Investigating the foundations of meaning in a xenolanguage

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Preprint, Fall 2022. To appear in: *Xenolinguistics: Toward a Science of Extraterrestrial Language*. Douglas Vakoch and Jeffrey Punske eds. Oxford University Press. Oxford, UK.

Abstract

This chapter outlines the fundamental nature of meaning and its effects on how linguists can investigate a xenolanguage. Underpinning our work are limits to what we can observe inside a mind, and the consequent assumptions we make to work around them. Also crucial are conceiving of meaning as being truth-conditional and compositional, and remaining mindful of cases where they appear not fully so. Lexical meaning can tell us about the conceptions and construals that an alien mind uses to organize their thoughts and their world, which might be so different that elicitation may prove difficult. Finally, as semanticists we can explore universals of human language to compare them to what we might find in an alien language.

Introduction

This chapter explores how we might discover the nature of meaning in extraterrestrial languages, and what that may or may not tell us about how extraterrestrials conceive their world. Any discovery will build off of three distinct threads of analysis that have only intertwined in the last generation of research. First we have the linguistic task of inducing generalizations about observed morphemes; next, the philosophical goal of understanding how knowledge is encoded and transmitted. Finally we have the modern linguistic theory of discovering the nature of human linguistic knowledge as a cognitive object. Each of these strands of modern semantics plays a key role in understanding what we might find out.

Given an alien species, how do we engage in understanding not only the forms of their languages, but the meanings?[1] Clearly we will need a solid footing in truth-conditions. We can reasonably assume they have objects like utterances, indexical forms that relate to them, and also referential forms that point out the objects around them and elsewhere. Yet we must also understand if and how they quantify over things, express modal claims, or combine modifiers. We must observe how they organize their discourses, and seek whether their languages reflect that organization. We must also explore the nature of their semantic ontologies, down to the most basic levels. Do they distinguish entities that 'are' from events that 'happen'? Do they conceive of modal claims in terms of possible worlds? How do their languages reflect their cognition of mereology? Do their languages show them to treat causation differently from us? Spatial and temporal awareness?

These questions and others are not merely curious inquiries of linguistic structure. In many ways, a speaker's semantic (and pragmatic) behavior can reveal things their underlying patterns of cognition, as well as their cultural habits and mindsets. Yet we must take care not to overstate the ways that cognition, languge, and culture are intertwined. So as we speculate about what meaning xenosemantics might involve, we must consider a method to find it.

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[1] We would also do well to ask: How can we help them discover how *our* languages work?

The truth about truth

At its heart, semantics is the bridge between the word and the world. Under a modern generative framework, it links the core linguistic component to the conceptual-intentional module of the mind. Under more cognitively oriented approaches, the semantics is simply a part of how we organize thought. In either case, once we separate the pieces of language that have no near relation to meaning, and we filter out non-linguistic thought processes and cultural habits, we end up with our field of study: some body of knowledge held by linguistic beings.

Ascertaining this knowledge is difficult. Any generalization requires us to iron out variations, but we have rarely if ever focused on discerning which variations even matter, the way we have for sound. When a person emits a speech sound, a listener's ears pick up a signal, and the listener's mind catches upon a variety of phonetic cues, adjusting for variations within and across speakers. In doing so that mind situates that sound within a class (a phoneme) that thus relates it by opposition to other classes. Linguists who easily worked out how we do this with sounds also argued that doing the same for the semantics was a fool's errand. Leonard Bloomfield pointed out nearly 100 years ago that linguists have to assume that the concept linked to a word in one person's mind is the same as that in another person's mind. How could one possibly know whether my lexical item *cat* actually means the same as yours? If our personal lexemes do not mean the same thing, how can we be certain that they are even the same lexical item? He called this assumption the *fundamental assumption of linguistics*, suggesting a problem that could not be overcome (Bloomfield 1933). Observation makes us wonder, though, if this assumption is really problematic. Speakers rarely have difficulties using words like *cat* with each other, so we know either that *speakers* make this assumption all the time or that these lexical items are unproblematically non-identical. Perhaps they vary in ways similar to the ways that non-meaningful linguistic categories vary, and minds adjust accordingly.

Adjustment does not entail that speakers always agree, but that is also the case with sounds. U.S. Supreme Court Justice Potter Stewart famously wrote in a judicial opinion for an obscenity case that defining *pornography* was difficult, but suggests that what we might call semantic intuition guides us toward understanding what the term might comprise (*Jacobellis v Ohio*, United States 1964).

> *I shall not today attempt further to define the kinds of material I understand to be embraced within that shorthand description, and perhaps I could never succeed in intelligibly doing so. But* ***I know it when I see it****, and the motion picture involved in this case is not that.* (my emphasis)

Participants in legal proceedings might obviously want something more predictable to guide their actions, but outside the narrow proscriptions of the law, "I know it when I see it" is a very ordinary method that humans use to categorize their world semantically. The fact that each person sees 'it' differently, and thus knows 'it' differently, is not controversial; it even underpins

Saussure (1915)'s notion of *langue*, Chomsky (1986)'s notion of *e- vs. i-language*, and so on.[2] Variations like this do not bother speakers generally, and should not bother any xenolinguists.

Being a crucial component of linguistic behavior, "I know it when I see it" is thus a fundamental component of understanding what we can find out about semantic meaning in humans, and undoubtedly other species as well. We cannot directly observe what two people's meaning of *cat* is, but we can empirically test for sameness by observing whether they always "see it" or don't in the same contexts. If two speakers agreed 100% of the time on whether a number of given objects were cats or not, we can reasonably conclude that their known meaning of *cat* was identical to one another's.

We can draw an analogy to an optometrist, who cannot observe what their patients are perceiving. Instead, they can only draw conclusions based on the patients' verbal behavior; answering *yes* or *no*, reading figures on a Snellen test, saying when the ball comes into view. Even advanced scanning devices cannot answer these questions. The doctor can induce what a patient can and cannot see clearly, and conclude that their visual acuity is the same as anyone else who gave the same answers at the same stages of the eye test. This in turn leads to an accurate prescription, even if the people with the same prescription still have slight variations in vision.

With semantic knowledge, the path to understanding what an alien friend knows involves finding out when it "sees it," and that leads us to truth-conditions. As Lewis (1970) pointed out succinctly, to know the meaning of an expression is to know the conditions that make it true. Linguistic knowledge of an expression's meaning is the knowledge of those conditions, even if a linguist still cannot quite tell exactly what that knowledge contains.

One might wonder how well truth-conditions can be applied to anything besides assertions. What makes a question or a command *true*? Clearly Lewis overgeneralized. That said, the meanings of these other speech acts still rely on truth-conditions. If I ask you *Does Maren drink coffee?* I am essentially laying out for you a proposition (Maren drinks coffee), but instead of asserting that it has a value of "true," I am instructing you to assert its truth-value to me. The answer still depends on the same world conditions that would make *Maren drinks coffee* true. If I tell you *Get Maren some coffee*, my command will only be satisfied if the proposition that you get Maren some coffee becomes true.

Alternately, some semanticists have instead formulated meaning in terms of its effect on the speech context: what the speech participants know and have in mind (Kamp 1981, Heim 1982). Even here, though, the particular effects on the context are largely rooted in truth-conditions or easily linked back to them.

Besides truth-conditionality, another key aspect of linguistic meaning is compositionality: the meaning of a complex expression is built solely out of the meanings of its parts. Just as speakers do not generally memorize the forms of entire sentences, they do not generally memorize the meanings of entire propositions. Instead, we build them each time, starting with the structure built by some level of the syntax. The mechanisms for composing meaning depend tightly on the denotations of lexical items, so most of semantic research eventually boils down to that.

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[2] Never mind what it might mean to *know* anything in the first place.

Semantics and perception

Much of the semantic research into the lexicon over the years has also delved into some kind of psychology, because it is fairly obvious that lexical meanings directly relate to how our minds have 'carved out' the spaces of reality around us, the way our vision delineates the borders of objects, and so on. What is less obvious is what those relations are, how deep they go, and what 'carving' even means.

Whitney (1867) figured that "separate articulated signs of thought" help humans make sense and organize the world around them. More importantly, humans could share these realities far and wide.

> *…not only were we thus assisted to an intelligent recognition of ourselves and the world immediately about us, but knowledge began at once to be communicated to us respecting things beyond our reach.* Whitney (1867:13)

This organization is quite evident in terms denoting human-assigned categories, which are relations that only exist in our knowledge. These include family relations, which mix biological and cultural notions. We see it in the names of places, like membership in a mountain range or a continent. Certain objects *only* exist in our knowledge, like the constellations in the night sky, or the red dot from a laser pointer (a collocation of instants of light), and their names reflect a recognition of our world.

This conception of language taming our thoughts reappears over the years. Bréal (1897:271 et seq.), who coined the term *sémantique*, argues that language is a translation of reality whose real value comes from how it objectifies our pre-existing thought by making vague ideas solid enough to transmit.

> *No doubt it must be the case that the idea came first: but this idea is vacillating, fleeting, difficult to transmit; once it's incorporated into a sign, we are more sure of possessing it, of handling it as we wish, and of communicating it to others. Such is the service rendered by language: It objectifies thought.*[3]

Saussure's seminal work went a clear step further with his concept of *signe*, which includes a linguistic representation and a mental concept. This is not a referential link like we'd imagine; the one does not exist without the other, so whatever the actual nature of things, linguistic signs help us carve out the mental spaces for them in our minds. For Saussure ([1916] 1995:99) this leads to conclusions we might today consider "Whorfian."

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[3] Translated by the author from French: *Sans doute il a fallu que l'idée précédât : mais cette idée est vacillante, fugitive, difficile à transmettre; une fois incorporée dans un signe, nous sommes plus sûrs de la posséder, de la manier à volonté et de la communiquer à d'autres. Tel est le service rendu par le langage : il objective la pensée.*

> *…it is clear that only the combinations consecrated by the language system appear to us to properly fit reality.*[4]

This sort of intricate link between the meaning of linguistic items and the mental conceptions of humans did not catch on very well among structuralists who soon dispensed with Saussure's notion of *signe* for empirical reasons. Bréal, for his part, had already emphasized how semantic changes in natural language demonstrated the flexibility of human thought processes, and their independence from language. Language helps us pinpoint and share clear ideas, but is not a requirement to have them.

Americanists avoided these questions altogether in their main line of research, eschewing semantic inquiry on positivist grounds. We cannot observe mental states, so leave that for later research. And in any case, tying one's linguistics to particular theories of psychology runs a risk as those come and go. Instead, they focused on inducing generalizations about the observable usage conditions of the welter of unheralded morphemes they discovered as they trekked around the globe documenting languages. This approach is very much like the modern reliance on observing truth-conditional behavior discussed above, and their findings with this method have proven to provide their most lasting results.

Nonetheless, they often came to assume a tight link between meaning and worldview. Famously, Edward Sapir would claim such a tight link that the semantics directly shaped cognition, as much as *vice versa*.

> *Human beings do not live in the objective world alone… but are very much at the mercy of the particular language which has become the medium of expression for their society.… the 'real world' is to a large extent unconsciously built up on the language habits of the group…. We see and hear and otherwise experience very largely as we do because the language habits of our community predispose certain choices of interpretation.* (Sapir 1929: 209–210)

Sapir's student Benjamin Lee Whorf argued (1956) that a Hopi speaker's sense of time was distinct from an English speaker's *because* the Hopi language's temporal semantics was not built on the same notion of how time progresses.

Such speculative claims, now called linguistic determinism, were not empirically backed, either by linguistics, psychology, or a cursory examination of multilingual speech communities. For one thing, Whorf doesn't seem to have actually asked any Hopis about their time concepts, or even conducted basic linguistic documentation. We know now that Hopi temporal semantics is built on the same ordering of times that every other language is (Malotki 1983). More recently, experimental "neo-Whorfian" research finds extremely minor differences in aspects like color discernment or directional orientation, yet even those results turn out to involve lexical selection rather than actual differences in perception (Li & Gleitman 2002, Li et al. 2011).

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[4] Translated by the author from French: *… il est clair que seuls les rapprochements consacrés par la langue nous apparaissent conformes à la réalité.*

Looking into the Lexicon

We can be confident that we will discover linguistic facts that *reflect* differences in our friends' cognition, rather than shape it.[5] We can begin to explore those differences just by asking about lexical items. However, we must be careful with our methods, because they were designed with human experience in mind. For instance, one classic idea is to begin fieldwork with a lexical list, such as a Swadesh list: Over one hundred words rooted in unversal human experience, including local person pronouns like *you*, basic elements of matter like *water*, and body parts like *arm*.

> *Pronouns and numerals are occasionally replaced…but such replacement is rare. The same is more or less true of other everyday expressions connected with concepts and experiences common to all human groups, or to the groups living in a given part of the world during a given epoch.* (Swadesh 1950:157)

Swadesh designed this list for research in historical linguistics, by eliciting words unlikely to be borrowed. Yet it proves useful for the first moments of fieldwork because the linguist is more likely to elicit *something* than by choosing words at random. After all, we are asking about experiences common to any human. A 'hit' is not completely likely, though, because a surprising number of languages lack a 'word' for ostensibly simple universal concepts. Or they have several words where English has one, making the translation inexact. More frequently, there are mismatches in lexical spaces from differences in encoding. Or, what is an ordinary noun in one language is only used as a finite verb with agreement in another. Or, what is a free word in English turns out to be a bound stem in the other language, and cannot be expressed without some other stem to carry it. Still, out of hundreds of words on these lists, there are bound to be a healthy number of hits that can kickstart a fieldwork process, simply due to the relative universality of the human experiences the list evokes.[6]

One immediately sees how a list rooted in human experience can be a problem with non-Earthlings. Even with a small alphabetical selection of 25 words (Table 1), which might get 20 hits with a human language, I can only see a handful that we could *expect* an alien would be able to translate at first (in boldface). Several others we could expect them to at least understand, but some, like *fog, flower, grass, laugh, hand*… perhaps those are foreign to them.

egg	flower	green	here	lake
eye	fog	hair	hit	laugh
far	foot	hand	hunt	leaf
father	good	**head**	husband	left hand
fire	grass	heart	**ice**	leg

[5] If the "language of thought" hypothesis holds, of us and of extraterrestrials, whereby thoughts are built in a separate mental language distinct from the spoken one, then these questions can all be applied to that.

[6] A similar approach involves *semantic primes*, argued to be the fundamental building blocks of linguistic meaning and language-built thought (Weirzbicka 1972, Goddard 1999). The same issues come up, but worse because many of those primes are somewhat abstract.

Table 1: selection of words to elicit from Swadesh (1950)

Granted, we would not have to use linguistic evidence alone to see what they perceive, nor should we. Our friends would hopefully consent to a wide variety of psychological and medical tests to help get a sense of their perception. For linguistics though, the first days will be tricky. Trickier still, in fact, because the list also assumes the speaker and linguist already share one common language to use for inquiry.

Referring to reference

Although we cannot assume that xenolanguages would refer to or describe things the same way we do, we can healthily assume they contain methods of reference to the objects of the world. In this way we can rely at first on pointing at things in the room, hoping for a match. Unfortunately, we then reach Quine (1969)'s *gavagai* problem: We cannot know, at least at first, that our hope is true. Imagine that I point at a sitting dog wagging its tail and say "dog." Do they know I am speaking about the entity and not some part of it, or some group it is a part of (mammal, animal)? Or do I mean its color, its furriness, its being alive, the act of sitting, its happiness, cuteness, puppy-dog eyes, odor, food, or what? Do they even understand that I am describing a particular object, instead of a generic concept? Or do they think I am asserting possession ("mine!"), or even offering the dog, saying "you can have it"? Consequently… what would their translation mean?

Experience shows that speakers of distinct languages eventually surmount mutual unintelligibility, as the existence of pidgins demonstrates. Even the paltry vocabulary lists of colonial merchant-explorers stand as a testament to overcoming this hurdle. Jacques Cartier's 1545 expedition records enough words from the villages along the St. Lawrence River (including the name of a village, *Canada*), that linguists today can tell that the inhabitants spoke an Iroquoian language distinct from any still known. This list consisted of body parts, person types (man, woman, child, etc), flora and fauna, tools and implements, and so on (Cartier 1863). After a while, with basic vocabulary and a lot of help from gestures, the expedition and the locals were able to communicate about certain kinds of information (Huchon 2006).

This history suggests to us that groping around the lexicon can get us started, barring massive differences in ontological perception and awareness. In doing so, we can start to gain some linguistic evidence about how our friends mentally compartmentalize the world around them.

Onto the ontology

We would need that evidence, because the way our semantics organizes objects might differ from how our friends' semantics does. While few semantic universals have been explored in depth, the nature of semantic investigation has led to a number of practical assumptions about fundamental universals of human language. Many of these revolve around the ontology of basic elements (Rett 2022). Building off Montague, Davidson, and so on, semanticists generally agree

at least on the distinction between entities and events.[7] We generally include truth-values, time intervals, and possible worlds as well. Some semanticists also include situations, kinds, degrees, and locations, depending on their approach and the theoretical question at hand. As far as I know, no one has made a full 'semantics' of a single language with all the fully accepted or well-supported components, so it does remain to be seen if these all truly fit together.

In a type-theoretic semantics, simple atomic objects are a member of one of these ontological sets, and complex expressions denote functions mapping from one set of objects to another (including itself). We do not question that semantic meaning deals with truth-values, entities, or events, because those are clearly distinct kinds of objects. At least, they seem clearly distinct. In all these years we have not developed any real criterion for distinguishing them beyond their use in language. Link (1983:303f.) suggests that "our guide in ontological matters has to be language itself." Entities are described by nouns and adjectives, while events are described by adverbs and adverbials. Verbs and thematic relations relate entities to events. In the absence of criteria we think of entities being objects that 'are', while events are objects that 'happen', but it is hard to actually define that difference. So we rely on entailments and morphological distinctions involving proforms, quantifiers, and modifiers. For instance, in English, *it* can be used to refer to antecedent events.

(1) *The mayor was caught red-handed and <u>it</u> sank his re-election bid.*
it = the event of the mayor being caught (red-handed)

(2) *The silo exploded and I saw <u>it</u> happen.*
it = the event of the silo exploding

In many ways, events and entities can be treated in similar ways as far as plurality and mereology are concerned (Link 1983, Bach 1986, Krifka 1990). They even overlap in famous instances, like (3), which could no doubt be elicited from our friends with minor tweaks to the vocabulary. We may find a sentence like this is not ambiguous for them.

(3) *Four thousand ships passed through the lock*.
= Not necessarily 4000 distinct boats, but events of ships passing

One point of distinction is that relations between events and entities are asymmetrical. A verb relates entities to events. The entity's role in the event is determinative— switch it out and the event is gone. In contrast, the event only plays a small role in determining the entity. If I see you, you contribute far more to this seeing event being the way it is than it contribues to you being the way you are. This asymmetry holds even if the event significantly affects the theme— say, I disintegrate you,[8] your contribution to this event's being how it is from start to finish dwarfs the event's contribution to how you were from start to finish. It also holds if the event is

[7] Entities are also called *individuals*, while events are sometimes called *eventualities.* which are then divided into events and states. Here we will use the broad *event* to cover eventualities including states, even though there is mounting evidence that states are distinct (see Maienborn 2011 for a discussion).
[8] Sorry about that.

nominalized: with *the creation of the sculpture,* the sculpture is a key component of this event, while the event is only one small part of the sculpture's history, as many other events may happen to it afterwards.

Also, the parts of entities that are themselves entities can have parts that have properties the whole cannot have. Bach (1986) offers this case as an example:

(4) *The gold making up Terry's ring is old but the ring itself is new.*

Another key difference is causation. The parts of events *cause* the whole event in ways that parts of entities do not cause entities. If Jenna climbed Mount Everest, that event is composed of a large number of sub-events, each of which contributes causally to the whole. Indeed, we tend to ignore potential sub-events that are not causal contributors, like stopping to scratch an itch or chatting idly with someone along the way. On the other hand, none of Jenna's parts *cause* her– not her arm nor her heart. None of those parts' parts cause them, either, not even down to the cellular level.

Any language whose ontology we have explored behaves similarly, although that is not a large set. We might find that alien languages do not work this way at all; *e.g.*, that the equivalent of *old* cannot apply to the components of something that is the equivalent of *new.* The above differences seem to suggest that people distinguish some semantic objects by concepts like causation. But we must not assume all species would do the same.

Speaking of speech acts

Setting aside the mode of communication our friends employ, and the things they might talk about, we can safely presume that they will deliver it via speech acts, or an analog thereof; we can still call them *speech acts* (Austin 1962). Natural languages are also observed to vary little in the sorts of speech acts available, at least in a broad sense: Assertions, questions, apologies, promises, and so on. We might wonder if our friends would have speech acts we have not observed, especially performatives. Searle and Vanderveken (2005) point out the lack of a possible speech act in human languages like "I hereby persuade you," with a performative effect, because performatives are rooted in social acceptance. Other creatures might have that power, though, and if they could use it on us, I suppose I would agree with them.

We can also assume as a hypothesis that their languages will have indexical items that express relations toward these speech acts, based on the universality in human languages. A language without indexicals could logically exist, but indexicality not only makes things far more efficient, it ropes in the self-aware components of our psychology.

Relations between entities and speech acts known as *person* are features of all human languages, and a large amount of research finds that cross-linguistic person marking boils down to the same small set (see Cysouw 2011 for a summary). The speaker is distinguished from the addressee, though the two can be lumped together in inclusive plurals. Everything else is being talked about. The small cross-linguistic variation allows for derivation via a powerful feature geometry (Harley & Ritter 2002), and allows tracking of changes over time. We might imagine other relations, though: We do not, for instance, observe languages that distinguish direct addressees from other (potential) listeners, themselves distinct from things being talked about.

We also see that the persons are tied to each particular speech act or utterance, not to entire conversations (first to speak, first to reply, most important person, etc.). In alien languages, we may well find some other setup, and if it is as universal for them as our person setup is for us, it may well reflect some aspect of their cognition.

Composed with compositionality

The meaning of entire clauses is built from the meanings of its parts, and a large body of research has sought to see how that works, building off Frege's idea of using functional application. A predicate is a function that takes a simple object as its argument. However, that is not sufficient. Heim & Kratzer (1998)'s well-accepted formulations of various compositional rules only number five, and only a handful of narrow types of conjunction have been added to them (Kratzer 1996, Chung & Ladusaw 2004). With this limitation on composition modes, von Fintel and Matthewson (2008) ask if compositionality can be shown to be universal for humans. If xenolanguages are not so compositional, it may throw a serious wrench in our attempts to learn about them. Compositionality fundamentally affects fieldwork, because it allows us to bootstrap upon previous findings by substituting out single words or morphemes and comparing the meanings of sentences.

Being pragmatic

This chapter has focused on semantics but we must not forget the pragmatics for understanding usage in a xenolanguage. A significant amount of communication is indirect. Speech act participants work tirelessly to create and fill deliberate gaps, but in doing so they rely on several types of tacit knowledge: cultural background, personal experience, observations of other conversations, and so on.

We should certainly expect surface pragmatic principles to vary, as we do among linguistic cultures and subcultures. We should not expect a pragmatics as extreme as that of the fictional Tamarians who appeared in an episode of *Star Trek: The Next Generation*. These humanoids spoke only in cultural references to heroic figures (*e.g.*, *Shaka, when the walls fell* describes events of failure). Whatever we get, we must take care to distinguish pragmatic from semantic elements of meaning.

When we scrape away cultural layers, we find basic principles of pragmatics that we usually call Gricean maxims (Grice 1975). These maxims are rooted in the assumption that speech act participants are cooperating, even when we are flouting the maxims. Put another way, the mere act of language is inherently cooperative. Should we expect the same from our friends? Or might the act of a xenolanguage be inherently something else?

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