Chapter 11

Psychological predicates

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The typical concerns of the Philosopher of Mind might be represented by three questions: (1) How do we know that other people have pains? (2) Are pains brain states? (3) What is the analysis of the concept pain? I do not wish to discuss questions (1) and (3) in this paper. I shall say something about question (2).1

I. Identity questions

‘Is pain a brain state?’ (Or, ‘Is the property of having a pain at time t a brain state?’)2 It is impossible to discuss this question sensibly without saying something about the peculiar rules which have grown up in the course of the development of ‘analytical philosophy’—rules which, far from leading to an end to all conceptual confusions, themselves represent considerable conceptual confusion. These rules—which are, of course, implicit rather than explicit in the practice of most analytical philosophers—are (1) that a statement of the form ‘b cing A is being B’ (e.g., ‘being in pain is being in a certain brain state’) can be correct only if it follows, in some sense, from the meaning of the terms A and B; and (2) that a statement of the form ‘being A is being B’ can be philosophically informative only if it is in some sense reductive (e.g. ‘being in pain is having a certain unpleasant sensation’ is not philosophically informative; ‘being in pain is having a certain behavior disposition’ is, if true, philosophically informative). These rules are excellent rules if we still believe that the program of reductive analysis (in the style of the 1930’s) can be carried out; if we don’t, then they turn analytical philosophy into a mug’s game, at least so far as ‘is’ questions are concerned.


2. In this paper I wish to avoid the vexed question of the relation between pains and pain states. I only remark in passing that one common argument against identification of these two—viz., that a pain can be in one’s arm but a state (of the organism) cannot be in one’s arm—is easily seen to be fallacious.
Another way (\textit{c.g.} as the \textit{substring}-class whose members have such-and-such a characteristic use) to express the claim that in a class is determined by its members, to which every real-world version of the particular classification (and here \textit{the word temperature}-class) refers is the \textit{syponymy}-class of the \textit{word temperature}-class. For this particular classification,\footnote{The word \textit{temperature} is the \textit{syponymy}-class of the \textit{concept of temperature} with the \textit{syponymy}-class of the \textit{concept of temperature} as a concept of temperature.} the concept of temperature means not that the concept of temperature is the \textit{syponymy}-class of the \textit{word temperature} and not that the concept of temperature means that the concept of temperature means the \textit{syponymy}-class of the \textit{word temperature} (a concept of temperature). That is, if it is clear which of the two concepts of temperature in question are the same and which concepts are different, then the second concept of temperature is the concept of temperature. Thus, we can say that the concept of temperature means the \textit{syponymy}-class of the \textit{word temperature} (a concept of temperature).

There are some well-known terms in chemistry on this topic. For example, a \textit{hydrosol} is a dispersed phase of a liquid, with a dispersed phase of a liquid having a particular dispersion of the dispersed phase of a liquid. In this paper I shall use the term \textit{hydrosol} as a blanket term for such things as...
For example, if the fact that I can know that I am in pain without knowing that I am in brain state $S$ shows that pain cannot be brain state $S$, then, by exactly the same argument, the fact that I can know that the stove is hot without knowing that the mean molecular kinetic energy is high (or even that molecules exist) shows that it is false that temperature is mean molecular kinetic energy, physics to the contrary. In fact, all that immediately follows from the fact that I can know that I am in pain without knowing that I am in brain state $S$ is that the concept of pain is not the same concept as the concept of being in brain state $S$. But either pain, or the state of being in pain, or some pain, or some pain state, might still be brain state $S$. After all, the concept of temperature is not the same concept as the concept of mean molecular kinetic energy. But temperature is mean molecular kinetic energy.

Some philosophers maintain that both ‘pain is a brain state’ and ‘pain states are brain states’ are unintelligible. The answer is to explain to these philosophers, as well as we can, given the vagueness of all scientific methodology, what sorts of considerations lead one to make an empirical reduction (i.e., to say such things as ‘water is $H_2O$,’ ‘light is electro-magnetic radiation,’ ‘temperature is mean molecular kinetic energy’). If, without giving reasons, he still maintains in the face of such examples that one cannot imagine parallel circumstances for the use of ‘pains are brain states’ (or, perhaps, ‘pain states are brain states’) one has grounds to regard him as perverse.

Some philosophers maintain that $P_1$ is $P_2$ is something that can be true, when the ‘is’ involved is the ‘is’ of empirical reduction, only when the properties $P_1$ and $P_2$ are (a) associated with a spatio-temporal region; and (b) the region is one and the same in both cases. Thus ‘temperature is mean molecular kinetic energy’ is an admissible empirical reduction, since the temperature and the molecular energy are associated with the same space-time region, but ‘having a pain in my arm is being in a brain state’ is not, since the spatial regions involved are different.

This argument does not appear very strong. Surely no one is going to be deterred from saying that mirror images are light reflected from an object and then from the surface of a mirror by the fact that an image can be ‘located’ three feet behind the mirror! (Moreover, one can always find some common property of the reductions one is willing to allow—e.g., temperature is mean molecular kinetic energy—which is not a property of some one identification one wishes to disallow. This is not very impressive unless one has an argument to show that the very purposes of such identification depend upon the common property in question.)

Again, other philosophers have contended that all the predictions that can be derived from the conjunction of neurophysiological laws with such statements as ‘pain states are such-and-such brain states’ can equally well be derived from the conjunction of the same neurophysiological laws with ‘being in pain is correlated with such-and-such brain states,’ and hence (sic!) there can be no methodological grounds for saying that pains (or pain states) are brain states, as opposed to saying that they are correlated (invariantly) with brain states. This argument, too, would show that light is only correlated with electromagnetic radiation. The mistake is in
We shall discuss "pain a brain state?" then. And we have agreed to write the
change of meaning issue.

II. Is pain a brain state?

We shall now proceed to do.

The answer is the following statements of the form, "pain is a brain state," where "pain," and "brain state," are in no sense synonymous, and to see whether any such statement can be found.

But, if we do not assert either (1) or (2) in other words, if we regard the change of meaning issue as a pseudo-thesis in this case, then how are we to discuss the change of meaning issue while we proceed to do so.

The job for which the notion of change of meaning was developed in the history of philosophy, that is, of the "mean-on-the-street," or the philosopher's possession today a notion of change of meaning is not expressed by either (1) or (2). It seems to me that the above position is not expressed by either (1) or (2). It seems to me that the above position is not expressed by either (1) or (2).

"Is pain a brain state?"

"Is there any neurological ground for the neurological identification of pain with brain state?"

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but on the grounds that another hypothesis is more plausible. The detailed development and verification of my hypothesis would be just as Utopian a task as the detailed development and verification of the brain-state hypothesis. But the putting-forward, not of detailed and scientifically ‘finished’ hypotheses, but of schemata for hypotheses, has long been a function of philosophy. I shall, in short, argue that pain is not a brain state, in the sense of a physical-chemical state of the brain (or even the whole nervous system), but another kind of state entirely. I propose the hypothesis that pain, or the state of being in pain, is a functional state of a whole organism.

To explain this it is necessary to introduce some technical notions. In previous papers I have explained the notion of a Turing Machine and discussed the use of this notion as a model for an organism. The notion of a Probabilistic Automaton is defined similarly to a Turing Machine, except that the transitions between ‘states’ are allowed to be with various probabilities rather than being ‘deterministic.’ (Of course, a Turing Machine is simply a special kind of Probabilistic Automaton, one with transition probabilities 0, 1.) I shall assume the notion of a Probabilistic Automaton has been generalized to allow for ‘sensory inputs’ and ‘motor outputs’—that is, the Machine Table specifies, for every possible combination of a ‘state’ and a complete set of ‘sensory inputs,’ an ‘instruction’ which determines the probability of the next ‘state,’ and also the probabilities of the ‘motor outputs.’ (This replaces the idea of the Machine as printing on a tape.) I shall also assume that the physical realization of the sense organs responsible for the various inputs, and of the motor organs, is specified, but that the ‘states’ and the ‘inputs’ themselves are, as usual, specified only ‘implicitly’—i.e., by the set of transition probabilities given by the Machine Table.

Since an empirically given system can simultaneously be a ‘physical realization’ of many different Probabilistic Automata, I introduce the notion of a Description of a system. A Description of $S$ where $S$ is a system, is any true statement to the effect that $S$ possesses distinct states $S_1, S_2, \ldots, S_n$ which are related to one another and to the motor outputs and sensory inputs by the transition probabilities given in such-and-such a Machine Table. The Machine Table mentioned in the Description will then be called the Functional Organization of $S$ relative to that Description, and the $S_i$ such that $S$ is in state $S_i$ at a given time will be called the Total State of $S$ (at that time) relative to that Description. It should be noted that knowing the Total State of a system relative to a Description involves knowing a good deal about how the system is likely to ‘behave,’ given various combinations of sensory inputs, but does not involve knowing the physical realization of the $S_i$ as, e.g., physical-chemical states of the brain. The $S_i$, to repeat, are specified only implicitly by the Description—i.e., specified only by the set of transition probabilities given in the Machine Table.

The hypothesis that ‘being in pain is a functional state of the organism’ may now be spelled out more exactly as follows:

(1) All organisms capable of feeling pain are Probabilistic Automata.
I shall now complete the hypotheses just advanced with (a) the hypotheses that

psychology

and (b) precisely what this looks to be an invaluable part of the program of

the psychological description of organisms—for this is what is required to make

step of course, will be to pass from models of specific organisms to a normal form

step. In fact, this is a sense; just what psychology is about. The difficult

of organizations—specifically, the problem of producing mechanical models of

of investigation this hypothesis is just to attempt to produce mechanical models of

mechanical kind. Indeed, far less feasible than the physical-chemical state hypotheses is today, and far more

adequate is the sense of this hypothesis, in spite of its advanced vagueness, is

some reason. If, in fact, psychology is a probabilistic automation under

condition (1) is obviously redundant, and is only introduced for explication

instance it may be introduced as a warning of the risk of confining our

logic of some formulae. The problem of condition (3) is to rule out such cases,

Mental Preference Function or Ordination (further conditions are discussed in the

that the hypotheses in the distinguished subject have a higher degree of the

Finally, and with respect to the second question, we could want to reduce at least

etc., which transmits a special subject of the mind, the subject referred to in (4)

Thus, in the Mental's body, of the machine's body, or the machine's body, it seems natural to

in my paper, The Mental Life of Some Machine (in addition, it seems natural to

experience'}, 

The meaning of these conditions for automatic models is discussed

other, preference function, or at least a preference partial ordering, and something that

and by what terms the functional organization must include something that resembles a

only when some of the sensory inputs are in that subject

the sensory inputs that an organization with their description is in pain when and

For every description of the kind referred to in (2), there exists a subject of

which separately possesses descriptions of the kind referred to in (2).

No organization capable of feeling pain possesses a decomposition into parts

Functional Organization, etc., being capable of feeling pain is possessing an appropriate kind of
III. Functional state versus brain state

It may, perhaps, be asked if I am not somewhat unfair in taking the brain-state theorist to be talking about physical-chemical states of the brain. But (a) these are the only sorts of states ever mentioned by brain-state theorists. (b) The brain-state theorist usually mentions (with a certain pride, slightly reminiscent of the Village Atheist) the incompatibility of his hypothesis with all forms of dualism and mentalism. This is natural if physical-chemical states of the brain are what is at issue. However, functional states of whole systems are something quite different. In particular, the functional-state hypothesis is not incompatible with dualism! Although it goes without saying that the hypothesis is 'mechanistic' in its inspiration, it is a slightly remarkable fact that a system consisting of a body and a 'soul,' if such things there be, can perfectly well be a Probabilistic Automaton. (c) One argument advanced by Smart is that the brain-state theory assumes only 'physical' properties, and Smart finds 'non-physical' properties unintelligible. The 'Total States and the 'inputs' defined above are, of course, neither mental nor physical per se, and I cannot imagine a functionalist advancing this argument. (d) If the brain-state theorist does mean (or at least allow) states other than physical-chemical states, then his hypothesis is completely empty, at least until he specifies what sort of 'states' he does mean.

Taking the brain-state hypothesis in this way, then, what reasons are there to prefer the functional-state hypothesis over the brain-state hypothesis? Consider what the brain-state theorist has to do to make good his claims. He has to specify a physical-chemical state such that any organism (not just a mammal) is in pain if and only if (a) it possesses a brain of a suitable physical-chemical structure; and (b) its brain is in that physical-chemical state. This means that the physical-chemical state in question must be a possible state of a mammalian brain, a reptilian brain, a mollusc's brain (octopuses are molluscs, and certainly feel pain), etc. At the same time, it must not be a possible (physically possible) state of the brain of any physically possible creature that cannot feel pain. Even if such a state can be found, it must be nomologically certain that it will also be a state of the brain of any extra-terrestrial life that may be found that will be capable of feeling pain before we can even entertain the supposition that it may be pain.

It is not altogether impossible that such a state will be found. Even though octopus and mammal are examples of parallel (rather than sequential) evolution, for example, virtually identical structures (physically speaking) have evolved in the eye of the octopus and in the eye of the mammal, notwithstanding the fact that this organ has evolved from different kinds of cells in the two cases. Thus it is at least possible that parallel evolution, all over the universe, might always lead to one and the same physical 'correlate' of pain. But this is certainly an ambitious hypothesis.

Finally, the hypothesis becomes still more ambitious when we realize that the brain state theorist is not just saying that pain is a brain state; he is, of course,
To argue on the ground just mentioned that pain is not under a brain state nor a
brain function, it is necessary to distinguish between the concept of a brain state and that of a
brain function. To state that a person has a brain state is to describe the person's current mental
state, whereas to say that a person has a brain function is to describe the person's ability to perform
certain tasks or carry out certain actions. In this context, the concept of a brain state is
frequently used to describe the person's current emotional state, whereas the concept of a
brain function is used to describe the person's current ability to perform certain tasks or carry
out certain actions.

1. **Functional State versus Behavioral Disposition**

In psychology, the idea of a functional state refers to the mental and emotional conditions that
a person is experiencing at a given time. These states can vary from one moment to another,
and they can be influenced by a variety of factors, such as one's current emotions, beliefs,
and experiences. On the other hand, the concept of a behavioral disposition refers to the
patterns of behavior that an individual is likely to display in a given situation. These
patterns can be influenced by a variety of factors, such as one's past experiences,
learning, and cultural background.

In psychology, the idea of a functional state is often used to describe the
person's current emotional state, whereas the concept of a behavioral disposition is
used to describe the person's current ability to perform certain tasks or carry
out certain actions. In this context, the concept of a brain state is
frequently used to describe the person's current emotional state, whereas the concept of a
brain function is used to describe the person's current ability to perform certain tasks or carry
out certain actions.

The theory that brain states are not under a brain state nor a functional state but a
functional state versus behavioral disposition is a well-known concept in psychology. It
suggests that the concept of a brain state is not useful for predicting behavior, whereas
the concept of a behavioral disposition is more useful for predicting behavior. This is
because the concept of a behavioral disposition is based on the person's current patterns of
behavior, whereas the concept of a brain state is based on the person's current emotional
state. In this context, the concept of a functional state is frequently used to describe the
person's current emotional state, whereas the concept of a behavioral disposition is
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frequently used to describe the person's current emotional state, whereas the concept of a
brain function is used to describe the person's current ability to perform certain tasks or carry
out certain actions. This is

**Psychological Predicaments 165**
functional state is like arguing that heat is not mean molecular kinetic energy from the fact that ordinary people do not (they think) ascertain the mean molecular kinetic energy of something when they verify that it is hot or cold. It is not necessary that they should; what is necessary is that the marks that they take as indications of heat should in fact be explained by the mean molecular kinetic energy. And, similarly, it is necessary to our hypothesis that the marks that are taken as behavioral indications of pain should be explained by the fact that the organism is in a functional state of the appropriate kind, but not that speakers should know that this is so.

The difficulties with 'behavior disposition' accounts are so well known that I shall do little more than recall them here. The difficulty—it appears to be more than 'difficulty,' in fact—of specifying the required behavior disposition except as 'the disposition of X to behave as if X were in pain,' is the chief one, of course. In contrast, we can specify the functional state with which we propose to identify pain, at least roughly, without using the notion of pain. Namely, the functional state we have in mind is the state of receiving sensory inputs which play a certain role in the Functional Organization of the organism. This role is characterized, at least partially, by the fact that the sense organs responsible for the inputs in question are organs whose function is to detect damage to the body, or dangerous extremes of temperature, pressure, etc., and by the fact that the 'inputs' themselves, whatever their physical realization, represent a condition that the organism assigns a high disvalue to. As I stressed in 'The Mental Life of Some Machines,' this does not mean that the Machine will always avoid being in the condition in question ('pain'); it only means that the condition will be avoided unless not avoiding it is necessary to the attainment of some more highly valued goal. Since the behavior of the Machine (in this case, an organism) will depend not merely on the sensory inputs, but also on the Total State (i.e., on other values, beliefs, etc.), it seems hopeless to make any general statement about how an organism in such a condition must behave; but this does not mean that we must abandon hope of characterizing the condition. Indeed, we have just characterized it.  

4. In 'The Mental Life of Some Machines' a further, and somewhat independent, characteristic of the pain inputs is discussed in terms of Automata models—namely the spontaneity of the inclination to withdraw the injured part, etc. This raises the question, which is discussed in that paper, of giving a functional analysis of the notion of a spontaneous inclination. Of course, still further characteristics come readily to mind—for example, that feelings of pain are (or seem to be) located in the parts of the body.
V. Methodological Considerations

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