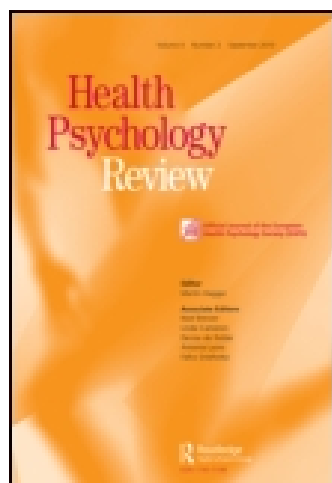


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Time to retire the theory of planned behaviour

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EDITORIAL

Time to retire the theory of planned behaviour

It doesn't matter how beautiful your theory is, it doesn't matter how smart you are. If it doesn't agree with experiment, it's wrong. (Richard P. Feynman)

The Theory of Planned Behaviour (TPB; Ajzen, 1985), an extension of the Theory of Reasoned Action (TRA; Fishbein & Ajzen, 1975), has been the dominant theoretical approach to guide research on health-related behaviour for the past three decades. The theory is well recognised amongst researchers and is also familiar to many students, practitioners and policy-makers.

The TPB proposes that volitional human behaviour is a function of the intention to perform the behaviour and perceived behavioural control (PBC). Intention is hypothesised to be a function of attitudes towards the behaviour, subjective norm and perceived behavioural control. The degree to which PBC influences behaviour directly (rather than indirectly through intention) is hypothesised to depend on the degree of *actual* control over the behaviour. Attitudes, subjective norms and PBC are assumed to be based on the strength and evaluation of accessible behavioural, normative and control beliefs.

Moreover, the TPB makes three mediation hypotheses. Firstly, the effect of attitude and subjective norm on behaviour is hypothesised to be fully, and that of PBC on behaviour to be partially, mediated by intention. Secondly, the effects of behavioural, normative and control beliefs on intention and behaviour are hypothesised to be mediated through attitude, subjective norm and PBC, respectively. Lastly, the effect of all other biological, social, environmental, economic, medical and cultural influences is hypothesised to be mediated by the TPB (sufficiency assumption; Ajzen, 1985; Sutton, 2002).

The TPB has inspired a considerable amount of empirical health behaviour research. The vast majority of studies have used correlational designs to investigate cross-sectional and prospective associations between TPB cognitions and behaviour (Noar & Zimmerman, 2005). A recent systematic review of 237 independent prospective tests found that the TPB accounted for 19.3% of variability in health behaviour with intention being the strongest predictor (McEachan, Conner, Taylor, & Lawton, 2011). It was also found that the TPB was considerably less predictive of behaviour when studies used a longitudinal rather than a 'shortitudinal' design, when participants were not university students and when outcome measures were taken objectively rather than as a self-report.

Experimental tests of the TPB have been surprisingly rare and those that have been conducted have not supported the theory's assumptions. A systematic review by Hardeman and colleagues (2002) found 24 studies in which the TPB was used in the development and/or evaluation of an intervention and concluded that the available evidence was insufficient to draw a robust conclusion about the usefulness of the theory. Factorial experimental tests of the TPB with interventions targeting one or all of the theory's cognitive predictors have either been unsuccessful in modifying the theoretical target variables (McCarthy, 1981) or when successful in changing cognitions, these changes did not translate into changes in

behaviour (Chatzisarantis & Hagger, 2005). Sniehotta (2009) used a 2*2*2 factorial design randomly allocating students to persuasive messages addressing salient behavioural, normative and/or control beliefs about using their university sports facilities. The behavioural belief intervention resulted in post-intervention changes in attitudes, but did not affect intention or behaviour. The normative belief intervention improved subjective norm and intention, but not behaviour. The control belief intervention did not affect PBC or intentions, but showed an effect on behaviour assessed objectively using recorded attendance at sports facilities (Sniehotta, 2009).

What have we learned?

The TPB has shaped psychological theorising. We owe the move from the three-factor model of attitudes used in the 1960s (Rosenberg & Hovland, 1960) towards a theory of decision-making to the insights provided by the TRA/TPB. We have also learned that intention and PBC are quite consistent psychological predictors of behaviour (McEachan et al., 2011) and that interventions resulting in large changes in intention are likely to also change behaviour (Webb & Sheeran, 2006).

Criticism

There has been no shortage of criticism towards the TPB. The balance between parsimony and validity has been questioned; is a theory of all volitional behaviour based on only four explanatory concepts sufficiently elaborated? For instance, the theory has been criticised for its exclusive focus on rational reasoning, excluding unconscious influences on behaviour (Sheeran, Gollwitzer & Bargh, 2013) and the role of emotions beyond anticipated affective outcomes (Conner, Gaston, Sheeran, & Germain, 2013). Moreover, the static explanatory nature of the TPB does not help to understand the evidenced effects of behaviour on cognitions and future behaviour (McEachan et al., 2011; Sutton, 1994).

Others have also questioned whether the hypotheses derived from the model are open to empirical falsification, or whether they are essentially common-sense statements which cannot be falsified (Ogden, 2003; Smedslund, 1978). Indeed, findings under *ceteris paribus* conditions suggesting that individuals are more likely to engage in behaviours that they enjoy less, feel incapable of doing or do not intend to do seems implausible and would cast doubt on the data more than on the underlying theory. Ogden (2003) found that authors of studies with results conflicting with TPB assumptions (e.g., null correlations between variables hypothesised to be highly related) rarely question the validity of the theory, but instead consider other explanations such as the operationalisation of their study measures.

The main focus of criticism has been the limited predictive validity of the TPB. Reviews show clearly that the majority of variability in observed behaviour is not accounted for by measures of the TPB. In particular, the problem of 'inclined abstainers', individuals who form an intention and subsequently fail to act, has been a recognised limitation of the TPB that remains unaddressed by the theory (Orbell & Sheeran, 1998). While we agree with these criticisms, we suggest focusing the debate on two additional aspects of the application of theory: validity and utility.

Concerns about validity

The main problem with the TPB is not that it is not explaining sufficient variability in behaviour. The main problem is that some of the theory's propositions are patently false.

In particular, the mediation assumptions in the TPB are in conflict with evidence. For example, beliefs are often found to predict behaviour over and above intentions (Araújo-Soares, Rodrigues, Pesseau, & Sniehotta, 2013; Conner et al., 2013). More critically, the bold *sufficiency hypothesis* assuming that all theory-external influences on behaviour are mediated through the TPB is empirically and conceptually indefensible, and has been falsified. For example, there is consistent evidence that age, socio-economic status, physical health, mental health and features of the environment predict objectively measured physical activity when TPB predictors are controlled for (e.g., Sniehotta et al., 2013).

The TPB elucidates an explicit, fully specified and statistically testable model describing how behavioural, normative and control beliefs determine attitude, subjective norm and PBC (through multiplicative composites of expectancy beliefs and outcome evaluations). French and Hankins (2003) have demonstrated that this method is misleading and have suggested range of alternative approaches.

There is considerable evidence that habit strength (Gardner, De Bruijn, & Lally, 2011), motivational measures such as self-determination, anticipated regret and identity (Conner & Armitage, 1998) or self-regulatory measures such as planning (Carraro & Gaudreau, 2013) regularly predict behaviour over and above TPB measures. Nudging, i.e., making subtle changes to the choice architecture by varying the salience, cost and reinforcement of behavioural choices outside of an individual's awareness, can result in behaviour changes without affecting intention or PBC (Marteau, Ogilvie, Roland, Suhrcke, & Kelly, 2011). Numerous moderators of the relationship between behaviour and TPB measures have also been identified (e.g. Rhodes & Dickau, 2013). The TPB seems to be most predictive amongst the young, fit and affluent and when predicting self-reported behaviour over a short term (McEachan et al., 2011; Sniehotta et al., 2013), which is less compatible with populations in which behaviour change theory is most needed.

Observing correlations between measures over time is not a sufficiently acceptable test of theory (Weinstein, 2007), particularly when there are clear opportunities for using more robust designs. We are not aware of any rigorous factorial experimental studies supporting the TPB. Why have experimental tests been so rare? Perhaps, it is because unlike Social Learning Theory (Bandura, 1977) the TPB does not theorise how cognitions change, thus calling into question whether it is a theory of behaviour *change* at all. Without a clear theory of change, it is difficult to devise replicable a priori interventions to modify attitudes, subjective norm and PBC, thereby preventing independent tests. This lack of clarity allows apologists to dismiss studies providing evidence in conflict with the TPB as insufficient operationalisations of the theory and conclude that there is an absence of evidence, rather than evidence falsifying TPB assumptions.

Where experimental tests have been attempted, observations have not been in line with the TPB, providing the most robust evidence for its lack of suitability as a theory of behaviour change (Chatzisarantis & Hagger, 2005; McCarty, 1981; Sniehotta, 2009). Are there really behavioural researchers left whose best explanation for human behaviour is condensed in the TPB?

Concerns about utility

A theory may be a useful falsehood, so the question is whether the TPB is in fact useful. In the 1970s, the TRA introduced great utility in suggesting that behaviour was not, as suggested in previous theories, a mere reflection of attitudes. It proposed new explanatory measures (i.e., intention and subjective norm), new research designs, and contributed to the development of knowledge. Three decades later, the TPB has lost its utility. It does not help practitioners to develop helpful interventions. It does not lend itself well to experimental tests and it does not provide explanatory hypotheses that would differ in a meaningful way from other prevalent theories (Sutton, 2002), which undermines our capacity to conduct comparative experimental tests of two plausible competing hypotheses against each other. Moreover, the TPB fails in the primary function of a theory: it does not accurately communicate accumulated empirical evidence. The TPB has become an empty gesture to tick the box that science should be theory-based. When have we last learned something new from reading a TPB study?

In practice, the field has already moved on. Scientists now use 'extended' forms of the theory, add self-regulatory behaviour change strategies to their interventions and elaborate around the theory. By doing so, they indicate that they do not believe that the TPB as it stands provides an acceptable explanation for human behaviour and that it needs to be changed or extended. The TPB originator acknowledges that research has made considerable progress since the TPB was introduced, but does not suggest changes to the actual theory incorporating new insights (Ajzen, 2011). A recent debate in this journal discussing how to change outdated theory in line with available evidence highlights the difficulties inherent in this process and importantly suggests strategies for improving the process of evidence informed theory development (Head & Noar, 2014; Kok & Ruiter, 2014; Noar & Head, 2014; Rhodes, 2014; Schwarzer, 2014). We welcome this debate about how the scientific community might be able to close the gap between what we call our theory of behaviour, and our knowledge that the theory is wrong. Abandoning outdated theories is an important step in this process. The TPB is no longer a plausible theory of behaviour or behaviour change and should be allowed to enjoy its well-deserved retirement.

Where next?

We do not need any more correlational studies of the TPB. The relationships between constructs in the TPB are known, as are the insufficiencies of the theory. While intention, PBC, attitude and subjective norm still have a role to play in predicting, understanding and changing health behaviour, a better understanding of the role of these reasoned action variables will result from a broader theoretical approach. 'Extended-TPB' models do a disservice to the novel ideas that such extensions test and provide unnecessary support to a model that in aggregate has been extended well-beyond recognition. What is needed is theoretical development testing new falsifiable hypotheses to explain behavioural phenomena to better help people change their behaviour and to help those who design and deliver interventions to help people to do so. Psychological theories should define their range of intended applications which should be empirically substantiated, rather than implicitly making untenable claims of explaining all behaviour by all humans. Several promising avenues of theory development have been proposed providing viable alternatives for researcher and practitioners. These include action theories which do not make extensive assumptions about cognitions and lend themselves to experimental tests

(e.g., self-regulation theories; Hagger, Chatzisarantis, Wood, & Stiff 2010) as well as theories with emphasis on temporal dynamics (e.g., PRIME theory; West & Brown, 2013) and temporal frames adopted by individuals when considering benefits and costs of behavioural options (e.g., Temporal Self-regulation Theory; Hall & Fong, 2007). Other approaches suggest incorporating multiple goals and behaviours in theory (Presseau, Tait, Johnston, Francis, & Sniehotta, 2013) or integrating evidence obtained from a range of theoretical approaches (Hagger & Chatzisarantis, *in press*). Other explanatory approaches involve dual process models (Hofmann, Friese, & Wiers, 2008) which assume that behaviour may be guided by reflective or impulsive determinants and offer hypotheses about the circumstances under which either of these processes is more likely to influence behaviour (Sheeran, Gollwitzer, & Bargh, 2013) and sequential models which hypothesise that different processes are involved in forming motivation to act and in translating this motivation into action (e.g., HAPA; Schwarzer, 2008). The longer we delay the retirement of the TPB, the longer we put off the discovery of a better explanation of health behaviour change.

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