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Perspective

Cognitive Psychology: A Brief on Doctrin of Behaviourism

Gezinus Wolters*

Department of Psychology, Hanze University , Groningen, The Netherlands

DESCRIPTION

Characteristic of the cognitive revolution that swept away the scientific doctrine of behaviourism some 40 years ago is the attempt to understand the inner workings of the 'black box'. Almost from the start, this has led to a longstanding debate concerning the optimal level of description of cognitive functions (the symbolic-computational versus the subsymbolic-implementational controversy). Although the debate is still not settled, there is general consensus that knowledge of the biological realization of cognitive functions is of great importance in guiding our understanding of them. For a long time, the main problem in this endeavour has been the impossibility of directly observing the processes and mechanisms of the brain underlying cognitive operations. As a consequence, cognitive psychology has had to resort to indirect ways of theorizing about the brain behaviour relationship by: speculating about possible brain systems and processes operative in cognitive tasks based on analysing the effects of experimental manipulations on performance and using insights from the neurosciences, especially neuropsychology, about global relationships between brain structure and cognitive function.

This situation has changed fundamentally by the technological advancements in neuroimaging techniques. Now, for the first time, it has become possible to measure on-line activity in the brain while it is carrying out cognitive tasks. Of course, the excitement about the ability to chart brain activity during cognitive processes has to be mitigated by the realization that the available techniques still have limitations. There are limitations in temporal and spatial resolution, and interpreting the data does show certain problems. Moreover, the application of the techniques requires laborious procedures and shows several constraints on subjects, tasks and situations to be studied. Also, the methodological consistency required for reliability and reliability leaves much to be desired. Despite all these limitations and problems, it is clear that neuroimaging has become a major tool for the advancement of our understanding of the relationship between the brain and cognition.

Neuroimaging will not provide the answers to all our questions about the brain behaviour relationship. Knowing that a particular brain area is involved in performing a cognitive activity does not by itself tell us how it is done. We need other tools, like neural network modelling, to explore and understand how brain areas perform cognitive operations. Moreover, to expand the insights into how cognitive operations and functions are accomplished in the brain, we need to integrate knowledge at an even more detailed level, the level of the individual neuron and its various modulating mechanisms.

Yet, charting the details of the functional role of brain regions in carrying out cognitive operations is an essential step in the enterprise of brain behaviour research. It provides the basic insights needed to constrain psychological models of cognition. Speculations about cognitive mechanisms and processes have to be guided by knowledge of the detailed architecture of active and inactive brain areas. Moreover, this knowledge is indispensable to the further development of models explaining how these cognitive mechanisms and processes are implemented in the neural system.

Correspondence to: Dr. Gezinus Wolters, Department of Psychology, Hanze University , Groningen, The Netherlands, E-mail: woltersg@gmail.com

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