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A Review of Cognitive Model: Experiments of Scalar Implicature

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Abstract
Experimental pragmatic studies focus on the cognitive processing models of scalar implicature (a general conversational implicature). The "[neo]-Gricean," Levinson, infers that the cognitive processing model of general conversational implicature is a process of cancellation of one literal meaning in the general conversational implicature in terms of a "stereotypical relation", which he calls "default model". However, the "post-Gricean" infers that the processing follows the "context-driven model", which holds that the literal meaning is only a stimulus to the hearer; it is the context that people depend on to process the conversational implicature. Countless experimental studies have been conducted to find a conclusion, but this issue is still unresolved. Another valuable inference about the cognitive processing model should be that the cognitive processing of contextual meaning is a dynamic interactive process among language, ad hoc, and mental contexts. It is completed by the interaction of various brain mechanisms with the surrounding neural systems as bridges, which are a holistic, dynamic, complicated process.

Key words: lt reasoning model; Context-driven model; Dynamic system

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1. ORIGINS OF SCALAR IMPLICATURE

1.1 Horn's Scale
Grice (1968) made a clear differentiation between "what is said" and "what is implicated", and emphasized the difference between a speaker's literal and implicated meaning. Grice also pointed out that conversational implicature can be conveyed when a speaker flouted the "co-operative principle", including four maxims, one of which is "quantity maxim". According to Grice, people may unconsciously follow the quantity maxim in the conversation; that is, the conversation needs to offer the required information, no more or less than what is necessary (1975). When speakers observe or flout the quantity maxim, the related conversational implicature can be conveyed. Neo-Gricean Horn (1972) established the concept of "scale", namely, "Horn's scale". Horn expounded that if there exists the divergence of the stronger item and the weaker item in accordance with strength among the scale items of a series of the same semantic field, they will constitute "scale" with a straightforward items (the stronger, the weaker) to express. Scaled word class under the "Horn's scale" should fulfill three qualifications: (1) The lexical meaning of a stronger item must entail that of a weaker item in any sentence structure; (2) The stronger and weaker items should have the same part of speech; and (3) The stronger and weaker items are both from the same semantic field or have the same semantic relations. Based on the definition of Horn, Levinson (2001) listed some commonly scaled word classes: indefinite pronouns (all, most, many, some, few); conjunctions (and, or); numerals (… three, two, one); modal verbs (must, should, may); frequency adverbs (always, often, sometimes); degree adjectives (hot, warm); and verbs (start, finish). On the basis of Grice's co-operative principle, if the speaker expressed the weaker item, the hearer may think that what the speaker is trying to say is no more than the weaker item and naturally

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cannot be the stronger item. Therefore, if the weaker item in Horn's scale appears within the conversation, the related conversational implicature can be generated; that is, the weaker item in the expression means to deny the stronger item. For instance, if the speaker chose "some" of indefinite scales (all, some), then his implicature is to deny "all". Let's see an example the speaker said the following:

(1) Some people outside hold umbrellas. This is its conversational implicature:

Not all people outside hold umbrellas.

This implicature conveyed by the scaled word classes in conversation is called "scalar implicature".

1.2 Horn's Scale and Research Value of Scalar Implicature

Why can Horn's scale become the topic researched by many researchers? First, Horn's scale is naturally present in the language, which is a natural corpus and is not created by Horn but conducted and generalized by Horn. As a natural corpus, it naturally reflects human beings' thinking patterns; therefore, Horn's scale has not only received great attention from linguists but has also been a concern of psychologists.

Second, Horn's scale exists in almost every language. Almost all languages have a similar (the stronger, the weaker) expression, so it can reflect people's common thinking pattern. Through experiments in multiple languages, people can make out whether there is commonness in human beings' language cognitive processing model under the conditions of different geographical, linguistic, and cultural environments.

Third, for a long time psychological linguists have not come to an agreement about people's cognitive language processing model. At present, two kinds of controversy primarily exist; namely the "context-driven model" and the "default model". As such, Horn's scalar implicature processing becomes the significant experimental basis of testing the two models. In fact, there are many methods based on scalar implicature, one of which is the "upper-bound or lower-bound context" processing experimental method (Bezuidenhout & Morris, 2004; Breheny et al., 2006). This approach infers that if the cognitive processing model is a "context-driven model", then in the upper-bound context (the context that supports the generation of scalar implicature), the reading time of "stimulus fragments" (the fragments including the weaker items) is obviously shorter than that in the lower-bound context (the context that does not support the generation of scalar implicature). If it is the default model, there should be no significant difference between them (see the specific experimental system in the second section). Possibly people's cognitive language processing model is neither of the two and other possibilities might exist. These can probably be inferred through the experimental study of scalar implicature.

2. DISCUSSION OF SCALAR IMPLICATURE COGNITIVE MODEL

"The Classic Gricean school", "the neo-Gricean school" and "the post-Gricean school" hold different opinions regarding scalar implicature. From Grice's point of view, when a particular context is needed in understanding a conversation, "particularized conversational implicature" can be identified, whereas, when no additional specific context is needed to convey meaning, and "generalized conversational implicature" can be calculated. The debate about the implicature cognitive model focuses on generalized conversational implicature. The Classic Gricean school argued that though the context is the key point of inferring the conversational implicature, the literal meaning also plays a significant role; besides, Grice's "co-operative principle" and "four maxims" are the basic principles of inferring the implicature, and processing scalar implicature does not need the context; in other words, the literal meaning can also convey GCI without the context. Neo-Grecian school (Bach & Harnish, 1979; Horn, 1972; Levinson, 2001) is fundamentally consistent with "the Classic school", but the foci of their theories are different. The neo-Gricean Levinson's "three heuristics" were reduced from Grice's "four maxims", while Levinson's "three heuristics" give more consideration to GCI, one of which is informativeness, the central principle used to convey and infer scalar implicature. The basic difference between the Classic Grice school and the neo-Gricean school is the emphasis on GCI. The post-Gricean school (Carston, 1991; 2002; Sperber & Wilson, 2001) proposes relevance theory and denies the function and significance of the literal meaning in cognitive processing. Post-Gricean holds that the conversation is to offer a stimulus or a contextual "relevance" between literal meaning and implicature, and the hearer tries to directly understand implicature based on this relevant information (Carston, 2002).

Scalar implicature is a part of generalized conversational implicature. The Classic Gricean school, the neo-Gricean school, and the post-Gricean school infer the processing model of scalar implicature based on their own theory. The Classic Gricean school and the neo-Gricean school hold that while understanding scalar implicature, the hearer first unconditionally understands the literal meaning and then infer scalar implicature according to the context. Levinson (2001) suggested that scalar implicature, the inference of GCI, is based on "conventionalized experience"; that is, there exists a "default" meaning in people's brains. The so-called "default model" means that the inference of implicature is to cancel the default conventionalized implicature. However, the post-Gricean school contends that while the hearer understands scalar implicature, the literal meaning is just a stimulus to the hearer; the hearer needs the specific context to directly understand scalar

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implicature—namely, particularized conversational implicature and generalized conversational implicature (including scalar implicature). This is called the "context-driven model".

With the development and deepening of the study, in addition to these two models, many scholars have proposed new assumptions and inference associated with the cognitive model of scalar implicature. For example, some researchers tend to choose between the default model and context-driven model—the "standard" model (Bach & Harnish, 1979).They think that the context that scale items appear, scale items and conveyed scalar implicature can be stored as a whole. As the context reserve of the same word class increases, one context or some contexts, and scalar implicature is often extracted. With the increase in the number of extraction, this one or some context and scalar implicature can become the most active combination. Then, when the participants come across scale items that belong to this or these most active combination, they will deal with them immediately; If those scale items just in accordance with the context and scalar implicature that participants encounter, then the processing time may be very short and even reach "standard". However, if they do not match, then the participants will extract from the reserve other combinations with the context and related scalar implicature; the processing time will be longer, and it may produce the effect similar to the "context-driven model". It can be easily seen that this view has a lot in common with "connectionism" in neuropsychology and neurolinguistics, especially in that they treat their language and language-related experience as pragmatic reserves and extractions.

Katsos (2011) mentioned that he had made an [informativeness] tolerance hypothesis on the basis of his research on children' scalar implicature cognition. The "tolerance" refers to the pragmatic tolerance—namely, in the conversation, the pragmatic expression of the speaker does not meet the needs of the hearer, and the hearer cannot accept it and then make a satisfactory reply. "Informativeness tolerance" means that the information the speaker provided is insufficient or excessive; the hearer cannot understand the implicated meaning and provide a satisfactory response. Here is an example:

(2) A: Are there fish dishes in the canteen today?
B: There are poached fish.

In Dialogue (2), B's answer provided too much information; the answer "yes" will suffice. However, A can accept this additional information; therefore, tolerance existed. But in (3), the information B provided was insufficient, and A was dissatisfied. In the study, this is called low tolerance:

(3) A: Your dress is so beautiful How much?
B: Not expensive.

Katsos' experimental (2011) results are as follows: Although children, as the speaker and the hearer, have the same ability as adults but in the task of only "right and wrong" judgment, children exhibit tolerance of "under-informative". Due to strong tolerance, children's understanding of the implicated meaning is inaccurate; therefore, it can be inferred that as the hearers, children's understanding of the implicated meaning is poorer than adults.

3. THE DEVELOPMENT OF COGNITIVE MODEL EXPERIMENTS OF SCALAR IMPLICATURE

3.1 Off-Line Experiment Model

Cognitive model experiments of scalar implicature originated from off-line experiments, and the main representatives are Gibbs and Moise (1997) and Nicolle and Clark (1999). Gibbs and Moise's experiments (1997) included four small experiments. Experiments 1 and 2 do not involve context, while Experiments 3 and 4 involve context. In all of the experiments, subjects first accept categorization training of what is said versus what is implicated and then enter the test. Subjects are required to read a sentence or paragraph and then complete a task: "choose the implicated meaning according to what the speaker says". A small part of the materials involves scale items, such as "everyone" and "nobody". The result shows that, in the absence of the specific context, subjects tend to only choose an "enriched" interpretation but do not choose a minimal interpretation; yet, in the specific context, subjects are more likely to choose "what is implicated". Therefore, the researcher concluded that in the understanding of "what is implicated", the conversational context plays an important role. Nicolle and Clark (1999) partly repeated Gibbs and Moise's experiment (1997), but came to an opposite conclusion. Although only some materials in these two experiments are scale items, Bezuidenhout and Cutting (1002), as well as other scholars, keenly captured the obvious research value and controllability of scale items in the experiments.

3.2 On-Line Experimental Model

Online experiments can be achieved through a variety of techniques; at present, the most commonly used means is the reaction time tests. Superlab and DMDX are commonly used software. The instruments that are more accurate than reaction time test are the specialized equipment, such as eye tracking and ERP (event-related brain potential instrument). The following will respectively review online experiments of the cognitive model of scalar implicature from several aspects.

3.2.1 Self-Paced Reading Time Experiment

Self-paced reading time experiments can also be divided into stimulus items (scale items) and target items (items associated with scale items) reading time experiments. Some experiments will treat stimulus

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items as the key point; for example, in Bezuidenhout and Cutting's (2002) research, the researchers treat "some" as observed scale items, design the upper-bound and lower-bound contexts, and compare the reading time of stimulus items that include "some" in these two contexts. The results of Bezuidenhout and Cutting's experiments are consistent with their "context-driven model" hypothesis; that is, the reading time of stimulus items in the upper-bound context is obviously shorter than that in the lower-bound context. In addition, some experiments will treat target items as the key point; for example, if Katsos simply examines the reading time of the stimulus items, there are many drawbacks, such as the researchers being unable to rule out the impact of readers' reading habits, personal interests, and other factors. Therefore, Breheny et al. (2006), as well as Katsos (2008), not only tested the reading time of the stimulus items (some) but also tested the reading time of the target items (the rest). In other words, researchers treat the items associated with the scale items as the key points and test them. Breheny et al. (2006) examined the impact of "neutral context" (that is, irrelevant to the target items) to the cont promotes the induction of scalar implicature. The author thinks that this also reflects the drawback that takes purely linguistic context as experimental materials; that is, linguistic ext: that is, whether items scale is highlighted or not, the position of scale items in the sentence and its impact on scalar implicature. The following is an example:

(4) Some consultants and the director had a meeting, and the rest did not attend.

(5) Only some consultants and the director had a meeting, and the rest did not attend.

(6) The director and some consultants had a meeting, and the rest did not attend.

(7) The director only had a meeting with some consultants, and the rest did not attend.

In Example (4), scale items (some) is at the beginning of the sentence, which is head-highlighted; in Example (5), scale items (some) are at the beginning of the sentence, which is also head-highlighted, and "only" is also highlighted at the same time. In Example (6), scale items (the rest) are at the end of the sentence, which is not entirely highlighted. In Example (7), scale items are at the end of the sentence, and "only" are highlighted. The difference between these materials is that they are in different positions, and, therefore, the context of these observations belongs to linguistic context (or called context). The researchers use highlighted ways to change the context and then observe changes of subjects' reading time of the fragment (the rest). InDesigns (4) and (5), subjects have sufficient time to deal with scale items, but in (6) and (7), since scale items are at the end of the sentence, subjects do not have sufficient time to process. Therefore, according to the context-driven model, the assumption that the author made was that the reading time of (6) and (7) was significantly longer than that of (4) and (5). The results prove that the reading time of (6) is indeed significantly longer than that of (4) and (5), thus proving the context-driven model. However, the reading time of (7) was significantly shorter than that of (4) and (5), and this is contrary to the context-driven model. The researchers inferred that highlighting "only" promotes the induction of scalar implicature. The author thinks that this also reflects the drawback that takes a purely linguistic context as experimental materials; that is, linguistic context is often subject to the readers' reading habits and reading attention. Assume that readers of some language focus on the content of not the beginning but the end of the sentence; then, the reading time of the structure similar to (4) and (5) is longer than that of (6) and (7). Therefore, the author prefers to use realistic situational context (instead of context) as material so that people can better observe the processing model of scalar implicature in the realistic communicative situation.

3.2.2 Reaction Time Experiment

The scalar implicature is cancelable (Katsos, 2008; Liu, 2008), meaning that the scalar implicature of scaled word class (some, but not all) can be canceled by speech or act after its generation. For instance, in sentence (1), the speaker could add "And maybe all people hold umbrellas" after saying "Some people outside hold umbrellas." In this way, the latter utterance cancels the conversational implicature of the previous one (not all). Experimental results of post-Gricean researchers prove that if the generation of scalar implicature observes the context-driven model, the comprehension of scalar implicature will not be time-consuming. Breheny et al. (2006) deduced from experiments that if the context-driven model is the cognitive processing model, it could be time-consuming in the context (the upper-bound context) by upholding the comprehension of scalar implicature since the cancellation of the implicature will affect the understanding process. On the other hand, it will not consume too much time and will have no impact on the understanding process in the context (lower-bound context) objecting to the scalar implicature comprehension or in the context (neutral context) that has no relation to the scalar implicature comprehension. If the default reasoning model is the cognitive processing model, in whatever context, the cancellation of scalar implicature has an impact on the comprehension process; therefore, it will be time-consuming.

Bezuidenhout and Morris (2004) devised the following corpora in their experiment:

(8) Some books have color pictures. Actually, all books have color pictures, so teachers all like them. (Testing Item 1)

(9) Many books have color pictures. Actually, all books have color pictures, so teachers all like them. (Comparing Item 1)

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(10) Those books have color pictures. Actually, all books have color pictures, so teachers all like them. (Comparing Item 2)

(11) At least some books have color pictures. Actually, all books have color pictures, so teachers all like them. (Comparing Item 3)

Subjects are observed in regard to their "eyeball fixation duration" at the position of "all" and "all have" while reading these sentences in the experiment. The reason for the observation of "eyeball fixation duration" at these two fragments is that according to the default reasoning model, when reading the "some" in the first part of Sentence (8), the subject has the scalar implicature "not all," and then reading the "all" in the last part of the sentence, the subject might feel the possibility of canceling the implicature of "not all"; when continuing to read "all have," the subject would complete the cancellation. Therefore, "all" in the context impels the "preparation" of cancellation of the subject whereas "all have" leads to the "completion" of the cancellation and the understanding of the implicature "maybe all." From this, it can be inferred whether the subject completed the cancellation by testing the "eyeball fixation duration" at these two fragments. Besides, by comparing the "eyeball fixation duration" of the "some" in Sentence (8) and the two fragments in the Sentences (9), (10), and (11), it can be deduced whether the "cancellation" takes place in reading the sentence (8). The experimental result shows that the "eyeball fixation duration" in reading the sentence (8) is obviously longer than that in reading the Sentences (10) and (11), which illustrates that when reading the "some" in the previous sentence, the subject has a "default" implicature: namely, "not all." However, then the "all" appears and he would spend some time "preparing" to cancel "not all," and thus, it takes a longer time to react when compared with reacting to the previous sentence without "some." And next, the cancellation is completed after reading "all have." It will be faster to cancel under the prepared condition, but the experimental result of Bezuidenhout and Morris (2004) revealed that the time consumed in reading "all" in Sentence (8) is obviously shorter than that in reading the Sentences (10) and (11), which is contrary to the default model deduction. Thereafter, they concluded that their experimental result violates the default reasoning model. In the meanwhile, they noticed that the reaction time in reading "all have" in Sentence (10) is obviously longer than that in (8) and (9), and deduced that the subject has the feeling of repetition in meaning when he reads "all have" and therefore consumes more time. We believe that their deduction is not convincing enough, and there should be other factors besides the context of producing an effect on the comprehension of scalar implicature. We need to carry out meticulous and intensive experimental research on the cognitive processing model of scalar implicature in terms of multifactorial effects.

3.2.3 Reaction Time to True or False Judgment Experiment

Recording the reaction time to true or false items is one of the most common in scalar implicature experiments. The model involves these elements: (1) Setting the role for the subject. The subject can be the speaker, the hearer, or the third party (Katsos & Bishop, 2011); (2) The subject is required to judge the materials heard through the tasks of "true or false judgment" or "grading"; judging whether the corpus is true or false (true or false judgment or grading according to a 5-point scale) (Katsos & Bishop, 2011); and (3) Recording the reaction time of the subject. Katsos and Bishop (2011) selected a corpus with excessive information, with moderate information, and with insufficient information and asked the subject to respectively judge true or false as speaker, hearer, and the third party. Another difference of Katsos' serial experiments from other experiments on the cognitive processing model of scalar implicature is that he compared the pragmatic competence of children and adults and attempted to test if the pragmatic competence is developed rather than innate. For example, in the study conducted by Katsos and Bishop (2011), the child subject was shown a picture and asked to judge whether the speech was "true" or "false." There were four objects in the picture: pineapple, toothbrush, frog, and five-pointed star. The speaker said, "Please give me the *new* toothbrush" (with excessive information). Different from adults, children tend to judge "true." At the same time, the experiment used the same picture and speech and asked children to grade according to a five-point scale. Similar to adults, children generally gave a grade of fewer than 3 points, which demonstrates that the pragmatic competence of children, no matter as a hearer, a speaker, or a third party, is the same as that of adults; the only difference is that children show more tolerance toward pragmatic misuse with excessive information. Katsos was once a proponent of the context-driven model (Breheny et al., 2006), but later his published experimental reports showed that he attempted to jump out of constraints of the context-driven model and default model to carve a new way to probe into the cognitive processing model of scalar implicature. In fact, he did not refuse these two models but instead approach studies from a new perspective. We can infer that the reason why he transformed his point of view is that he is more a psychologist to probe into the cognitive features of human beings through a scaled word class corpus; it is more likely that he believed that the factors affecting the deduction of scalar implicature are not restricted to the context-driven model or default model but are a part of a multi-dimensional, multi-factorial, and dynamic processing model.

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3.2.4 Eye Movement Experiment

The result of the eye movement experiment is more convincing because it employs advanced equipment: an eye tracker. The experiment conducted by Bezuidenhout and Morris (2004) in 3.2.2 is a classic eye movement experiment using an eye tracker to record the eye fixation duration in reading a corpus containing scaled word class. Besides, there are other experiments, like the experiment conducted by Huang and Snedeker (2009), test the eye movement based on "read-back" phenomena or on the scaled word class corpus in combination with pictures.

3.2.5 ERP Experiment

With the development of science and technology, neuroelectrical instruments, especially event related potentials (ERP), are employed in the scalar implicature experiment. Up until now, many researchers have made efforts, such as Noveck and Posada (2003), Kounios and Holcomb (1992), Kutas and Van・Patten (1994), and Wu and Tan (2009). Researchers mainly observed the cognitive condition of subjects through N400 brain wave generated when they processed the scaled word class. The researching mechanisms have varied: some only observed the change of context, like Noveck and Posada (2003), and some tests were conducted with the combination of speech and pictures, like Wu and Tan (2009). Take Noveck and Posada (2003) as an example: They compared changes in the N400 brain wave of subjects under the conditions of semantic correctness, semantic error, and insufficient pragmatic information when they dealt with "some." They inferred that if the brain wave amplitude is greater in dealing with scalar implicature than with literal meaning, it reveals that it takes more time to process scalar implicature than literal meaning; if not, it will not take more time. The experiment demonstrated that under the condition of insufficient scalar implicature information, no greater N400 wave amplitude is generated; therefore, researchers have come to the conclusion that it will not take more time to deal with scale implicature than with literal meaning and that when people process conversational implicature, it is unnecessary to process literal meaning prior to the implicature. According to their inference, text items are just stimulus to the brain cognition, and the brain receiving the stimulus processes conversational implicature directly.

However, we do not fully agree with their deduction and conclusion: Conversational implicature is not directly processed without dealing with literal meaning. We infer that literal meaning needs processing. If text items are just a stimulus, why is there no understanding of meaning arising when confronted with unknown forms, as someone having no knowledge about German sees it?

ERP can directly reflect the cognitive process of the human mind, which is exceptionally advantageous to study the semantic cancellation and the cognitive process of scaled word class in various contexts. We should apply this scientific experimental method to probe into the cognitive processing model of the implicature.

CONCLUSION

In order to set up the cognitive processing model of scalar implicature and to reveal the secrets of the processing model of utterance, researchers have made efforts to discover the basis through experimental scientific methods consisting of online and offline experiments. But, it is evident from contradictory experimental results that the cognitive processing model of scalar implicature is neither of the two models mentioned above. That is to say, the cognitive processing model is by no means a single and fixed model and meanwhile, it can be inferred that the model will be at least affected by the mental context, cognitive experience, pragmatic misuse tolerance, knowledge background and cognitive load of the subject. For instance, while the brain functions of everybody are exactly the same, their brain structures are quite different. For instance, 100 human brains with pain function have various pain sensitivities.

Human beings and human brains are part of the ecological environment, and their cognitive mechanism of language meaning must have ecological characteristics: holistic, dynamic, interactive, and environmental. Language itself is holistic since its speech sounds, vocabulary, grammar, meaning, and pragmatic use (including context) are a dynamic entirety. Besides the semantic cognitive mechanism, the brain cognitive mechanism contains knowledge, emotion, personality, nature, social culture, and other cognitive mechanisms which constitute a dynamic entirety as well. The entirety is not in a fixed condition: it is intrinsically changeable. Within or between entireties (including other people), interactions or mutual modifications continuously take place and evolve into the best condition for survival. Additionally, these entireties and their environment (including people) are supplementary to each other: the environment influences them, they transform the environment, and finally they come into an ecological harmony. The nature of this ecological thinking is consistent with the proposition of the second-generation cognitive science: cognition is an interactional unity of brain, body and environment.

If the use of scaled words occurs in a realistic context, all the parts of the holistic utterance and its realistic context (including people) and other cognitive mechanisms form a large, complicated web and interact with one another. Before finding the best scalar implicature, the web is still dynamic and thus it is possible to add or cancel some implicature. And, it is also the reason why the generation of scalar implicature is time-consuming.

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In terms of the cognition of language meaning, if it is not under the condition of a realistic context, all the parts of the holistic language (speech sounds, syntax, and semantics), and the mental context of human beings, which is the ample mental images stored in the psychological space of language users in the process of studying and experiencing in the past, interact with each other and generate the cognition of certain sentence meaning. Thereafter, the single sentence containing a scaled word generates the scalar implicature of this scaled word, and there exists the scalar implicature at the semantic level.

The way we postulate the cognitive processing model of language meaning is not completely by default-reasoning model or by context-driven model. On the contrary, the cognitive processing of a contextual meaning is a dynamic interactive process among language, ad hoc, and mental contexts. It is completed by the interaction of various brain mechanisms with the surrounding neural systems as bridges. Rather than linear or parallel, the processing procedure is stereoscopic and complex.

At any rate, human beings continue to explore and progress on the way to unveiling the secrets of the cognitive processing mechanism of language. The cognitive processing model of scalar implicature is just like a window through which we can catch a glimpse of the cognitive processing mechanism of language and have a better understanding of the nature of language and even of the mysteries of the human brain. Therefore, it deserves the painstaking efforts of countless researchers and greater attention within the circle of linguistics.

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