object, if there is one, and what will be the surface form of the others? Which of these elements are optional and which are obligatory? For example, in the sentence *Carla bought the computer from Sally for \$100*, the subject, *Carla*, is the buyer and direct

object, *the computer*, is the goods; both elements are obligatory. The backgrounded elements, both of which are optional, surface as oblique objects: *from Sally*, the seller, and *for \$100*, the money. Of note are the different prepositions used with each, particularly that *from* is the only preposition allowing the interpretation that *Sally* is the seller, while other prepositions may be used for the money--e.g. *with*. Such grammatical information about the syntactic-semantic valence description of each verb is not specified in the frame. Nevertheless, it is deducible from the rich descriptions of the different frame elements.

Considering a more general money-transferring frame serves as a reminder of the many nouns whose meanings may be described in frame semantic terms--i.e. with respect to the underlying conceptual framework needed for their understanding and with reference to speakers' knowledge and experience of the background situations which motivate the categories that have been named. Among the nouns linked in a money-transferring frame are *tip*, *ransom*, *allowance*, *refund*, *honorarium*, *bounty*, *tuition*, *retainer*, *bonus*, *rent*, *fare*, *child support*, *bus money*, *salary*, *reward*, and *alimony*. Referring to a sum of money with any one of these nouns requires rich and detailed information about a much larger scene, of which the actual transferring of money is just a small part. For example, using the word *alimony* assumes something like the following: two people who used to be married are now divorced; upon divorce it is agreed that one of them gives the other a sum of money at regular intervals, usually monthly. There is, of course, much more involved, including legal negotiations, court decrees, and so on. The claim being made here is that all words bring along an entire scene.

Among other factors that will have to be considered for a full description of nouns linked to a money-transferring frame is the syntax of the expressions in which any particular noun occurs. Some nouns require the indefinite article, while others require a possessive pronoun. The choice depends on whether the money transferred is expected and whether talk about that money takes place before or after an agreement about the transfer has been made. If the money is not expected, the indefinite article can be used: *She gave him a tip/a reward/a bonus*. If the money is expected, the possessive pronoun is needed: *She gave him his allowance/his salary/his change*. Before the agreement about the transfer, the indefinite article can be used, but after the agreement, the definite article or the possessive pronoun must be used. Compare *I will give you an honorarium/a reward* and *Here's your honorarium/the reward*. The point is that the semantics of the determiner system interacts with the semantics of the scene activated by noun. The interpreter of such sentences constructs a scene depending, in part, on the choice of determiner (Fillmore 1977b: 114-116).

A number of important concepts figure into the Frame Semantics approach to linguistic description and analysis. One such concept is that of a prototype, understood as a fairly large slice of the surrounding culture against which the meaning of a word is defined and understood. For example, to understand the meaning of the word *breakfast*, it is necessary to understand the institutions and practices of the culture in which the category exists. In this case, it is necessary to understand the practice of eating three meals a day at more or less fixed times and that the meal eaten in the early part of the day after a period of sleep has a special menu; for this meal we use the word *breakfast*. The conditions which define the prototype need not all be present in order for native speakers to use the word appropriately. Speakers of American English may use the word *breakfast* for the meal eaten in each of the following situations: sleeping through the morning, eating eggs, toast, coffee, and orange juice at two in the afternoon; staying up all night, eating eggs, toast, etc. at seven in the morning; sleeping through the night, eating a peanut butter and jelly sandwich at seven in the morning. This range of usage can be captured in an account of word meaning which appeals to the notion of a prototype. The word *breakfast* provides a category which can be used in a variety of contexts; the contexts are determined by the word's prototypic use; the prototypic use is the one it has when the conditions of the background situation match the defining prototype (Fillmore 1982:117-119).

Defining words in terms of frames and prototypes provides a useful approach to the boundary problem for linguistic categories. To illustrate, in this approach, the word *bachelor*, an often-cited example in the literature, is defined against a prototype background frame rather than in terms of all the unusual circumstances in which the word might be used. That *bachelor* might occur in contexts which don't match the prototype suggests that speakers are willing to extend the word's frame or create a new frame. (See also Fillmore 1975, 1977b, and 1982 for discussions of *bachelor* and other examples of

words that illustrate the boundary problem, including *widow* and *orphan*.)

Another important concept in Frame Semantics is that of perspective. By way of example, consider again the sentence *Carla bought the computer from Sally for \$100*, which evokes the Commercial Transaction Frame. While mentioning all of the frame elements, such a report of a commercial transaction essentially takes the perspective of the buyer. Similarly, the sentence *Sally sold the computer to Carla for \$100* is a report of a commercial event from the perspective of the seller. That the notion of perspective depends, to a certain extent, on an understanding of history can be illustrated with the words *land* and *ground*, both of which identify the same entity, the dry surface of the earth. Hearing that a traveler spent a few hours *on land*, we understand that the traveler interrupted a sea voyage; hearing that a traveler spent a few few hours *on the ground*, we understand that the traveler interrupted an air flight. Thus, the different words assume different perspectives on or schematizations of the same scene; understanding the choice of words for talking about that scene requires appealing to the history of events leading up to it. (See Fillmore 1977b:128-136 and Fillmore 1982:124-135 for descriptions of notions in traditional semantics, empirical semantics, and technical semantics that have been reformulated in terms of the frame).

Frame Semantics contrasts with other approaches to linguistic semantics. For example, in "a checklist theory of meaning" (Fillmore 1975:128), the meaning of a linguistic form is represented in terms of a checklist of conditions that have to be satisfied in order for the form to be appropriately or truthfully used. In Frame Semantics, word meaning is characterized in terms of experience-based schematizations of the speaker's world -- i.e. frames which impose order on prototypes. Frame Semantics also contrasts with theories of semantic fields as characterized and practiced by field theorists. In semantic field theory, a word is defined in terms of relation to its peers--i.e. other words in the same *field* (in the sense of 'field of entrants in a race'). In Frame Semantics, a word is defined in relation to its background frame, not in relation to other words. Field theories of word meaning rely on the existence and knowledge of other semantically related words. In contrast, Frame Semantics takes the view that a word's meaning depends on its conceptual underpinnings, knowledge of which is necessary for its appropriate use. Thus, only Frame Semantics allows for frames with single lexical representatives. (See Fillmore 1985a:225-230 for a more detailed exposition of differences between semantic field theory and Frame Semantics.) The frame notion is the basis for what Fillmore (1985a) calls the semantics of understanding (U-semantics), which contrasts with what may be called truth conditional semantics (T-semantics). The goal of U-semantics is to determine what it takes for a hearer to provide an interpretation of a sentence, in other words, to determine what situation a sentence fits. U-semantics is compositional in that its operation relies on knowledge of words, phrases, and grammatical constructions for an interpretation to be constructed. However, it is non-compositional in that the interpretation of a sentence is not constructed by purely symbolic operations. In contrast, the goal of T-semantics is to determine under what conditions a sentence may be true, where truth is determined compositionally, from the bottom up using symbolic operations (Fillmore 1982:230-232).

Much of the Frame Semantics literature covers frames and individual words (or sets of words) and expressions. In addition to its utility in lexical semantics, the frame is also considered a useful tool in text semantics and the semantics of grammar. The interpreter of a text invokes a frame when assigning an interpretation to a piece of text by placing its contents in a pattern known independently of the text. A text evokes a frame when a linguistic form or pattern is conventionally associated with that particular frame (Fillmore 1985a:232). For example, consider the sentence *Julia will open her presents after blowing out the candles and eating some cake*. Although there is no mention of a birthday party, interpreters sharing the requisite cultural background invoke a birthday party scene. With the noun phrase *birthday presents*, instead of just *presents*, the sentence contains words which evoke the very same scene. Using the frame concept in text semantics establishes and affirms the close link between lexical semantics and text semantics not only because a lexical item can be taken as a very small text, but also because the meaning of any single lexical item plays an important role in the construction of the meaning of any (longer) text, for example, a sentence. To illustrate, consider the preposition *on*, as in *The children played on the bus*. The sentence describes a scene in which some children were playing while the bus was in operation as a vehicle for transportation. That sentence could not be used appropriately to describe a scene in which the children were playing in an abandoned wheelless bus in a vacant lot, for which only the sentence *The children played in the bus* is appropriate. The construction

of the meaning of the first sentence relies on more than just understanding the basic meaning of the preposition *on*. It relies on knowledge of the details of the situation framed by *on*, particularly that the bus has to be "in service...and...destined to make the journey anyway" (Fillmore 1985a:235). Such an approach to text semantics highlights the contribution of word meaning, defined in terms of frames, to sentence interpretation.

Frame Semantics takes as a goal a uniform representation for the meanings of words, sentences, and texts (Fillmore 1976:28). Indeed the labeled box notation initially suggested as an informal representation system for the lexicon (Fillmore 1977b) was refined and used for the representation of grammatical constructions in the grammatical framework developed by Fillmore and his colleagues, Construction Grammar (Fillmore 1985b, 1988). The connection between Frame Semantics and Construction Grammar goes beyond the matter of representation. Construction Grammar views the description of grammatical patterns and the semantic and pragmatic purposes they serve as equally important and necessary. While the details have yet to be worked out, in Construction Grammar, the semantic frame associated with a lexical item provides some of the semantic information needed for the semantic interpretation of a sentence. As with lexical items and texts, semantic descriptions and explanations of grammatical constructions appeal to frames for background information about the scene organized or schematized by the construction.

Research in different areas has been approached within the perspective of Frame Semantics or makes use of frame semantics notions. These include lexicology, lexicography, syntax, and grammar in general.

The characterization of the frame as the most central and powerful kind of domain structure (Fillmore 1978:165) paved the way for a frame-based organization of the lexicon, where the frame provides the conceptual underpinnings for related senses of a single word and semantically related words. This would necessarily include all categories of words--i.e. content words and function words--as well as phrases and expressions. Research in lexicology and lexicography which derives from this characterization of the frame is discussed below.

In the area of lexicology, Petruck (1986) validates and extends the frame semantics approach to the study of meaning -- word meaning, word structure, and semantic structure in the lexicon -- by demonstrating its applicability to one area of the lexicon in one language, body part terminology in Modern Hebrew. That work proposed an experience-based schematization of the BODY FRAME and described the meanings of Hebrew body part words in terms of what speakers know or believe about the entities designated by those words. It characterized the internal structure of polysemous words and the semantic structure of the domain in terms of this schematization. While the frame semantics approach could be demonstrated with any lexical semantic domain, it seems especially appropriate for body part terminology because its referential domain, the body, is one with which all people have primary experience. Invoking the framework and approach of the earlier study, Petruck (1995) claims that compound and complex words based on body part terms are also part of the BODY FRAME because it is experience of and knowledge about the body that provides the conceptual underpinnings for their formation and understanding. These works contribute to the development of a theory of the lexicon based on the frame.

Drawing on and further developing Fillmore (1977b), Lawler (1988) offers a careful analysis of the Commercial Transaction Frame in order to define *money* for the ultimate purpose of providing the details of the metaphor *time is money*. He uses this frame to provide a consistent semantics for the lexical items *buy*, *sell*, *pay*, and *spend*. Employing the same apparatus, Lawler (1989) explores the lexical semantics of the English words *value*, *worth*, *cost*, and *price*, all of which are primarily part of the Commercial Transaction Frame as well. He shows the usefulness of the frame in determining the meanings of the words and in shedding light on unexpected symmetries in their syntactic and semantic behavior.

In a group of papers that deal with lexical description and dictionary making, Fillmore and Atkins (1992, 1994), Fillmore (1994), and Atkins (1994, 1995) demonstrate the perspicuity of Frame Semantics for lexicography. While addressing some of the practical matters of dictionary making, the research relies on the notion of the frame as the organizing principle for the lexicon as a theoretical construct.

Fillmore and Atkins (1992) presents the results of a large-scale study of the English lexeme RISK, described in detail in Fillmore and Atkins (1994), as an initial attempt to describe the apparatus for a "frame-based" dictionary, which would be housed on a computer with multiple windowing facilities. In contrast to ordinary print dictionaries, this dictionary would provide the user with access to the underlying frame(s) relative to which a word is defined, and to further information about associated conceptual frames, as well as to the categories derived from these frames. The RISK frame is characterized with two sub-frames, CHANCE and HARM, and a description of the categories useful for the word's valence description. Having examined a large corpora of data, the authors specify in detail the lexico-syntactic patterns in which RISK occurs, nominally or verbally. They also lay out the polysemy system of the verb RISK and suggest that its different uses can be explained in terms of the different syntactic realizations of the elements in their common semantic frames. The results derive from an analysis of the descriptions of RISK as given in ten print dictionaries and an analysis of the uses of RISK in two corpora of data. Work on the corpus material highlighted the design constraints of ordinary print dictionaries, making it clear that a full and accurate entry for RISK was not possible using that medium.

Drawing on the work with RISK, Fillmore (1994) considers the differences in relative complexity between nouns and verbs that share a semantic structure--e.g. deverbal nominalizations. He suggests that nouns are inherently capable of greater complexity because of the different grammatical functions of the two word classes. A complete description of verb requires a description of the clauses in which the verb occurs, a relatively simple task. In contrast, for nouns there are potentially many more relevant layers to describe, including the noun's complements, the internal structure of the NP in which the noun occurs, and the larger structures in which that NP functions. Thus, a complete description of a noun is a far more difficult task. Also drawing on the RISK data, Atkins (1995) addresses the role of the example in a frame semantics dictionary in contrast to a print dictionary. In a frame semantics dictionary, examples would not be predicated on the existence of distinct senses of individual words; nor would they constitute a separate component of a dictionary entry. Rather, examples would be an integral part of the description of the meaning of an entry, appearing when needed to illustrate a point in that description, including the different syntactic patterns in which a word may occur. Using the same approach adopted for the study of RISK, Atkins (1994) considers the lexical set of verbs of seeing. Positing the perception frame, among whose elements are Experiencer, Precept, and Judgement, it is possible to account for the various uses of the different verbs while incorporating the lexical and grammatical information associated with each verb. Bringing to bare the insights and experience of a working lexicographer, Atkins assesses the efficacy of Frame Semantics for lexicography. All of these works shows how Frame Semantics will inform and advance lexicographical work which will undoubtedly continue to change and develop with additional advances in electronic technology.

Frame semantics has also been used to account for different sorts of syntactic phenomena. For example, Lambrecht (1984) offers an analysis of formulaic German binomial expressions of the form *N und N* employing frames to account for their creation and use, which is subject to semantic and pragmatic constraints. In general, German NPs headed by count nouns require determiners. However, in certain more or less fixed combinations, such as *Messer und Gabel* - 'knife and fork', *Hut und Mantel* - 'hat and coat', as well as in novel pairs such as *in Schule und Arbeitswelt* - 'in school and the world of work', such NPs may go without determiners. Lambrecht argues that such bare binomial expressions are licensed whenever the paired noun denotata can be construed as belonging to a single semantic frame. This frame may be given by historical, social, or cultural convention but also by mere salience of the denotata in the given text. German bare binomial constructions demonstrate the relevance of semantic frames for syntactic well-formedness and show that frames can be created by speakers within a text. In another work involving issues of syntactic well-formedness, Lakoff (1986) argues against a purely syntactic account of the coordinate structure constraint and suggests that the extraction phenomenon can be explained by appealing to frame semantics. More specifically, Lakoff proposes a notion of a "natural course of events" characterized in terms of a semantics of understanding (Fillmore 1985), rather than truth-conditional semantics. Lakoff's "natural courses of events" or "scenarios" (1986:153) are "humanly-constructed holistic organizations of states and events" (1986:157) -- i.e. instances of frames. The analysis offers a way of using frames to account for a syntactic phenomenon which is determined, in part, by semantic and pragmatic criteria.

Intimating the incompleteness of purely syntactic accounts despite their descriptive accuracy, O'Connor (1994, 1996) describes the use and interpretation of Possessor-Raising construction in Northern Pomo, an Amerindian language of Northern California. This construction, in which the possessor of a body part is grammatically expressed as a direct argument of the verb rather than as an oblique (specifier of the body part nominal), alternates with an ordinary expression of possession. She shows that its use and interpretation can only be understood against the background of speakers' knowledge of frames and scenes evoked both by the verb and by the nature of the nominal referents, interpreted within the context of utterance. By appealing to frames to describe such facts of use and interpretation, O'Connor's account provides a more complete description of the construction than purely syntactic accounts.

A number of large scale studies of different phenomena in Japanese grammar use frame semantic notions in their analyses. Okamoto (1985) proposes a Principle of Pragmatic Interpretation as one of four general principles used to interpret nominal ellipsis in Japanese. This particular principle relies on knowledge of the world as structured by frames and provides the means to determine the referent in a nominal ellipsis. Matsumoto (1989) offers a framework for dealing with a wide range of naturally occurring noun modifying constructions in Japanese, including relative clauses and complement clauses. Matsumoto's framework involves semantic frames evoked by linguistic clues in the constructions and construers' (=interpreters') expectations based on their world view. Fujii (1993), a study of clause-linking devices, which also considers comparable phenomena in English, incorporates the frame idea as used in lexical semantic description and analysis for the semantic description of certain conditional constructions, and argues that frames can be associated with constructions, not just lexical items. In Matsumoto (1989) and Fujii (1993), it is also possible to see the direct developmental relationship between frame semantics and construction grammar. Both employ the idea of a frame as a knowledge structure for the interpretation of different kinds of grammatical constructions and make explicit the necessity of an approach to grammatical analysis which recognizes the intimate relationship between syntax, semantics, and pragmatics.

Adopting a construction grammar approach to the analysis of argument structure constructions, Goldberg (1995) also uses the frame idea. Much the same way as verbs, or words in general, are defined relative to background frames/scenes of highly structured cultural and world knowledge, so too are basic argument structure types. That is, argument structure constructions (e.g. the ditransitive construction, the caused-motion construction, the resultative construction, etc.) also invoke frames which designate event types fundamental to human experience. Thus, the meaning of a particular argument structure construction derives not only from the meaning of the particular verb in the construction, but also from the construction itself, whose meaning derives, in part, from the frame-semantic knowledge with which it is associated. By way of example, the ditransitive construction involves a scene in which someone gives someone something. The claim is that the meaning of a sentence such as *Sara faxed Jeremy the invoice* derives not simply from the meaning of the verb *fax*, but also from what speakers of a language know about a situation where one person gives something to another person. Among other things, the work demonstrates the usefulness of frames in relating world knowledge and language structure. The work also serves as another example of the link between frame semantics and construction grammar.

The research described here shows the different realms in which Frame Semantics has been used to provide accounts of a variety of lexical, syntactic, and semantic phenomena. Other areas that might benefit from the Frame Semantics approach to the study of meaning include first language acquisition, foreign language learning and teaching, as well as diachronic studies. Some of these areas of research are mentioned in Fillmore's own writings on Frame Semantics. For example, Fillmore (1975) suggests that the approach informs our understanding of children's acquisition of categories and category labels. And Fillmore (1985:223-224) implicitly provides a program for the teaching of vocabulary in the foreign language classroom.

What might be called practical matters of Frame Semantics research also need to be addressed. Among the topics worth considering are the following: determining the contents of a frame; determining the boundaries of any particular frame; and determining how frames interact.

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