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## ARE PSYCHOPHYSICAL MODELS OF BEHAVIOR POSSIBLE?

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In "The Correspondence Hypothesis," (*Philosophical Review*), Bruce Goldberg argues that the correspondence hypothesis is an illusion because "*B*'s having the same thought as *A*" does not entail "*B*'s having the same set of mental or neurophysiological properties, i.e., brain state or process, as *A*." If Goldberg is correct, a telling blow has been struck against the construction of information processing and psycholinguistic models created with the intention of later incorporation into neurophysiological models of brain functioning.

However, while Goldberg is correct in pointing out that two individuals can be said to have the same thought and yet not have the same set of mental or neurophysiological properties, his more important conclusion, viz., that the correspondence hypothesis is an illusion, does not follow. His conclusion results from: (1) construing the correspondence hypothesis to mean, "If the thought is the same with respect to content, then the set of neurophysiological properties is the same," which is insufficient for the purposes of the scientist; and (2) failing to notice that there is sufficient reason for claiming that both private and public modes of thinking may share properties in common.

† † †

The unity of scientific explanation is of concern to scientists and philosophers alike. For example, Brandt and Kim have discussed the possibility of correlating mental with physical phenomena in terms of the "Principle of Simultaneous Isomorphism (PSI)."

PSI: For every *phenomenal property M*, there is a physical property *P* such that it is lawlike and true that for every *x* and every *t* an *M*-event (i.e., an event involving the instancing of *M*) occurs to *x* at *t* if and only if a *P*-event occurs in the body of *x* at *t*; further, distinct phenomenal properties have distinct physical correlates (1967: 521).

Recently, however, PSI has been challenged by Bruce Goldberg. He argues that PSI, which he calls the correspondence hypothesis, is an illusion. His principal claim is that "*B*'s having the same thought as *A*" does not entail "*B*'s having the same set of mental or neurophysiological properties, i.e., brain state or process, as *A*."

The following hypothetical dialogs illustrate Goldberg's argument:

(i) Two farmers talking:

A: "I was just thinking that if it doesn't rain soon the crops will fail."

B: "I was thinking the same thing."

Don't assume that because A was thinking of corn and B of wheat that what B said is false (1968: 439).

(ii) A teacher asks her students, "Who was the first president of the United States?"

*Student A*: silently soliloquizes, "George Washington."

*Student B*: calls to mind a mental image of George Washington and recognizes it as a likeness of George Washington, first president of the United States.

*Student C*: calls to mind a mental image of George Washington but fails to identify it. However, later, when shown a picture of George Washington, recognizes him as the figure that had appeared before his mind's eye.

*Student D*: simply straight away, and without any mental sound or image, writes down, "George Washington was the first president of the United States."

(Goldberg, 1968: 441-444)

Goldberg focuses his argument on the second hypothetical dialog and argues that at least we would want to say that students *A*, *B*, and *D* had the same thought, viz., that George Washington was the first president of the United States. Student *C* is a troublesome case since he failed to recognize his

mental image as one of George Washington when it appeared. But however this case is to be decided, Goldberg's argument can be put as follows: " $S_1$  has the same thought as  $S_2$ " does not entail "the set of mental properties in virtue of which  $S_1$  has the thought in question is the same set as that in virtue of which  $S_2$  can be said to have the thought in question." In fact, he argues, nothing can be strictly inferred about either  $S_1$ 's or  $S_2$ 's mental or neurophysiological properties since  $S_1$  and  $S_2$  can be said to have the same thought without silently soliloquizing or picturing anything, as when, e.g., *Student D* simply straight away wrote down, "George Washington was the first president of the United States." The only thing these four cases do have in common is content, but the correlation of content with brain state, i.e., neurophysiological properties, Goldberg rejects as unintelligible. "Consider what it might mean to say that the content of a thought is caused by a brain state" (1968: 445). For example, what would it mean for the content of "George Washington was the first president of the United States" to result from  $A$ 's neurophysical properties? Hence, he concludes, the correspondence hypothesis is mere illusion.

If Goldberg is correct, a telling blow has been struck against the construction of information processing and psycholinguistic models created with the intention of later incorporation into neurophysiological models of brain functioning. However, while Goldberg is correct in pointing out that two individuals can be said to "have the same thought" and yet not have the same set of neurophysiological properties, I will argue in the following that his more important conclusion, viz., that the correspondence hypothesis is an illusion, does not follow.

To see why this is so it is important to get clear about what the correspondence hypothesis asserts. Goldberg offers the following: "Where there is the same thought there is the same brain state" (1968: 439). As stated, however, the claim is ambiguous; "same thought" can mean either "same with respect to content," or "same with respect to content and vehicle of thought." Goldberg uses "same" to mean, "same with respect to content" only: he argues that " $A$  has the same thought as  $B$ " is true, in the above case, of  $A$  and  $B$  where  $A$  silently soliloquized while  $B$  pictured that George Washington was the first president of the United States. Hence, for Goldberg, the correspondence hypothesis is the assertion, "If two thoughts have the same content, then they are correlated with the same set of neurophysiological properties."

But would any psychologist or neurophysiologist hold that sameness of content is sufficient for constructing correspondence theories? The answer is clearly no. What is wanted by scientists when they construct models of thinking is sameness for both content *and* vehicle of thought. The reason for this is transparent. Both psychologists and neurophysiologists are interested in the discovery and ultimate decoding of processes—psychological and neurophysiological. Hence both

criteria of sameness are required. Sameness of vehicle of thought is required to isolate kinds of psychological and/or neurophysiological processes, e.g., picturing as opposed to silently soliloquizing. And, sameness of content is needed to identify further within a given kind of process that particular set of mental properties correlated with a given thought, e.g., picturing George Washington and recognizing that image as a likeness of the first president of the United States. Hence, the correspondence hypothesis is not simply, "If the thought is the same with respect to content, then the correlated set of neurophysiological properties is the same," but rather, "If the thought is the same both with respect to content and vehicle of thought, then the neurophysiological properties are the same." Thus, it is only possible on Goldberg's formulation of the correspondence hypothesis to correlate two different sets of neurophysiological properties with the same thought.

But let us turn to his more serious objection, viz., that from " $S_1$  has the same thought as  $S_2$ " we can reasonably infer either " $S$  experiences mental events  $e_1 \dots e_n$ " or "It is not the case that  $S$  experiences any mental events." "Imagine that a child writes down the answer but says that no images or sounds occurred in his mind" (1968: 443). Clearly, mentally picturing and silently soliloquizing a thought necessarily involve mental events; whereas, sketching, speaking, or writing down one's thought(s) need not. Therefore, argues Goldberg, any correspondence thesis is undermined which must claim that for any mental predicate, such as "has a thought," there is: (1) a corresponding set of mental properties, and (2) a correlated set of neurophysiological properties. No set of mental properties exists—only behavior. Hence, the correspondence hypothesis is an illusion.

It could be argued that "has a thought" is not appropriately used to refer to written expressions of thought. But let us grant the use and see what follows. In order to do so, let us employ Goldberg's reasoning in another case. Suppose  $S_1$  and  $S_2$  are both diabetic, and further, that they both have diabetic condition  $a$  to degree  $y$ , i.e., neither require additional insulin as long as they exercise control over their diets. Now consider the following hypothetical case:  $S_1$  follows his prescribed diet, while  $S_2$  does not and has just eaten a large portion of ice cream and cake with sweetened coffee. It is true to say, " $S_1$  has the same diabetic disposition as  $S_2$ ," but clearly this does not entail that  $S_1$  and  $S_2$  have the same physiological state. Thus, from " $S$  has diabetic condition  $a$  to degree  $y$ " we can infer either " $S$  is manifesting symptomatic diabetic irregularities" or " $S$ 's metabolic state is normal." QED, the possibility of constructing a model of diabetes is an illusion. Obviously, something has gone wrong, since we already have such models.

Perhaps, Goldberg might reply, the abnormal metabolic state is not entailed by " $S$  has diabetic condition  $a$  to degree  $y$ ," but rather follows from " $S$  has diabetic condition  $a$  to degree  $y$ " and " $S$  ingests  $x$  amount of sugar." Thus the following

subjunctive conditional can be formed in the above case, i.e., "If any *S* should have diabetic condition *a* to degree *y* and ingests *x* amount of sugar, then abnormal metabolic condition *z* would result," whereas no such comparable subjunctive conditional can be formulated in the case of simply writing down one's thoughts. The formation of subjunctive conditionals (true universal statements whose antecedent has been satisfied) is a necessary condition for theory construction. (See Nagel, 1961: 68-69). Hence, the cases are not parallel. No correspondence model can be constructed.

But this move will not work, since it assumes that the written or spoken expression of a thought does not presuppose the same mental properties as the silent entertaining of that thought. But there are grounds. Silently soliloquizing and writing down, e.g., the English sentence, "George Washington was the first president of the United States," necessarily make use of the same concepts and syntax: only the mode of thinking about *x* is different. So, unless an *a priori* argument can be given which rules out the possibility of two modes of thinking having properties in common—and that seems unlikely—it is clearly possible that writing one's thoughts and silently soliloquizing them share common properties.

But perhaps, it might be objected, that since we are aware of mental events when thinking silently to ourselves in words or pictures, but not necessarily when writing, speaking, or sketching, the two modes of thinking are radically different in kind. But are we aware of *processes* in either case? True, I am aware of the "sound" or images of my thoughts when thinking to myself, but clearly that mental "sound" or visual pattern is not identical to the process by which it is produced; e.g., if Chomsky's analysis is correct, sentences are not identical to the grammatical transformation of dictionary entries from which they result. Moreover, when writing, sketching and speaking, we are aware of the vehicle of our thought(s) and bear the same relation to its "product" as to our private thoughts. In fact, the two modes differ only in terms of public accessibility. And even that difference is not sacrosanct. For if we are able to construct adequate models of thinking, we should be able to "publicly broadcast" on a suitable screen the private thoughts of individuals. Hence, in neither case are we aware of the mental process *per se*. And in both, we are aware of the vehicle of thought. The two modes of thought are not radically different in kind. They are merely alternative ways for expressing thought.

The same can be argued for thinking about, e.g., George Washington, by means of mental images and deliberately drawing his likeness; both presuppose the same concepts and rules for representation (for not just any picture will count as a likeness of George Washington in either mode). What is needed is a model for artistic modes of thinking. Meanwhile, there is sufficient reason to claim that writing, speaking, and drawing presuppose the same mental processes as thinking to oneself in words or pictures. And thus, we can formulate

the following subjunctive conditional: "If any *S* should think about *x* in mode *y* then correlated mental properties  $m_1 \dots m_n$  would occur at the same time." Simply straight away writing down one's thought(s) in the absence of mental events, therefore, is not a counterexample to the correspondence hypothesis.

Admittedly, it may turn out that the psychophysical models we construct do not picture reality. But such has been the fate of many models offered by scientists, e.g., the phlogiston theory of combustion. All that is claimed is that such models might reflect reality, not that they *necessarily* do so. Indeed, such is the character of all scientific hypotheses.

In summary then, while Goldberg is correct in pointing out that two individuals can have the same thought and yet not have the same set of mental or neurophysiological properties, his more important conclusion, viz., that the correspondence hypothesis is an illusion, does not follow. His conclusion results from: (1) taking the correspondence hypothesis to mean, "If the thought is the same with respect to content, then the set of neurophysiological properties is the same," which as I have shown is insufficient for the purposes of the scientist, and (2) failing to notice that there is sufficient reason for claiming that both private and public modes of thinking may share properties in common.

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