

WE THINK IN MEANINGS

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Preface

This paper attempts to document a number of ideas generated by class discussion and readings or brought forward from the author's previous deliberations. It is not presumed to present final or exhaustive treatments of the various topics touched on. Rather, it should be viewed as a starting point for further work. It is hoped that the ideas are at least consistent with each other and ideally with the truth. This is a sincere effort to make plausible connections and reconciliations between subjects sometimes seen as disparate or in conflict.

Meanings

When we really think, we don't think in words, we think in meanings. That is, if we look at ourselves right after having followed a train of thought, or as we are comprehending written text, we can see that our thought was fast and nonverbal, and that our comprehension proceeds only when we move beyond the level of words to the level of meanings.

But what are these meanings that we are referring to? And, if we claim that thought is nonverbal, which explicitly if negatively acknowledges words, and that it proceeds from shifting from words to meanings, can we characterize or at least discuss thought without resorting to mention of words?

First of all, we can distinguish several senses of "meaning." We can say that what a symbol refers to or denotes is its meaning. Individual symbols are artifacts invented to stand for (represent) entities. Entities may be physical and concrete or logical and conceptual; they may be objects, processes, relations -- in short, anything. There is no "grounding problem" -- symbols get their meaning by the invention process, where they are given their designation, some referent in the ("real" or "mental") world.

We can of course also concern ourselves with the meaning of symbol structures such as discourse. Here we usually have to incorporate implicit semantic and pragmatic background knowledge as well as explicit compositional meaning from lexical items and syntax in order to arrive at an overall interpretation of a segment of discourse. But this is a separate though closely related sense of "meaning." This is less literal and perhaps depends on the structure-producer's intentions.

Yet another kindred sense of "meaning" has to do with meaningfulness and significance, import and implications. This sense seems to carry with it the notion of an affected party, who or what a particular significance is for. It is not so much a matter of what is "sent" but of what is "received."

So, what can we now say about the meanings that we "think in"? In saying "we think in meanings," the intent is to convey not so much the specifics of the thought process, but more a feeling for the kind of "material" or representation being worked with. Of course the intent is also to contrast this stance with one which states that we think in words¹. It is also not so much a matter of emphasizing one of the senses of "meaning" over the others as much as it is of pointing out that all three senses discussed earlier share a common "footing" -- that there is in some significant sense a level of meanings in the cognitive realm, which all three senses of "meaning" intersect with. We might also say that we think in concepts.

Concepts

Here again we can distinguish at least three related senses. A concept might be an individual abstraction, a symbol in its own right that stands for a pattern or regularity in the world. Such symbols are not directly externalizable and need not be discrete in "shape" or "form." We translate between such "internal" symbols and external(izable) symbols such as verbal language when we want to communicate with others.

Another sense of "concept" refers again to a structure which really is a "conception." Here we combine facets of our awareness of a topic into an overall conceptual amalgam. This conception can concern a concrete object, e.g. a person, and thus we might not ordinarily consider such a conception as being a category, that is, as able to be instantiated.²

Finally, we can speak of "conceptual" as simply meaning "mental" (and probably nonverbal). It is this last sense which most closely resembles the common footing for the three senses of "meaning." Let us look at these senses more closely, with an eye to what the common footing is, and how it relates to "conceptual" and "mental."

When we discuss the symbol/referent "package" and call the referent the meaning of the symbol, surely the referent can be a concrete object or physical situation external to mind and even body. So, how is such meaning "mental"? Although a referent need not itself be mental, there is always a path through the mind when translating from a symbol to its referent, which must be done because the symbol is an invention and must be mentally interpreted in order for us to get at its meaning.

Clearly, also, when discussing symbol structures and considering either the meaning sent or the meaning received, mental

¹If my memory serves me correctly, our own Ursula Bellugi stated literally that "we think in words" in an interview for a PBS science program a few years ago.

²Interestingly, if we allow for time giving us different "instances" of a specific concrete object at different instants, e.g. John as a boy and as a young man and as an old man, then even here we can see elements of categoryhood to the conception.

translation and interpretation are involved. In other words, conceptual processing occurs, in the third sense of "conceptual."

But isn't this hopelessly vague? Perhaps so far. Is there anything more substantive that we can say so that thought and meaning can be better characterized? Yes.

Admittedly based on introspection and commonsense reasoning, we can surmise that if thought is nonverbal and fast, a lot of information must be packed into each link in the chain that forms a train of thought. Each "meaning" or "concept" link might thus carry considerable structure. These structures would not be discrete in "shape" or "form" but might nevertheless more or less obey semantic "combinability" constraints specific to the concept at hand. Such constraints in effect define the concept. Based on these constraints, only some concepts will make sense preceding or following a given link in a given context. In this sense there is a "syntax" for thought.

Series-Parallel Semantic Circuitry?

Although we can view attention as sequential, and a train of thought as a sequence of concepts attended to, there is at the same time room for parallelism and distributed, associative, and "subsymbolic" processing. We said that individual links (concepts) can have structure. Yet each structure is fitted to its neighbors in the chain in one step, in a sense. So, structures might be matched or otherwise brought together as wholes. This requires, it would seem, a good deal of parallel, concurrent processing. Memory access might be associative and parallel, based on content and occurring in one step, across distributed memory storage, while what is accessed is used sequentially by attention. And though individual concepts might be considered symbols, their component features might sometimes be "subsymbolic," unable to stand alone as intelligible concepts. Of course, sometimes complex concepts are built up of existing concepts.

Which brings us to the topic of semantic primitives. Although "semantics" is usually reserved for linguistic contexts, it has to do with that same level of meaning that we have been discussing. In fact, if we define language narrowly as *verbal*, as many people at least tacitly do, then we could say that thought need not involve language. If we broaden our conception of language to include any symbol system for communication, then we can say that thought employs language, albeit nonverbal language. We can also grant that forms of thought such as musical, artistic, and mathematical contemplation and (mental) manipulation, though using possibly very different concepts and combinability constraints, nevertheless utilize their own valid logics and languages (notation aside). Even personal symbol conventions private to an individual constitute language and have meaning, though this is directly neither socially nor culturally based.

What does this have to do with semantic primitives? It seems reasonable that each mode of reasoning would contain its own concepts, combinability constraints, and concept construction conventions. And in each case we could posit that there are relatively primitive concepts or features that more complex concepts are built from. Just what might those primitive building blocks consist of?

Would there be any universal primitives, common to all verbal languages or even to all languages of any kind?

Recall that we are not talking about words when discussing the level of meaning, but rather concepts and semantic features. There may be language- and culture-based elements to how we conceptualize phenomena, but at the same time there may well be built-in ways of combining ideas and of finding patterns in the world. Concepts need not be innate in the sense of being genetically encoded and hardwired in an organism. There can be structure to knowledge inherent in the way that reality is constructed. For example, if we want to discuss a hierarchy or network of abstractions, where some concepts are instances of more general and abstract ones, then these generalization relationships can be seen to be inherent in the definitions of the items of information forming the abstraction structure. Some of these items might be language- or culture-specific or even individual-specific, but they still obey knowledge-structuring constraints such as generalization. And, some of these items might be truly domain-independent universals, especially the "higher" we go in our abstraction hierarchy.

Relative Primitives

So, we can talk about true universals and relative universals. We can also talk about true or universal primitives and about relative or local, language/culture-specific primitives. With this insight we can reconcile Jackendoff's [1990] claims for universal primitives with Sweetser's [1990] apparent counterexamples based on language/culture-specific differences in such seemingly primitive systems as the way of dividing up space as reflected in prepositions. We might consider that there are objects, processes, and relations acting as cognitive universals and yet allow for local variations on just what our working set of prepositions might be. As primitive and "atomic" as prepositions seem to be, perhaps some of them in a given language are somewhat arbitrary and might themselves be able to be seen to be composed of even more primitive, general, "subatomic" semantic building blocks. To briefly and not necessarily definitively illustrate, take English *in* and *on* versus Spanish *en*. *En* is used to mean both "in" and "on." Is there a common denominator to *in* and *on*? Perhaps "proximity" fits the bill. Where in English we distinguish at least these two kinds of proximity (proximity to the interior of a container and immediate proximity to the surface of an object), in Spanish they are not conceptualized as being different enough to warrant separate terms. Which is right? Which is better? These questions are not necessarily productive. The key is to have a set of terms sufficient for getting points across. The specific terms (i.e. concepts) used may vary. Saying some things may be easier in one language than in another, while the roles may be reversed for saying other things.

We asked earlier what the meaning primitives might consist of. We have established, at least for the sake of this discussion, that concepts in thought trains have features and obey combination constraints. The features might be semantic primitives, whether universal or relative, and there should be degrees of universality and generality. From another perspective, that of what it "feels like" when a train of thought occurs, the concepts are less like words and more like pictures or shapes. The notion of "image schemas" appears to fit

nicely into this scenario.

These abstract image-like templates or patterns are very possibly picked out by infants and children during conceptual development via "perceptual analysis" [Mandler, 1992]. This gives us a way to explain preverbal conceptualization (and without resorting to an innate stock of concepts). If such conceptualization can be preverbal, then it can be nonverbal in general. Such nonverbal patterns such as "a movement" image schema consisting of three parts -- starting point, path of motion, and end point -- can also be seen as candidates for the meaning elements making up concepts, i.e. as possible semantic primitives. Image schemas are generally simple and general, and there is reason to believe that they can be both decomposed (at least a little, as we just saw with "a movement") and composed into larger, more complex structures. And, of course, they are somewhat pictorial in nature.

Thus we could conceivably delineate a hierarchical or network structure of image schema relationships just like the abstraction hierarchy that we have been referring to. Whether these two knowledge structures are equivalent is a question for further reflection and empirical investigation. It should be noted that there need be no privileged direction of movement within such a structure. That is, suppose we have a small segment of the hierarchy, involving a schema and two or more instantiations of the schema. It is not the case that we must "have" the schema first, in order to devise or recognize the instances. Nor is the reverse necessarily true. Just as, given schemas we can find instances, so we can start with instances sharing some features and abstract a schema for the shared features. In the special case where the context is metaphor or analogy, given a schema, a "prototype" instance and a "target" instance which is mapped to from the prototype via analogy or metaphor [Langacker, 1992], there is clear directionality.

It will be interesting to follow the development of image schema theory to see if this can give us the "concept chemistry" and "meaning math" that we need in order to productively characterize what we do when we "think in meanings". In particular, Lakoff's [1990, 1992] work on the invariance hypothesis, generic-level schemas, and conceptual metaphor may well provide a firm empirical as well as theoretical foundation for systematizing concepts.³ Perhaps we will be able to soon characterize all of the following archetypal, generic-level schemas [Lakoff 1990, 1992] in terms of the same relatively small set of building blocks, which might fit into the generalization structure (abstraction hierarchy/network) that we have been talking about:

! Causal structure

! Temporal structure

! Event shape

! Purpose structure

³It should be noted that Lakoff and colleagues' seminal work on conceptual metaphor, which leads him to postulate that abstract thought is metaphorical, may describe how we talk about conceptualizations, but need not tell us how we actually think about things. The connection, whether equivalence or not, needs clarifying.

! Modal structure

! Linear scales.

What might some of those building blocks be? A cursory scan of this list can help us identify the types of primitives which can be used to construct the more specific though still quite general schemas of the list. Causal structure contains objects, (at least implicit) change, states, and force. Of course there is overlap here with time and events. Temporal structure contains objects, events (change), and relative motion (e.g., agents moving forward in time or events moving toward a stationary agent). Event shape contains objects, change, states, and force.⁴ Purpose structure contains (purposive) objects, events or causation, and (resultant) objects (e.g. goals). Modal structure contains objects, paths, forces, and potential or actual obstructing or alleviating conditions. Finally, linear scales contain spatial extent and labelling, and directionality. Although it is clear that there is much commonality among these descriptions, there is still some proliferation of building blocks. More work is needed to further systematize the potential primitives listed here.

We can see, for example, that we can probably group events and processes, causation, actions, time, change, states, and conditions together. We can consider processes as event and state structures. Conditions are states. Events are state changes. Actions are purposive events. State change requires causation and takes time (perhaps it actually *defines* time). Of course, we can introduce objects into this, both as the locations and initiators of change and as a way of embracing processes and so on as "things" as well. We could keep going, adding in location, motion, spatial extent, direction, and force.

Certain kinds of objects, for example sentient entities, can perform purposive acts and can consider certain states or results as goals. This (purposive structure) seems a more specific application than the others. Thus, it might instantiate one or more of the more general (generic-level) schemas. Similarly, labelling might be considered a fairly specific phenomenon, one restricted to sentient entities.

At any rate, the point here is to suggest what the primitives might be like and how we might go about isolating them. Exciting times lie ahead for those who will try to organize these concepts. After all, the ability to work with concepts, especially higher-order concepts (about concepts), may well be the hallmark of what distinguishes human intelligence from that of other species. This conceptual ability for abstract thought may drive the invention and development of language, toolmaking, culture, and the other tangible fruits of human society.

References

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⁴There are also, of course, other aspects of events such as manner, and the features which Lakoff lists: "instantaneous or repeated, completed or open-ended, single or repeating [if this is different from the first pair, perhaps he meant 'instantaneous or ongoing' instead?], having fixed stages or not, preserving the existence of entities or not, and so on." However, we did say that this is just a cursory analysis.

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