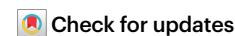


Studying cognition in context to identify universal principles

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Much of the study of cognition has focused on identifying universal principles and has thereby marginalized approaches that consider culture and context. However, embracing context can lead to better methods for identifying universality.

The shared capacity for cognition among humans motivates psychologists to assume that cognition has a universal architecture. Overwhelmingly, Western cognitive psychology has relied on well-controlled laboratory experimentation to establish universal principles of cognition¹. These seemingly objective efforts have resulted in an array of empirical demonstrations of cognitive abilities in domains such as attention, memory, judgement and decision making, which are often used as evidence of universal principles of cognition. A universal principle of cognition might be considered analogous to principles of physics. For example, Newton's law of gravitation in physics could be analogous to the universal law of generalization in cognitive psychology, which states that the likelihood of a response generalizing to a new stimulus depends on the similarity between the stimuli. Both laws can be considered fundamental truths that form the basis of that science. Framing universals of cognition depends on framing the scientific inquiry at a sufficiently abstract level².

However, there is a growing body of research that suggests that context and culture, which are often ignored in cognitive psychological investigations, influence how cognitive processes present. This research forces researchers to re-evaluate certain claims of universality. The study of human cognition is at a critical juncture, reckoning with a body of research that might provide little insight into both core cognitive architecture and cognition in context. Here, I present a way in which these fields can move forward and perhaps reconcile the apparent conflict between the search for cognitive universals and the need to understand cognition in context.

The adaptability of human cognition

Reading and writing are cultural inventions that clearly influence cognition. One of the most substantial ways in which literacy has shaped cognition is through its effect on how individuals process the sounds of language, or phonology. For instance, literacy has been shown to influence eye gaze in phonological competition tasks. When listening to a sentence (such as 'Today he saw a crocodile') while looking at a visual display of multiple objects, highly literate individuals looked at objects with similar-sounding names to a crocodile (phonological competitors) in the visual scene before looking at objects with similar meanings (semantic competitors). That is, literate participants looked at a picture of a crocus flower (phonological competitor) before a picture of a turtle

(semantic competitor). By contrast, participants with a low level of literacy were more likely to look first at semantic competitors such as the turtle³. These findings indicate that how individuals process similar sounding and semantically related information differs as a function of literacy. Although researchers make claims about phonological processing that are intended to generalize across all humans, research comparing literate and pre-literate people indicates that it might be difficult to establish universal principles.

Beyond phonological processing, literacy also influences attention, memory, thinking and reasoning⁴. Because literacy is culturally derived and not shaped by evolutionary processes, the ability to read and write probably makes use of universal underlying cognitive systems that allow people to perceive, think and learn. Thus, literacy is likely to influence how these systems are used to give rise to cognitive processes. This example demonstrates that the systems that support processes for attention, memory, language processing and reasoning have remarkable flexibility in adapting to diverse environments and adjusting to cultural inventions. This cognitive flexibility in the face of cultural inventions and contexts limits the search for universals of cognition.

Approaches to studying cognition in context

In other domains, the effects of culture on cognition might be less obvious, but are no less important to study. One pitfall of existing cognitive research is that researchers often fail to sufficiently conceive of stimuli, objects or situations within an abstract representational space, resulting in experimental tasks that can be heavily influenced by cultural factors. For example, some studies use tasks that require participants to categorize objects or perform spatial reasoning tasks, which reflect Western cultural assumptions about the importance of object categories and geometric reasoning⁵. Culturally established habits and norms can influence how the symbols and shapes that are used as stimuli are understood by study participants. Researchers typically assume that the paper on which a task is presented is represented as a means to convey information, with no interest in and of itself. This use of paper is apparent to Western individuals, but individuals from other cultures might view the paper as relevant. Although a wide range of studies examining language processing, mental imagery, memory and other cognitive system sometimes use a cross-cultural comparative approach, doing so can permit researchers to view culture as outside the individual and separable from human activity, rather than an integral part of cognition⁶. To move forwards, cognitive research must reorient to be grounded in a theoretical context that incorporates culture into any cognitive model under investigation.

One approach to integrating the study of culture with cognition recognizes that individuals activate cultural knowledge – purposefully or otherwise – according to the specific surroundings and contexts in which they find themselves or with which they seek to engage.

Cultural knowledge or schemas can therefore frame, transform and regulate all aspects of psychological functioning when they are activated and relevant to the situation⁷. From this perspective, culture is a superordinate schematic framework that organizes or activates other cognitive processes⁸. Thus, human cognition is best understood if cultural and contextual elements inform theorizing and methodology. By considering culture and context as constructs that inform cognitive processes and mechanisms, researchers might be better able to identify shared principles.

Another approach to studying cognition in context is to focus on individual performance under varying environmental conditions (known as cognitive performance plasticity⁹). This approach allows an understanding of the dynamic and adaptive nature of cognitive processes at individual and population levels. For example, researchers could test the same individual in several environments by manipulating the features of their physical, ecological or social context. However, this approach can limit conclusions by relying on associated patterns in behaviour rather than demonstrating causal relationships. That is, although performance might vary across contexts, that variability does not necessarily indicate that specific contexts give rise to specific behaviours. Controlled experiments that examine how different contexts interact could complement research into individual variation; however, such experiments are ambitious and challenging to implement. This approach could allow researchers to identify the flexibility of specific cognitive constructs, thereby influencing the ways in which they define universal principles.

A final approach requires cognitive psychologists to move beyond the controlled laboratory setting and develop methods that align directly with the lived experiences of a specific culture or group¹⁰. This approach centres the belief that individuals are not simply subjects to be studied but should direct the framing of research and the methods and the modes of analysis used. Data collected using this approach, although not intended to define universal principles, could be used by researchers who are interested in extracting universal principles. For example, researchers from different cultural backgrounds might be interested in similar underlying constructs, although how those constructs are understood and studied might differ. By broadening the approach to understanding human cognition to incorporate methods that consider culture and context, the study of human cognition could capture important and understudied features.

Conclusion

The aims to discover cognitive universals and to understand cognition in context are both complex and at first glance seem to be in opposition. A universal principle of cognition might be best understood through scientific inquiry of a construct at an abstract level. However, abstract formulation can inadvertently constrain what it means to study human cognition by effectively eliminating the quality of psychological research that is of fundamental concern – understanding human behaviour. As an alternative to seeking to establish universal principles of cognition, research might focus on how cultural practices or shared traditions shape cognitive functioning, with no goals to understand or identify universal principles. Both approaches are consequential in understanding human cognition, and in combination these two seemingly conflicting schools of thought can redefine the study of human cognition.

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Competing interests

The author declares no competing interests.