LOGICAL POSITIVISM, NATURALISTIC EPISTEMOLOGY, AND THE FOUNDATIONS OF PSYCHOLOGY

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ABSTRACT: According to the standard account, logical positivism was the philosophical foundation of psychological neo-behaviorism. Smith (1986) has questioned this interpretation, suggesting that neo-behaviorism drew its philosophical inspiration from a different tradition, one more in keeping with naturalistic epistemology. Smith does not deny, however, the traditional interpretation of the philosophy of logical positivism, which sets it apart from naturalistic epistemology. In this article I suggest (following recent historical scholarship) that a more careful reading of the leading figure of logical positivism, Rudolph Carnap, shows an important naturalistic component in his philosophy. Hence, we must reevaluate our standard interpretation of the philosophy of logical positivism and its relation to psychological neo-behaviorism.

Key words: behaviorism, Carnap, logical behaviorism, logical positivism, naturalistic epistemology, psychologism

The Classical View

There is (or once was) a widespread account of the philosophical foundations of psychological behaviorism. According to that account logical positivism\(^1\) was the foundation of psychological behaviorism,\(^2\) especially neo-behaviorism. On this account the philosophical basis for neo-behaviorism was largely a set of epistemological views that was a combination of classical empiricism—all knowledge originates in and is justified by sensory experience—combined with the new logic. These epistemological views, in turn, led to a certain conception of the mind or of mentalistic terms, variously called logical

\(^1\) The history of this movement is often divided into three periods: the period of the original Vienna Circle, logical positivism, and logical empiricism. There are crucial philosophical differences between these three periods, especially between the second and the third, but I will, in the present context, simply ignore them.

\(^2\) By psychological behaviorism I mean a movement in twentieth-century psychology encompassing what is sometimes called classical behaviorism—the views of Watson, Hunter, and Weiss—the neo-behaviorism of Hull, Tolman, Skinner, Spence, and more recent “neo-neo-behaviorisms.” For a recent survey of these various schools see O’Donohue & Kitchener (1999).
behaviorism, analytical behaviorism, physicalism, etc. In various ways these philosophical views supported the program of neo-behaviorism.\(^3\)

According to one influential account (Fodor, 1968), a philosophical behaviorist is one who believes that necessarily, for each mental predicate that can be employed in a psychological explanation, there must be at least one description of behavior to which it bears a logical connection (p. 51). I call this kind of behaviorism semantic behaviorism, according to which for every mentalistic term there is some behavior (or behavioristic term) such that there is a conceptual (logical, semantic) connection between them.

Semantic behaviorism can take several forms. Analytic behaviorism is the view that for every mentalistic term there is some behavior (or behavioristic term) such that this behavior (term) constitutes the criteria for the (correct) application of the mentalistic term. This kind of behaviorism would be associated with Ryle, Wittgenstein, and Strawson. Logical behaviorism is the view that for every mentalistic term there is some behavior (or behavioristic term) such that this behavior (term) constitutes the verification basis for the application of the mentalistic term. This view is associated with Carnap, Hempel, and others. Logical behaviorism is often termed (or equated with) physicalism, the view that every sentence containing a mentalistic term can be translated into a sentence or sentences containing only physical terms. This view is also associated with Carnap, Hempel, and others. All three versions of behaviorism, however, are instances of semantic behaviorism, with differences concerning the semantic connection in question. Because my concern is with logical positivism, in the remainder of this article I will focus on logical behaviorism and physicalism; in fact, I will use these concepts interchangeably unless there is a special reason for making the distinction. It is, therefore, semantic behaviorism that is the crucial philosophical idea lying at the basis of many of the views of the logical positivists, and semantic behaviorism was a consequence of certain epistemological views of the logical positivists.

According to the classical view, therefore, the epistemology (and philosophy of science) of the logical positivists led to semantic behaviorism, and these views, in turn, were the basis for psychological behaviorism.\(^4\) The crucial question in the present context is the connection between this kind of semantic behaviorism and behaviorism as a research program in psychology.

This classical view is a thesis not only about the connections between logical positivism and psychological behaviorism, it is also a claim about historical fact: namely that the neo-behaviorists were historically influenced by these positivistic

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\(^3\) This standard interpretation is attributed by Smith (1986) primarily to Koch (1999) and Mackenzie (1977) and secondly to Leahey (1980). It can also be found in Taylor (1959), Fodor (1968), and Bechtel (1988).

\(^4\) Compare Boring’s statement “There began a movement . . . named logical positivism, which in science (including psychology) became physicalism, because it reduced all scientific language to the communal language of physics, and which in psychology became behavioristics because the psychological operations are all observations of behavior” (Boring, 1950, p. 655). I owe this reference to Smith (1986).
philosophers in the sense that the reading of their works (together with personal contacts) actually caused or influenced these psychologists to formulate their views about psychology. Before coming under the influence of the logical positivists, however, psychological behaviorists had no well-developed indigenous views about epistemology, philosophy of science, or the philosophy of mind.

Finally, according to this classical view, demonstrating the inadequacy of logical positivism threw into doubt the plausibility of psychological behaviorism. When logical positivism was shown to be defunct by its critics in the 1960s, neo-behaviorism likewise became suspect because of its “vanishing philosophical support.” Psychological behaviorism was shown to be implausible, inappropriate, or logically suspect.5

Objections to the Classical Account

This classical account of the relation between logical positivism and neo-behaviorism was subject to a thoroughgoing analysis and systematic attack in a book that deserves to be read much more than it has been. In his book Behaviorism and Logical Positivism: A Reassessment of the Alliance, Smith (1986) has argued against this classical account on several grounds.

First of all, psychological behaviorists, notably Hull, Tolman, and Skinner6 were not historically influenced in the origination of their philosophical views by the logical positivists. It was not the philosophy of logical positivism that shaped their views, although logical positivism might have reinforced them. The underlying philosophical views of these neo-behaviorists were reflections of an indigenous epistemology and philosophy of science, one that was rooted in the works of nonpositivistic individuals such as Lewis, Perry, Holt, Dewey, and others. These views variously comprised pragmatism, neopragmatism, critical realism, neo-realism, and so on, but they had in common a naturalistic approach to the knowing enterprise, something that later would come to be called naturalistic epistemology.7

According to Smith (1986) the neo-behaviorism of Hull, Tolman, and Skinner involved an indigenous, naturalistic epistemology, one that was at odds with the epistemology and the philosophy of mind of the logical positivists. On the one

5 According to Smith (1986), three theses were being advocated: (1) the “importation of philosophy of science from logical positivism” thesis, (2) the “linked fates” thesis, and (3) a third thesis characterized by Smith (1986) as the “closely connected” thesis or as the “subordination of subject matter to method” thesis. It is unclear to me which of the latter two interpretations of (3) Smith believes to be at issue.

6 Smith does not include a study of Guthrie or Spence in his account.

7 Naturalistic epistemology is a movement that arose in the 1960s largely as a result of the work of Willard Quine (1969) and Alvin Goldman (1986), although it was Quine who made that phrase famous. According to Quine’s version of epistemology, knowledge is a natural phenomenon to be studied by naturalistic, basically psychological, methods. In this account philosophy (as a discipline concerned with a priori truths and analytic propositions) has no exalted position from which to make pronouncements about the nature of knowledge. According to Quine there are no such a priori or analytic methods. The standard book of readings on naturalistic epistemology is Kornblith (1994).
hand these neo-behaviorists were groping toward a naturalistic epistemology, whereas the logical positivists were opposed to any such epistemological notion. The logical positivists had inherited from Frege (1980) the wholesale commitment to a sharp distinction between the tasks of logic and psychology. Logic (and epistemology), it was said, prescribes how one ought to reason, whereas psychology discovers how people, in fact, reason. To confuse epistemological questions with psychological ones, to reduce laws of logic to psychological laws about the mind, was to commit the fallacy of psychologism. Frege had made his case against the earlier psychologism of John Stuart Mill, and the logical positivists accepted this distinction between logic (epistemology) and psychology.  

If philosophy and psychology are basically distinct enterprises, however, there can be no such thing as a naturalistic epistemology—it would be an oxymoron; hence, the neo-behavioristic fledging attempts to construct such a naturalistic epistemology was, according to Smith, logically incompatible with the epistemology of the logical positivists. Also, because logical positivism and neo-behaviorism are logically independent of each other, any philosophical objections brought against logical positivism would not automatically undercut the plausibility of neo-behaviorism. Hence, Smith concludes that one should evaluate the adequacy of behaviorism on its own merits (1986, p. 20), largely on the basis of post-positivistic philosophy of science. If this is done, it might turn out that behaviorism is more plausible than usually thought.

I have no wish to question Smith’s argument about the actual historical relations between logical positivism and behaviorism; I believe he has made a convincing case that logical positivism was not the philosophy that generated the philosophical views of the neo-behaviorists. This fact, however, remains consistent with the view that logical positivism was important in the subsequent development of neo-behaviorism. Secondly, I have no wish to question Smith’s suggestion that behaviorism should be open to independent evaluation; however, I do want to question Smith’s claim about the epistemology and philosophy of mind of

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8 In the context of psychology, a useful account of the history of debates about psychologism can be found in Kusch (1995).

9 The feasibility of such a strategy and the accompanying philosophical issues have been explored by Ringen (1993a, 1993b), Smith (1993), and Amundson (1993). One question that needs much more discussion concerns the precise logical relation between the naturalistic epistemology of the neo-behaviorists, their methodology, and their psychological theories of learning; a second question concerns the adequacy of the naturalistic epistemology of the neo-behaviorists.

10 For Smith’s argument it is important to note that when the neo-behaviorists appropriated the views of the logical positivists, they interpreted them in keeping with their naturalistic epistemology; for if they didn’t, if (that is to say) the nascent naturalistic epistemology of the neo-behaviorists was morphed into a non-naturalistic epistemology, then the classical view would, after all, seem to be correct.

11 What this reevaluation would involve, however, is somewhat unclear because the naturalistic epistemology of the neo-behaviorists involved philosophical components usually associated with logical positivism (e.g., operationism and a commitment to intervening variables). If these philosophical views could be proved to be inadequate, the methodology of these neo-behaviorists would be shown to be equally inadequate. Again, the crucial point is that these methodological views should be interpreted in a naturalistic, as opposed to a “logical,” way.
logical positivism. In particular, I would like to suggest that the standard picture of logical positivism, the one that Smith endorses, is itself in need of serious reassessment and revision. In an important sense, not only did logical positivism leave open the possibility of a naturalistic epistemology, but it endorsed it (at least in part). If so, then the alleged contrast between the epistemologies of neo-behaviorism and logical positivism is not as radical as Smith’s remarks suggest, hence these epistemologies are not as logically independent as Smith thinks. We need to reexamine the philosophy of the logical positivists, which has been misinterpreted. We will find that it is much more compatible with the nascent naturalistic epistemology of the neo-behaviorists (and later versions such as Quine’s). In short, if we need to reevaluate psychological behaviorism, we also need to reevaluate philosophical behaviorism.

Logical Positivism and Naturalistic Epistemology

Reassessing Logical Positivism

Given the standard reading of the alleged close connection between logical positivism and behaviorism, and given the central place that logical positivism has held in twentieth-century philosophy of science, it is somewhat surprising that there have been few investigations into the history of this movement and in delineating the respective philosophical views of its members. For decades most individuals have simply assumed that this was a homogeneous, unified, single movement with its members agreeing on fundamental philosophical principles, thus leading individuals such as Smith to mention “the logical positivist view about...” The positivists themselves certainly encouraged this because they did not want to publicize the fact that they disagreed rather vehemently about certain core questions in philosophy. A careful examination of their actual views shows that the standard account of logical positivism needs serious revision; there is no such thing as “the” logical positivist view about so-and-so.

Recently, a group of scholars has started to examine the history and philosophy of this movement carefully (e.g., Cicera, 1994; Friedman, 1991, 1999; Giere & Richardson, 1996; Richardson, 1998; Stadler, 2001; Uebel, 1991, 1992). The final conclusions are not yet in, but one thing seems clear: there was no uniformity of opinion among the leaders of logical positivism. Schlick was probably the most conservative. His conception of epistemology, although perhaps containing some naturalistic elements, was basically in the mold of traditional philosophical (empiricist) epistemology. Neurath, perhaps the most radical of the three leaders, endorsed naturalistic epistemology explicitly (see Uebel, 1991, 1992), which anticipated many of the views that Quine (1969) would later advance. Carnap lined up in the middle, attempting a negotiation and compromise between the divergent viewpoints of Schlick and Neurath. Although it has received a great deal of attention, Carnap’s epistemology (e.g., Richardson, 1998) has not,
in my opinion, been interpreted correctly in all of its details, as I will attempt to show.

The existence of great disagreement among these individuals suggests that the standard interpretation of the philosophy of the logical positivists is in error—perhaps especially in the case of Carnap, whose epistemology and semantics contain an important naturalistic component. Furthermore, Carnap’s naturalistic semantics, which anticipates many of Quine’s (1960) later views about meaning (for a fuller discussion see Kitchener, forthcoming), is a version of what Smith (1986) calls a behavioristic epistemology and a behavioristic psychology of science.

**Logical Behaviorism, Physicalism, and Semantic Behaviorism**

Of the three leaders of logical positivism, Carnap became the dominant figure, leading individuals to attribute to him a place in twentieth-century analytic philosophy that far overshadows the importance of Schlick and Neurath. Besides, the historical influence of Carnap on twentieth-century psychology is especially important. It was Carnap, along with Feigl, Hempel, and Bergmann, who was most influential in shaping the views of psychologists in the 1950s and 1960s, at least to judge by the frequency of citation. Carnap, therefore, appears to be the key player in accounts of the relation between logical positivism and psychological behaviorism.

Carnap (along with Feigl, Hempel, and Bergmann) advocated versions of what I have called *semantic behaviorism*. Semantic behaviorism arose as a direct consequence of an underlying epistemology and philosophy of language that involved the so-called *linguistic turn* (Bergmann, 1964; Rorty, 1967). Unlike earlier analytic philosophy, what was radical about this new linguistic approach was its commitment to *semantic ascent*, that is, the move from the object language (or the material mode of speech) to the meta-language (the formal mode of speech). Instead of saying, with the neo-behaviorists, that thinking is just subvocal speech or that pain is a certain kind of behavior, for example, one asserts that the word “pain” means a certain kind of behavior; the words “pain” and “behavior” have a certain kind of logical (semantic) connection—they are synonymous or logically equivalent. The latter statements are semantic theses about words, not a metaphysical thesis about the nature of mental states. It seems clear, I think, that the behaviorists were not interested in the linguistic turn made by the logical positivists; rather, they were more interested in metaphysical matters—not questions about the word “mind,” but questions about the thing mind.

A psychological behaviorist might talk about the mind or behavior as objects and attribute properties to them in the *object language* (i.e., the material mode of speech). As such, psychologists make ontological claims about what exists, what properties are to be found in the world, etc. Suppose, however, that one engaged in semantic ascent and jumped to a higher-order language, a meta-language, one in which one talked *about* this object language. Such a language would be a meta-language occurring in the formal mode of speech. Here one would be talking not
about objects (the mind) but about words (“mind”), and one would be making logico-linguistic claims about these words (and the corresponding sentences). Instead of saying that the mind is a set of behaviors (as some psychologists were wont to do), one would say something about the relation between the word “mind” and the word “behavior.” This is a linguistic thesis, not an ontological one, so whereas the psychological behaviorist can say “the mind is behavior,” the logical behaviorist only says “sentences about the mind are sentences about behavior.”

Logical positivists such as Carnap and Hempel were thus committed to what I have called semantic behaviorism (Kitchener, 1999a)—the view that every mentalistic term has a conceptual (logical, semantic) relation to some behavioral term. Both Carnap and Hempel set out their philosophies of mind in a semantically-sounding fashion. In his famous article “The Logical Analysis of Psychology,” in which he advances logical behaviorism, Hempel says, for example:

All psychological statements which are meaningful, that is to say, which are in principle verifiable, are translatable into statements which do not involve psychological concepts but only the concepts of physics. (1949, p. 18, italics mine)

Hempel (1949) makes it clear that by “translatable” he means “definable by,” “has the same content as,” or “means the same as.” The content of a statement consists of the conditions under which a statement is true, and “the meaning of a statement is established by the conditions of its verification” (p. 17). Such conditions of verification must involve physical properties.

Hempel’s account is largely taken from the earlier work of Carnap (1959), in which the same thesis about the logical analysis of psychological concepts was called physicalism. Every sentence of psychology can be translated into some sentence of physical language (Carnap, 1959, p. 166), with the result that every psychological concept is definable in terms of physical language. Whether one calls it logical behaviorism or physicalism, such a view is a semantic behaviorism.

The underlying cluster of terms—translation, definition, meaning—is variously used by Carnap (1963a, 1963b) to formulate the thesis of physicalism, but what did Carnap mean by these terms? In these early articles Carnap had not yet taken the semantic turn, so he was committed to the thesis that all questions of logic and philosophy were syntactical questions. A translation is a rule for transforming a word from one language into another word (e.g., “cheval” = “horse”). Therefore, by a translation or definition Carnap presumably meant a set of logically necessary and sufficient conditions, an extensional equivalence. According to Carnap’s early views, all conceptual questions involved purely formal relations between terms, and this included all questions of meaning.12

The thesis of physicalism or logical behaviorism claims that every psychological concept is logically equivalent to a physical concept (or word). As

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12 Carnap asked (1963a, p. 399): “But is it not also necessary in order to understand the ‘sense’ of the sentences, to indicate the ‘meaning’ of the words?” No, he answers, syntax is enough. “For the ‘meaning’ of a word is given either by translation or definition,” which he takes to be purely formal.
we have seen, physicalism is a linguistic thesis, not a metaphysical thesis, but the second component of physicalism is an epistemological component: because semantics is determined by the conditions of verification, two terms mean the same if their respective methods of verification are the same. Hence, two concepts (sentences) are equivalent in (cognitive) content if all the verifiable consequences of the one are the same as the verifiable consequences of the other. The meaning (content) of a sentence (e.g., “snow is white”) being the set of conditions under which it is true (snow being white), two sentences have the same meaning or content if they have the same set of verifiable consequences. They are, as Carnap says, equipollent. In this sense, therefore, the thesis of physicalism rests on two pillars: verifications and the linguistic turn. As we shall see, however, these two pillars cannot support the positivist’s philosophical edifice, for they fit uneasily with the traditional epistemology in which positivists are supposed to believe.

If logical behaviorism is a version of semantic behaviorism, what is the semantic relation between psychological terms and physical terms? Furthermore, what theory of semantics did the logical behaviorist account presuppose?

On the standard interpretation, reinforced by the logical behaviorists themselves, semantics is concerned with the relation between a sign (word, sentence) and a thing or object that is referred to. Various terms have been used for this semantic relation: designation, reference, denotation, truth-value, extension, etc. For the sake of simplicity we will take it to be, following Carnap, designation. On the standard account, semantics is to be distinguished from psychology (on pain of psychologism); the semantic relation of designation must therefore be a philosophical (logical) relation and not any kind of psychological one. It seems that this argument can be extended mutatis mutandis to include any naturalistic relation (e.g., causality), so on the standard account, semantics is non-naturalistic; semantic behaviorism appears to be committed to non-naturalism.

Although the possibility of naturalistic semantics might seem to be out of question for logical positivists, we can, in fact, find the beginnings of such an account in Carnap himself. In fact, semantics is tied up with what can be called his psychological (behavioristic) theory of confirmation.

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13 From early on in his career (roughly between 1933 and 1936), Carnap adopted a certain interpretation of semiotics championed by Morris (1938), according to which a theory of signs had three divisions: (1) syntax was concerned with the formal, configurational relation of sign to sign; (2) semantics investigated the connection between signs and what they designated; and (3) pragmatics was concerned with the relation between (human) sign users and signs. According to Carnap, “logical analysis belongs either to semantics (if referring to meaning and interpretation), or to syntax (if formalized),” whereas “the descriptive concepts [of the theory of language] belong to pragmatics” (1953, p. 50). Pragmatics thus appears to be an empirical endeavor—an empirical theory of language use—not a logical one.

14 Some philosophers have recognized a kind of naturalistic epistemology in Carnap (e.g., Cicera, 1994; Coffa, 1991), tracing its roots to the early Vienna Circle and its predecessors.
Confirmation and Naturalistic Semantics

Carnap’s Theory of Confirmation

What makes a theory an adequate one, or one theory better than another? The obvious answer is empirical evidence. A theory has some positive epistemic status if the available empirical evidence adequately supports it; one theory is better than another if the available evidence supports it more adequately that it supports the other theory, etc. Now, forgetting for the moment that the criteria of theory evaluation are not always empirical in nature, what were Carnap’s views on the nature of empirical evidence?

The received view was that the epistemic adequacy of a theory is determined largely, if not exclusively, by its total empirical evidential support. Because it unreasonable to employ a term like “verification” here and because Popper’s brand of falsificationism was received with mixed feelings, an obvious alternative took the form of constructing a theory of confirmation (Carnap, 1962), a theory of probability concerning the degree to which empirical evidence supported a hypothesis. Carnap’s theory of induction was designed to be a purely logical account, analogous to deductive logic, and one that was quantitative in nature, with the concept of inductive support being characterized as the relation of partial validity holding between the premises of an argument and the conclusion. This relation of quasi-validity constituted the degree of probability the evidence gave to a hypothesis.

Carnap’s theory of confirmation purported to deal only with purely formal relations between two statements. In his book on confirmation he said “we are concerned only with what may be called the logical aspects of confirmation, namely, with certain logical relations between sentences (or propositions expressed by these sentences)” (Carnap, 1962, p. 20). By “logical relations” Carnap meant the purely formal, syntactical relations holding between two sets of propositions. Confirmation was a logical relation between $e$ (a sentence describing or reporting empirical evidence) and $h$ (a sentence about some hypothesis). According to Carnap:

Within the practice of the procedure of confirmation, these [logical] relations are of interest to the scientist. . .He intends to examine a certain hypothesis $h$; he makes many observations of particular events which he regards as relevant for judging the hypothesis $h$; he formulates the results of all observations made or as much of them as are relevant in a report $e$, which is a long sentence. Then he tries to determine whether and to what degree the hypothesis $h$ is confirmed by the observational evidence $e$. This last question alone is what we shall be concerned with. We call it a logical question because, once a hypothesis is formulated by $h$ and any possible evidence by $e$ (it need not be the evidence actually observed), the problem whether and how much $h$ is confirmed by $e$ is to be answered merely by a logical analysis of $h$ and $e$ and their relations. (1962, p. 20)
This occurs in much the same way that a logician determines the formal validity of an argument; no actual factual knowledge is necessary in order to determine whether an argument is formally valid or not, and no actual factual knowledge is required to determine the degree to which $e$ inductively supports $h$.

Carnap’s purely logical theory of confirmation needed to be supplemented, however, by methodology and psychology to be of any practical value:

Inductive logic alone does not and cannot determine the best hypothesis on a given evidence, if the best hypothesis means that which good scientists would prefer. The preference is determined by factors of many different things, among them logical, methodological, and purely subjective factors. (1962, p. 221)

We can call such an account of the conditions under which a theory or hypothesis is acceptable a *theory of acceptance*. Inductive logic thus requires supplementation by a theory of acceptance.

Although rarely discussed by commentators on Carnap, *methodology* for him was concerned to “give advice how best to apply the methods of inductive logic for certain purposes” (1962, p. 203). Hence, Mill’s methods of experimental inquiry, measurement theory, the theory of experimental design, the statistical theory of hypothesis testing, etc belong not to inductive logic per se but to the methodology of science. Methodology is thus concerned with the question of what procedures, strategies, tactics, etc are good ones to employ to achieve certain kinds of results. In short, methodology is a theory of scientific inquiry (Kitchener, 1999b).

Carnap had little to say about methodology, however, because it belonged to what he called the *pragmatics* of science, whereas he was concerned with the syntax and semantics of science. The important point, however, is that methodology belongs to pragmatics, and *pragmatics is basically empirical in nature* (Carnap, 1963c, p. 861), a subject studied by psychology and sociology and concerned with what methods actually produce what results (Carnap, 1938, p. 42; 1949, p. 124). Hence Carnap’s complete account of confirmation contained an important empirical component.

**Carnap’s Naturalistic Semantics**

The empirical domain entered into Carnap’s account in another way. For what, we may ask, is the relation between the empirical evidence, consisting, say, of actual observations made and $e$, a statement describing this evidence? Carnap often talked of this relation as *designation, representation*, etc; he spoke of a statement “confronting” an observation, “properly fitting” a fact, being “compared with facts,” etc, although what such statements mean seems to be unclear. These concepts are clearly semantic ones; they are concerned with the connection between statements and objects designated by them. It is here that the notorious problem of *protocol sentences* arises, and it is here that Carnap’s naturalism again enters the picture.

Carnap’s account of the semantic connection between a statement and a fact was heavily indebted to Tarski’s (1944) semantic theory of truth, in which (to
oversimplify) a statement such as “snow is white” is true if and only if snow is white. It was Carnap’s thesis of *Metalogik* (what Quine, 1960, called semantic ascent) that motivated Carnap’s linguistic turn and resulted in the claim that no logical sense could be made of the question of the relation between a statement and a fact unless one described this relation, and such a description had to occur in a meta-language. Hence, the relation between the object language and the object (the word “white” and the property whiteness) became, via linguistic ascent, the relation between meta-language and object-language, the relation between “words about words” and “words.”

This account leaves us with a purely coherentist account of truth, in which we are forever encased in different levels of language. What of the primitive (or original) semantic connection, the relation between linguistic sign and the object designated—the kind of relation required, for example, in an ostensive definition? This relation could not be a logical relation because logical relations tie together logical entities, and logical entities occur within a language; nor could it be a logical relation between words and things, the kind of relation envisaged by the earlier logical atomists, because such a relation was thought to be metaphysical and hence rejected. Departing from his earlier views about *Metalogik*, Carnap seemed to believe that this connection is to be understood as a word–thing relation, not a logical relation but an empirical relation—but what kind of empirical relation?

The most obvious answer would be a causal relation. In fact several logical positivists and friends of logical positivism (e.g., Reichenbach, Hempel, and Popper)\(^{15}\) took this view. It was also Carnap’s view (e.g., Carnap, 1932), although he typically phrased the naturalistic connection as a relation between a statement (assertion) and its conditions of use. “We know the meaning (designatum) of a term,” Carnap claims, “if we know under what conditions we are permitted to apply it in a concrete case and under what conditions not” (Carnap, 1938, p. 49; see also 1953, p. 72)—but to speak of humans applying a term to a concrete case is to leave the realm of semantics and to enter the realm of pragmatics, which is an empirical discipline. Carnap’s semantics, therefore, contains a naturalistic component—a behavioristic theory of science.

**A Behaviorist Theory of Method**

Although Carnap was not always clear about it, he seems to have believed that methodology was an empirical study of scientific procedure, an account of the procedures used and results obtained, which in turn was to be analyzed behavioristically in terms of the behavior of testing and the behavior of noting the results.

This view is bluntly stated in his famous paper “Testability and meaning” (Carnap, 1953), and it is one he apparently continued to hold to the end of his

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\(^{15}\) Cf. Hempel’s remark that the acceptance of an observation report “is connected (by causal not by logical relations) with experiences occurring in those tests” (1965, p. 41). Cf. also Popper (1965, p. 105).
Indeed, section III of “Testability and meaning,” entitled “Empirical analysis of confirmation and testing,” was concerned with empirical methodology, questions of observing, confirming, and testing sentences (hypotheses). Because of its importance, a long quotation from Carnap might not be out of order:

In the preceding chapter we analyzed logically the relations which subsist among sentences or among predicates if one of them may be confirmed with the help of others. . .In what follows we shall deal with empirical methodology. Here we are concerned with the questions of confirming and testing sentences and predicates. These considerations belong to a theory of language just as the logical ones do. But while the logical analyses belong to an analytic theory of the formal, syntactical structure of language, here we will carry out an empirical analysis of the application of language. Our considerations belong, strictly speaking, to a biological or psychological theory of language as a kind of human behavior, and especially as a kind of reaction to observations. We shall see, however, that for our purposes we need not go into details of biological or psychological investigations. In order to make clear what is understood by empirically testing and confirming a sentence and thereby to find out what is to be required for a sentence or a predicate in a language having empirical meaning, we can restrict ourselves to using very few concepts of the field mentioned. (1953, p. 63)

Carnap suggests that “observable” and “realizable” will do. As primitive terms, they must be defined “within psychology, and more precisely, within the behavioristic theory of language” (1953, p. 63). Instead of offering such definitions Carnap says he will simply provide “some rough explanations for the terms.” His explanations of “observable” and “realizable” were characterized behavioristically. For example, a term O is observable for person S if S is able, under suitable circumstances, to come to a decision using a few observations as to whether O is present or not (p. 63). The above schema is an indication of the truth conditions of a sentence, of what it would be for a given sentence to be found true, of how we would verify the sentence, of the conditions under which one uses a term. These very conditions are precisely the same as those expressed by what Carnap called reduction sentences: if a certain test condition T is established, and if a certain condition R results, then a sentence containing the theoretical term is accepted (believed, confirmed, uttered). For example, if one stands near one’s desk under good illumination, and if one sees a key on the desk, then “there is a key on the desk” is uttered and is acceptable. Here, then, is “meaning is use”—“an expression of language has meaning in this sense if we know how to use it in speaking about empirical facts” (1953, p. 73).

This process, Carnap suggests, can be understood psychologically. Human beings are conditioned to respond to certain environmental conditions by uttering certain words: “Children learn the use of common language, and thereby the correct performance of the operation described, through practice, imitation, and usually without the benefit of rules” (1949, p. 125). What a linguist (or field
anthropologist) does in determining the meaning of a native speaker’s words involves the same process.

As the preceding has indicated, Carnap’s physicalism lands him directly in Quine’s problem of translation—how to give an adequate translation of another speaker’s words—how to interpret what another speaker means or believes—both of which lead to corresponding versions of naturalistic epistemology. In fact, at one point Carnap sets out the very issue of Quine’s naturalistic epistemology when he says:16

The problem [of the relation between experiences and physical things] appears in [physicalism] in an entirely different form, as a problem concerning human organisms. In particular, it is the problem of how an organism is able, on the meager basis of the environmental stimuli received by its sense organs, to recognize and manipulate the things in its environment. While the details of this problem are a matter of physiology and psychology, the general character of these relations is a philosophical problem. (1963c, p. 945)

Carnap seems to take a pragmatist turn in his theory of confirmation and methodology. Similarly, in several other works (e.g., 1949) Carnap suggests that to examine the concept of confirmation as we actually use it we must consider the conditions $C$ under which a statement $p$ is accepted by an individual $S$; this results in a description of $C$ followed by a description of the set of observations $O$ followed by a description of $S$ making the statement $p$. The actual procedure of confirmation is thus one in which a human being engages in certain kinds of behavior in certain kinds of situations and comes to accept a basic protocol statement (in the sense that his behavior and experience cause him to accept the statement). This protocol statement can then be introduced into a language.

Such a view, as we have seen, is consistent with the notion that to know the meaning of a word is to know the conditions under which we are permitted to apply it, the conditions under which it is true (Carnap, 1938, p. 49; 1942, p. 2). To know the meaning of a word as used by a speaker $S$, one must study $S$’s use of words from an external perspective. This empirical study of human language would fall into the realm of pragmatics. It could be called, Carnap suggests, descriptive (empirical) semantics as opposed to the pure semantics of formally constructed language systems (Carnap, 1942, p. 11; 1937, pp. 6-7; 1956, p. 233).

Pragmatics, methodology, and (at least certain) parts of semantics are empirical (psychological) topics to be pursued behavioristically. A large part of semiotics is thus naturalistic, and so is one part of Carnap’s theory of confirmation—his theory of acceptance—along with his account of protocol sentences. It thus appears that parts of Carnap’s semantics, philosophy of science, and epistemology are, after all, empirical in nature.

16 Why didn’t (or couldn’t) Carnap take the next step and turn his epistemology into a full-fledged version of naturalistic epistemology? We know that Carnap received a copy of Quine’s Ontological Relativity (Creath, 1990) and liked it, especially chapters 5 and 6. But what about chapter 3?
Carnap’s account of general epistemology also displays the features of a naturalistic interpretation. Following Russell (see Kitchener, forthcoming), Carnap maintains that there are two key procedures involved in analytic philosophy: the method of analysis and the method of synthesis. Synthesis is deductive logic, whereas analysis is inductive logic (or psychology). How, then, does epistemology fit in? At least during one period of his life Carnap framed the question this way: is epistemology equivalent to deductive logic or inductive logic (psychology)? The first option lead him to *The logical syntax of language* (Carnap, 1937) then to semantics, pragmatics, and eventually psychology. But the second option, inductive logic, led to the same place—the importation of psychology into matters epistemological. Either way, however, he was lead uncomfortably (and, no doubt, kicking) to a kind of psychologism or a mixture of logic and psychology.

Carnap’s physicalism, semantic behaviorism, and physicalism contain elements of naturalism, as does his epistemology. In such conditions Carnap’s semantic behaviorism must be reinterpreted, for it is the semantic part of his account that needs further clarification, leading (I would suggest) to a behavioristic epistemology. Carnap’s naturalistic semantics, epistemology, and philosophy of science, far from being incompatible with naturalistic epistemology, are in fact compatible with the kind of naturalism that Smith (1986) suggests is present in neo-behaviorism.

If my argument is correct, then not only must we follow Smith’s recommendation (1986) and reevaluate psychological behaviorism, tracing it back to its naturalistic roots, but we must also reevaluate logical behaviorism and logical positivism, uncovering their naturalistic roots. Their respective epistemologies and semantics might not be widely divergent; they might be closer than usually recognized.

**Conclusion**

If Carnap and other logical empiricists held an interpretation of semantics, protocol sentences, and confirmation theory that contained a naturalistic (psychological) component, then we seem to have misinterpreted the nature of their program. How we could have done so for so many years is puzzling. A large part of the blame must be ascribed to these thinkers who were so intent on distancing themselves from psychologism that they could not see the naturalistic components in their own philosophical accounts. The rise of naturalistic epistemology gives us the medium for reevaluating past historical events and figures, and seeing in what respects these early views contained naturalistic and logical components to varying degrees.

If this thesis is correct, then the gulf between logical positivism and early versions of psychologistic, naturalistic epistemology is not as wide as it originally seemed. In particular, the naturalistic semantics, naturalistic epistemology, and naturalistic theory of mind of Carnap and certain versions of psychological behaviorism might not be so antithetical as some scholars have historically suggested. Some individuals have seen similarities between the views of Quine and
Skinner, but no one (as far as I know) has pointed out fundamental similarities between the views of Carnap and Skinner (it goes without saying that we need to reevaluate the relation between Carnap’s naturalism and Quine’s naturalism). Carnap’s analysis involving environmental conditions (white snow) and the speaker’s utterances (“snow is white”) is the behavioristic analogue of Tarski’s theory of truth—what we can call “semantic descent”—but this analysis seems to be conceptually indistinguishable from an account like Skinner’s, involving discriminative stimuli and verbal operant behavior (two of the ingredients of a contingency of reinforcement). Carnap has little to say about Skinner’s third term (reinforcement) aside from admitting that verbal responses are conditioned. The naturalistic behaviorism of Skinnerians might be compatible with the corresponding naturalistic semantics of Carnap. At the very least we must reevaluate Skinner’s characteristically misunderstood views about semantics (Skinner, 1945).

In sum, Carnap’s particular version of physicalism and his canonical version of logical behaviorism need to be reconsidered carefully. They do not seem to be the philosophical views that many individuals have taken them to be; they may be versions of semantic behaviorism, but if so then semantic behaviorism must be understood in a new and radically different way, one that departs significantly from traditional interpretations of semantics.

The neo-behaviorists, according to Smith (1986), were trying to construct a behaviorist epistemology, a behavioristic account of the knowing process, and so, I have argued, was Carnap; he was concerned with a behavioristic account of confirmation, something close to a psychological theory of science. Koch (1999) famously criticized logical positivism for its epistemology and philosophy of science and called for a new epistemology, a psychological epistemology of science. It is somewhat ironic that the leading defender of logical positivism was, at the same time, working in this direction. Carnap, of course, never worked out his ideas in a fully naturalistic way, nor did he give them a central place in his philosophical scheme of things (this would have to await the later views of individuals such as Quine). Perhaps Carnap was incapable of completing such a program, but at the very least he was open to exploring such a possibility, albeit on a limited scale. Recent scholarship has shown why one should follow the suggestion of Smith (1986) and reevaluate these older movements, but if we reevaluate behaviorism we also need to re-evaluate logical positivism.

References


KITCHENER
