

1 Title: Commentary: *What more can we learn from early learning theory? The contemporary*
2 *relevance for behaviour change interventions*

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4 Marie Johnston's 'What more can we learn from early learning theory? The contemporary relevance
5 for behaviour change interventions' (Johnston, 2016) is a good summary of key learning theory
6 constructs, with specific examples of their application in health behaviour change research. Early
7 learning theory is introduced as a synonym of classical and operant conditioning theories and
8 research, although the examples provided throughout the paper are mainly related with operant
9 conditioning. The aims of behavioural science are described in the terms of the father of operant
10 conditioning, B. F. Skinner, as being the prediction and control of behaviour. Johnston goes on to say
11 that learning theory-based, health-related interventions acquired prominence in the 1960s and
12 1970s and "focused on behaviour while still allowing that cognitive processes might have a causal
13 role" (Johnston, 2016, p. 1), citing A. Bandura (Bandura, 1969). She also states that the main
14 intervention developments at that time were in cognitive theory and methods, although no
15 references are provided for this claim, and that "subsequent explanations [in learning theory]
16 frequently refer to cognitive processes that might explain stimulus control" (Johnston, 2016, p. 2).
17 Thus, Johnston suggests that early learning theory was confined to classical and operant
18 conditioning but later, and presumably current, learning theory included cognitive processes. Such
19 description of how the scope of learning theory evolved may well be accurate, but it then seems that
20 everything in psychology is synonym of learning theory.

21 This question may not be central to Johnston's paper but it is raised by it, and is of relevance to
22 those who seek to understand the differences (or similarities) between the various theoretical
23 approaches within psychology. In general, the behavioural principles she describes are clear and
24 logically connected within a coherent body of research, which historically is associated with
25 behaviourism. I am less sure the same could be said had her paper focused on principles of 'later'

26 learning theory. While it is relatively easy to understand concepts such as intermittent
27 reinforcement, there seems to be less clarity in Sheeran et al.'s findings on "stimulus control
28 processes involving association with implicit cognitive or affective processes without the need for
29 conscious or implicit motivation" (as cited in Johnston, 2016, pp. 2-3). Similarly, there is an obvious
30 and direct link between the Premack principle and the selection of reinforcement strategies based
31 on people's reported favourite hobbies, but it is less obvious how cognitive terms have shaped the
32 development of behavioural interventions (e.g., Ginja *et al.*, 2017).

33 It is interesting to note that behaviourist B. F. Skinner, who is the most cited author in Johnston's
34 paper and who brought to light many of the behavioural processes she describes, had always
35 strongly opposed cognitive explanations. One point of disagreement seems particularly challenging
36 to a reconciliation between behaviourists and cognitivists: for B. F. Skinner, and generally for
37 behaviour analysts, causes of behaviour are to be found outside individuals, namely in their
38 interactions with the environment (social and non-social), which include contingencies of
39 reinforcement that result in learning (behaviour change) during an individual's lifetime (e.g. speaking
40 a language) and contingencies of survival which are responsible for our genetic predispositions (e.g.
41 tendency to make vocal sounds). With cognitive models, which may or not take into account the
42 effects of environment, processes such as thoughts, beliefs and attitudes are said to play a causal
43 role in behaviour. As Johnston says, the predictability of behaviour can be explained by the
44 persistence of "causal factors such as thoughts or rewards" (Johnston, 2016, p. 2). On this point, B. F.
45 Skinner's position is unambiguous: "[cognitive terms] are troublesome not because they raise
46 questions about dimensions but because they assign the initiation of behaviour to the person rather
47 than to that person's genetic and personal history" (Catania, 1988, p. 204). Because cognitive
48 processes (which are different from physiological processes) cannot be directly measured or
49 manipulated, he justifies the non-causality of cognitive events on the grounds of pragmatism: "Our
50 only chance of solving our problems is to look at the variables of which our behaviour is a function
51 rather than at the mental events which serve as current surrogates of those variables" (Catania,

52 1988, p. 273). For behaviour analysts, the question is not whether strategies which are typically
53 treated as being cognitive, or which were developed by cognitive researchers, work or not, but
54 whether cognitive processes need to be hypothesised to account for their success. For example, the
55 potential of motivational interviewing or of the therapeutic relationship to engender behaviour
56 change is widely accepted but it may be possible to explain how they work in terms of contingencies
57 of reinforcement (Follette *et al.*, 1996; Christopher and Dougher, 2009).

58 In sum, Johnston suggests that learning theory posits the existence and causality of cognitive
59 processes in behaviour, but the behaviouristic discoveries justly highlighted in her paper were
60 derived from a philosophy of science standing at sharp contrast with cognitivism. This raises the
61 question of how we should consider the fundamental differences characteristic of each of the two
62 movements which Johnston presents together, and what, if any, are the implications of such
63 considerations to explaining and studying behaviour.

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