

## THE ROLE OF THE OBSERVER IN COGNITIVE SCIENCE.

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The current philosophical basis of cognitive science leads to problems in the theories of cognition proposed. An alternative basis, using phenomenology, may be more viable.

Western metaphysics has been divided between dualists and monists. Both equate self and mind. Cognition is the relation between the self or mind and the world or the rest of the world.

Cognition requires a world and a mental representation of that world. Unfortunately we cannot be sure of the world. Any variety of realism requires some representation of the world. Theorising becomes the relation of one model to another. Because of our prejudices we tend to ascribe one of these models reality. The subjects of our theorising are taken to possess representations of this world. We deduce the nature of their representations, and the processes necessary to gain these representations upon the assumption that our "observers world" is real. In fact what we take to be properties of the subject may be imposed by the nature of the assumptions within the observer's world.

Phenomenology equates the world with the self (e.g. Merleau-Ponty 1962, 1964). My world is myself. Mind is a part of myself which I have learned to contrast to the real. Rather than trying to control one's own subjectivity, as an observer, one must understand it. There is no real world to base one's cognitive models on. Instead one must consider the relationship between worlds. What cannot be communicated cannot be studied. As researchers we devise many ways for subjects to communicate with us. It is a mistake to ignore their role in this communication.

As cognitive scientists we should consider the worlds of subjects. To do this we must abandon our privileged position as "objective" observers. We have struggled to objectify our analyses of behaviour and other manifestations of cognition, this attempt is spurious. We will only progress by devising ways of recording and relating subjective worlds.

This may look as if it will be very difficult, and further, non-objective. The remainder of this paper argues that 1. Current cognitive science theorising is already non-objective and that this poses a serious problem. 2. This problem must be faced by making the role of the observer explicit in theory.

Let me provide examples of 1. I hope that they will be clear enough to allow you to generate others. Let me take a psychological example, a linguistic example and an A.I. example. For psychology, consider the concept of imagery in particular and mental representation in general. The initial interest in imagery was fairly simplistic, early studies sought to discover if there were any apparent performance correlates of a mental image. Reports of imagery were correlated with performance in one way or another. It has since become clear that reporting an image correlates with some analogue kinds performance especially in terms of "distance" traversed over time. It has also become clear that reported imagery is not necessary for such effects (Friedman 1979) and that use of "the image" is not like use of an object (Hinton 1980, Richman and Mitchell 1979). So we now have representations which are like images, but clearly cannot correlate precisely with imagery reports. The problems of interpreting the original observed performances have not been solved. It is not clear what the basis of imagery reports or time differences in processing are. The assumptions that time differences represent real processing and that reported imagery has some imaginal (e.g. analogue) basis are part of the observer's or theorist's world. I suggest that the observers have found evidence which supports their world. They have not found evidence which would convince their more cynical colleagues. By wading into such exciting problems as imagery, without being clear what they believe an image could be, cognitive psychologists have produced a lot of experiments which are uninterpretable. You can like them or dislike them but is is

unclear what they have shown. The image as a concept may be a useful part of the observer's world, it is not clear, and cannot be without the distinction, whether it is a useful part of the subject's world, or even a functional entity within the processing system.

Space prevents me going into detail for the other examples. I'll just name them to annoy and tease those who believe in them. In AI the notion of a representation of knowledge seems to be a formalisation of the observer's knowledge, it is not a theory of knowledge in itself. In linguistics the notion of a language is part of the observer's/community world. It is not clear that it is an essential part of linguistic theory. Need one assume the object of study to understand it? It would be better to derive it.

How will considering the role of the observer help to solve such problems? For a start, it becomes clear that there are no "bald facts" which we all agree about as decent and upright scientists. For example, pro-imagery people seem to believe in the reality of images, linguists believe in language. For some purposes these beliefs may be useful, they cannot be validated by assuming them. Nor can the existence of such things be proven. If we want to understand the mind of a subject, rather than simply capturing behaviour in a descriptive way, then we have the problem that their beliefs and ours may be different. Supposing one found "imagery effects" in a person who reported no imagery. The current way of understanding this would be to claim that the person had an unconscious image. It is important to recognise that this is a claim about our world, not the subjects. For example it might be futile to tell such a subject to "picture" something, other ways of enabling "imagery" might be necessary. The ideal, if we wish to study the minds of others, would be some model which both observer and subject could agree on, or at least be made to agree on.

One role of science is to establish such an agreement within a scientific community. For example, Human Information Processing has certain agreements about how to consider psychology. A critical notion is that of information. Recently, we have seen criticisms by Gibson (e.g 1966) and Turvey (e.g.1977) of the assumption that there is some absolute way of defining units of information in the environment. Their alternative becomes subject relative. I suggest that this is too simple. The "primitive units of information" in the environment will depend upon the subject, the environmental context, the historical context of the subject and, not least important, the way in which the observer characterises the problem of interest. That is, the notion of invariance only has meaning within a system which includes the observer, the subject and the environment. An affordance, like edible, or a feature, like straight line, can only be specified in this manner. The fact that they appear "real" invariants to us is due to our ignorance about our participation in this process. You may protest that by including our participation in science, we are liable to destroy the objective and repeatable nature of science. Clearly the functional utility of several sciences, or better, systems of scientific communication, is great. It is not clear that this is the case in cognitive science. I am proposing that cognition be regarded as a relation between the world of the observer and the world of the subject, rather than as a static system which can be charted and understood as processing within a single world. I believe that this will overcome the problems with using phenomenology as the basis merely for introspection or some uncritical description of people's beliefs. I am suggesting using two phenomenologies at once. The relation between those worlds will serve as the basis for cognitive science, rather than attempting to base one world in

the other, as is presently done. As a glib summary to remember: What is real is not important, what the subject and the observer believe to be real is critical.

References.

Friedman A. 1978. Memorial comparisons without the mind's eye. Journal of Verbal Learning and Verbal Behaviour. 17. 427-444.

Gibson J.J. 1966. The Senses Considered as Perceptual Systems.

Hinton G. 1979. Some demonstrations of the effects of structural descriptions in mental imagery. Cognitive Science. 3. 231-250.

Merleau-Ponty M. 1962. The Phenomenology of Perception. RKP.

Merleau-Ponty M. 1964. Philosophy and Sociology. In Signs. Northwestern University Press.

Richman L.L. and Mitchell D.B. 1979. Mental travel: some reservations. Journal of Experimental Psychology: Human Perception and Performance. 5. 13-18.

Turvey M.T. 1977. Preliminaries to a theory of action with reference to vision. In Perceiving Acting and Knowing. Ed. R. Shaw and J.B. Bransford. LEA.

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