

Cognitivist Overview

Cognitivist Psychology, and the affiliated disciplines that make up 'Cognitive Science': linguistics, computer science, philosophy and neuroscience, owe an intellectual and cultural debt to behaviorism. While many in the cognitivist community see themselves in the tradition of William James, John Dewey and the 'Chicago school,' most cognitivists were trained as behaviorists. They do not differ with behaviorists with respect to the metaphysical thesis that the mind is physical. They differ on the basic object of study of psychology: the cognitivists hold that psychology is the study of the mind, not just behavior.

Theoretically, cognitivism marries information theory of computer science to psychology and neurobiology. It sees mental states and processes as informational states and processes which are realized in the computational 'hardware' of the brain. Thus, a proper explanation of psychology should not only describe the behavior of the organism, it should also explain the informational algorithm that drives that behavior, and the neurobiological states that implement the algorithm.

You are neutral on the issue of the definition of mental illness, but be ready to oppose any definition that is clearly behaviorist or psychoanalytic in nature.

Noam Chomsky, PhD

Your Biography

You are Noam Chomsky, PhD Revolutionary in Linguistics, Professor of Linguistics and Philosophy, MIT.

After primary education at an experimental school of progressive education in Philadelphia, you enrolled at the University of Pennsylvania where you studied mathematics, philosophy and linguistics. In 1951, you moved to Harvard, where you stayed until 1955. Your masters thesis *The Logical Structure of Linguistic Theory* was published in 1955, the same year you were granted your PhD In Linguistics from University of Pennsylvania.

In the debate between cognitivists and behaviorists, you are the 800 pound gorilla. In your short career, you have revolutionized the entire discipline of linguistics, founded (with George Miller and Herbert Simon and Newell) the new interdisciplinary field of Cognitive Science, and become the intellectual spokesperson of the American left.

1) Revolution in Linguistics

Before Chomsky, linguistics was primarily descriptive and taxonomical. You see linguistics as a branch of cognitive psychology,¹ whose goal is to discover the mechanism that produces all and only grammatical sentences in a language. Your theory is complex, and you have changed it slightly over time, so this description should be read as ***highly introductory and superficial***. As a student, you are strongly encouraged to read the primary sources below to get a sense of the complex issues herein.

Roughly then, you understand linguistics—the scientific study of language—as the study of the

rules of grammar. In short:

“The person who has acquired knowledge of a language has internalized a system or rules that relate sound and meaning in a particular way. The linguist constructing a grammar of a language is proposing a hypothesis concerning this internalized system. The linguist's hypothesis, if presented with sufficient explicitness and precision, will have certain empirical consequences with regard to the form of utterances and their interpretations by the native speaker.” (1968, p. 23)

Harkening back to the Port-Royalists of the 17th and 18th century, you hold that a system of propositions that expresses the meaning of a sentence is produced “by the mind as the sentence is realized as a physical signal, the two being related by certain formal operations that, in current terminology, we may call *grammatical transformations*.” In short, the meaning of a sentence is symbolically related to the physical structure of symbols in the brain. The task of cognitive scientist is to understand these internal relations through the positing of informational systems.

You go on to distinguish between *surface structures* and *deep structures*. *Surface structures* are structures of the language spoken, such as 'subject and predicate'. *Deep structures* are structures of the underlying meaning. The sentences 'Bob is to the right of John' and 'John is to the left of Bob' have different surface structures but the same deep structure. On the other hand, some syntactic (grammatical) structures are insufficient to determine meaning. For example include 'I like her cooking', could mean 'I like what she cooks, in general' and 'I like her when she cooks,' or even 'I like it when someone is actively cooking her.' Three deep structures, one surface structure.

To provide an adequate theory of a language, one must specify the complete 'grammar' of that language. Doing so would require three parts: (1) a syntactical component that would generate sentences in that language, revealing the internal structure of the infinite set of possible sentences in the language (2) a phonological component that describes how the language sounds, and how it relates to the syntactical component, and (3) a semantical component that describes how a language *means*. These are represented in Illustration 1. It is the task of the linguist to specify the rules by which the transitions take place.

2) Contributions to Cognitive Science

In 1959, you published the famous “*Review of Skinner's Verbal Behavior*.” You were born in 1928 and received Ph.D in 1955, when you became an assistant professor of linguistics at MIT. This review was written, then, when you were an *untenured* 31 year old. It is included as an appendix to the gamebook. This review is not only hugely influential, it is hugely controversial. Many people have accused you of not understanding behaviorism, misquoting Skinner, and various other academic abuses.²

Your basic argument is two-fold, first that Skinner's terminology is hopelessly confused, and second, that behaviorism is unable to explain observable facts about language acquisition. It is the second of these—which is an empirical claim, after all—that has been the most persuasive. It

is important, however, that you master both.

There is another important point in your work, but it doesn't appear in the review. Consider Skinner's contention that science cannot take into account 'inner states.' You argue:

It is hardly possible to argue that science has advanced only by repudiating hypotheses concerning "internal states." By rejecting the study of postulated inner states Skinner reveals his hostility not only to "the nature of scientific inquiry" but even to common engineering practice. For example, Skinner believes that "information theory" ran into a "problem when an inner 'processor' had to be invented to convert input into output" (p. 18).

This is a strange way of describing the matter. Suppose that an engineer is presented with a device whose functioning he does not understand, and suppose that through experiment he can obtain information about input-output relations of this device. He would not hesitate, if rational, to construct a theory of the internal states of the device and to test it against further evidence. He might also go on to try to determine the mechanisms that function in the ways described by his theory of internal states, and the physical principles at work -- leaving open the possibility that new and unknown physical principles might be involved, a particularly important matter in the study of behavior of organisms. His theory of internal states might well be the only useful guide to further research. By objecting, a priori, to this research strategy, Skinner merely condemns his strange variety of "behavioral science" to continued ineptitude. (Chomsky, 1971).

3) Politics

You have always been a dissident. You strongly object to the Vietnam war, and have always been a vocal opponent of American Foreign Policy that you see as 'imperialistic.' You have been called a 'socialist anarchist' in a number of circles, and the name is not entirely wrong. You believe that any state that imposes its will on people needs to justify that imposition, and the justifications you have seen are lacking.

You have an affiliation with the Students for a Democratic Society – the SDS. The SDS is a national network of radical students opposed to the Vietnam war, capitalism and the like. While some have described you as the 'faculty advisor' for MIT's branch of the SDS, the truth is that the SDS would not admit of such hierarchical arrangements. But perhaps it is better to just use the term, rather than have to explain to everyone that there were no such 'faculty advisors'.

The SDS are radical, but generally peaceful. They did, however, come to the aid of the Stonewall patrons during the riots in Greenwich Village in 1969 (see 'History of Gay Rights Movement' in the game book). You fully support those actions.

In the summer of 1969, the SDS split amidst a conflict between the language of the 'old-left' Marxist-Leninist Weathermen underground and the 'new left' SDS-Workers Alliance. The Weathermen underground radicalized after the split, and following the murder of Black Panther leader Fred Hampton, engaged in bombings and other acts of terrorism. You were in no way affiliated with the Weathermen. In fact, their adoption of language from the brutal regimes of

Lenin, Stalin and Mao is antithetical to your entire political agenda. We mention it here simply because your political opponents often seek to tar you with 'guilt by association' attacks, holding you responsible for the actions of the Weathermen.

You are, however, willing to work with many other advocates for human and civil rights, including Judd Marmor, Kenneth Clark and others.

Game Objectives

Remember that in addition to being one of the intellectual heavyweights of your era, you are a political radical, affiliated with the SDS: Students for a Democratic Society. The SDS came to the aid of the Stonewall rioters in 1969. You are an ardent supporter of the movement to declassify homosexuality, as well as being generally concerned about the use of psychiatric and psychological concepts to control people.

Oppose and criticize Behaviorism when and wherever you can. While you must carefully read your review of 'Verbal Behavior' that is contained in the appendix of the gamebook, you should also look at your 1971 paper 'The Case Against B.F. Skinner' available online (see below). You are nothing if not polemic.

Organize and participate on a symposium and J. Marmor and K. Clark on the duties of academics with respect to social activism in 1974. You should articulate the views contained in your 1967 paper, as well as your criticisms of behaviorism contained in your 1971.

Oppose the passing of the 'Leona Tyler principle', which states:

As citizens, members of the APA have the right to advocate for any cause through the myriad of political advocacy organizations, but when psychologists and psychiatrists speak for the profession through APA public stances and proclamations, it should be from science and professional experience.

On occasion psychiatrists are asked for an opinion about an individual who is in the light of public attention or who has disclosed information about himself/herself through public media. In such circumstances, a psychiatrist may share with the public his or her expertise about psychiatric issues in general. However, it is unethical for a psychiatrist to offer a professional opinion unless he or she has conducted an examination and has been granted proper authorization for such a statement.

Your final task in this game is to engage the Piaget in a public discussion or debate of the concept of 'innateness' in psychology, and the acceptability of positing innate ideas in a scientific enterprise. You should propose the event to the conference committee in time for it to happen in 1975.

As you will remember, the problem of innate ideas strikes the very core of the idea of the scientific study of the mind: the empirical hypothesis unifies the tradition as a whole, with the exception of Jungians. Moreover, the debate on homosexuality often turns, in the public mind at the least, on whether sexuality is innate (an 'orientation') or not (a 'preference'). The kind of innateness you and Piaget are discussing is probably *not* the same, as you both agree that the

structure of thought that is innate, not the content. This should be made clear in your public discussion.

You posit that there is an innate system of grammars that are common to all humans, as a function of our biology. Piaget agrees there is a 'fixed nucleus' of cognition that is innate, but only commits to the thesis that "the functioning of intelligence alone is hereditary." The actual debate is recorded in Piatelli-Palmarini's 1980 book, which you should review during the course of the game.

You are neutral on **the issue of the definition of mental illness**, but be ready to oppose any definition that is clearly behaviorist or psychoanalytic in nature.

Fission: Found the Cognitive Science Society

Must Read

[Chomsky makes many of his papers available online at: <http://www.chomsky.info/articles.htm>]

Chomsky, N. (1959). "Review of Skinner's Verbal Behaviour" *Language* 35: 26-58. Electronic copy of 'review' with preface: <http://cogprints.org/1148/0/chomsky.htm>

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Further Work

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R. H. Robins, A Short History of Linguistics (Indiana University Press, 1967), p. 239.

¹ See, e.g. Chomsky (1968), p. 1

² See, e.g. K. MacCorquodale (1970) "On Chomsky's Review of Skinner's Verbal Behavior" *Journal of the Experimental Analysis of Behavior* 13: 83-99 and Adelman, B. A. (2007) "An Underdiscussed Aspect of Chomsky (1959)" *Analysis Verbal Behavior* 23(1): 29-34.