

Research Methods in Cognitive Psychology

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Abstract

Cognitive Psychology (CP) in the last 50 years has shown impressive development, producing a large body of data mainly concerned with specific elements of the complex cognitive architecture of the mind. The focus on single processes, in large part necessarily narrow and detailed, has not prevented the development of general concepts, paradigms, and models that can be useful to all areas of psychology.

Keywords: Psychology, Disorders, Cognitive Psychology.

Accepted on January 28, 2021

Introduction

Cognitive psychology, the school of psychology that researches internal mental processes, employs various methods as it examines how humans understand, diagnose, as well as solve problems and how human memory works [1]. Two widely used methods of cognitive psychology are a case study and a controlled experiment. Case studies are in-depth investigations of individuals or single cases. Through the method of case study, a detailed analysis of an individual or a case is obtained. This is achieved through the use of certain data collection tools including questionnaires, interviews, and observations, etc. The data collected provides evidence which is used to disprove or support some theory because it incorporates highly detailed data. At the same time, a considerable disadvantage of this method is its subjectivity and limited generalizability [2].

Case study accounts in psychology, because they are based on the qualitative approach to data collection and data analysis, risk being affected by the researcher bias. In particular, researchers who work with the observed individuals often for a long time can become biased towards the patients and manipulate the findings to create ground for their theories. Sometimes, the findings reflect the researcher's attitude to the patient, e.g. whether he/she likes the study participant or not, and are interpreted in the way that serve the researcher's bias. Another disadvantage of the case study is difficulty of replication and limited generalizability. Case studies are used to research rare cases and single individuals over a long time in cognitive psychology and they cannot be

replicated because of the individual differences among people. Also, they use inductive reasoning.

To compare, the experiment is also used in cognitive psychology to either support or disprove theories. However, the experiment uses deductive reasoning, because it verifies a hypothesis with the help of factual data represented through figures and calculations. This method lies within the quantitative paradigm and involves comparisons of (two or sometimes more) variables as they are manipulated under specific conditions. Randomized control trials (the most valid and reliable type of experiment) involve a highly representative sample of randomly assigned participants and allows establishing causal relationships between studied variables. These findings are applicable to a larger society, and they are valid and reliable evidence for the theory support or disproof. In this way, the use of experiment leads to more objective results, with greater validity and reliability; it is applicable to the society in general and can be replicated [3].

the method of experiment to test new hypotheses on envy, namely how envy affects cognition with regard to attention, memory, and self-regulation. The purpose of the study was to examine whether the experience of envy increases the memory of and attention to certain advanced targets and examine how this experience affects the self-regulatory resources within those who experience envy [4]. To achieve their aim, the authors of the study used four consecutive experiments each testing a particular hypothesis relating to the research purpose. The samples varied from 65 and 69 participants in the third and first experiments to 187 and 152 participants in

the second and fourth experiments. Using the quantitative research design and statistical methods of data analysis, the authors found that envy has significant effects on cognitive processing: it enhances both attention to and memory of information about targets and depletes one's willingness to demonstrate persistence or exert willpower in other spheres. In this way, confirmed the socio-functional perspective on envy as a source of shifting cognitive processes in individuals towards certain targets [5].

Approaches to Cognitive psychology

A number of different approaches have been proposed in order to better understand the field of cognitive psychology. Each of these approaches emphasizes a different aspect and highlight distinct features underlying the cognitive processes. These methods provide us with an insight into how the human mind functions by giving us a general idea about the workings of the basic cognitive processes that we engage in. Broadly, there are four major approaches that try to explain the various cognitive processes by highlighting the different important features. These approaches Experimental Cognitive Psychology, Computational Cognitive Science, Cognitive Neuropsychology, and Cognitive Neuroscience [6].

Experimental Cognitive Psychology

This approach involves conducting tightly controlled experiments under laboratory conditions on healthy individuals. It generally includes experiments that designed in such a way that they might disrupt the cognitive processes and reveal their workings [7]. The findings obtained through such experiments then lead to formulation of the theories, which in turn lead to testable claims. For example, a researcher wants to examine the effect of arousal on reaction time. He uses the experimental approach, and the reaction time is assessed through a machine where the buttons light up and the time to respond is measured. The arousal is also assessed through heart rate measurement, under the following conditions after rest, after cognitive overload, after exercise, after caffeine, and after both exercise and caffeine. The results obtained through such experimental methods can thus lead to formulation of some theories, which later can be tested [8].

Computational Cognitive Science

This approach involves computational modeling through the recreation of some of the aspects of human cognition in the form of some computer program, or formula in order to predict behavior in novel situations. In other words, this approach basically involves creating computer based models of human cognitive functions, as well as some work on artificial intelligence [9].

Cognitive Neuroscience

This approach has gained popularity over the past decade or so, and involves brain-imaging devices to study cognitive functions. This can help to discover where these processes occur in the brain, and when. In other words, this approach involves using brain imaging and brain anatomy to study 'live' cognitive functioning in healthy individuals. As the technology improves, these studies are becoming more influential and potentially useful. Some of the methods used in the cognitive neuroscientific approach include Single Unit Recording Event Related Potentials (ERPs) Positron Emission Tomography (PET) (Functional) Magnetic Resonance Imaging (fMRI, MRI) Magneto-encephalography (MEG) Transcranial magnetic stimulation (TMS) [10].

Conclusion

Some researchers investigate the relationship between cognition and the brain's structures and activities. This is psychobiological research. One way of looking at such relationships is to conduct post mortem studies, to compare the brains of normal individuals with those who were known to have some kind of cognitive deficit. Also, one can also observe the performance of brain damaged individuals and their cognitive deficits. Researchers can also monitor an individual doing a cognitive task, with the help of various measures such as PET, MRI, or fMRI.

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