Author's response to reviews

Title: Creatures of habit: accounting for the role of habit in implementation research on clinical behaviour change

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Author's response to reviews: see over
Reviewers’ reports on “Old habits die hard: accounting for the role of habits in implementation research on clinical behaviour change”

Our responses are highlighted in green below. In yellow are partially revised text portions (please see revised manuscript for details on what has been added/removed/modified, as the manuscript shows all changes “tracked”).

Please note also that we propose a slightly revised title of the paper, “Creatures of habit: accounting for the role of habit in implementation research on clinical behaviour change”. The reason for this was that we wanted the title to mirror both “sides of the coin”, breaking unwanted habits and forming desired habits. We felt the previous title did not fully account for this.

Reviewer #1’s report

Title: Old habits die hard: accounting for the role of habits in implementation research on clinical behaviour change

Version: 1  Date: 12 April 2012

Reviewer: Falko F Sniehotta

Reviewer’s report:

The role of habit in behaviour change is a timely and important issue for behavioural research in implementation science and beyond. I fully agree with the main message of this manuscript, incorporating the concept of habits in theory based behaviour change research is likely to provide a better understanding of why health care professionals do not act in accordance with current guidelines and recommendations and thereby allow for the development of potentially more effective interventions to facilitate desirable changes.

My only slight disappointment about this manuscript is the descriptive nature and the lack of any new insight. The authors conclude that ‘there seems to be an emerging recognition that habits might be a critical factor in explaining the difficulties of modifying clinical behaviour.’ Unfortunately, the present paper does not deliver much more in its present form but a summary of relevant approaches underlining this recognition. I would encourage the authors to be a little more ambitious and outline in some more detail an agenda for implementation science delivering on their concluding statement: ‘There is a need to explore intervention strategies that account for the habitual nature of clinical practice by exploring various means of situational or contextual disturbances to break existing habits.’

We are grateful for the comments and encouraging words. Needless to say, we’re very pleased to see that the referee agrees with the overall message of the paper, i.e. the importance of accounting for habits in research on clinical behaviour change. We agree that the paper does not contribute new insights, but the aim is primarily to introduce the concept of habits in clinical behaviour research (where there is “an emerging recognition” of the importance of this concept) and to describe how habits have been addressed in this field. Hence, the aim was not really to provide new knowledge or insights concerning habits. Still, we agree with the referee that we could attempt a more ambitious approach and we have revised the manuscript to provide more depth and details (please see responses below). Hopefully, the revised version is more in line with the referee’s requests.
Minor Essential Revisions

1. The Behaviourist conceptualisation of habit would deserve a more comprehensive, complete and accurate review supported by appropriate references. At the moment, the shallow summary of this approach does not help appreciating what is already known about habits.

>>>We agree and have developed this some more. The text now reads:

Habits have been studied extensively in the behaviourist tradition. Behaviourists consider habit as repeated behaviour that is established through learning. The behaviourist view posits a direct relationship between situation (stimulus) and behaviour (response). Explicit rewards are required after a response to a situational cue. The probability that a situation will elicit a behaviour depends on the frequency of performing the behaviour in the situation [25-28].

However, the conceptualization of habit strength as frequency of past behaviour is increasingly being disputed. Some behaviours turn quickly into habits, whereas others may require painstaking practice and frequent repetition. And although habitual behaviour may be frequently performed, frequent behaviour is not necessarily habitual [23,29,30]. Thus, behavioural recurrence does not constitute direct evidence for habitual behaviour. There is also recognition that rewards are not necessary for habit formation when a behaviour is intrinsically rewarding. In fact, providing external rewards can reduce intrinsic motivation to continue to perform a behaviour, thus hindering the habit formation process [31].

2. I feel that some statements such as ‘The development of habits in working life can also be understood in terms of the novice–expert theory of Dreyfus and Dreyfus.’ or ‘The process of forming habits when carrying out a work task can be explained further with reference to cognitive action theory.’ may benefit from clarification. Surely, the authors intend to point out that other theoretical approaches used to describe/account for professional behaviours refer to processes which show similarities with the construct of habit. I do not think that it would be desirable to suggest that any of these approaches would provide an explanation for how habits are formed.

>>>We agree and have removed the text on the expert-novice and cognitive action theories. These theoretical approaches do not really provide insights into how habits are formed, yet they sort of underscore the importance of understanding this concept as it has been addressed in other fields of research without necessarily referring to habits. Admittedly, the parallels are more anecdotal than crucial to the paper, and we have removed them in the revised version of the paper. Please see the revised manuscript with tracking changes!

3. The authors argue that ‘Inherent in many social cognitive theories is the assumption that intention and hence behaviour can be influenced by the provision of appropriate information concerning a behaviour.’ It does not seem to be the main take home message of 35 years of research on these theories that provision of information would be the main intervention strategy. This might be one of the examples where the authors could go beyond description and provide a somewhat more elaborated analyses what indeed the main social cognitive
approaches to behaviour change are and how they would differ from a habit theory perspective. For example, Lally, P., Chipperfield, A., & Wardle, J. (2008). Healthy habits: Efficacy of simple advice on weight control based on a habit-formation model. International Journal of Obesity, 32, 700–707 suggests strategies to support habit formation in interventions. This level of elaboration would be helpful to stimulate empirical research on habits, not just debate.

>>>True and we have revised the paper to avoid over-simplifications. What we wanted to emphasize is that interventions often presume a cognitive route to behaviour change, via attempts to influence understanding, knowledge and attitudes. We have added a paragraph (see below) that addresses interventions based on habit theory to provide some information on how these might different from more traditional interventions based on social cognitive theory.

Different types of interventions are needed to disrupt unwanted habits and/or to promote desired habits than are used to modify behaviour through conscious cognitive deliberation, as depicted by social cognitive theories. Since habits are triggered automatically in response to contextual cues, breaking “bad” habits can be achieved by either removing persons from the environment which cues unwanted habitual responses or by modifying the context, e.g. placing reminders in the environment. Research also suggests that vigilant monitoring can offer a means of inhibiting habits because it enables the individual to identify cues and exert control in order to reduce unwanted habitual responses [46]. Forming “good” habits require behaviour to be carried out repeatedly in the presence of the same contextual cues. Recent research has shown that participants encouraged to perform a health-promoting behaviour regularly in familiar contexts achieved increases in habit-related automaticity, such that initial repetitions caused large increases in automaticity but automaticity gains were reduced with each new repetition [8, 47]. However, there is still a paucity of empirical research on habit formation techniques or interventions underpinned by habit theory.

4. Finally, the authors make a compelling point about the potential importance of habits in behaviour implementation science. However, there are a range of issues limiting empirical research. One is the lack of certainty how to break/develop habits in interventions (see point 3), the other is the difficulty of measuring habits. Much of the research referred to in this paper use Verplancken’s Self-reported habit index. This measures has its merits and has stimulated scientific activity in this field, but is has although considerable conceptual shortcomings which were recently discussed elsewhere (Sniehotta, F.F. & Presseau, J. (2012). The habitual use of the Self-report Habit Index. Annals of Behavioral Medicine, 43, 139-140.).

>>>Again, excellent observations! We agree that these two issues are important and have addressed them: concerning interventions please see above and concerning SRHI and measurement issues please see added text below.

Beyond research on clinical behaviour, the Self-Rated Habit Index (SRHI) is the most widely applied instrument to assess habit strength. It has been used with a variety of behaviours, including exercising, engaging in sports activity, watching television, eating unhealthy snacks, fruit consumption and transportation mode choice. The SRHI is a 12-item scale which assesses the automaticity of a behaviour together with its antecedent (frequency of repetition) and possible consequences (including assimilation of the behaviour into one’s self-identity) [59]. A recent systematic review of 22 healthy eating and physical activity studies based on the SRHI found a medium-to-strong habit-behaviour correlation and a habit-intention trade-off, such that the impact of intentions on behaviour lessened as
habit strength increased [24]. Concerns have been raised about validity aspects of the SRHI. For instance, the self-identity aspect does not appear to be a necessary feature of the habit concept and the inclusion of repetition indicators may inflate the habit-behaviour correlation [9, 28]. Further, the validity of self-reports of behaviours which are assumed to be automatic, i.e. operating outside of awareness, may be questioned, as suggested by Sniehotta and Presseau [9], who have argued that a self-report of one’s habitual behaviour more likely reflects an inference of the consequences of the habit and these consequences may not always be salient. Challenges involved in operationalizing and measuring habit are a reason why habit measurement has not advanced further.

Level of interest: An article of importance in its field
Quality of written English: Acceptable
Statistical review: No, the manuscript does not need to be seen by a statistician.
Declaration of competing interests:
I declare that I have no competing interests

Reviewer #2’s report
Title: Old habits die hard: accounting for the role of habits in implementation research on clinical behaviour change
Version: 1 Date: 5 April 2012
Reviewer: MARIE M JOHNSTON

Reviewer’s report:
This paper would appear to be relevant to the Debate aspect of IS and relates to the ongoing debate in other journals about the integration of the theoretical construct of ‘habit’ in research on behaviour change (see some references below). The paper starts by discussing the role of theory in implementation interventions, then discusses social cognitive theories and argues that habit has not been adequately explored in implementation research. While this is an interesting topic it is not clear what this paper adds to the debate. To be publishable, the following points would need to be addressed:

Major Compulsory Revisions:
1. Crucially, while making the argument that there is a lack of research on clinical behaviours that incorporates the concept of habit, the paper give only a perfunctory mention of the empirical studies which do exactly this and the authors appear to prefer to continue to argue that it is not being done. So in the second paragraph in the section on ‘Addressing habits in clinical behaviour change settings’ they argue that ‘It is likely that the non-adherence to many of these desired clinical behaviours is habitual for many health care professionals, although empirical research is lacking to establish the extent to which this is the case for various target behaviours’. Then, in the third paragraph in the section on ‘Addressing habits in clinical behaviour change settings’ the paper refers to empirical studies where habit has been investigated in implementation research, but the authors simply say: ‘The other approach (e.g. [59–62]) has involved investigating evidence of habit with reference to the behaviourist Operant Learning Theory [63]. In these studies, the respondents were asked whether a particular behaviour was automatic or not, e.g. managing patients without
antibiotics or referring patients with back pain for an X-ray.' The authors recognise that these are empirical studies using a definition that includes automaticity and not simple repeated behaviour but do not elaborate on these studies. Surely these papers are central to the argument of this paper.

>>>We agree with these comments and have added information on the existing clinical behaviour studies that address habits, e.g. discussing what results were found regarding the habit measures (rather than merely mentioning the studies), please see below (and the manuscript with changes tracked):

Two basic approaches have been used to account for habitual qualities in clinical practice. A few studies (e.g.[50–52]) have applied the Theory of Interpersonal Behaviour, which includes frequency of past behaviour as a potential predictor of intentions and behaviours. This conceptualization of habit thus does not account for the automaticity aspects of habit. The importance of habit (as frequency of past behaviour) as a predictor for intentions and behaviours has differed between these studies.

The other approach (e.g. [53–56]) has involved investigating evidence of habit with reference to the behaviourist Operant Learning Theory [63]. In these studies, the respondents were asked whether a particular behaviour was automatic or not, e.g. managing patients without antibiotics, referring patients with back pain for an X-ray or placing preventive fissure sealants in young dental patients (“when I see a patient, I automatically consider (behaviour X)”). These studies also enquired whether this behaviour was “usual practice”. Habit operationalized this way has been found to be an important predictor of the outcome measures although the results have been inconsistent. This automaticity approach appears to operationalize the habit construct with more theoretical purity than attempts to merely measure behavioural frequency, yet the complexity of the habit concept can hardly be captured with two questions.

There have also been attempts to expand on existing theories and construct new approaches to account for the presumed habitual quality of much clinical practice. Godin et al. [5] have proposed an augmented version of the Theory of Planned Behaviour that included habit as an additional construct. They argued (Godin et al. [5:9]) in their systematic review of studies based on social cognitive theories that habits ought to be addressed in future research because “many of the behaviours performed by health care professionals could be categorized as habitual”. However, they did not provide a definition of the concept of habit. Michie et al. [58] have developed the “behaviour change wheel” as a method for characterizing and designing behaviour change interventions. Resembling dual processing models, their expanded view of motivation encompasses both analytical and automatic processes, the latter involving emotions and impulses that arise from associative learning of habitual behaviour.

2. The introductory sections appear to reiterate arguments which have been made many times including in IS. I would suggest that virtually all of the Introduction and 4 paragraphs of the following section on Social Cognitive theories could be reduced to a short paragraph with reference to other papers which have already made these same points. The next paragraph starts with the intention-behaviour gap and that is really where the argument about habit begins.

>>>Agreed, although the paper was written with the ambition of providing a broad overview of this research. The introduction has been shortened considerably. We have also reduced the text on the social cognitive theories. Please see the revised manuscript with changes tracked (showing what have been omitted),
3. First sentence of the last paragraph before ‘Understanding habit’ states that ‘Inherent in many social cognitive theories is the assumption that intention and hence behaviour can be influenced by the provision of appropriate information concerning a behaviour.’ This statement is extremely vague and needs more justification. It is simply untrue of Bandura’s theory which is actually called ‘Social Cognitive Theory’ and which outlines 4 clear methods of changing behaviour none of which are based on the provision of information. But perhaps the authors had other theories in mind.

>>>True and in line with referee #1’s comments! We wanted to point to interventions presuming a cognitive route to behaviour change, via attempts to influence understanding, knowledge and attitudes. We did not attempt to present a more detailed account of what interventions work.

4. The next paragraph states that ‘The behaviourist view posits a direct relationship between situation (stimulus) and behaviour (response). The probability that a situation will elicit a behaviour depends on the frequency of performing the behaviour in the situation’. This is misleading as it omits the important role of contingency and reinforcement in the development of S-R connections and in the evidence of habit learning within the behavioural paradigm.

>>>We have revised this text portion somewhat, please see below:

Habits have been studied extensively in the behaviourist tradition. Behaviourists consider habit as repeated behaviour that is established through learning. The behaviourist view posits a direct relationship between situation (stimulus) and behaviour (response). Explicit rewards are required after a response to a situational cue. The probability that a situation will elicit a behaviour depends on the frequency of performing the behaviour in the situation [25-28].

5. The connections between habit and dual-process models, novice-expert theory and cognitive action theory are interesting but, without any supporting implementation research on them, not enough to justify the publication of the paper.

>>>We agree. Referee #1 also commented on the inclusion of some of these models/theories and we agree that they do not really provide insights into how habits are formed. We have removed the text on the novice-expert theory and cognitive action theory (please see revised manuscript with tracking changes), but have retained some text concerning the dual-process models since the “behaviour change wheel” described by Michie et al. (2011) has some similarities with those models.

6. The authors should include reference to the on-going debate about habit. The following three references may be helpful.
Agree wholeheartedly and we have revised the text to address debates concerning the habit concept and the operationalization of the habit construct. We were not aware of the 2012 articles when writing the paper so we are grateful for these! Below are some passages where this debate is addressed:

A new conceptualization of habit is emerging that differs from behaviourism by going beyond habit as merely repeated behaviour. More attention is paid to the automaticity aspect of habitual behaviour. There is general agreement that habits are automatic in the sense that they are enacted without purposeful thinking, largely without any sense of awareness, and can be performed quickly in parallel with other activities [23]. While habits form through repeated performance in unvarying settings, and many habits are performed frequently, several researchers consider that, once formed, the “active ingredient” of habit is automaticity. This viewpoint presents behaviour frequency as a precursor and possible consequence of automaticity, rather than a part of the construct habit itself [9, 27, 32].

Beyond research on clinical behaviour, the Self-Rated Habit Index (SRHI) is the most widely applied instrument to assess habit strength. It has been used with a variety of behaviours, including exercising, engaging in sports activity, watching television, eating unhealthy snacks, fruit consumption and transportation mode choice. The SRHI is a 12-item scale which assesses the automaticity of a behaviour together with its antecedent (frequency of repetition) and possible consequences (including assimilation of the behaviour into one’s self-identity) [59]. A recent systematic review of 22 healthy eating and physical activity studies based on the SRHI found a medium-to-strong habit-behaviour correlation and a habit-intention trade-off, such that the impact of intentions on behaviour lessened as habit strength increased [24]. Concerns have been raised about validity aspects of the SRHI. For instance, the self-identity aspect does not appear to be a necessary feature of the habit concept and the inclusion of repetition indicators may inflate the habit-behaviour correlation [9, 28]. Further, the validity of self-reports of behaviours which are assumed to be automatic, i.e. operating outside of awareness, may be questioned, as suggested by Sniehotta and Presseau [9], who have argued that a self-report of one’s habitual behaviour more likely reflects an inference of the consequences of the habit and these consequences may not always be salient. Challenges involved in operationalizing and measuring habit are a reason why habit measurement has not advanced further.

Level of interest: An article of limited interest
Quality of written English: Acceptable
Statistical review: No, the manuscript does not need to be seen by a statistician.
Declaration of competing interests:
I declare that I have no competing interests