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Language Comprehension as Structure Building

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[Language Comprehension](#) (1)

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[Currently Displayed]
 - [Powers, David M.W. \(1993\)](#) [Time as a Window on Comprehension](#) (2)
 - [Straight, H. Stephen \(1994\)](#) [A Promising Model of Sentence Construal](#) (3)
 - [Riesbeck, Christopher K. and Fitzgerald, Will \(1994\)](#) [Language Understanding is Recognition, Not Construction](#) (4)
 - [Osborne, Miles \(1994\)](#) [Words First, Theory Later](#) (5)
 - [Jenkins, James J. \(1995\)](#) [Comprehending Comprehension](#) (6)

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[Language Comprehension](#) (1)

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Abstract

Many of the processes and mechanisms involved in language comprehension are general ones. This book describes a few of those cognitive processes and mechanisms, using the Structure Building Framework as a guide.

Keywords: [comprehension](#), [cognitive processes](#), [sentence comprehension](#), [psycholinguistics](#)

1. Language can be viewed as a specialized skill involving language-specific processes and language-specific mechanisms. Another view is that language (both comprehension and production) draws on many general cognitive processes and mechanisms. According to this view, some of the same processes and mechanisms involved in producing and comprehending language are involved in nonlinguistic tasks.
2. This commonality might arise because, as Lieberman (1984) and others have suggested, language comprehension evolved from nonlinguistic cognitive skills. Or the commonality might arise simply because the mind is best understood by reference to a common architecture (e.g., a connectionist architecture).
3. I have adopted the view that many of the processes and mechanisms involved in language comprehension are general ones. This book describes a few of those cognitive processes and mechanisms, using a simple framework -- the Structure Building Framework -- as a guide.
4. According to the Structure Building Framework, the goal of comprehension is to build a coherent mental representation or "structure" of the information being comprehended. Several component processes are involved. First, comprehenders lay foundations for their mental structures. Next, they develop their mental structures by mapping on information when that incoming information coheres with the previous information. If the incoming information is less coherent, however, comprehenders engage in another cognitive process: They shift to initiate a new substructure. So, most representations comprise several branching substructures.
5. The building blocks of these mental structures are memory nodes. Memory nodes are activated by incoming stimuli. Initial activation forms the foundation of mental structures. Once the foundation is laid, subsequent information is often mapped onto a developing structure because the more coherent the incoming information is with the previous information, the more likely it is to activate similar memory nodes. In contrast, the less coherent the incoming information is, the less likely it is to activate similar memory nodes. In this case, the incoming information might activate a different set of nodes, and the activation of this other set of nodes forms the foundation for a new substructure.
6. Once memory nodes are activated, they transmit processing signals, either to enhance (boost or increase) or to suppress (dampen or decrease) other nodes' activation. In other words, two mechanisms control the memory nodes' level of activation: Enhancement and Suppression. Memory nodes are enhanced when the information they represent is necessary for further structure building. They are suppressed when the information they represent is no longer as necessary.
7. This book describes the three subprocesses involved in structure building, namely: the Process of Laying a Foundation for mental structures; the Process of Mapping coherent information onto developing structures; and the Process of Shifting to initiate new substructures. The book also describes the two mechanisms that control these structure building processes, namely: the Mechanism of Enhancement, which increases activation, and the Mechanism of Suppression, which dampens activation.
8. In discussing these processes and mechanisms, I begin by describing the empirical evidence to support them. I then describe comprehension phenomena that result from them. At each point, I stress that I assume that these processes and mechanisms are general; that is, the same ones should underlie nonlinguistic phenomena. This suggests that some of the bases of individual differences in

comprehension skill might not be language specific. I describe how I have investigated this hypothesis empirically.

9. The process of laying a foundation is described in Chapter 2. Because comprehenders first lay a foundation, they spend more time reading the first word of a clause or sentence, the first sentence of a paragraph or story episode, and the first word of a spoken clause or spoken sentence; they also spend more time viewing the first picture of a picture story or picture story episode.

10. Comprehenders use these first segments (initial words, sentences, and pictures) to lay foundations for their mental representations of larger units (sentences, paragraphs, and story episodes). Because laying a foundation consumes cognitive effort, comprehenders slow down in understanding initial segments. Indeed, none of these comprehension time effects emerges when the information does not lend itself to building cohesive mental representations, for example, when the sentences, paragraphs, or stories are self-embedded or scrambled.

11. The process of laying a foundation explains why comprehenders are more likely to recall a sentence when cued by its first content word (or a picture of that first content word); why they are more likely to recall a story episode when cued by its first sentence; and why they are more likely to consider the first sentence of a paragraph the main idea of that paragraph, even when the actual theme occurs later.

12. Initial words, sentences, and pictures are optimal cues because they form the foundations of their clause-level, sentence-level, and episode-level structures; only through initial words, sentences, and pictures can later words, sentences, and pictures be mapped onto the developing representation.

13. Laying a foundation explains why comprehenders access the participant mentioned first in a clause faster than they access a participant mentioned later. This Advantage of First Mention occurs regardless of the first-mentioned participant's syntactic position or semantic role. First-mentioned participants are more accessible because they form the foundation of their clause-level substructures.

14. Laying a foundation also explains why the first clause of a multi-clause sentence is most accessible shortly after comprehenders hear or read that multi-clause sentence (even though while they are hearing or reading the sentence, the most recent clause is most accessible). According to the Structure Building Framework, comprehenders represent each clause of a multi-clause sentence in its own substructure. Although they have greatest access to the information that is represented in the substructure that they are currently developing, at some point, the first clause becomes most accessible because the substructure representing the first clause forms the foundation for the whole sentence-level structure.

15. The processes of mapping and shifting are described in Chapter 3. The process of mapping explains why sentences that refer to previously mentioned concepts (and are, therefore, referentially coherent) are read faster than less referentially coherent sentences; why sentences that maintain a previously established time frame (and are, therefore, temporally coherent) are read faster than sentences that are less temporally coherent; why sentences that maintain a previously established location or point of view (and are, therefore, locationally coherent) are read faster than sentences that are less locationally coherent; and why sentences that are logical consequences of previously mentioned actions (and are, therefore, causally coherent) are read faster than sentences that are less causally coherent.

16. The process of shifting from actively building one substructure to initiating another explains why words and sentences that change the topic, point of view, location, or temporal setting take substantially longer to comprehend. The process of shifting also explains why information presented before a change in topic, point of view, location, or temporal setting is harder to retrieve than information presented afterward. Such changes trigger comprehenders to shift and initiate a new substructure; information presented before comprehenders shift is not represented in the same substructure as information presented afterward.

17. Shifting also explains a well known language comprehension phenomenon: Comprehenders quickly

forget the exact form of recently comprehended information. This phenomenon is not unique to language; it also occurs while comprehenders are viewing picture stories; and it is also exacerbated after comprehenders cross episode boundaries, even the episode boundaries of picture stories.

18. Finally, shifting explains why comprehenders' memories for stories are organized by the episodes in which the stories were originally heard or read. Comprehenders shift in response to cues that signal a new episode; each episode is hence represented in a separate substructure.

19. The mechanisms of suppression and enhancement are described in Chapter 4. The suppression mechanism explains why only the contextually appropriate meaning of an ambiguous word, such as *bug*, is available to consciousness although multiple meanings -- even contextually inappropriate ones -- are often immediately activated. The inappropriate meanings do not simply decay; neither do they decrease in activation because their activation is consumed by the appropriate meanings. Rather, the suppression mechanism dampens the activation of inappropriate meanings. It also dampens the activation of less relevant associations of unambiguous words.

20. Suppression and enhancement explain how anaphors (such as pronouns, repeated noun phrases, and so forth) improve their antecedents' accessibility. Anaphors both enhance their antecedents' activation and suppress the activation of other concepts, with the net effect that after anaphoric reference, antecedents are more activated than other concepts. They are accordingly more accessible.

21. Suppression and enhancement are triggered by information that specifies the anaphor's identity. More explicit anaphors trigger more suppression and enhancement. Information from other sources (such as semantic, syntactic, and pragmatic context) also triggers suppression, but it does so less quickly and less powerfully.

22. Suppression and enhancement explain why speakers and writers use more explicit anaphors at longer referential distances, at the beginnings of episodes, and for less topical concepts. The mechanisms of suppression and enhancement also explain why comprehenders have more difficulty accessing referents at longer referential distances, at the beginnings of episodes, and for less topical concepts.

23. Suppression and enhancement explain how concepts marked with cataphoric devices, like spoken stress and the indefinite article, "this," gain a privileged status in comprehenders' mental representations. Cataphoric devices enhance the activation of the concepts they mark. They also improve their concepts' representational status through the suppression: Concepts marked with cataphoric devices are better at suppressing the activation of other concepts, and they are better at resisting being suppressed themselves.

24. Finally, the mechanisms of suppression and enhancement explain why comprehenders typically forget surface information faster than they forget thematic information; why comprehenders forget more surface information after they hear or read thematically organized passages than after they hear or read seemingly unrelated sentences; and why comprehenders better remember the surface forms of abstract sentences and the thematic content of concrete sentences.

25. Individual differences in structure building are described in Chapter 5. The Structure Building Framework explains why skill in comprehending linguistic media (written and spoken stories) is closely related to skill in comprehending nonlinguistic media (picture stories). Comprehensible information, regardless of its medium, is structured, and comprehenders differ in how skillfully they use the cognitive processes and mechanisms that capture this structure.

26. The process of shifting explains why less-skilled comprehenders are poorer at remembering recently comprehended information: They shift too often. The mechanism of suppression explains why less-skilled comprehenders are less able to reject the contextually inappropriate meanings of ambiguous words; why they are less able to reject the incorrect forms of homophones; why they are less able to

reject the typical-but-absent members of nonverbal scenes; why they are less able to ignore words written on pictures; and why they are less able to ignore pictures surrounding words: Less-skilled comprehenders have inefficient suppression mechanisms.

27. The distinction between the mechanisms of suppression and enhancement explains why less-skilled comprehenders are not less able to appreciate the contextually appropriate meanings of ambiguous words and why they are not less able to appreciate typical members of nonverbal scenes. It is less-skilled comprehenders' suppression mechanisms, not their enhancement mechanisms, that are faulty.

28. Although the Structure Building Framework accounts parsimoniously for many comprehension phenomena, several questions remain unanswered. In the final chapter, I briefly identify just a few of those questions: Are the cognitive processes and mechanisms identified by the Structure Building Framework automatic, or are they under comprehenders' conscious control? In what medium are mental structures and substructures represented? How is the Structure Building Framework similar to other approaches to describing comprehension? And what is lost by describing language comprehension at a general level?

29. I conclude that by describing language comprehension using the Structure Building Framework as a guide, I am not forced to accept nativism, to isolate the psychology of language from the remainder of psychology, to honor theory over data, to depend on linguistic theory, or to ignore functionalism. Instead, by describing language comprehension as structure building, I hope to map the study of language comprehension onto the firm foundation of cognitive psychology.

REFERENCE

Gernsbacher, M.A. (1990) Language Comprehension as Structure Building. Hillsdale NJ: Lawrence Erlbaum

Lieberman, P. (1984) The biology and evolution of language. Harvard University Press

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