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Cognitive and affective material in the Mental Lexicon

The interface of form and meaning

Abstract

The paper is a quest for cognitive and affective material in conceptualization in order to elaborate on the coordinating mechanisms between form (linguistic structure) and meaning (conceptual structure and semantic structure) residing in the Mental Lexicon. The Mental Lexicon is seen as an active and dynamic, highly complex network of both neural and mental processes coordinated by conceptualization and manifested in language used in social verbal interaction. It is also taken to assume a central role in conceptualization which in turn is responsible for processing mental contents (mental representations, image schemas, mental models, memories, beliefs, intentions, plans, desires, mental projections, images, etc.), which have both cognitive and affective components. The analysis of linguistic examples shows that there is a wide range of parameters influencing the interpretation of linguistic structure and natural language use starting from formal semantics to inferential pragmatics, including quantification, modalities, intensional contexts, epistemic contexts, intentions, propositional attitudes, deictic relations, presuppositions and implicatures.

Keywords: natural language processing, form and meaning, cognitive and affective mental contents, Mental Lexicon

Once I thought I was wrong, but I was mistaken.
(bumper sticker)

“The nature of thought is a frustrating puzzle. Thoughts are
where everything begins and ends.”
Wallace Chafe (2005)

1 Semantic and conceptual interpretation in the mentalistic tradition

With a steadily growing interest in cognitive approaches to linguistics, and an exponentially growing literature on cognitive linguistics, one finds it important to ask fundamental questions not only concerning the nature and methods of cognitive approaches, but also concerning the cognitive content to be identified in language and communication. It has been revolutionary to ascertain that general-purpose cognitive abilities facilitate and support mental processes that are responsible for language production and language processing beside special-purpose cognitive abilities. The original idea of a mental organ in identifying the Language Faculty is but one of the possible versions of the mentalist approaches, which happens to focus on the special status of syntax generating syntactic structure (cf. Chomsky 1965). On this view, autonomous syntax (as a core component of grammar) being responsible for computation, i.e. for symbol manipulation within a formal system of signs, is assumed to

rely only on special-purpose cognitive skills. The Lexicon is to provide for the basic linguistic entities which need to be inserted into the syntactic structures with the help of morpho-syntactic construction rules, while selectional restrictions (based on lexical features) are at work as part of the interpretative mechanism. Thus, all information for the semantic interpretation is provided!

It should be kept in mind, however, that the basic tenets of cognitive linguistics were formulated at the time when generative grammar was also occupied with questions of the semantic representation of syntactic structures (cf. Chomsky 1977.) The transition from the Standard Theory (Chomsky 1965) to the Extended Standard Theory (Chomsky 1972, 1977) was a controversial, but a dynamic and thrilling period full of debates concerning the relationship between syntax and semantics in general and the nature of semantic representation in particular.

In the Standard Theory it is assumed that

... the semantic interpretation of a sentence depends only on its lexical items and the grammatical functions and relations represented in the underlying structures in which they appear. (Chomsky 1965: 136)

In The Extended Standard Theory, on the other hand,

... semantic interpretation is held to be determined by the pair (deep structure, surface structure), rather than by deep structure alone; further, it is proposed that insofar as grammatical relations play a role in determining meaning, it is the grammatical relations of the deep structure that are relevant (as before), but that such matters as scope of “logical elements” and quantifiers, coreference, focus and certain kinds of presupposition, and certain other properties, are determined by rules that take surface structure into account. (Chomsky 1972: 134)

Whereas in the Standard Theory the thesis that semantic representations (i.e. “readings” of senses of sentences) are claimed to be constructed by purely formal rules of grammar, in the Extended Standard Theory Chomsky expresses doubt that semantic representations can be fully determined by grammatical rule. He writes:

Thus one might argue that nonlinguistic beliefs, intentions of the speaker, and other factors enter into the interpretation of utterances in so intimate a fashion that it is hopeless and misguided to attempt to represent independently the “purely grammatical” component of meaning, the various “readings” of expressions in the sense of / . . . / the standard theory, and the relation between such readings and a syntactic structure. (Chomsky 1972: 67)

By the time of the elaborate formulation of the Extended Standard Theory, especially its summary in Chomsky 1977, Chomsky admitted that in order to determine full semantic representations of sentences, it is necessary to consider various “readings” of expressions in addition to the representations of those sentences that are provided by a grammar. The Extended Standard Theory contends that there are two levels of semantic representation. One, the level of logical form, is determined by rules of grammar, and the other, the level of “fuller” semantic interpretation, is determined by rules that are not part of grammar and which operate on representations in LF “along with other cognitive representations” (cf. Chomsky 1972: 104-105; Chomsky 1977: 195-196)

I have picked one particular period in the development of the discussion about “semantic interpretation” in the recent history of linguistic thought (roughly the period between 1968-1978), only to attempt a retrospective view concerning the evolution of the fundamental intuition about the interplay of form and meaning in linguistic structure and language use. The

latter dichotomy is present in Chomsky's formulation in the debate as he does make a distinction between *sentence* and *utterance* when talking about "semantic interpretation":

(i) ... the semantic interpretation of a sentence depends only on its lexical items and the grammatical functions and relations represented in the underlying structures. (Chomsky 1965: 136)

and

(ii) ...nonlinguistic beliefs, intentions of the speaker, and other factors enter into the interpretation of utterances in so intimate a fashion that it is hopeless and misguided to attempt to represent independently the "purely grammatical" component of meaning. (Chomsky 1972: 67)

The idea of a *two-level semantic interpretation* led directly to the assumption that there should be a *two-level meaning interpretation* for linguistic structure. The distinction between conceptual interpretation and semantic interpretation got to be supported by the presumption that both conceptual structure and semantic structure are justified for linguistic analysis (cf. Jackendoff 1983, Talmy 2000, Jackendoff 2010).

The acknowledgement of the "problems" of surface structure for generative grammar in terms of semantic interpretation is of historic importance: matters of scope of quantification and other logical elements, modalities, intensional contexts, certain matters of fact and beliefs, propositional attitudes, deictic references, presuppositions, speaker intentions and implicatures ought to have been taken into account for a "fuller" meaning interpretation. In an explicit way of wording, Chomsky (1977) admits the legitimacy of various "readings" of expressions that are not "purely grammatical" components of meaning. In the "semantic crisis period" referred to above, all these anomalies and oddities got relegated to the *grammar of surface structure*. Not for too long, however.

2 Language as a cognitive system: conceptualization and linguistic behavior

Further evidence was accumulated only to induce a different approach to meaning interpretation based on more subtle distinctions. Multi-word lexical items, entrenched linguistic expressions, collocations, idioms and idiomatic expressions, formulaic language and constructions – all had to be treated as "non-marginal" linguistic material (cf. Fillmore et al. 1988, Goldberg 1995, Jackendoff 1995, Croft 2001, Komlósi & Knipf 2005, Komlósi & Schnell 2008, Komlósi 2009).

Cognitive Grammar did not attack the frail solution of generative grammar to semantic interpretation of the surface structure directly. Instead, it started a radically new approach to relating form and meaning in language by understanding the function of cognition in language production (grammar) and language processing (meaning construction). The fundamental change was introduced in the way we think about language: cognitive linguistics starts out from a presumption that both general (all-purpose) and specific (special-purpose) cognitive skills facilitate and support language by an ontological dominance of *conceptualization*. In other words, language as a cognitive system and as a medium for individual and social cognition cannot be treated as a mental domain isolated from other cognitive systems and cognitive activities (cf. Langacker 1987, Langacker 1991, Langacker 1999, Croft & Cruse 2004, Chafe 2005, Radden & Dirven 2007).

It has become more and more accepted in linguistics that something sharing the properties of the mind ought to assume a central role in conceptualization which in turn is responsible

for processing mental contents (mental representations, image schemas, mental models, memories, beliefs, intentions, plans, desires, mental projections, images, etc.), which have both *cognitive and affective components*. Mental contents induce behavior (cf. *mental causation*). Predicting the behavior of fellow human beings is part of social cognition which is made possible by the attribution of mental contents to others as interactive agents in social and verbal interaction (cf. the *intentional stance*).

If we look at natural language or human language from this perspective, it becomes obvious that verbal behavior is only a segment (albeit a most important one!) of human behavior that assumes complex mental processes for the execution of these activities. One can also argue that language use requires symbol manipulation based on *meta-level conceptualization*: physical, linguistic and mental contexts are all mental constructs that are results of complex mental representations and mental construals only to support context-dependent and context-sensitive interpretations in the process of social cognition. Thus, mental contents include not only “relatively fixed” meanings (concepts, lexical meanings, etc.), but also “dynamic, flexible, negotiable meanings” (intentions, beliefs, mental projections, mental spaces, etc.) which help on-line coordination of interpersonal meanings that are driven by the need of *cognitive and affective concordance* to bring about “predictable and reliable” social contexts in which rationality and coherence dominate.

3 The Mental Lexicon: thought processes and verbal behavior

Cognitive Linguistics seems to have found the *locus* of cognitive and affective coordination: linguistic activity as the manifestation of thought processes and verbal behavior as the medium of social cognition via social interaction need a sophisticated *catalyst or mediator* between form and meaning. The form (linguistic utterances based on surface structure) is constantly shaped by conceptualization which determines the manifestation of mental contents to bring about *meaningful human behavior*. A major part of human behavior is verbal interaction and the interpretation processes induced by behavior. The active interface between linguistic form and meaning is attributed to the Mental Lexicon. It should be obvious from the above train of thoughts and line of argumentation that this *locus* is *metaphorical*: the term *Mental Lexicon* refers to an active and dynamic, highly complex network of both physical and mental processes that get coordinated by conceptualization and get manifested in language used in social verbal interaction.

There is, however, a somewhat divided view among cognitive linguists about the presumption according to which thoughts are not independent of language: thoughts are already shaped by the semantic resources of a given language, and there is a considerable overlap between semantic structures and grammatical structures. It is interesting to note here the different views on the direction of fit (i.e. conceptual structure – semantic structure – grammatical structure), as exemplified, e.g. in Langacker (1999) and Chafe (2005).

If we assume that the Mental Lexicon is an active interface between form and meaning (or language and thought), we may expect that observing the ways people talk can point at things about the nature of thought that go beyond its purely linguistic aspects.

Some of these things are suggested in Chafe (2005) as follows:

Some Things That Language Shows About Thought

1. Thought is dynamic.
2. Thought is segmented into foci of consciousness.

3. Thought is constructed of ideas of events and states and their participants.
4. These ideas are oriented in different dimensions, including time, space, force, epistemology, emotions, social interaction, and context.

(Chafe 2005: 59)

The notion *Mental Lexicon* has witnessed a long evolutionary path in the course of the past decades. It has always been intriguing to accommodate the trivial knowledge in linguistics that the linguistic system is structure-sensitive whose constituting elements (the linguistic expressions themselves) need to comply with valid and language-specific morpho-syntactic rules to fulfill well-formedness requirements in grammar. However, at the same time, linguistic expressions also need to comply with language-external requirements and function as dynamic expressions of negotiated contexts, speaker intentions, presuppositions and implicatures, speaker attitudes, motives and desires, mental projections and fairly liberal meaning extensions. Whatever happens in the mind, it will be reflected in *its* language and language use. It is not by accident that Marslen-Wilson (1989) describes the Mental Lexicon as “the central link in language processing”. There is a converging view that this central link in language processing has a modular, purpose-specific structure, supporting the multiple-lexicon view of storage and association. According to this model, there is a phonological lexicon, a semantic lexicon, a morphosyntactic lexicon and a graphemic lexicon. Each of those might have its particular pattern of organization. The semantic lexicon is assumed to be organized in terms of semantic fields (cf. association tests) and the morphosyntactic lexicon is supposed to be organized in terms of lexical frames and idiosyncratic structures (cf. idioms, constructions, prepositional phrases, pragmatemes, collocations, etc.; see e.g. Aitchison 2003). Thus, we can say that the Mental Lexicon is a multidimensional web of words with all kinds of connections among those words.

4 The Mental Lexicon: context and meaning creation

In what follows, I intend to illustrate by analyzing everyday linguistic material that the notion *Mental Lexicon*, understood as the central link in language processing functioning as a multidimensional web of lexical information, is indeed a *catalyst and mediator* in meaning creation that can effectively connect linguistic form and cognitive and affective meanings in interpretation.

Let us observe the example in (1):

- (1) Once I thought I was wrong, but I was mistaken.

It is a well-formed English sentence consisting of two sentences (S1 and S2) and two propositions (P1 and P2).

S1 = Once I thought I was wrong,
 S2 = but I was mistaken.

However, S1 consists of a matrix-clause (MC) and an embedded-clause (EC):

MC = Once I thought (that)

EC = I was wrong

Also, (P1) is based on a deictic relation for its denotation: “I” should be understood as “Speaker”.

(P1) = Speaker was wrong_{PA}, where PA stands for propositional attitude.

(P1) creates an opaque context with the verb “thought”, therefore the truth-value of EC is subject to the epistemic state of the Speaker.

The “default reading” of (S1) is based on a presupposition (Pr1):

(Pr1) = I was not wrong

Compare (2):

(2) I knew I was wrong

which consists of a matrix-clause (MC) and an embedded-clause (EC), but due to the factive verb “knew”, no opaque context is created. The only reading (avoiding contradiction) is:

(3) I knew I was wrong and I was indeed wrong.

Whereas (3’):

(3’) *I knew I was wrong but I was not.

creates cognitive dissonance and thus a contradiction ensues.

Notice, however, that (S1) can have a reading (S1’) in which the presupposition (Pr1) has been cancelled:

(S1’) I thought I was wrong and I was indeed wrong.

(S1’’) I thought I was wrong and it turned out that I was indeed wrong.

As we can see, it is possible to cancel the presupposition (Pr1) and then remove the potential contradiction from (S1’) and (S1’’).

A delicate question arises: Are we able to determine the epistemic content of “I thought” when the act of thinking was directed at “being wrong” or “being right”. Namely, in (S1’’) a subsequent temporal relation is involved: “The fact that I was wrong turned out to be a fact later. My thought of being wrong was only an assumption. Later I learned the fact that I was indeed wrong.”

Also, “to be wrong” is an idiomatic expression, as opposed to “a wrong answer” or “the wrong side of the road” or “the food has gone wrong”.

The idiomatic expression “to be wrong (about sthg)” is synonymous with “to be mistaken”.

As mentioned before, the presupposition of (S1) is (Pr1):

(Pr1) I was not wrong

which is contradictory to (S2):

(S2) but I was mistaken (i.e. but I was wrong)

In a substituting formulation:

(Pr1) + (S2) = I was not wrong, but I was wrong.

However, (1) is not contradictory:

(1) Once I thought I was wrong, but I was mistaken.

(S2) cannot be related to EC, it can only be related to MC. It does not negate the truth-value of EC (whatever it would be in the opaque context), it negates MC, the act of thinking (that p).

I would also claim that a humorous effect is created in this “reading” since it suggests that I have never been wrong in my life, even when I thought I might be wrong. (The suggested meaning might be this: “I am perfect, I am never wrong about anything.”)

The set of decisive arguments in the analysis is supposed to support the claim that no formal grammatical structure would be able to “encode” conditions or circumstances that occur in real-life meaning construction. These circumstances were created by components such as: propositions, deictic reference relations, presuppositions, epistemic (opaque) contexts, epistemic contents, default and particularized interpretations, idiomatic expressions, paraphrase and sense equivalence, ambiguity in negating propositional truth-values or epistemic states, irony. As we have seen above, the negation ambiguity was triggered by the fact that no formal instruction can determine what the negation of (S2) should refer to: the matrix-clause or the embedded-clause. The decision should be arrived at with the help of contextualization: negating the EC leads to contradiction, negating the MC creates a context of irony (a source of humor in this case). Such decisions are made on the basis of on-line, dynamic context-creation. The ultimate, decisive context is a blend of textual context, logical context and conceptual context. It seems that the multidimensional character of the Mental Lexicon, functioning as an active and dynamic, highly complex network of both physical and mental processes coordinated by conceptualization can effectively support the relevance of such decisions.

Let us examine an example of quantificational ambiguity residing in (4a), underlining the importance of suppressed premises, presuppositions, contextual cues and particular, local pieces of information necessary for the intended interpretations.

(4a) Everybody speaks two languages in this room.

There are two expressions with quantification (underlined), which give rise to scope ambiguity depending on the wide-scope for the universal quantification (everybody) or the wide-scope for the existential quantification (two languages).

Resolving the “default” ambiguity could run as follows:

- (4b) For every person in this room we can find any two languages such that the person selected will speak those two languages.
- (4c) There are two and only two specified languages which are spoken by each person in this room.

Note that (4a’) would not affect the interpretation of the ambiguity in a significant way:

(4a’) Two languages are spoken by everybody in this room.

(4b) has a “wide-scope reading” for the universal quantification, whereas (4c) has a “wide-scope reading” for the existential quantification.

These interpretations, however, are not the only possible interpretations. Everyday, common-sense reasoning suggests some more options.

For the “wide-scope reading” of the universal quantification, (4d) might be pragmatically required.

(4d) For every person in this room we find at least two languages such that the person selected will speak at least those two languages.

For the “wide-scope reading” of the existential quantification, (4e) might be pragmatically required.

(4e) There are two specified languages which are spoken by each person in this room in addition to any further languages spoken by any of the persons in this room.

There is a rationale for (4c)

(4c) There are two and only two specified languages which are spoken by each person in this room,

in a situation, for example, in which you have invited lecture presentations in many different languages but the audience is prepared to listen to talks only in two specified languages. You cannot expect anyone from the audience to “interpret” a talk that might be delivered in a language not among the two specified languages, since nobody speaks languages other than the two specified languages. Thus, the languages to be used by the invited lecturers need to be restricted to those two specified languages as well.

A reasonable question asked on the basis of information provided by (4c) is (4c’):

(4c’) Which two languages are we talking about?

There is a rationale for (4e)

(4e) There are two specified languages which are spoken by each person in this room in addition to any further languages spoken by any of the persons in this room,

in a situation, for example, in which the moderator of the conference knows that there are some persons in the audience who speak languages other than the two specified languages and they would be eligible for functioning as interpreters for those extra languages.

A reasonable question asked on the basis of information provided by (4e) is (4e’):

(4e’) Which other languages can we count on in addition to the two specified languages?

A reasonable question asked on the basis of information provided by (4d) is (4d’):

(4d’) How many languages are spoken in this room altogether?

As we can see, the interpretation of (4a) and (4a’) requires information about suppressed premises and presuppositions as particular, local pieces of information necessary for identifying intended interpretations.

Let us examine one more conversational example in (5):

- (5) A: Did Helen remember her boss’s birthday last Friday?
 B: I saw her buying an expensive picture book on Thursday.

To cut a long story short, I can assert that we have a conversational implicature here which unfolds through the identification of meanings at the subsequent interpretational stages providing for sentence meaning – utterance meaning – speaker meaning of (5B).

The *sentence meaning* (proposition) of (5B) is a description of an act carried out by Helen on Thursday. There are important pieces of information that can be derived from reconstructing deictic relations established in this piece of discourse. *Helen* in (5A) is co-referential with *her* in (5B). *Friday* in (5A) is understood as being subsequent to *Thursday* in (5B).

The *utterance meaning* of (5B) is manifold. On the basis of the Gricean Cooperative Principle, we can observe that despite the fact that Partner B does not provide Partner A with a formally acceptable answer to the question in (5A), her response must be taken as a relevant answer intended to be interpreted by Partner A. The reason for this is that crucial elements of the “birthday frame” evoked in (5A) are directly referred to and conceptually linked to elements in (5B), such as “buying an expensive picture book”. It is also part of the utterance meaning that Partner B wants Partner A to realize that Partner B intended to and has provided relevant pieces of information for Partner A to make viable inferences in the form of an implicature. In this sense, Partner A is in the position (given the speech context) to identify the communicative intent of Partner B by identifying the illocutionary force in (5B).

The *speaker meaning* in (5B) leaves a lot of free room for additional interpretations. In principle, speaker meaning could create perlocutionary effects in the interlocutors. In this conversation, for example, social-cultural or corporate-cultural parameters could influence the interpretation. There might be additional local knowledge involved concerning gender issues (male-female or female-female relations in the boss-coworker hierarchy). There could be additional knowledge concerning the personal relationship between the persons involved in the “birthday present frame”. The expression “an expensive picture book” is subject to individual evaluation: it could be highly expected or highly unexpected in the given situation. The list of possible local conditions is endless, however, any little piece of additional

information may influence cognitive or affective evaluation of the context and subsequent meaning construction.

With a brief survey of the theoretical backgrounds for an interface between form and meaning in natural language, and the analysis of the examples above I have made an attempt to justify the metaphorical use of the term Mental Lexicon in linguistics. It is assumed that the richness and complexity of the mental processes get best coordinated in the Mental Lexicon which is sensitive to both language-specific linguistic structure and conceptual structure. The metaphor suggests that the Mental Lexicon functions as a conduit or catalyst between form and meaning in the production, processing and interpretation of natural language.

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