The Systematic Development of a Brief Intervention to Increase Walking in the General Public Using an “Extended” Theory of Planned Behavior

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The Theory of Planned Behavior (TPB) has been extensively used in predictive studies, but there have been considerably fewer experimental tests of the theory. One reason for this is that the guidance on developing concrete intervention strategies from the abstract theory is vague, and there are few exemplars of how to do this. The aim of this article is to provide such an exemplar. The development of an intervention to increase walking in the general public is described, based on the TPB, extended to include postvolitional processes. Identification of target constructs, elicitation of key salient beliefs underpinning these constructs, selection of appropriate behavior change techniques, and technique refinement. Each step is based on available evidence and consistent with theory. Perceived behavioral control (PBC) was identified as the key determinant of walking intentions, with an “intention-behavior gap” noted. A brief intervention was developed, using techniques to increase PBC by rehearsal of previous successful performance of behavior, along with planning techniques to translate motivation into behavior. This systematic approach taken should provide a model for others. The intervention has demonstrated efficacy in producing large changes in objectively measured walking behavior, in 2 separate evaluations reported elsewhere.

Keywords: intervention study, health behavior, exercise psychology, public health

The Theory of Planned Behavior (TPB) is a social cognition model which extends the earlier Theory of Reasoned Action. The TPB suggests that the proximal determinants of volitional behavior are a persons’ intention to engage in that behavior, and their perceived behavioral control (PBC; ie, the extent to which a person feels that the behavior is easy to perform and/or under their control). In turn, the TPB states that intentions are determined by attitude toward the behavior, subjective norm (ie, the perceived views of important others), as well as PBC. Crucially, according to the TPB, each of attitude, subjective norm, and PBC are determined by salient beliefs regarding, respectively, anticipated outcomes, important others, and factors that inhibit or facilitate control over the behavior.

There are several reasons why the TPB might be a useful theory on which to base interventions to alter physical activity behavior. First, it can be used to predict and explain any behavior in terms of a limited set of constructs. Second, a lot is known about this theory as it is among the most commonly used models for predicting intentions to perform physical activity behaviors as well as the actual behaviors themselves. Indeed, meta-analytic reviews of the TPB have provided empirical support in terms of its capacity to predict physical activity behavior, as well as many other health-related behaviors. Third, there is meta-analytic support across 47 empirical tests of a central proposition of this theory: that changes in intention do lead to changes in subsequently behavior. Despite the extensive literature where the TPB has been used to predict physical activity and other health-related behaviors, there is a dearth of experimental studies. A systematic review of applications of the TPB in behavior change interventions identified 24 studies that have attempted to establish the extent to which the theory has been used to develop and evaluate interventions to change health-related behaviors. In the majority of these, the theory was mainly used to measure process and outcome variables and to predict intention and behavior. Only 7 studies used the TPB to develop a behavior change intervention, which was evaluated using an experimental design with any behavioral outcome. Only 1 investigated whether behavior change was mediated by the psychological changes proposed by the theory, and then TPB constructs were found to not be the most important mediators of effects found.

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One main reason why the TPB has been used in a very large number of predictive studies, but considerably fewer intervention studies, is that the procedure for conducting a predictive study is much better described. Replicable protocols for how to identify salient beliefs in a pilot study, operationalize constructs in terms of measures, and how to analyze the relationships between these measures are described in considerable detail, making the process of conducting a TPB study akin to following a recipe in a cookbook.

By contrast, the authors of the TRA and TPB provide limited guidance to people wishing to develop interventions to alter behavior. Ajzen does offer suggestions for identifying constructs for interventions to target, and a model of the mechanism by which change should occur. However, these guidelines are fairly vague in terms of how to select appropriate intervention strategies (ie, how to derive concrete intervention strategies from the abstract theory). Further, there are few published descriptions of intervention development which have followed these guidelines. Although there are other examples of where interventions to alter health-related behavior have been derived from the TPB; the illustration reported here is in our view the most developed in terms of multiple studies to inform intervention development, and using techniques other than information provision or pen and paper exercises. Most importantly, none of the published interventions derived from the TPB of which we are aware have successfully demonstrated changes in objectively assessed health-related behavior.

By treating the TPB as a causal theory, precise predictions about mechanism can be derived, and the extent to which these predictions accord with evidence derived from empirical tests can be established. Thus, experimental studies which manipulate 1 or more constructs of the theory, allow a test of the extent to which change occurs as specified by the theory.

**Overview of Process of Developing Intervention**

The current illustration concerns the development of an intervention to increase brisk walking in the general public that has produced large changes in objectively measured walking behavior. The public health basis for targeting walking includes the observations that walking is a common, acceptable, cheap form of physical activity that requires little planning, and has demonstrable cardiovascular benefits. The illustration follows a systematic process consisting of the following 4 steps:

1. Identify target constructs within the TPB by literature review of research conducted using the TPB to identify constructs to target, and identify determinants of the target construct
2. Identify and develop change techniques and intervention strategies most effective in changing these constructs
3. Identify procedures and techniques external to the theory addressing open questions, shortcomings and gaps in the main theory, drawing on other established related theories and utilizing evidence and knowledge from overlapping theories
4. Refine specific strategies to change behavior, including pilot work to optimize the acceptability of the resultant draft intervention

**Identification of Target Constructs Within the TPB**

The TPB proposes that the likelihood of performing a specific behavior is a linear function of a small set of social cognitions about anticipated consequences, social approval, and perceived control with regard to this behavior. The simplest approach to take would be to target all constructs. However, given that there are usually constraints of time and space in delivering interventions, whether in terms of amount of material that can be communicated as part of a persuasive communication, or addressed through an intervention consultation, it may usually be a more sensible approach to focus on the most important determinant.

Ajzen argues that the relative capacity of attitude, subjective norm or PBC in predicting intention does not necessarily provide a useful guide to which construct should be the target of a behavior-change intervention. He argues that one should aim to target the construct which has low mean levels and for which there is consequently room for improvement. Ajzen also states that a weak relationship between a TPB construct and intention may indicate that the construct is not an important factor in determining the behavior of the population of interest. Although we agree that association does not prove causation, a lack of association at least suggests that causation in unlikely, given sufficient variability in both constructs, so the most promising constructs to target in behavior change interventions change are those that are most strongly predictive. The alternative strategy of addressing constructs which have low absolute mean levels, as recommended by Ajzen does not build on the evidence provided by the wealth of studies using the TPB to predict behavior.

Previous research using the TRA/TPB to predict physical activity behavior has been examined in meta-analyses, including more than 100 studies, and found that the theory predicted around one-quarter of the variance in behavior. Further, intentions to engage in physical activity were strongly predicted by attitudes and PBC, but less strongly predicted by subjective norm. Nevertheless, it is important to note that when more specific forms of physical activity have been investigated using the TPB, it has been found that there is variation in the predictors of these more specific activities. This clearly indicates that in identifying constructs we wish to change to promote walking, the literature on TPB studies of walking...
should be consulted, rather than TPB studies of physical activity in general.

A search of the PsycINFO database was therefore conducted in October 2007 using the keywords “theory of planned behavior*” AND “walk*”. This search, in combination with other unpublished studies of which we were aware, yielded 7 empirical studies that have examined the predictors of walking intentions, and/or walking behavior itself, the findings of which are summarized in Table 1. The most striking feature of the results shown is that this evidence points toward PBC as having the largest relationship with walking intentions: a) PBC is a significant predictor in all 7 studies whereas attitude or subjective norm are significant in only 4 studies each; b) the sample-weighted mean correlation is larger for the PBC–intention relationship \( r = .46 \) than the other constructs; and c) in 6 out of the 7 studies, PBC has the largest relationship with walking intentions. This is impressive consistency, given the variation in samples employed, namely students, military personnel, patients, and general public samples.

These results provided clear guidance for developing an intervention to increase intentions to walk: PBC was the construct that an intervention should aim to change. That is, people who do not intend to walk more are those who feel less in control of increasing their walking, and expect to find it more difficult. The findings in Table 1 are somewhat in opposition to common sense ideas of why people do or do not intend to walk. Campaigns to encourage people to walk often stress the health benefits of walking. According to the TPB, beliefs about the likelihood of health and the value attached to health should underpin attitudes toward the behavior. The results reported here suggest that the relationship between attitudes to walking and intentions to walk is considerably weaker than that between PBC and intentions. This is in opposition to the wider literature on applications of the TPB to physical activity in general, where attitudes were the strongest predictor of intentions. Thus, basing an intervention to promote walking on research conducted on physical activity in general would have been misdirected.

According to the TPB, PBC with regard to walking is determined by beliefs about what factors make walking difficult or easy, weighted by individual evaluations of how important these factors are in preventing or facilitating walking. Consequently, a belief-elicitation study with 180 English general public adults was conducted, showing that the most common factors that were seen to make it difficult to walk were time, work/family commitments, injury or illness, and inclement weather. By contrast, people who walk more are those who feel more in control of their walking, and expect to find it easier. The most prevalent facilitative factors named by a general public sample were a near mirror image of those factors seen to make it difficult: more time, fewer work commitments, good weather, but also a pleasant environment.

### Identification and Development of Change Techniques and Intervention Strategies

Having identified the construct one wishes to alter, according to Ajzen, one should aim to alter the beliefs held to underlie the construct one wishes to alter. Given this, it is perhaps not surprising that the most popular behavior change methods in the studies identified in the review by Hardeman and colleagues were persuasion and information, with skills training and goal setting used less often. Little evidence is provided for the approach advocated to changing behavior, and there is good reason to think that other approaches that do not seek to alter beliefs may be more effective.

Commentators have noted that there is a lack of evidence whether changes in beliefs lead to changes in behavior. For instance, an intervention study with British teenagers showed that an intervention group receiving a communication targeting modal salient

### Table 1 Summary of Raw Correlations Between Walking Intentions With Attitude, Subjective Norm, and Perceived Behavioral Control (PBC) in Theory of Planned Behavior Studies

<table>
<thead>
<tr>
<th>Study</th>
<th>N</th>
<th>Attitude</th>
<th>Subj norm</th>
<th>PBC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eves, Hoppé, &amp; McLaren</td>
<td>233</td>
<td>.06</td>
<td>-.01</td>
<td>.37**</td>
</tr>
<tr>
<td>Scott, Eves, French, &amp; Hoppé</td>
<td>41</td>
<td>.31</td>
<td>.45**</td>
<td>.50**</td>
</tr>
<tr>
<td>Scott, Eves, French, &amp; Hoppé</td>
<td>200</td>
<td>.06</td>
<td>.04</td>
<td>.69**</td>
</tr>
<tr>
<td>Darker &amp; French</td>
<td>295</td>
<td>.37**</td>
<td>.49**</td>
<td>.49**</td>
</tr>
<tr>
<td>Darker &amp; French</td>
<td>46</td>
<td>.33*</td>
<td>.29</td>
<td>.50**</td>
</tr>
<tr>
<td>Rhodes, Brown, &amp; McIntyre</td>
<td>351</td>
<td>.55**</td>
<td>.41**</td>
<td>.33**</td>
</tr>
<tr>
<td>Galea &amp; Bray</td>
<td>62</td>
<td>.74**</td>
<td>.59**</td>
<td>.74**</td>
</tr>
<tr>
<td>Overall mean correlation (sample weighted)</td>
<td>1228</td>
<td>.33**</td>
<td>.30**</td>
<td>.47**</td>
</tr>
</tbody>
</table>

* P < .05; ** P < .01.
behavioral beliefs concerning exercise lead to a significant change in attitudes but not intentions or behavior, in comparison with a control group.4 If the model of causation proposed in the TPB is correct, although changes in beliefs in this study may have altered attitudes, these effects would have to be very large or the sample size very large to in turn demonstrate effects on intentions and then behavior.32,35

There are at least 2 ways in which interventions that are ineffective at changing behavior are not useful. First, there is likely to be little interest in ineffective behavior change interventions in the wider world of health promotion. With the exception of interventions that target large populations (e.g., via television or other media advertisements), weak interventions will not have a major impact upon public health, nor on the health of individuals within clinical populations. Secondly, they provide poor tests of theory. If one is interested in testing whether models such as the TPB provide a good model of behavior change, it is first necessary to bring about changes in behavior. Consequently, ineffective interventions based on providing information are of little interest to those interested in health promotion or those interested in developing a science of behavior change.

The recommendations of Ajzen14 do not give a great deal of guidance on which are the most appropriate methods for altering the beliefs underlying TPB constructs, other than “be creative.” There is an almost total lack of guidance on how to develop concrete behavior change strategies to alter these constructs, beyond providing information/persuasion. This contrasts with other theories, such as Social Cognitive Theory,36,37 which propose routes to enact change (e.g., mastery experience). The lack of guidance on how to alter constructs is a major obstacle for interventionists in developing and evaluating interventions to change physical activity and other health-related behaviors. For example, a recent review of interventions for obese adults found that the majority of behavioral interventions are not based on theory at all, and if they are, the links between theory and intervention contents is usually badly reported, if at all.38

For both these reasons, the approach we took to altering PBC was not based upon providing information or arguments about why people could increase their walking. Given that the main predictor of intentions to walk is PBC, the work of Bandura36 on the 4 sources of information for self-efficacy is a useful starting point for developing an intervention to alter self-efficacy. The similarity if not identity of the PBC construct and the self-efficacy construct of social cognitive theory36,37 has been noted.39 Bandura proposes 4 routes to alter self-efficacy: mastery experience, vicarious experience, emotional/physiological feedback, and persuasion. A number of reviews have proposed how to operationalize these routes into concrete intervention strategies to promote physical activity self-efficacy.40–43 However, none of these reviews provided a systematic review linking specific techniques to changes in self-efficacy, limiting the robustness of the conclusions drawn, and consequently not providing strongly evidence-based guidance need on how to select specific interventions strategies. (It should be noted since this intervention was developed, the lack of a systematic review identifying which techniques are most effective for altering self-efficacy for lifestyle physical activity has been addressed.)44,45 As has been noted more generally, there is currently insufficient evidence to map specific intervention techniques onto change mechanisms (i.e., theory-specified psychological changes explaining the effects of behavior change interventions).46

Of the 4 strategies proposed, it has been proposed that the strongest method to alter PBC is mastery experience: where a person can perform a behavior, this should be expected to lead to a much greater increase in PBC than a persuasive message encouraging them to do so.37 Following from this, as most people have experienced success in walking for 30 minutes a day on a number of occasions, getting people to recall how they achieved this should be a convincing method of increasing self-efficacy.47

Identification of Theory-External Procedures and Techniques

While the TPB provides positive constraints in terms of intermediate interventions targets (the predictive constructs of the model as potential mediators of the intervention), it leaves considerable freedom for intervention development with regard to the behavior change techniques employed, the modes and features of delivery, materials, etc. Consequently, although most previous studies testing the TPB in randomized studies involve some variant of providing information and persuasion, apart from this, the contents of interventions employed still show considerable variation.10

One likely reason for this variation in techniques used in experimental TPB studies is that a theory cannot be tested without making references to related theories and theoretical assumptions for example regarding communication, perception, memory, psychometrics, etc. From this perspective, any 1 behavior change intervention involves assumptions derived from multiple theories rather than the 1 central theory. The central concern then becomes less about restricting the considerable freedom in choosing intervention techniques available to people developing interventions, and more about the desirability of thorough reporting and justification of the decisions made during intervention development.

For the current intervention, in addition to attempting to influence PBC through getting people to recall previous instances of successfully walking for 30 minutes, we also included various planning techniques described in detail below, to form an “extended” TPB intervention, with the role of postintentional planning processes given
consideration alongside the standard TPB preintentional constructs. It is now well recognized that there is often a “gap” between intentions and behavior.²⁸ The problem here is not so much an absence of intentions, which changes in beliefs could reasonably be expected to bring about, but an absence of skills to translate those good intentions into behavior. In line with this, interventions should consider not only a motivational component (eg, to increase the intention to walk more), but also a volitional arm to enact those intentions.⁴⁹ This may be particularly important for walking, as the association between intentions and behavior has been found to be low in past research.²¹,²³ This may be due to people reporting walking as being a means to achieve other goals, rather than a goal in itself, as is the case with many forms of exercise.⁵⁰ As people often achieve walking as a by-product of the pursuit of other objectives, it may be less memorable, or intentions to walk may be unreliable or invalid.²¹,²³ For this reason, our intervention was based on an “extended” version of the TPB.

Refinement of Specific Strategies to Change Behavior, Including Pilot Work

Once the overall strategy for attempting to promote walking by altering self-efficacy had been decided, numerous techniques were considered and some of these were then piloted. The key objective here was to maximize acceptability of the intervention techniques, to optimize adherence to the intervention, while retaining fidelity to the theoretical approaches taken.

Several techniques were piloted with 45 adult volunteers, who each received different versions of the intervention, which was revised in an iterative fashion, and to complete drafts of the measures used in the evaluation study while “thinking aloud.” Analysis of the “think aloud” transcripts while completing the TPB questionnaire has previously been published.²⁹ Although a barrier to walking that is often cited is a lack of time, given the number of hours a day the average person spends watching television per week, in most cases, people probably do have sufficient time to walk for 30 minutes per day, but choose not to do so. Equally, where a barrier such as inclement weather was identified as a barrier to walking more, the solutions to this were usually obvious to participants (eg, carry an umbrella or leave one at work). It therefore became apparent through piloting that participants found approaches such as self-monitoring tools such as diaries or log books to be labored, patronizing, and coercive.

Consequently, we soon decided that the best people to identify how to overcome barriers to walking were the people who identified the barriers. In these regards, our intervention therefore was influenced by the thinking behind Motivational Interviewing,⁵¹ where people provide their own reasons for why they are able to achieve a change in behavior, rather than have it provided by persuasion from interventionists. It has been observed in research on people with addictions that when the interventionist cites the reasons for change, the client in turn cites the reasons for not changing; each person takes on one side of the argument. By contrast, the more people talk about their own reasons for change during interventions, the more likely they are to do so.³¹ Thus, the intervention was structured so that participants rehearse the reasons why they were capable of walking more and how they could overcome barriers, as a potentially very effective method of increasing PBC.

Content of the Intervention to Increase Walking

Our final intervention consisted of 2 sets of strategies: motivational and volitional. More details on the specific techniques are provided in the intervention manual, which is available on request from the first author. In terms of the CALO-RE standardized taxonomy of 40 behavior change techniques for physical activity interventions,⁵² the following techniques were used: 5) goal setting (behavior), 7) action planning, 8) barrier identification/ problem solving, 18) prompt focus on past success, 23) teach to use prompts/cues, 24) environmental restructuring, and 35) relapse prevention/coping planning.

Motivational Strategies

Two strategies were employed in the motivational component of the intervention. First, there was a “warm up” task, where the participants were each shown 10 statements derived from previous participants³¹ about what would make it easier for them to walk more (ie, “when I felt like I have enough time to walk”; “when I can walk in pleasant surroundings”). They then had to use a 10-point scale to indicate how confident they would be to walk more (ie, when I felt like I have enough time to walk; when I can walk in pleasant surroundings”). The researcher asked them to elaborate on any of incidences where they indicated a high level of confidence (ie, where they endorsed a rating toward the higher end of the scale). This “warm up” task had the dual aims of engaging the participants with the intervention, and rehearsing their reasons why they believed they could walk more. Note that this task conforms to the principles behind motivational interviewing of getting participants to rehearse their own reasons why they believe they can carry out the behavior.

The second motivational strategy in the intervention required participants to think of 3 occasions where they felt like they had personal control over their walking. They were then asked to explicitly state what they felt that the helpful factor in each situation had been. Here, the aim was to get participants to recall previous mastery experiences (ie, occasions where they felt they not only could but did manage to walk as a lifestyle activity).
Participants were also asked to think of the opposite situation (ie, to generate an example of a time when they felt like they had no control over their walking and state the unhelpful factor). By completing both tasks, we aimed to get participants to realize what were the important barriers to them walking more.

**Volitional Strategies**

The second motivational strategy of the intervention fed into a strategy that formed part of the volitional component of the intervention (although note that when developing the intervention, we conceptualized this technique as a third motivational strategy, as it developed from attempts to increase self-efficacy; however, upon reviewing the intervention as it was finally constructed, we now consider this to be a volitional strategy). Participants were required to develop what we called a Facilitative Plan. On the basis of what they had already talked about, participants generated 3 helpful factors that would make it easier for them to implement their physical activity plans. They were then required to produce ideas for how they could successfully bring about these factors. For instance, if they indicated that having a free period at lunchtime was a particularly helpful factor in determining whether they walked, they made a plan to block out time in their diaries to this end, to prevent other activities taking priority. These facilitative plans can be thought of as analogous to coping plans, but with the focus on prospective facilitation encouraging helpful factors or preparatory behaviors rather than reactively overcoming difficulties. We anticipated that this focus should not only result in higher feelings of control over the behavior, but also was more congruent with the principles behind Motivational Interviewing, of focusing on reasons why the participants could successfully enact the behavior.

For the second volitional component of the intervention, participants were asked to decide whether their goal was to increase their walking by an additional 10 minutes a day or an additional 20 minutes a day. They were asked to consider this choice carefully, and not to be overly optimistic when selecting their goal. Participants were given this somewhat limited freedom to choose their goals for 2 reasons which pulled in opposite directions. First, there is some evidence that allowing people to choose their own goals results in more engagement with those goals and intrinsic motivation than assigning goals. On the other hand, allowing participants a completely free rein to choose their goals might result in unrealistically difficult goals, which participants were unlikely to achieve and consequently experience as setbacks, rather than easier goals which they can achieve and be reinforced by this success.

Participants were then asked to make up to 3 action plans to incorporate their additional walking into their everyday lives. Action planning can help initiate action by specifying when, where, how, and with whom to act. People who form action plans are more likely to act in the intended way, and can help people to implement their intentions. Participants were also asked to consider what potential barriers or obstacles could interfere with the success of their action plans, and to revise them if necessary.

The final strategy of the volitional component of the intervention involved participants developing coping plans to counteract the possible barriers they had just identified. Coping plans can help a person overcome obstacles and to cope with difficulties by anticipating potential barriers to performing this behavior (ie, feeling too tired or lazy to walk).

In line with previous successful interventions, participants were asked to make a commitment to act as they had planned to over the next 7 days. They also received copies of all of their plans at the end of the intervention session to take home with them, to act as prompts.

**Evaluation of the Intervention: Effectiveness and Mechanism**

An intensive process of intervention development has been described, illustrated by an intervention to increase walking based on an “extended” TPB. A study to evaluate the success of this intervention in altering walking behavior among adult general public volunteers has been reported elsewhere. It found that the intervention resulted in very large increases in self-efficacy (Cohen’s $d = 1.86$) and intentions to walk more ($d = 1.55$) immediately. Further, large increases in walking behavior, as assessed by pedometers were also observed ($d = 0.82$) over the following week, a mean increase in objectively measured walking of 87 minutes/week. These increases in walking were mediated by changes in PBC, and were maintained to the final follow-up point, 6 weeks after the intervention was delivered.

The large effects ($d = 1.06$) of this intervention on objectively assessed walking have since been replicated in a further study with adult volunteers, delivered by a person who was not part of the development of the intervention. In this study, there was a significant and medium-to-large increase ($d = 0.65$) in PBC, but no significant effects on self-reported planning.

**Conclusions**

Our aim in describing and illustration the process for development of this intervention with demonstrable efficacy is to provide a useful exemplar for other people who wish to develop concrete interventions from abstract theories, especially the TPB. In doing so, we have deviated somewhat from the recommendations of Ajzen of how best to do this. Throughout, we have detailed the reasons why we believe that our approach is superior to that of Ajzen, which we find somewhat vague. Nevertheless, other approaches are possible, and the best approach to take in developing effective TPB interventions is still an open question which is best informed by evidence.
A likely critique of our approach is that our intervention is not strictly speaking a TPB intervention, given that we extended it to include volitional techniques to address the “intention-behavior gap,” and techniques derived from social cognitive theory and motivational interviewing. We believe that 3 points are worth making in this regard.

First, we have described our intervention as being based on the TPB, as this was where the intervention was originally derived from, and the intervention aimed to alter TPB constructs. We do not think the use of techniques derived from social cognitive theory to alter a TPB construct (specifically PBC) presents problems for this description. For example, it can be argued that even if one is planning a straightforward TPB intervention based on providing information about health to alter attitudes, the development of particular arguments may well be influenced by insights from other theoretical approaches, such as the Elaboration Likelihood Model. In particular, in the absence of specific guidance provided by Ajzen, other researchers have used other theories to identify “strong” arguments that lead to deeper, more central processing of information and hence more attitude change. Thus, the idea of a theoretically “pure” intervention is a chimera.

From this perspective, any 1 behavior change intervention involves assumptions derived from multiple theories rather than the 1 central theory. The central concern then becomes less about restricting the considerable freedom in choosing intervention techniques available to people developing interventions, and more about the desirability of thorough reporting and justification of the decisions made during intervention development.

Second, we do think that introducing constructs external to the TPB such as volitional processes does result in this being not longer a “pure” TPB intervention. It is for this reason that we have described our intervention as being based on an “extended” TPB, and have detailed precisely how we have extended this theory.

Third, the evaluation of this intervention assessed TPB constructs, and examined the extent to which the proposed causal mechanisms of the theory could account for the process of change. Thus, our intervention was used to assess the extent to which changes in behavior were brought about in the manner that the TPB specifies, to test whether the TPB is a sufficient model of behavior change. To this extent, the intervention is still unproblematic as a test of the theory.

Irrespective of the merits of these arguments, we hope that shedding light on the decisions involved in arriving at the specific intervention techniques chosen, this can encourage more open discussion about the challenges involved, which have not to date received the attention they warrant.

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