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EDITORIAL

The theory of planned behaviour: Reactions and reflections

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The seven articles in this issue, and the accompanying meta-analysis in *Health Psychology Review* [McEachan, R.R.C., Conner, M., Taylor, N., & Lawton, R.J. (2011). Prospective prediction of health-related behaviors with the theory of planned behavior: A meta-analysis. *Health Psychology Review*, 5, 97–144], illustrate the wide application of the theory of planned behaviour [Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50, 179–211] in the health domain. In this editorial, Ajzen reflects on some of the issues raised by the different authors. Among the topics addressed are the nature of intentions and the limits of predictive validity; rationality, affect and emotions; past behaviour and habit; the prototype/willingness model; and the role of such background factors as the big five personality traits and social comparison tendency.

Keywords: theory of planned behaviour; review; future directions

Introduction

Since its introduction 26 years ago (Ajzen, 1985), the theory of planned behaviour (TPB; Ajzen, 1991, in press) has, by any objective measure, become one of the most frequently cited and influential models for the prediction of human social behaviour. Its popularity is revealed by conducting a Google Scholar search for the keyword ‘theory of planned behavior OR theory of planned behaviour.’ From 22 citations in 1985, the number of citations per year has grown steadily to a total of 4550 in 2010 (Figure 1). Relying on a variety of indices, Nosek et al. (2010) found that my programme of research ranks as having the highest scientific impact score among US and Canadian social psychologists.

Yet, for all its popularity, or perhaps because of it, the TPB has also been the target of much criticism and debate. Some researchers reject it outright as an adequate explanation of human social behaviour. These investigators tend to deny the importance of consciousness as a causal agent (Wegner, 2002; Wegner & Wheatley, 1999) and view much human social behaviour as driven by implicit attitudes (Greenwald & Banaji, 1995) and other unconscious mental processes (Aarts & Dijksterhuis, 2000; Bargh, 1989; Bargh & Chartrand, 1999; Brandstätter, Lengfelder, & Gollwitzer, 2001; Uhlmann & Swanson, 2004). Most critics, however, accept the theory’s basic reasoned action assumptions but question its sufficiency or

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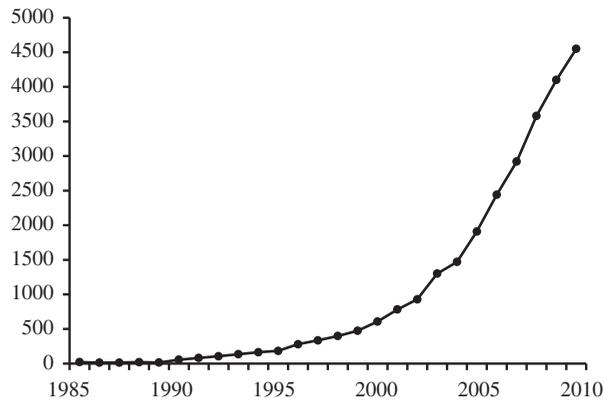


Figure 1. Number of citations of the TPB in Google Scholar.

inquire into its limiting conditions (for a discussion, see Fishbein & Ajzen, 2010 Chapter 9). The articles in the present issue, as well as the meta-analysis of TPB research published in *Health Psychology Review* (McEachan, Conner, Taylor, & Lawton, 2011), are largely in the latter vein and I will take this opportunity to try to clarify aspects of the theory and to engage with some of the critical issues raised by the different authors.

Limits of predictive validity

Even when all TPB constructs are carefully assessed, they contain random measurement error. Well-designed measures of attitude towards a behaviour of interest, subjective norm, perceived behavioural control, intention and behaviour rarely exhibit reliabilities in excess of 0.75 or 0.80. It follows that, even with good measures, the most we can reasonably expect in terms of correlations among the theory's constructs are coefficients of about 0.60. Past syntheses of TPB research have shown that, even when studies with questionable measures are included in the meta-analysis, the observed mean correlations approach their theoretical limits. For example, in a synthesis of the results of several previous meta-analyses, Sheeran (2002) reported a mean overall correlation of 0.53 between intention and behaviour; the mean correlation between perceived behavioural control and intention was found to be 0.40 in a meta-analysis by Armitage and Conner (2001); and in meta-analytic reviews covering a broad range of different behaviours (Armitage & Conner, 2001; Cheung & Chan, 2000; Notani, 1998; Ravis & Sheeran, 2003; Schulze & Wittmann, 2003), attitudes, subjective norms and perceived behavioural control produced mean multiple correlations with intentions that ranged from 0.59 to 0.66.

Meta-analysis made by McEachan et al. (2011) produced comparable results. Correlations of attitudes, subjective norms and perceptions of control with intentions ranged from 0.40 to 0.57, producing a multiple correlation of 0.67. The intention-behaviour correlation of 0.43 and the perceived control-behaviour correlation of 0.31 were somewhat lower than in previous meta-analysis, most likely due to the fact that the present synthesis was restricted to prospective studies that assessed behaviour at some time after administering the TPB survey.

The intention–behaviour correlation, though usually quite substantial, can vary considerably. The meta-analysis by McEachan et al. points to one moderator of this relation, the temporal distance between measurement of intention and observation of behaviour. It stands to reason that, as time passes, an increasing number of intervening events can change people’s behavioural, normative or control beliefs, modify attitudes, subjective norms or perceptions of control, thus generating revised intentions. Changes of this kind will tend to reduce the predictive validity of intentions that were assessed before the changes took place. Consistent with this argument, shorter intervals between assessment of intentions and observation of behaviour (5 weeks or less) were associated with stronger correlations than longer time intervals. Direct evidence in support of the proposition that instability of intentions over time can reduce their predictive validity was provided by Sheeran, Orbell, and Trafimow (1999) and by Conner, Sheeran, Norman, and Armitage (2000).

However, intentions are sometimes found to be poor predictors of behaviour even over relatively short time periods, as illustrated in the study by Kor and Mullan (2011). Intentions were assessed with respect to three sleep-related behaviours in the coming week: making bedroom/sleep environment restful, avoiding going to bed feeling thirsty or hungry and avoiding anxiety and/or stress-provoking activities before bedtime. One week later, the participants reported how often they had performed each behaviour in the preceding week. Composite measures aggregated across the three behaviours showed a correlation of only 0.17 between intention and behaviour. (Perceived behavioural control predicted behaviour somewhat better, with a correlation of 0.25.) A possible reason for the low intention–behaviour correlation is revealed by the relatively strong effect of the participants’ general capacity to override or inhibit impulses. Ability to inhibit responses, as assessed by a visual Go/NoGo computer task, correlated 0.43 with behaviour. This finding suggests that performance of the three sleep-related behaviours requires the ability to self-regulate, an aspect of *actual* control over the behaviour. For example, many people find it difficult to put distressing thoughts out of their minds and may therefore be unable to avoid anxiety or stress-provoking activities before bedtime. In the TPB, lack of actual control over a behaviour will tend to reduce the predictive validity of intentions. The relatively low correlation between *perceived* behavioural control and behaviour suggests that perceptions of control were not sufficiently accurate to serve as a good proxy for actual control.

At its core, the TPB is concerned with the prediction of intentions. Behavioural, normative and control beliefs as well as attitudes, subjective norms and perceptions of behavioural control are assumed to feed into and explain behavioural intentions. Whether intentions predict behaviour depends in part on factors beyond the individual’s control, i.e. the strength of the intention–behaviour relation is moderated by actual control over the behaviour. Barring methodological shortcomings, a low intention–behaviour relation is a warning sign indicating that we may be reaching the limits of reasoned action.

Affect, emotions and rationality in the TPB

Irrationality

A frequently voiced criticism of the TPB and other reasoned action models is that they are too ‘rational,’ not taking sufficient account of cognitive and affective

processes that are known to bias human judgments and behaviour. It is true, of course, that the TPB emphasises the controlled aspects of human information processing and decision making. Its concern is primarily with behaviours that are goal-directed and steered by conscious self-regulatory processes. This focus has often been misinterpreted to mean that the theory posits an impassionate, rational actor who reviews all available information in an unbiased fashion to arrive at a behavioural decision. In reality, the theory draws a much more complex and nuanced picture.

Importantly, there is no assumption in the TPB that behavioural, normative and control beliefs are formed in a rational, unbiased fashion or that they accurately represent reality. Beliefs reflect the information people have in relation to the performance of a given behaviour, but this information is often inaccurate and incomplete; it may rest on faulty or irrational premises, be biased by self-serving motives, by fear, anger and other emotions, or otherwise fail to reflect reality. Clearly, this is a far cry from a rational actor. However, no matter how people arrive at their behavioural, normative and control beliefs, their attitudes towards the behaviour, their subjective norms and their perceptions of behavioural control follow automatically and consistently from their beliefs. It is only in this sense that behaviour is said to be reasoned or planned. Even if inaccurate, biased or otherwise irrational, our beliefs produce attitudes, intentions and behaviours consistent with these beliefs (Geraerts et al., 2008).

Affect and emotions

Perhaps the most frequently mentioned biasing factors ostensibly neglected in the TPB are affect and emotions (Conner & Armitage, 1998; Rapaport & Orbell, 2000; Richard, de Vries, & van der Pligt, 1998; Wolff, Nordin, Brun, Berglund, & Kvale, 2011). This concern is based in part on the mistaken perception that the theory posits a rational actor who is unaffected by emotions and in part on the standard methodology that is typically used to operationalise the theory's constructs. In the TPB, affect and emotions enter in two ways. First, they can serve as background factors that influence behavioural, normative and/or control beliefs. Thus, it is well known that general moods can have systematic effects on belief strength and evaluations. Compared to people in a negative mood state, people in a positive mood tend to evaluate events (such as the consequences of a behaviour) more favourably and to judge favourable events as more likely to occur (Forgas, Bower, & Krantz, 1984; Johnson & Tversky, 1983; Schaller & Cialdini, 1990). In addition, affective states can also help to select the behavioural, normative and control beliefs that are readily accessible in memory (Clark & Waddell, 1983; McKee, Wall, Hinson, Goldstein, & Bissonnette, 2003). Thus, for example, McKee et al. (2003) reported that, in a free-response elicitation session, participants in a negative mood state were more likely to emit unfavourable beliefs about smoking compared to participants in a positive mood state.

The research discussed above indicates that affect and emotions can have indirect effects on intentions and behaviour by influencing the kinds of beliefs that are salient in a given situation, as well as the strength and evaluative connotations of these beliefs. However, it is often suggested that affect can influence behaviour in a more direct fashion, and that this possibility is not sufficiently accounted for in the TPB.

Wolff et al. (2011) follow the lead of other investigators (Abraham & Sheeran, 2003; Conner, Smith, & Mcmillan, 2003) who have argued that anticipated regret and, more generally, anticipated affect can influence intentions and behaviour independent of the other predictors in the TPB. Indeed, in a meta-analysis of 24 datasets, Sandberg and Conner (2008) found that the inclusion of anticipated affect in the prediction equation accounted for an additional 7% of the variance in intentions and 1% of the variance in behaviour.

From the perspective of the TPB, expectations that performing a behaviour will lead to experiencing pain, pleasure, regret, fear, elation or other emotions are simply behavioural beliefs, i.e. beliefs about the likely consequences of the behaviour, some positive and others negative. It has been argued, however, that these kinds of behavioural beliefs are not sufficiently represented in applications of the theory due to the way in which salient beliefs are elicited (Conner & Armitage, 1998; Wolff et al., 2011). In a typical elicitation session, participants are asked to list what they believe to be the advantages and disadvantages of performing a behaviour under investigation. This question tends to elicit instrumental rather than experiential or affective consequences. However, there is nothing in the TPB that requires a focus on instrumental outcomes. For example, in a study on five leisure activities, Ajzen and Driver (1991) asked participants in formative research to list the benefits and costs of each leisure activity as well as the things they liked and disliked about each activity. The instrumental beliefs were found to predict an instrumental attitude measure (e.g. *useful–useless*) better than an experiential measure (e.g. *interesting–boring*), and the reverse was true for the affective beliefs. The two types of attitude made independent contributions to the prediction of intentions. However, equally strong predictions were obtained when the two attitudes were combined into a single measure, suggesting that they can usefully be considered parts of the same attitude.

In a recent study, Ajzen and Sheikh (in press) explored a possible reason for the finding that anticipated affect adds strongly and independently to the prediction of intentions. A review of the literature revealed a peculiar feature of most studies dealing with the role of anticipated affect. Whereas the basic variables in the TPB are assessed with respect to performing a behaviour of interest, anticipated affective reactions are usually measured in relation to *not* performing the behaviour (Fishbein & Ajzen, 2010, Chapter 9). In fact, some investigators have made this explicit in their definition of anticipated affect. Thus, according to Abraham and Sheeran (2003), ‘Anticipated regret refers to beliefs about whether or not feelings of regret or upset will follow from *inaction*’ (p. 496, emphasis added). In the study reported by Abraham and Sheeran, participants expressed their attitudes, subjective norms, perceived control and intentions with regard to exercising on a regular basis in the next 2 weeks, but they were asked how much they would regret it and how upset they would be if they did not exercise regularly in the next 2 weeks. If, as suggested by the TPB, measures of anticipated affect are (partial) measures of attitude, then it can be argued that studies on anticipated affect actually assess two kinds of attitude: a general attitude towards enacting a given behaviour and an affective attitude towards not performing the behaviour. Because not doing is not necessarily the opposite of doing (Richetin, Conner, & Perugini, 2011), this focus on action as well as inaction may be sufficient to account for the residual predictive validity of anticipated emotions, irrespective of whether the alternative attitude is affective in nature or not.

The study by Ajzen and Sheikh (in press) provided strong support for this argument. It showed that when all variables in the TPB as well as anticipated affect were assessed either with respect to performing a behaviour (drinking, eating fast food) or with respect to avoiding the behaviour, anticipated affect made no independent contribution to the prediction of intentions. Only when anticipated affect was measured with respect to one alternative (action or inaction) and the TPB variables were assessed with respect to the other alternative was there a significant residual effect for anticipated affect. The study also demonstrated that this effect does not require a measure of affect. When the criterion was intention to enact a behaviour (drinking, eating fast food), adding measures of attitude, subjective norm, and perceived behavioural control with respect to avoiding the behaviour significantly increased explained variance just as did anticipated affect associated with avoiding the behaviour. By the same token, when intention to avoid the behaviour was the criterion, adding the TPB predictors in relation to enacting the behaviour made a significant contribution comparable to anticipated affect with respect to enacting the behaviour. In other words, it was not the addition of a measure of anticipated affect that improved prediction of intentions but rather the addition of measures addressing the alternative to the behaviour.

The results of the study by Wolff et al. (2011) are quite consistent with these findings. Trying to predict intentions to take a genetic screening test for a hypothetical disease, Wolff et al. assessed instrumental beliefs regarding this behaviour as well as anticipated affect. Importantly, the latter measure had to do with the affective consequences of taking the test, not with anticipated regret or other emotions that might result from not taking the test. Consistent with my argument, these affective beliefs did not emerge as a separate factor in a factor analysis; no attempt was made to test whether they make a significant independent contribution to the prediction of intentions.

Measurement context

The affective state of participants may be considered part of the measurement context. The intention–behaviour relation can be disrupted if participants experience one affective state when their intentions are being assessed and another when they perform the behaviour. According to the TPB, readily accessible behavioural, normative and control beliefs provide the cognitive foundation for attitudes, subjective norms and perceived control, respectively. We saw earlier that affective states can influence the behavioural, normative and control beliefs that are readily accessible. When different beliefs are activated in the survey context and in the behaviour contexts, they will produce different attitudes, subjective norms and/or perceptions of control, resulting in different intentions. The intention assessed at the survey stage will then be a relatively poor predictor of actual behaviour because a different intention is active in the behavioural context (see Ajzen & Sexton, 1999 for a discussion).

The study by Cooke and French (2011) nicely illustrates a related issue: the effect of measurement context on the relative importance of attitudes, subjective norms and perceptions of control. Again, as the context of measurement changes – from bar to library in this study – the kinds of behavioural, normative and control beliefs that are activated can also change. It stands to reason that with respect to binge drinking,

normative beliefs become especially accessible when drinking alcohol (e.g. in a bar), compared to a neutral context (a library). Consistent with this argument, subjective norms contributed more to the prediction of intentions to binge drink when assessment occurred in a bar than when it was obtained in a library. In this study, the investigators obtained direct measures of the TPB predictors. It would be interesting to demonstrate more directly that context affects beliefs by eliciting behavioural, normative and control beliefs in the two different contexts.

The sufficiency assumption

Several of the studies in this issue address, at least in part, an issue known as the TPB's sufficiency assumption. According to the theory, we should be able to predict performance of a behaviour from intentions to perform the behaviour and from perceived behavioural control. Intentions, in turn, should be predictable from attitude towards the behaviour, subjective norm and perceived behavioural control. Addition of other variables should not improve prediction of either intention or behaviour. Generally speaking, the TPB does indeed permit quite accurate prediction of intentions and behaviour, often – as I argued earlier – coming close to the theoretical limit. Nevertheless, it has been proposed that the constructs contained in the theory may not be sufficient to fully explain people's intentions and actions (Conner & Armitage, 1998). Indeed, one of the most frequently addressed questions in research with the theory has to do with the prospect of increasing the amount of explained variance in intentions or behaviour by adding one or more predictors.

In earlier treatments of the theories of reasoned action and planned behaviour (Ajzen, 1991; Ajzen & Fishbein, 1980), the possibility of adding more predictors was explicitly left open. In fact, the TPB was developed in this fashion by adding perceived behavioural control to the original theory of reasoned action and, more recently, by adding descriptive norms to the normative component (Fishbein & Ajzen, 2010). Proceeding in this vein, Kor and Mullan (2011) as well as Norman and Cooper (2011) investigated the role of past behaviour, and the latter also examined the related habit construct; Ravis, Sheeran, and Armitage (2011) asked whether prototype similarity affords predictive validity over and above intentions; Wolff et al. (2011) included uncertainty avoidance motive in the prediction equation; Hassandra et al. (2011) considered the role of self-concept; and Kor and Mullan added perceived autonomy support.

For the sake of parsimony, additional predictors should be proposed and added with caution, and only after careful deliberation and empirical exploration. Fishbein and Ajzen (2010, Chapter 9) described some of the criteria that should be met by any proposed addition to the theory. First, like the theory's existing predictors, the proposed variable should be behaviour-specific, conforming to the principle of compatibility. That is, it should be possible to define and measure the proposed factor in terms of the target, action, context and time elements that describe the behavioural criterion. Second, it should be possible to conceive of the proposed variable as a causal factor determining intention and action. Third, the proposed addition should be conceptually independent of the theory's existing predictors. Fourth, the factor considered should potentially be applicable to a wide range of behaviours studied by social scientists. Finally, the proposed variable should

consistently improve prediction of intentions or behaviour if it is to be made part of the theory.

Past behaviour and habit

The dictum that ‘past behavior is the best predictor of future behavior’ is supported by much empirical evidence. The finding of a strong correlation between past and later behaviour attests to the temporal stability of the particular behaviour and its antecedents. Moreover, it is often found that a measure of past behaviour contributes to the prediction of future behaviour even after the predictors in the TPB have been accounted for (Ajzen, 1991; Conner & Armitage, 1998; Ouellette & Wood, 1998). For example, in a secondary analysis of data reported by Abraham and Sheeran (2003), the amount of variance in physical activity explained by the TPB increased from 36% to 53% with the addition of past physical activity. As mentioned earlier, Kor and Mullan (2011) predicted a composite of three sleep-supportive behaviours. They reported a correlation of 0.32 between past behaviour and behaviour measured 1 week later. Although not as strong as in other studies, it exceeded the intention–behaviour correlation ($r=0.17$) as well as the correlation between perceived control and behaviour ($r=0.25$). In fact, when past behaviour was added to the regression equation, the regression coefficients for intention and perceived control were no longer significant.

One possible reason for findings of this kind is methodological, having to do with the nature of the intention and behaviour measures. Whereas behaviour at the two time points was assessed in terms of frequency of performance (e.g. ‘Over the past week, how many days did you make your bedroom/sleep environment restful?’), the measures of intention and perceived control relied on assessments of the likelihood or subjective probability of performing the three behaviours (e.g. ‘I intend to make my bedroom/sleep environment restful over the next week’, *strongly disagree–strongly agree*; ‘I am confident that I can avoid having anxiety and stress provoking activity before bedtime everyday’, *strongly disagree–strongly agree*). There was thus greater scale compatibility (Courneya & McAuley, 1993) between the measures of past and future behaviour than between the measures of intention and perceived control on one hand and either past or future behaviour on the other. The greater shared method variance between measures of past and later behaviour may have been at least in part responsible for the relatively strong correlation between them. Some support for this argument was also reported by Conner, Warren, Close, and Sparks (1999).

It should be noted that past behaviour fails to meet one of the criteria for inclusion in the TPB, namely the requirement that it constitute a causal antecedent of intention. It is difficult to argue that the performance of a behaviour in the past directly causes a person’s current intention. Instead, past behaviour is usually considered a proxy for habit strength: The more frequently a behaviour has been performed in a stable context, the more it is said to habituate and come under the direct control of external stimulus cues at the expense of intentions (Ajzen, 2002). Consistent with this argument, Norman and Cooper (2011), studying breast self-examination, obtained an independent measure of habit strength in addition to assessing past behaviour as well as the extent to which the behaviour is being performed in a stable context, a condition required for habituation. This approach is

greatly superior to much previous research in which it has simply been assumed that frequency of past behaviour can be equated with habit strength. Unfortunately, contrary to previous findings, in this study frequency of past behaviour did not contribute independently to the prediction of later behaviour and it was thus impossible to test the hypothesis that its effect is mediated by habit strength. In fact, the results of this study were quite weak. Even after adding past behaviour, context stability and the interaction between these two variables, the TPB accounted for only 15% of the variance in future breast self-examination.

From the perspective of the TPB, more interesting than the effect of past on future behaviour is the frequently reported finding that a measure of past behaviour contributes independently to the prediction of *intentions*, over and above attitudes, subjective norms and perceived behavioural control. In three meta-analytic syntheses (Albarracín, Johnson, Fishbein, & Muellerleile, 2001; Rise, Sheeran, & Skalle, 2006; Sandberg & Conner, 2008), the addition of past behaviour to the prediction equation raised the proportion of explained variance in intentions by between 9.65% and 13%. One possible interpretation of such findings is that the TPB's sufficiency assumption is invalid. In other words, intentions may be determined not only by attitudes, norms and perceived control but also by one or more additional variables, and these additional variables are captured, at least in part, by measures of past behaviour. This explanation implies that if we could identify and assess these additional variables, then the direct residual effect of past behaviour on intentions would disappear. Fishbein and Ajzen (2010, Chapter 9) examined the possibility that the two most frequently proposed additions to the theory – self-identity and anticipated affect – constitute the missing components. After reviewing the available research, they concluded that although each of these variables has been found to add predictive validity (see also Hassandra et al., 2011), neither could account for the residual effect of past behaviour on intentions. This issue is still unresolved, begging for additional research.

Prototype similarity vs. intention

According to the prototype/willingness model (Gibbons, Gerrard, Blanton, & Russell, 1998), the reasoned action processes described in the TPB are only one possible path to arrive at a behaviour. In the second path, behaviour is more spontaneous, reactive on the immediate situation and heavily influenced by perceived similarity to a behavioural prototype. When people find themselves in situations that encourage certain behaviours, especially risk-taking behaviours such as smoking, it is not their preconceived intentions that determine their actions but rather their willingness to engage in the behaviours, i.e. their openness to the opportunity. Their willingness, in turn, is determined by the extent to which they see themselves as similar to the prototypical person who performs the behaviours in question.

The idea that a relatively spontaneous mode of operation stands in contrast to the TPB rests on a misunderstanding of reasoned action. There is no assumption in the TPB that people carefully and systematically review all available information before they form an intention to engage in a behaviour. On the contrary, the theory recognises that most behaviours in everyday life are performed without much cognitive effort. Consistent with contemporary theorising in social psychology (Carver & Scheier, 1998; Chaiken & Trope, 1999; Petty & Cacioppo, 1986), it is

assumed that the amount of information processing that people engage in prior to performing a behaviour varies along a continuum, from shallow to deep (Ajzen & Sexton, 1999). In-depth processing is reserved for important decisions and behaviours in novel situations that demand careful consideration of the behaviour's likely consequences, the normative expectations of significant others, and the obstacles that may be encountered. When it comes to routine, everyday behaviours like eating breakfast, taking one's vitamin supplements, going to work, watching the news on TV and so forth, no careful deliberation is required or postulated. Attitudes, subjective norms and perceptions of control as well as intentions in relation to these kinds of behaviours are assumed to guide behaviour implicitly without cognitive effort and often below conscious awareness (see Ajzen & Fishbein, 2000, for a discussion of these issues).

The major remaining questions in relation to the prototype/willingness model, then, are whether a measure of willingness predicts spontaneous kinds of behaviour better than a measure of intention, and whether including perceived similarity to a behavioural prototype in the TPB improves prediction. In their discussion of the first question, Fishbein and Ajzen (2010, Chapter 2) concluded that the empirical evidence neither gives an advantage to willingness over intention, nor supports the idea that adding a measure of willingness improves prediction of behaviour. Behavioural intentions are indications of a person's readiness to perform a behaviour. This readiness to act can be operationalised by asking whether people intend to engage in the behaviour, expect to engage in the behaviour, are planning to engage in the behaviour, will try to engage in the behaviour, and indeed, whether they are willing to engage in the behaviour. These various expressions of behavioural readiness are best considered manifest indicators reflective of the same latent underlying construct, i.e. intention. The results of the study reported by Matteredne, Diepgen, and Weisshaar (2011) are consistent with this line of reasoning. Comparing the TPB and the prototype/willingness model, the investigators found a strong correlation between their measures of willingness and intention to adopt skin protection measures, but intention was a better predictor of behaviour ($r = 0.49$) than was willingness ($r = 0.36$).

Rivis et al. (2011) addressed the second question. Using a within-subjects design, they examined the predictive validity of prototype similarity for a set of 14 health-related behaviours. According to the prototype/willingness model, perceived prototype similarity should have a direct impact on behaviour, unmediated by intention. In fact, the data showed that perceived prototype similarity significantly improved prediction of behaviour over and above the predictive validity of intentions, accounting for an additional 6% of the variance. However, the measure of prototype similarity or identification in this study was virtually identical to a measure of self-reported behaviour. The question employed, 'In general, how similar are you to the type of person your age who (performs behaviour x)?' is likely to produce much the same information as asking, 'Are you the kind of person who performs behaviour x?'; i.e. 'do you perform behaviour x?' Clearly, this could account for the observed relation between perceived prototype similarity and behaviour. Unfortunately, it is not clear how one can obtain a measure of prototype similarity that is clearly different from self-reported behaviour. Recognising this difficulty, Rivis et al. (2011) refer to prior research in which prototype similarity had an effect on behaviour even after controlling for a measure of past behaviour. Their argument would be more convincing if the investigators had controlled for past behaviour in their own study.

Wolff et al. (2011) adapted a general attitude towards uncertainty scale to their specific context, i.e. uncertainty connected to taking a genetic screening test. As such, this scale constituted an alternative measure of attitude towards taking such a test and it thus fails the criterion that factors added to the TPB should be conceptually independent of the existing constructs. As it turned out, this attitude measure was superior to one based on the summed products of behavioural beliefs and outcome evaluations in that it was the best predictor of intentions. However, it should be noted that this study raises concerns regarding compatibility among the measures employed. Whereas intentions to take a genetic screening test specified two context elements (taking the test on one's own initiative and on the advice of a physician), measures of the other TPB constructs did not mention these elements.

The concept of 'perceived autonomy support' proposed by Kor and Mullan (2011) as a possible addition to the TPB in the context of sleep-related behaviours also fails to meet the criterion that it be conceptually independent of the other predictors in the model. The sample scale item provided ('People who are important to me provide me with choice and options with regard to my sleep habits') suggests that this construct is part of the theory's normative component. When included in the prediction equation, its regression weight was not significant and it failed to substantially improve prediction of intentions.

Background factors

In the TPB, the most detailed substantive information about the determinants of a behaviour is contained in a person's behavioural, normative and control beliefs. The theory does not specify where these beliefs originated; it merely points to a host of possible background factors that may influence the beliefs people hold – factors of a personal nature such as personality and broad life values; demographic variables such as education, age, gender and income; and exposure to media and other sources of information. Factors of this kind are expected to influence intentions and behaviour indirectly by their effects on the theory's more proximal determinants. Most empirical studies assess a few demographic characteristics if only considered as control variables. Some studies, however, focus on one or more background factors that, for intuitive or theoretical reasons, are considered to be relevant to the behaviour under investigation.

A good case in point is reported by the study of Manning and Bettencourt (2011). The investigators used the TPB as their conceptual framework to examine adherence to a medical regimen. Unlike Kor and Mullan (2011) who dealt with their behavioural category of sleep-related activities by assessing the TPB constructs in relation to each behaviour, Manning and Bettencourt aggregated several regimen adherence behaviours and then assessed the TPB constructs with reference to the category as a whole. Intentions to adhere were predicted very well, but the theory accounted for only a small proportion of variance in behaviour, perhaps due to the long time lag between the TPB survey and the behaviour. In addition to measuring the TPB constructs, the investigators also assessed depressive symptoms as a possibly relevant background factor. Degree of depression correlated negatively with intentions and reported adherence to the medical regimen. However, consistent with the TPB, these effects of depressive symptoms were found to be mediated by the theory's predictors.

As have other investigators in the past (Courneya, Bobick, & Schinke, 1999; Rhodes & Courneya, 2003), Ravis et al. (2011) examined the role of the 'big five'

personality traits – openness, conscientiousness, extroversion, agreeableness and neuroticism (Costa & McCrae, 1985) in the context of the TPB. In addition, they also assessed the general tendency to compare oneself to important others. Interestingly, however, rather than postulating a simple effect of these kinds of background factors on intentions and behaviour, their within-subjects methodology allowed them to examine the possibility that these variables influence the predictive validity of intentions relative to perceived prototype similarity (see the earlier discussion of this construct). Although the effects of the big five personality traits and social comparison tendency were quite small, this investigation – like earlier studies by Trafimow and Finlay (1996), Sheeran, Norman, and Orbell (1999) and others – shows that there may be stable individual differences that influence the relative weights of the different predictors in the TPB.

Discussion

Research on the TPB has made considerable progress since the theory was introduced some two dozen years ago. Initial studies were mostly attempts to test the theory's predictive validity in various behavioural domains. The combined weight of much empirical evidence, perhaps best captured in such meta-analytic syntheses as the one included in the current set of articles, lends clear support to the theory. Satisfied that the TPB does in fact predict intentions and behaviour quite well, investigators turned their attention to more sophisticated questions, although straight-forward applications to new behaviours or behaviours in novel settings continue to appear in print. The questions raised in the current issue are representative of some of the questions that occupy contemporary investigators. Among other things, the present studies were designed to gain a better understanding of the role of automatic or spontaneous processes involved in habitual behaviour, processes that may be in play side-by-side with more reasoned modes of operation; to explore impulsivity and the ability to inhibit it when required for self-regulation; to examine the utility of making detailed plans as a way to improve ability to act on intentions; to test the ideas that adding anticipated affect or the motive to avoid uncertainty may improve prediction of intentions; to demonstrate individual differences in the relative weights assigned to the predictors in the TPB; and to study the role of such background factors as personality traits and depression. I have tried to show that some of these variables and processes, such as willingness to perform a behaviour or social support that appear to go beyond the TPB can actually be accommodated within it, whereas others, such as habit formation and various background factors, can expand and enrich our understanding of human social behaviour.

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