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Review Paper

Dual-process models of health-related behaviour and cognition: a review of theory

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ABSTRACT

Objective: The aim of this review was to synthesise a spectrum of theories incorporating dual-process models of health-related behaviour.

Study design: Review of theory, adapted loosely from Cochrane-style systematic review methodology.

Methods: Inclusion criteria were specified to identify all relevant dual-process models that explain decision-making in the context of decisions made about human health. Data analysis took the form of iterative template analysis (adapted from the conceptual synthesis framework used in other reviews of theory), and in this way theories were synthesised on the basis of shared theoretical constructs and causal pathways. Analysis and synthesis proceeded in turn, instead of moving uni-directionally from analysis of individual theories to synthesis of multiple theories. Namely, the reviewer considered and reconsidered individual theories and theoretical components in generating the narrative synthesis' main findings.

Results: Drawing on systematic review methodology, 11 electronic databases were searched for relevant dual-process theories. After de-duplication, 12,198 records remained. Screening of title and abstract led to the exclusion of 12,036 records, after which 162 full-text records were assessed. Of those, 21 records were included in the review. Moving back and forth between analysis of individual theories and the synthesis of theories grouped on the basis of theme or focus yielded additional insights into the orientation of a theory to an individual. Theories could be grouped in part on their treatment of an individual as an irrational actor, as social actor, as actor in a physical environment or as a self-regulated actor.

Conclusions: Synthesising identified theories into a general dual-process model of health-related behaviour indicated that such behaviour is the result of both propositional and unconscious reasoning driven by an individual's response to internal cues (such as heuristics, attitude and affect), physical cues (social and physical environmental stimuli) as well as regulating factors (such as habit) that mediate between them.

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Introduction

Choice architecture (CA) interventions are complex interventions that incorporate dual-process models of behaviour. Yet it is difficult to make causal claims about the effectiveness of the CA approach without making explicit the theory of change behind the intervention strategy. No existing review—systematic or otherwise—has synthesised the CA theory of change. Therefore, the author undertook a review of theory to examine the conceptual literature undergirding the CA approach to health by examining dual-process models of health-related behaviour and cognition. This review builds on the approaches used by Campbell et al.'s review of theories about the causal relationship between income and health (2014), Bonell et al.'s review of theories on school environment and health (2013) and Baxter & Allmark's review of chest pain and medical assistance (2013).^{1–3} Their objectives were to elicit and organise as complete a set of relevant theories as possible; synthesise theories that share areas of conceptual agreement; and reveal areas of competing explanations.

Dual-process models refer to two conceptual frameworks used in imagining how individual decision-making and behaviour operate. The first model (sometimes called system 1) is derived from unconscious, instinctive and involuntary reasoning grown out of learnt associations and leading to instinctive cognitive and behavioural responses.⁴ Such a model is also characterised in part by its relation to specific cues in the environment, which may produce a behavioural urge to act based in part on stimuli's emotional effect on a subject. The second model of cognition and behaviour (sometimes called system 2) is thought to result from conscious reasoning in pursuit of personal interest and (generally) responds to incentives in the interest of maximising personal happiness or utility.⁴

This review focuses on theories of behaviour and behaviour change that explicitly incorporate both models of behaviour (systems 1 and 2). The aim of this review is to scope and synthesise a spectrum of theories incorporating dual-process models of health-related behaviour. It seeks to delineate the theoretical constructs, such as 'self-regulation' or 'social preferences', that make up those theories for the purposes of synthesising causal mechanisms into relevant groups of theories.

Methods

This article's aims flow from consideration of what end-users—especially researchers and policymakers interested in CA intervention design—will find helpful.⁵ Such a broad question reflects the reviewer's desire to scope out the universe of theories relevant to the research aims.

Inclusion and exclusion

As with Cochrane-style reviews, inclusion criteria were developed *a priori* to specify a prescribed set of relevant theories. Unlike Cochrane-style review inclusion criteria,

however, reviews of theory lack specified publication standards or methodological guidance with regard to inclusion criteria. In this review, an included 'theory' or model must offer an explanatory account or hypothesis articulating a causal pathway linking together two or more phenomena of interest.¹ The review concerned itself with both conscious or volitional models of behaviour in addition to unconscious or automatic models of behaviour, and thus documents that neglected to specify an investigation into both reasoning models were excluded. Moreover, dual-process models that did not investigate behaviours related to health were excluded.

Methods were determined *a priori*, articulated in a protocol and followed the guidance of Bonell et al.² in their theory systematic review and synthesis of literature on positive youth development and how it might reduce substance use and violence. Studies were included in the overall review if they: were published since 1940; were in English; reported a theory of change that incorporated a dual-process model of cognition, process evaluation or experimental evaluation; and were relevant to one or more health-related behaviours.

Search methods for identification of studies

On 22 February 2016, the following databases were searched: MEDLINE with MEDLINE In-Process & Other Non-Indexed Citations (from 1946 to 29 February 2016), PsycINFO (from 1987 to March week 1 2016), and Embase (from 1974 to 29 February 2016), all on OvidSP; CINAHL on EBSCO: ISI Web of Science; and ERIC, Sociological Abstracts, ASSIA, and Thesis and Theses Global, all on ProQuest. The simplified search string for MEDLINE, Embase, and PsycINFO was as follows:

1. Dual process OR dual-process
2. Non-conscious OR automat* OR unconscious
3. Conscious OR reflex* OR voluntary
4. Model* OR theor*
5. Exp Behavior/or exp Mental Processes/
6. Exp psychology/
7. Exp health/
8. OR (1 AND 4 AND 5 AND 6 AND 7)
9. OR (2 AND 4 AND 5 AND 6 AND 7)
10. OR (3 AND 4 AND 5 AND 6 AND 7)

All other search strings, with number of hits by string, can be found in [Appendix 1.2](#). Additional search strategies were also used to locate studies and to recursively generate additional search terms in the string listed above. The reviewer searched grey literature databases and organisational websites including those of the World Health Organisation, National Institute for Health and Clinical Excellence (UK) and Agency for Health Care Research and Quality (USA). Finally, the reviewer conducted snowball search techniques, including the search of reference lists and electronic citation tracking from published reports of eligible studies.⁶ Abstracts generated from database searches were exported to EndNote and de-duplicated. The reviewer screened titles, abstracts and eventually full-text records for eligibility against inclusion criteria to assess for exclusion.

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