Researching Learning in Animal Models Remains Confined to Pre-Verbal Cognition

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June 07, 2017

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Early Behavioural Research and Scientific Context

Although John Locke, bootstrapping non-innatist learning theories during the Enlightenment, clearly distinguished reaction to external sensation and internally perceived ideas, early behavioural research treated living beings as stimulus-response association systems. Discovering the overgeneralization of neurological associations and thereby defining classical conditioning, it still is debated whether Pavlov really used a bell in his laboratory (cf. Jarius & Wildemann, 2015). Extending Pavlov's ideas and lacking the tools to model the complex structure of the brain, B. F. Skinner introduced operant conditioning as a process of reinforcement of desirable and punishment of undesirable behavioural trajectories. This approach conceptually matches the emergence of Wiener's (1948) first order cybernetics control theory. Today, approaches such as neuro-constructivism emerged based on better understanding of the complex brain and its developmental trajectories in relationship to the environment (Karmiloff-Smith, 2009).

The Mouse Model

Animal-research in a lab setting comes with the advantage of comparably high scientific standards, reproducibility, and scrutiny compared to psychological field work. The mouse model is established in health sciences, merging disciplines, for example, researching links between gut microbiome and psychological phenomena (UCLA, 2017). Many neuronal and neurobiological findings can be transferred from a mouse model to human hosts. Van der Staay (2006) deems the animal model suitable to research brain-behaviour relations. Apart from reproducible, controlled conditions and standardized rearing, testable measures need to be found for complex phenotypes. In psychology,

many traits are "normally distributed in the population, and the distinction between normal and 'abnormal' or clinically conspicuous is a question of convention" (ibid., p. 134). Definitions of the DSM, for example, do not translate well into pathogenetic mechanisms. Characteristic endophenotypes may more closely resemble the biological makeup, but are not specific to the disorder or behaviour. The closer tied to biology mechanisms are, the better the generalizability from mouse model to humans. Apart from the fallacy of anthropomorphism, there may even be a sex bias in mouse studies (Wald & Wu, 2010, p. 1571). Animal research necessarily omits the influence of higher, cognitive functions on behaviour.

Breaking Free from the Linear Paradigm

Piaget set the stage for the constructive learning approach, an adaptation that consists of a sequence of accommodation and assimilation. Vygotsky (1938/1987) supersedes Shapiro & Gerke's mechanical social imitation theory, and bases human learning on speech development as the history-driven "internalization of culturally produced sign systems", as mastery of abstract tool use turned inward (p. 7). Opposing Chomsky's idea of innate language capability, Piaget and Vygotsky's theories agree that prior constructs must be mastered for higher-order constructs to emerge. The Stanford Prison Experiment (n.d.) suggests that there must be more to learning than primitive operant conditioning. Researchers were stunned by the speed and intensity with which guards and prisoners identified with assigned high-order roles up to depressive symptoms in prisoners. These roles point to complex, culturally acquired ego states (Emmerson, 1999). Following Frankl (1946/2006), the lack of will to meaning, as a function of cognition, may contribute to much of the observed difference in behaviour. Promotional behaviour (seeking) also complements preventive behaviour (fear) in E. Tory Higgins'

(1987, 1997) theories of self-discrepancy and regulatory focus that combine cognitive and emotional aspects.

Conclusion

Emotions, idiopathic or social, undoubtedly modulate human behaviour on multiple levels. There is growing evidence that emotional processing shares the same neural circuitry with other, higher cognitive functions (LeDoux & Brown, 2017). Some learning may be shared with other mammals, but some aspects must be unique to human cognitive evolution, to climb Chomsky's (1956) language hierarchy or develop Maruyama's (1980) mindscapes. Chomsky's review may have devastated the reputation of Skinner's Verbal Behaviour. After more than 50 years the theory is still around, because it managed to produce practical applications (Schlinger, 2008).

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