Author’s response to reviews

Title: Changing Behaviour 'more or less' - Do theories of behaviour inform strategies for implementation and de-implementation? A Critical Interpretive Synthesis

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Changing Behaviour 'more or less' - Does theory inform strategies for implementation and de-implementation? A Critical Interpretive Synthesis

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Implementation Science

Editors comments:

Firstly, all the reviewers recognise this as a well conducted review, but the broader concerns question whether the scope and contribution is relevant to practice and to the broader literature more generally. My own experience of de-implementation processes (in the UK) is that these tend to operate at the organisation or system level through restriction of prescribing, test ordering or referral options, via individual funding requests and often through the application financial incentives. Reviewers 1 and 2 appear to share this system level experience. Reviewer 3 has concerns with de-implementation being framed as being synonymous with reducing frequency of a behaviour. Whilst we are not asking you to conduct a different review, we do feel that significant contextualisation, reflection on the terminology used and a clearer rationale for the approach taken are warranted.
We thank the reviewers and editor for recognizing that this was a well conducted review and appreciate the opportunity to address their concerns around the framing of de-implementation as a decreasing behaviour and the recognition of system level changes necessary to de-implement. We have addressed this concern by adding the following text to the introduction on Page 4:

Implementation and de-implementation interventions can be administered at any level within the healthcare system: the individual health professional; healthcare groups or teams; organisations providing health care; and the larger healthcare system (22). The end-point, however, is changing what health professionals do to improve the quality of care delivered to patients. This change can involve either doing some things more often (i.e. increasing the frequency with which a behaviour is performed; e.g. using intermittent auscultation for healthy women in labour) (23) or doing some things less often (i.e. decreasing the frequency with which a behaviour is performed; e.g. ordering X-rays for acute uncomplicated low back pain)(24). If system change does not influence the actions that individual clinicians perform as they deliver care, then the behaviour change techniques delivered at the system level will have been ineffective. The use of behavioural theories to understand how change occurs can help identify those mechanisms of change, including mechanisms that are triggered at the system, organisational or team levels. For the purpose of this review, a behavioural perspective at the health professional level was taken and examined implementation and de-implementation as a change in behaviour frequency of those individuals. Specifically, implementation was defined as an increase in the frequency of an appropriate (evidence-based) behaviour and de-implementation as a decrease in the frequency of inappropriate (non-evidence-based) behaviour.

Reviewer #1:

1. This paper addresses an important issue. It offers a first step towards the understanding of differences/similarities between approaches for implementation and de-implementation. The authors also searched for theories used in other fields for increasing and decreasing behavior. However, like the editorial office, I also have doubts about the search strategy and whether the focus of the search was not narrow. The authors stated in the response to the editorial office that they defined de-implementation from an individual behavior change perspective and not from a policy or system change. However, it may be necessary to use policy or system changes for changing the behavior of an individual, which certainly true for reducing undesired behavior.

Response:

We agree that an intervention may be delivered at a system level, but would emphasise that the purpose of a system level intervention is still about changing behaviour at the individual level (i.e. getting individuals to change the way they deliver care). Policy change is an intervention delivered at the system level, however the impact that system change may have is at the
individual healthcare professional. If system change does not influence the actions that individual clinicians perform as they deliver care, then the behaviour change techniques delivered at the system level will have been ineffective. The use of behavioural theories to understand how those change occur can help identify those mechanisms of change. Therefore, this review focussed on theories that may explain individual level behaviour change and whether they propose different mechanisms for increasing and decreasing behaviour frequency, including mechanisms that are triggered at the system, organisational or team levels.

We have added the following text in the introduction at page 4 (lines 94-106) to make this clearer.

Implementation and de-implementation interventions can be administered at any level within the healthcare system: the individual health professional; healthcare groups or teams; organisations providing health care; and the larger healthcare system (22). The end-point, however, is changing what health professionals do to improve the quality of care delivered to patients. This change can involve either doing some things more often (i.e. increasing the frequency with which a behaviour is performed; e.g. using intermittent auscultation for healthy women in labour) (23) or doing some things less often (i.e. decreasing the frequency with which a behaviour is performed; e.g. ordering X-rays for acute uncomplicated low back pain) (24). If system change does not influence the actions that individual clinicians perform as they deliver care, then the behaviour change techniques delivered at the system level will have been ineffective. The use of behavioural theories to understand how change occurs can help identify those mechanisms of change, including mechanisms that are triggered at the system, organisational or team levels. For the purpose of this review, a behavioural perspective at the health professional level was taken and examined implementation and de-implementation as a change in behaviour frequency of those individuals. Specifically, implementation was defined as an increase in the frequency of an appropriate (evidence-based) behaviour and de-implementation as a decrease in the frequency of inappropriate (non-evidence-based) behaviour.

Abstract:

1. Results: the authors write that 9 of the 15 theories do not distinguish between implementation and de-implementation and that only the Operant Learning Theory makes an explicit distinction between techniques for increasing and decreasing frequency. This raises the question what the other 5 theories do (15 = 9 + 1 + 5 (?)). In the manuscript it becomes clear that these theories only focus on decreasing or increasing behavior, but this information lacks in the abstract.

Response:
We thank the reviewer for pointing out this discrepancy in the number of theories reported and have added the following sentence in the Abstract:

9 of the 15 behavioural theories identified do not distinguish between implementation and de-implementation (5 theories were applied to only implementation or de-implementation, not both);

Introduction

2. P 3, row 17-20: "relatively little work has been reported to understand and address systematic methods for designing de-implementation interventions. This raises the question of whether approaches for implementation versus de-implementation are similar or distinct".

a. Please explain why 'this' (that there has been reported relatively little work for designing de-implementation interventions) raises the question of whether approaches for implementation and de-implementation are similar or distinct. Based on 'a lack of reports on designing de-implementation interventions' it is unclear why the reader should expect that the approaches should be different. Are there any other indications that these approaches for the design should be different?

Response:

We thank the review for noting the lack of clarity with this statement. We have revised the section to include the following sentences, and hope that we’ve improved the clarity.

Relatively little work has been reported to understand and address systematic methods for designing de-implementation interventions. Researchers have noted de-implementation will likely involve different approaches than those used to facilitate people doing more of some things, but there is little evidence to support this notion (14, 15). This raises the question of whether approaches for implementation versus de-implementation are similar or distinct and an investigation into whether implementation and de-implementation approaches should differ is imperative.

b. I think the authors are focusing on interventions needed to do less or more, and whether you need different interventions because of different factors influencing implementation and de-implementation. However, because they 'talk' about methods for designing, it is unclear for the reader whether they also mean that the process of designing interventions might be different between implementation and de-implementation. For example, is it for both implementation and de-implementation important to tailor intervention to barriers and facilitators for (de)implementation using for example the intervention mapping approach, or
the use of the theoretical domains framework of the authors themselves. Please clarify this issue.

Response:

The reviewer is correct in that we are investigation whether you need different interventions because of different factors influencing implementation and de-implementation. We are not suggesting that methods for designing interventions should be different. We do see in the introduction where it may be confusing. Therefore, in the introduction where appropriate we have changed ‘methods’ to ‘interventions’ (first sentence of introduction).

Developing theory and evidence about interventions to support de-implementation is an important priority in implementation research.

3. P 3, row 48 and further: "Implementation and de-implementation interventions can be administered at any level within the healthcare system: the individual health professional; healthcare groups or teams; organisations providing health care; and the larger healthcare system [20]. The current review focused on changing what individual healthcare professionals do to improve the quality of care delivered to patients. This change can involve either doing some things more often (i.e. increasing the frequency with which a behaviour is performed; e.g. using intermittent auscultation for healthy women in labour) [21] or doing some things less often (i.e. decreasing the frequency with which a behaviour is performed; e.g. ordering X-rays for acute uncomplicated low back pain)[22]."

To authors explain above that their review focuses on changing what individual professionals do to improve quality of care delivered to patients. And indeed these interventions to change their behavior can be administered at any level within the health care system. For example, sometimes it is needed to restrict to provision of certain care by individual professionals by changing the reimbursement of low value care, but it can also be that you have to educate individual professionals about the ineffectiveness of certain care. However, it seems that the authors only focus this review on interventions that are geared at individual professionals. I think this is a missed opportunity.

Response:

We thank the reviewer for raising the concern. We would suggest that there is a difference between the level at which an intervention is delivered, versus the level(s) at which it has an effect. Because we are looking for theories that may explain the mechanisms for change that caused an effect and that change is at the individual level, we have focussed on the theories that have been used to change individual behaviour, irrespective of the level of delivery (policy
change, incentives delivered by organizations, individual praise). We believe we have addressed this concern in introduction by adding the following text:

Implementation and de-implementation interventions can be administered at any level within the healthcare system: the individual health professional; healthcare groups or teams; organisations providing health care; and the larger healthcare system (22). The end-point, however, is changing what health professionals do to improve the quality of care delivered to patients. This change can involve either doing some things more often (i.e. increasing the frequency with which a behaviour is performed; e.g. using intermittent auscultation for healthy women in labour) (23) or doing some things less often (i.e. decreasing the frequency with which a behaviour is performed; e.g. ordering X-rays for acute uncomplicated low back pain)(24). If system change does not influence the actions that individual clinicians perform as they deliver care, then the behaviour change techniques delivered at the system level will have been ineffective. The use of behavioural theories to understand how change occurs can help identify those mechanisms of change, including mechanisms that are triggered at the system, organisational or team levels. For the purpose of this review, a behavioural perspective at the health professional level was taken and examined implementation and de-implementation as a change in behaviour frequency of those individuals. Specifically, implementation was defined as an increase in the frequency of an appropriate (evidence-based) behaviour and de-implementation as a decrease in the frequency of inappropriate (non-evidence-based) behaviour.

Methods

4. P 7, row 22-24: "Theory provides an organised description of a system that accounts for what is known and explains and predicts phenomena" (p.2).

Please explain more extensively when an article included a theory according to your inclusion scheme because the reader has to understand why so many articles were excluded based on this criterion. What do you mean by a system?

Response:

Thank you for pointing this out. By ‘system’ we mean a set of constructs with moderating or modifying factors and their connections to explain the phenomena of behaviour.

The first selection criterion was the use of theory to change behaviour. The majority of papers that used theory did not use theory to change behaviour but to predict it so whilst they fit the criterion for theory they did not fit the criterion for changing behaviour. For that reason, they were excluded. We were concerned with the small number of included paper from the stage 1 search. For that reason, as we identified in the methods section, we added the scoping review as a
way to validate the identification of theories. We have added the following section to the Strengths and limitations section of the discussion to address the search strategy.

The focus of the search strategy was to identify those papers that explicitly reported both behaviour change and the use of theory to explain the behaviour change. Because of this specific focus many papers were excluded. Other researchers using the CIS approach may decide to be more inclusive in their selection criteria, including studies like those in scoping reviews that were excluded from this review (28). Additional theories may have been identified in the excluded papers. For example, papers were excluded from this study if intention to change was evaluated, rather than actual behaviour. In addition, despite claiming that theory was applied to their study design, few authors reported the explicit use of theory. For example, when describing strategies for changing behaviour frequency, several authors did not clearly specify their theoretical rationale (e.g. (93-95)). There was often no direct link between the theory proposed by the authors and the techniques reported for changing behaviour (e.g. (96-98)). Despite the absence of these articles in the review, 96 articles form the scoping review used theories already identified through the Stage 1 search, suggesting the stage 1 search was comprehensive enough to identify similar theories used to change frequency of behaviour. In addition, the theories presented in this review suggest different processes (OLT) and techniques (behaviour substitution) may be required to support implementation and de-implementation.

5. P 8, row 35-39: "Of particular interest were theories that were reportedly applied to both increase and decrease frequency of behaviour. Theories applied for one direction of change would not add further insight into potential differences already identified in Stage 2 and were excluded."

It is not clear why theories that applied for one direction of change from the review of Davies would not add further insight into potential differences. Where the theories identified in the previous review of Davies identical to the theories identified to those in stage 2? Theories that apply for one direction can give insight by comparing the underlying assumption of theories aimed at increasing behavior and theories aimed at decreasing certain behavior. The choice to exclude these theories seems not consistent with stage 2 in which the authors decided to include theories that apply for one direction. Please explain this or add the theories from the review of Davies that only apply for one direction.

Response:

This is a valid point. In this stage of the methods we were using the scoping review to validation the identification of our theories through our search strategy and make sure that we didn’t miss any theories because of this narrowed search. 96 articles in the scoping review used theories already identified by the Stage 1 search (predictive studies and studies applying theory to behaviour change). We were looking for theories that were applied to change behaviour in both
directions that would inform whether similar or different strategies were used, including theories that were only used in one direction would not add to the investigation.

We have added the following section to the Strengths and Limitations section of the discussion to address the search strategy.

The focus of the search strategy was to identify those papers that explicitly reported both behaviour change and the use of theory to explain the behaviour change. Because of this specific focus many papers were excluded. Other researchers using the CIS approach may decide to be more inclusive in their selection criteria, including studies like those in scoping reviews that were excluded from this review (28). Additional theories may have been identified in the excluded papers. For example, papers were excluded from this study if intention to change was evaluated, rather than actual behaviour. In addition, despite claiming that theory was applied to their study design, few authors reported the explicit use of theory. For example, when describing strategies for changing behaviour frequency, several authors did not clearly specify their theoretical rationale (e.g. (93-95)). There was often no direct link between the theory proposed by the authors and the techniques reported for changing behaviour (e.g. (96-98)). Despite the absence of these articles in the review, 96 articles form the scoping review used theories already identified through the Stage 1 search, suggesting the stage 1 search was comprehensive enough to identify similar theories used to change frequency of behaviour. In addition, the theories presented in this review suggest different processes (OLT) and techniques (behaviour substitution) may be required to support implementation and de-implementation.

Results

6. P 9, row 17-18 "The electronic search returned 1876 articles after removal of duplicates (figure 1) with 7 articles…"

It would be more clear to the reader to add "(n=1883)" at the end of the sentence because 1876 is not included in the figure 1/

Response:

We have added the required text

7. P11, row 41-50 "In contrast, some authors used reinforcement strategies to decrease undesired behaviours by reinforcing a substitute behaviour that was incompatible with the problematic behaviour. For example, Epstein and colleagues [47] recommended parents give praise (positive reinforcements) to children whenever they ate fruit and vegetables or
exercised, regardless of whether the target behaviour was to 'increase fruit and vegetable intake' (implementing behaviour) or to 'decrease fat intake' (de-implementing behaviour)"

To my opinion these sentences do not belong to the subheading "Theories that propose different approaches for increasing and decreasing behaviour" since Epstein and colleagues use the same strategy regardless of the aim (implementation or de-implementation). Apparently the OLT cannot be grouped solely to theories that propose different approaches but also to B?

Response:

Our intention was to report that there were papers that don’t use the punishment component of OLT despite it being a strategy for decreasing behaviour. The theory itself does propose different strategies. However, the authors of papers included in this search may use the strategies differently. It still does not negate what the original theory proposed.

To clear up any confusion we have revised the paragraph (page 11, line 283-285) as follows:

Despite OLT proposing different strategies for implementation and de-implementation, the theory also proposes reinforcing an alternative behaviour may be used to decrease the frequency of an unwanted behaviour. Consistent with this, some authors used reinforcement strategies to decrease undesired behaviours by reinforcing a substitute behaviour that was incompatible with the problematic behaviour.

Reviewer #3:

This paper delivers on its stated aims and scores highly on rigour, fidelity and proportionality of claims. In this regard, I can't fault it. I see that it has been through a previous round of review comments and therefore am assuming that the scope and contribution are deemed appropriate for the journal.

Response:

We thank the reviewer for recognising this review for its rigour, fidelity and claims.

I do have a few additional points that I can’t resist making about the paper and the boundaries set around the task reported in it.

The first relates to the decision to confine the trawl of theory to behavioural psychology. I appreciate that not all disciplines can be covered but I wondered whether a more fruitful search might have taken in, for example, organisational science or selected other disciplines with something to say about the drivers of behaviour in (health care) organisations. It felt strange to
be deep into the paper and reading about the limits of Skinner and operant learning. Perhaps a small revision might be to strengthen the sections where this choice is explained/considered.

Response:

As reported in our methods we did not limit our search to solely the psychology discipline and included health and medical sciences, education, business and marketing, law and neurobiology (page 5, line 135-137). Inclusion of the other disciplines was to determine if theories from other disciplines were used to increase or decrease the frequency of behaviour and how they proposed doing that.

Research fields that may apply behavioural theories for increasing and/or decreasing the frequency of behaviours, including psychology, health and medical sciences, education, business and marketing, law, and neurobiology were explored.

I would also have liked to have seen some consideration given, at least at a speculative level, to why any given theory might be more or less appropriate for understanding behaviour change in each direction. E.g. the concept of 'loss aversion' (Kahneman etc) might logically have greater salience in a context of decreasing rather than increasing activity.

I wondered why the decision was taken to build a normative component into the definitions of implementation and de-implementation (i.e. in each case the term is understood as linked to the strength of evidence for a change in practice). It seems to me that 'bad' changes might be interesting to study alongside 'good' changes.

Response:

This is an interesting point. We have in the discussion added the as an area of investigation that is lacking.

Despite including databases for a broad range of disciplines in our search, one area of psychology that is absent from this review is the field of cognitive psychology. Cognitive psychology research has reported that decisions to act followed by a negative outcome produce more regret (action regret) than decisions to refrain from acting followed by a negative outcome (inaction regret) in the short term (99). However, inactions give rise to more intense regret over time (99-101). This suggests that there are temporal asymmetries in the emotional consequences of negative outcomes that were associated with the direction of behaviour change. Directly after an outcome, actions are noticeable and more likely to be internally acknowledged than are inactions (102). However, these perceptions of responsibility may change. When people think back upon actions which resulted in bad outcomes, they may think ‘At least I tried; it was all I could do,’ and possibly reduce the sense of responsibility from the negative outcome (99, 101). This may be particularly important for changing the behaviour of healthcare professionals. The
potential negative outcomes from de-implementation interventions (inaction; e.g. not to prescribe unnecessary drugs) may be associated with greater regret than the potential negative outcomes from implementation (action; e.g. to order Bone Mineral Density scans for patients over 50 year of age with a fracture). Negative outcomes in healthcare can be life threatening to the patient. The perception that healthcare professionals ‘did nothing’ (inaction) may be associated with greater regret if the consequences are negative than if it is perceived that health professionals did ‘everything they could’ (action). Further work with the application of cognitive psychology to implementation and de-implementation interventions is required.

These comments apart, this is clearly a robust and accomplished paper within its own terms and I accept that reviewers shouldn't expect papers to reflect their own interests and preoccupations!

Thank you for recognizing the value of this research.