

# Towards a State-of-the-Art Theory of Meaning

Yusuke Sugaya

## 1. The Meaning of Semantic Investigation

Meaning is one of the broadest terms and the most difficult concepts to define in human science, as even after long discussion since classical antiquity, so the meaning of meaning must itself be questioned in any academic field, including philosophy. Even so, in practice, and with little consideration, one uses the word in a wide variety of senses (e.g., the meaning of a sentence, a rule, a baby's cry, suffering, and life) that immediately transcend the sphere of linguistics. It is widely considered, however, that all of these senses share the common feature of involving a form (i.e., symbol), as human mind can associate a form with a meaning. Among various symbolic systems, language is viewed as the representative of such form-meaning pairings (in the broad sense), and linguistic semantics is thus seen to function as the central study of meaning and of its relation to form.

This view gives rise to the **form-first** and comprehension-based semantics, which might be common and prevalent not only among ordinary people but a lot of linguists as well. In the opposite direction to this, there is the other type of view: the **meaning-first** and production-based investigation of meaning. These two perspectives are fundamentally different—while the former studies the human interpretation of ready-made form, the latter surveys the system of **meaning synthesis** in the human brain. Since there are many different sorts of symbols, such meaning-making may result not only in the linguistic expression but also in other kinds of externalization—if a meaning appears as a behavior, for instance, it falls within the scope of certain psychological studies.

Needless to say, these two distinct approaches to meaning must be **symmetric** to some extent—at least, in order to completely understand an utterance, a hearer must decode a form by “chasing” or “reproducing” the encoding procedure of the speaker. For this reason, the meaning-first semantics is primordial (discussed in the following section), and thus meaning comprehension studies should be based on the research addressing the problem of meaning production. If productive meaning is primary, the original question arises: what is the meaning of investigating meaning production? The two statements below (1, 2) seem to provide the general answer to that question.

(1) Why study semantics? Semantics (as the study of meaning) is central to the study of communication; as communication becomes more and more a crucial factor in social organization, the need to understand it becomes more and more pressing. Semantics is also at the centre of the study of the human mind—through processes, cognition, conceptualization—all these are intricately bound up with the way in which I classify and convey our experience of the world through language. (Leech 1974: ix)

(2) We can make meaning. What’s perhaps most remarkable about it is that we hardly notice we’re doing anything at all. There are deep, rapid, complex operations afoot under the surface of the skull, and yet all we experience is seamless understanding. (...) To understand how meaning works, then, is to understand part of what it is to be human. (Bergen 2012: 20)

From the standpoint of phenomenology, we live through the subjectively created meaning, since no one can directly experience the physical world without perception and conception obtained through the sensory organs. For human beings, meaning synthesis is the only way in which we are connected to the outside. Hence, the study of meaning can be, as these linguists indicate, contributive to revealing how we relate the world to ourselves.

Moreover, if we take the viewpoint of rejecting the existence of a language-specific module, it is reasonable to suppose that meaning is neurologically constructed throughout the cerebrum, activating a number of brain regions. Obviously, the brain is responsible for many kinds of cognitive faculties such as seeing, attending, acting, and remembering, all of which can be combined to bring about the human facility of speech—this may be an evolutionary **adaptation** because of there being no language-specific region in the brain. Thus, the semantic study from this standpoint concerns a variety of brain domains and their functions and therefore may be expected to help us unravel this complex cognitive system.

## 2. Meaning Process

Langacker (2008) offers a new definition of meaning: “meaning is not identified with concepts but with **conceptualization**” (ibid: 30). As linguists have dealt only with the final state of conceptualization associated with a linguistic form, they may not accept the following premises: (a) meaning is a construction; (b) meaning is made step by step; (c) the process is part of meaning; and (d) meaning or meaning-making can emerge only in the mind (brain). If semantic studies are based on these premises, their purpose and methodology would be revised following the postulate that building a **cognitive model of processing** as a hypothesis has the highest priority, after which experimental demonstration must be conducted, as studies in cognitive science have done normally.

### 2.1. Stative vs. dynamic, comprehension vs. production

Why not study stative meaning? General semantic researchers have seldom paid attention to meaning-production, partly because of the form-first assumption. It is quite natural that linguistic semantics has long attempted to analyze “linguistic” meaning (i.e., form and then meaning), presupposing that some meaning is attached to

a form (i.e., form-meaning pair), in order **not to move away from the linguistic domain**. Of course, we never proceed to mention that, inside that domain, their linguistic accounts of lexical or grammatical forms associated with fixed meanings (e.g., describing and classifying senses of an item) are in vain.

However, the meaning assumed in this case is the attenuated (simplified), idealized, and objective one, detached from complex human psychology. This rough treatment of meaning is likely to be a consequence of ignoring the involvement of the complicated meaning-making process (because of different purposes). When taking the meaning-first standpoint (i.e., form is secondary), we can go beyond the analysis of only the conveyed and shared **meaning bound by form** and begin an interesting research dealing with the more specific and complicated level of meaning. Moreover, this may open up the possibility and even the necessity of the multidisciplinary studies with neighboring scientific fields such as psychology and cognitive science (discussed in Section 3). Note that a possible strategy is to start with an investigation into how meaning leads to “linguistic” forms from this viewpoint.

Neurologically, language is considered a high-level cognitive function, but those who study language merely in the linguistic domain tend not to take that fact into consideration. This is simply because they do not take account of other domains or lower levels of cognitive functions, as if language studies **floated independently of other scientific realms**. What they should notice is that a higher-level function like language can appear only after a number of necessary lower domains are connected and integrated in the brain. Research on the meaning-making process, on the other hand, requires the **lower, more realistic** levels of organization, which would enable some reduction to the neurological and biological levels. In this respect, work on such processing is progressive and necessary nowadays so as to create a mutually contributive relationship with other sciences, although it might be an issue whether language needs finally to be reduced to such lower levels.



The degree of **meaning transition** refers to the extent to which a hearer infers and reads a speaker's meaning construction. This is based on the assumption that **empathy should function in understanding an utterance**, not excluding the objective view of communication (i.e., conveying prescriptive information). In the standard theory of comprehension, decoding a symbol simply involves the determined linguistic interpretation of lexicon and grammar (i.e., canonical semantics). Some addressees may, moreover, like to understand why and how a linguistic expression uttered toward them—because a meaning transfer cuts away much portion of the meaning—, which urges them to reproduce the meaning process in their minds (i.e., empathy). Thus, because there is a symmetric and reproductive relation between production-based and comprehension-based semantics, researchers should begin with the former in principle.

## 2.2. Cognitive model

The abductive reasoning—making a hypothesis and then verifying it with an experiment—is the basic method of this semantics, because most meanings created inside a person's brain cannot be symbolized in a linguistic form. Thus, scientists have to logically infer what is taking place during a meaning-making process, and construct a valid cognitive model to be tested later by an experiment.

This obviously presupposes an ontology in which meaning forms a **complex structure**, rejecting the assumption that meaning is an **inseparable mass** and the dichotomy of whether it exists or not (0/1). Broadly, the recent results of neuroscience research tend to rebut the coarse idea of a **domain-general** cognitive model—even if high-level cognitive faculties are less localized—and instead supports a view of the relative localization, some basic cognitive functions being linked together to produce a high-level behavior like the use of language. In parallel, given that we take a fine view with a “magnifying lens,” meaning must be the result of combining some dividable subprocesses and consist of several parts, each of which could itself be meaning as well. Depending on the type of meaning or its associating form, there are thus **gradual**

**phases of meaning production** ( $0 \rightarrow 0.1 \rightarrow 0.2 \rightarrow \dots \rightarrow 1$ ), possibly including a parallel distributed structure or some interweaving crossovers.

It is well known that cognitive science methodologically adopts the metaphor that “a brain is a computer.” Consider the simple situation where, when you type a word on your keyboard, it appears on the screen. It goes without saying that, even for this short operation, some computer programming and processes of computation intervenes between the input and the output. More easily visualized, a vending machine for beverages also includes a linear sequence of multiple steps: (i) counting coins, (ii) understanding a customer’s order, (iii) taking out the drink, and (iv) providing change. Similarly, meaning can (and should) be described with a cognitive model of processing, although its process must be more complex by far than these examples. In the sense that this work strives to look inside the black box of the mental processes giving rise to meaning with the method of cognitive science, it should be regarded as research in the **original meaning of cognitive semantics**.

For the few first steps, Langacker’s theory of construal can contribute to the construction of such cognitive models in certain respects, since it deals with the interpretation not of sentences but of scenes to be linguistically expressed—how do we subjectively view and construe an objective scene? Because perceiving (or recalling) an object might initiate a meaning-making process, the visual psychological research on our viewing manner, including how to take perspective (where we see it from), needs to be incorporated into the model. Thus, viewing itself and interpretation of perceived information (conducted in the secondary visual cortex) would be the key to the beginning of the meaning process.

### **2.3. Experimentation and implementation**

A hypothetical cognitive model should be empirically proved with a variety of (behavioral or neurological) experiments. In the case of behavioral experiments, researchers must design an experiment that provides a stimulus for its participants and

observes various types of reactions—for example, their eye-movements with an eye-tracker—, with reference to a lot of psychological studies. Concerning neurological demonstrations, furthermore, the technology to examine brain activity is rapidly progressing (e.g., EEG, MEG, fMRI, and NIRS) so that it is becoming easier to measure the ongoing process of a concept formation, identifying the pertinent brain region, with the aid of electrophysiological techniques.

Finally, the end of cognitive research would be seen as computer implementation, contributing to the **Artificial Intelligence** (AI) or robotics research. A computer that can spontaneously create a meaning may be said to be almost a human being from the cognitive perspective. Of course, there are a large number of steps to implement such a cognitive model for meaning-making in computer, because that creative behavior is considered one of the highest levels of integrated cognitions. It must therefore not be straightforward to build human-like cognitive functions on the computer from zero (*tabula rasa*). However, this view and attempt would offer a highly valuable aid for the following: (i) elucidating the process of meaning leading to a linguistic form (linguistics), (ii) clarifying the meaning causing various behaviors (psychology), (iii) unraveling the brain mechanism for meaning (cognitive neuroscience), and (iv) building AI with fairly human-like thought (computer science). It is desirable that it would make some contribution not only to multiple fields of science but also to human lives.

### 3. Psychology-based

In light of the above discussion, it has become of increasing importance to academically locate linguistics in a proper place in science, without isolating it from the other sciences. It is depending on such a location in science that the essence of a given study varies, including an approach, methodology, and goal of analysis.

### 3.1. Academic hierarchy

First of all, it should be taken for granted that language is **not isolated** at all and is identified as a **higher-level** of cognitive mechanism supported by lower systems. Each academic sphere deals with a different type of entity, ranging from a universal law to a specific language, from the viewpoint of which those sciences can be classified and posited in the whole science, as in Figure 1. First, any of them is divided into two categories in terms of whether it is empirical—for example, the objects in mathematics are abstract so cannot be experienced directly. On the other hand, empirical sciences basically treat the realistic things existing in the world, which are moreover arranged in light of **categorical specificity** or **inclusiveness**. For example, animals are seen as one of the natural things on the earth, which means one base of biology is physics, and a human mind has to reside in a person—biology can thus be the foundation of psychology. This would be reasonable and actual, as molecular biology and the (biological) neuroscience research on human minds have become predominant today in the fields of biology and psychology, respectively.

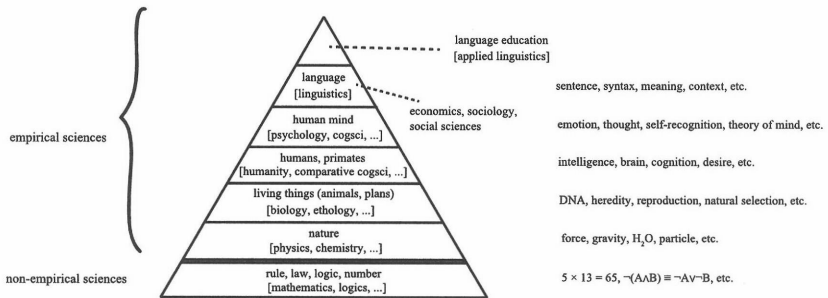


Figure 1: The academic hierarchy diagram

Among the most important here is that language is obviously situated on quite a high layer, which suggests that it cannot be directly reduced to even lower entities like neuron, genome, atom, and mathematics. As is apparent in Figure 1, the immediate foundation of linguistics must be psychology or cognitive science (or other studies on human minds). Hence, the mathematical study of language (e.g., formal logics) and the biological survey of language (e.g., evolution) may create some **theoretical gaps** to be filled between each of them and linguistics.

As well as research isolating language, investigations undertaken with such a gap are likely to possess some significant deficiencies or shortages. For instance, formal semantics, an important sphere in linguistics, uses logical operators and theorems to describe the meaning of sentences, yet seems to have the fatal disadvantage of **lacking empirical reality in the truth-conditional treatment**—no one thinks of a sentence as a true/false judgment except for such linguists. If formal semantics would like to be classified as a non-empirical science, it should be the basement of other lower sciences like physics, but it can never be so.

### 3.2. Psychological linguistics

Since the lower-level study of a higher-level thing (e.g., molecular biology) can function to radically develop the original domain of a given science (i.e., biology), it is natural to similarly think that linguists should launch and enhance the psychological or cognitive perspective of semantics in a true sense. There have already been, of course, **psycholinguistics** and **cognitive semantics** in linguistics, but they actually have not conducted what their names literally denote. The former just takes the methodology of experimental demonstration, dealing with the linguistic comprehension and production processes and the acquisition of language, to support linguistic theories (based on generative grammar). It has never referred to psychological research, because of the long-standing linguistic tenet of clearly distinguishing it from the study of language.

The latter is, on the other hand, semantics based on linguistic theory fitted accurately with the styles of human thought (i.e., cognitive linguistics) and so tends to possess (at least, seek for) some **psychological reality**. In actuality, however, it has still reached neither the cognitive science of meaning nor the psychological study of meaning, as its main scope has been merely the **semantic description of a linguistic category or metaphor**. Of course, there are some theories in cognitive semantics, including mental spaces theory (Fauconnier 1985), the prototype theory (Lakoff 1987), and conceptual metaphor theory (Lakoff and Johnson 1980), striving to unravel the system of human thoughts. These studies are nevertheless **too linguistic to be connected with on-going psychological investigations**, and additionally they avoid the manner and results of psychology—at least, they are not experimentally based at all. In this sense, any existing research in that field could not be seen as a lower-level explanation of the higher-level.

In lieu of these, what is a linguistic study incorporated into psychology, or psychology-based linguistics? Although there are numerous possible styles for such, what they should have in common is to **cease endowing language with a special value** and instead to regard it as one psychology-induced human behavior. A relevant assumption is that **language would be a product of substitution**, in which a variety of mental capacities (e.g., perception, empathy, emotion, (cultural) values, and self-recognition) for different human acts (e.g., decision-making) can be adapted for language as well. Because such interactions of cognitive faculties must be highly complicated, it appears to be more effective methodologically to build a cognitive model of mental processing as a hypothesis to then be confirmed with a psychological experiment (i.e., experimental cognitive semantics). It goes without stating that, first and foremost, the researchers must refer to the copious results of psychology and to well understand the mechanism whereby these mental abilities function to make a behavior in order to apply them to the study of language too.

### 3.3. Biological linguistics

Furthermore, it is not until linguistics becomes psychology-based like the above that we can begin even lower-level (i.e., biological) research into language. In other words, after linguistics attains theoretical incorporation into psychology, it should be studied at a lower level in terms of more basic entities such as neurons, genes, and evolution. Language is an **evolutionary** product of substitution (i.e., adaptation) and a specific and unique operation of the assembly of various human faculties or body sites, exactly as human articulatory organs (e.g., mouth, nose, throat, and lung) were originally for consumption (eating and drinking) and respiration (breathing) and were adapted for communication at some point in human history.

In the beginning, the complex mental mechanism forming language should be reduced to the neural level or the brain science (i.e., **neurological reality**). As some psychological phenomena can be treated as manifestations of precisely the same function from the perspective of active brain regions, this reduction would provide us a new understanding of language as well as mind. Similarly, a specific brain area that is active during a language use (e.g., intersubjective expressions) could also be active for a psychological behavior (e.g., other-awareness), ensuring that the same cognitive activity is at play in these different domains of action. It is thus of significance to notice that a combinational research of three different levels—language, mind, and neuron—can reveal other different domains together in collaboration at one time.

Moreover, an evolutionary investigation into language is regarded as concerning an even lower level, which strongly suggests we posit that **some language-related cognitive functions are innate** or that their manifestations are determined by genes. If it is true that language should be an “evolutionarily developed” unique use of various capacities for other (cognitive) functions or behaviors, what should be explored in this domain is the part of “evolutionarily developed” (i.e., gene mutation)—when and how are some sorts of such abilities integrated to form a current language use? In addition, the extent to which that is innately determined (hard-wired into the human brain) by

genome information should be questioned too, because this is relevant to **the ways of heredity passed on from ancestors**. Additionally, note that since the initiating processes by which some abilities are combined to form a linguistic skill can be observed in the brains of newborn babies or infants as well, research on language acquisition should be conducted at the same time in order to discover the evolutionary process in parallel.

With this end in view, language study itself can be essentially changed from the standard, although there would be some meaning and value in the surveys of linguistics completely isolated from lower-levels fields. Now that the fundamental realms of sciences are rapidly growing by the day, linguistics may be in danger of being left behind and of losing its value, as long as it does not start seeking any connection with lower-level or more basic fields of science.

#### 4. Effects of Culture

It seems to be a major propensity of human thoughts to simply divide something into two categories, or naive dichotomy between the two—e.g., the good vs. the evil, the typical vs. the atypical, and the subjective vs. the objective—ignoring the fact of there being “an issue of degree” between two concepts. Common in the fields of the human sciences is the opposition of two contrastive values—individualism vs. totalism, or individuality vs. universality—that have often been an issue. In particular, the language sciences have assumed, based on such dichotomization, that the system of language is **universal** with some **individual differences**. However, if a linguistic theory deals with meaning as well as form, it is necessary to consider the effects of culture on the cognition (or psychology) forming language. Thus, breaking the two-category system by means of intervention of community (or social group) level, there are three contrastive values—**individuality, communality, and universality**—that should form the basis of linguistic (or semantic) researches.



#### 4.1. Phenomenological reduction

Since no one can get outside of his or her own inner world, anything should be reduced to the **personal subjectivity** (a.k.a., phenomenological reduction) (cf. Husserl 1982). This philosophical assumption is applicable to linguistics as well, which may bring about psychological linguistics like the above. Linguistic expressions themselves are objectively overt to everyone, or linguistic forms are visible, whether sounds or letters, in a broad sense. As has already been sufficiently discussed, language (symbols of meaning and form) should undergo the mental process, the study of which can thus reveal the essence of language itself. However, this could lead to the idea that everyone's language would vary by individual, because no one has precisely the same mind or thoughts. Since one's mentality can vary from moment to moment, moreover, the mental mechanism of language can vary from person to person as well. If so, how is it possible to conduct a scientific study of language?

Linguists may claim to ignore such individual differences and instead pursue only universality, but the correct answer seems to reside already in psychology. For one simple thing, psychologists are inclined to take a **statistical processing**, such as the *generalized linear mixed model*, to include the effects of individual differences. Interestingly, linguists understand that the results of gathered data differ a good deal from one person to another, when asking participants to judge a sentence in terms of acceptability or grammaticality. Without calculating results statistically, nonetheless, many of them traditionally like to assign a grammatical/ungrammatical sign (\*) to a sentence because of the assumed dichotomy.

Moreover, another of Husserl's significant concepts is "intersubjectivity," which concerns the understanding of the outside world. Evidently, we can never know the truth of the objective world from man's (not a god's) perspective but can seemingly interact with or obtain feedback from outsiders, including persons who are able to share an idea—although patients of *locked-in syndrome* cannot do. Regardless of whether the information acquired from sensory organs is true or false, we would

recognize the existence of the environment and feel as if it would affect us, and vice versa. Nevertheless, the feeling of a relationship or the sense of sharing appears only in a person, so again all of things should start with the discussion from the viewpoint of individual.

#### 4.2. Cultural values

Although the mental process of language is perfectly private, it is well known that we are **biologically social creatures**, so our psychology must be affected by cultural values. Historically, not only linguists but also (cognitive) psychologists had long presupposed **the universality of psychological processes** for their studies, yet cultural psychology, fortunately, has emerged and rapidly developed during the last twenty years, leading us to suspect that the plasticity of the human brain is greater than expected and social values can thus originally make the cognitive process much more variant than was assumed before (Bruner 1990). Now, with reference to these studies, language (or meaning) theories should therefore take into account the social effects on the mental (meaning-making) process of language, too.

One problem is that modern humans live in complicated societies accelerated by the global on-line network these days, so it is difficult to judge which social groups, large or small, each person belongs to. For the same reason, moreover, **the distinction in cultural values is growing increasingly smaller** at any level, people in the world sharing similar social systems and the same computer devices allowing them to watch the same pictures and videos over the Internet. Under these circumstances, the effects of group differences would be too subtle to consider when analyzing the psychological process, including language, as a result of which one might validate the dichotomy between individuality and universality.

However, even if such dramatic changes in the social construction have had a great impact on one's psychology, there are still a large number of obstructions—e.g., differences in language, ethnicity, and religion, geographical distances, and

borderlines between states—that prevent human minds from losing diversity and being unified in having only a few styles of thinking. Many studies in cultural psychology have focused on a comparison of how Western and East Asian cultures affect various cognitive processes (e.g., Markus and Kitayama 1991, Masuda and Nisbett 2011), discovering such significant distinctions of psychology that can eliminate the bias in favor of the universality. In connection with this, it might be seen as reasonable and effective for linguistic researches that attempt to include cultural effects to compare a Western language such as English and an East Asian language like Japanese at the same time, assuming that each step of the cognitive process of language (or meaning) might be affected by Western or East Asian cultural values.

#### 4.3. The universal design for language

It is certain that such cultural or environmental effects are so remarkable that our brain may be modified by them to some extent, but human beings biologically possess universal designs for various cognitive processes that make individual differences much smaller between people. Evidently, this alludes to the working of the **human genome** that plays a role in forming the cognitive abilities and their specific uses for language. Since it is doubtful, from the biological viewpoint, to assume the existence of **more concrete, or higher-level, universality in grammar (syntactic structures) or lexicon**, researchers on the universality of language are expected to be concerned with the mapping of the human genome that gives rise to the high-level cognition of language.

The study of the human genome reveals not only the universality but also the communality of minds. Although cultural values may have a lesser impact on such a **biologically hard-wired matrix**, there is also the theoretical view of **culture-gene coevolution**, where the strong association has been accentuated between cultural values (e.g., individualism vs. collectivism) and functions of the gene (e.g., types of serotonin transporter genes) (Chiao and Blizinsky 2009). It is estimated that a mental

or physical cultural system as an environment can modify genes, which in turn can function to form cultural human minds—that is, a mutual constitution. It would then be possible to examine the cultural values affecting the language process in terms of biological genes and evolution as well. What is still problematic is to distinguish what is universal from what is communal concerning a vast range of mental processes.

Again, there are three discrete necessary levels of research—individuality, communality, and universality—according to which, different types of research should be conducted. Note that these three domains are interrelated with one another and can be described as a **three-layer model**: Individuality is based on communality and then communality is founded on universality, as discussed above. Also, these values can otherwise be metaphorically treated as a journey: **Starting with individuality, one can reach universality through commonality**. This can bring about the gradual generalization of the objective study of subjectivity. After all, a naive dichotomy between two values should be dismissed initially and, whichever level a study focuses on, it needs to take into consideration all of those values as the background, which must affect its foreground research.

## 5. Conclusion

Now, the point in question is what kind of semantics, as one division of linguistics, should be adopted in this era. Compared to the other sciences, linguistics is smaller in scale and adheres to the traditional treatment of meaning, isolating that domain from others, despite the major sciences rapidly progressing and developing new technology and their researches—Artificial Intelligence in computer science, electrophysiological measurements in clinical medicine, genome mapping in molecular biology, and many other discoveries in social/cultural psychology. The best and only way in which semantics can stay meaningful and live longer is to **get connected with those fields of sciences**. Fortunately, because these sciences concern lower levels than language, such

a meaning study can develop itself exponentially to be more realistic and clearer, while hopefully contributing back to such other sciences as well. This shift of direction may be viewed as adaptive to the recent movement of breaking down the boundaries between sciences.

For that interdisciplinary work, there would be a number of steps to go through. First of all, there should be extensive deductive arguments, as discussed here, of abstract methodology and theoretical orientation, finally drawing a blueprint directing researchers working in a semantic domain. Unlike other theories in linguistics, the current manuscript has mainly asserted that a new semantic study should (i) build a hypothesis of the **meaning-producing process** to be confirmed by experiments, (ii) be based on **lower-level sciences** like psychology and biology, and (iii) consider **the effects of culture** on the cognitive process. This view of research is expected to enable meaning survey to flourish again, recovering the study of the high-level cognition of language that is now getting left behind other advanced sciences.

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