



## Exercise habit strength, planning and the theory of planned behaviour: An action control approach

Gert-Jan de Bruijn\*

Amsterdam School of Communication Research ASCoR, University of Amsterdam, Kloveniersburgwal 48, 1012 CX Amsterdam, The Netherlands

### ARTICLE INFO

#### Article history:

Received 2 June 2010

Received in revised form

23 September 2010

Accepted 8 October 2010

Available online 15 October 2010

#### Keywords:

Exercise

Action control

Theory of planned behaviour

Habit strength

Action plans

### ABSTRACT

**Objectives:** Action control refers to the successful translation of intention into behaviour. The purpose of this study was to explore the potential usefulness of extending intention–exercise profiles with past exercise behaviour and exercise habit strength and the potential discriminative effect of action planning items and theory of planned behaviour (TPB) concepts.

**Design:** Prospective data from 330 undergraduate students (M age = 21.5; 25.5% males).

**Method:** Measures of exercise behaviour, exercise habit strength, TPB concepts and action plans were assessed at T1; subsequent exercise behaviour was assessed again two weeks later. Profiles were created from T1 exercise behaviour, intention, habit strength and T2 exercise behaviour. Data were analyzed using chi-square analysis, discriminant function analysis and analysis of variance and interpreted using *p*-values and effect sizes.

**Results:** There was considerable asymmetry in the intention–exercise relationship, with successful exercise intenders reporting stronger exercise habits. However, more than 40% of strongly habitual exercise intenders were not following on these intentions. Measures of perceived behavioural control were the consistent predictor of action control, but could not discriminate differences between key target groups. Effect sizes for significant differences were mostly large. Planning items were generally unrelated to exercise action control.

**Conclusion:** The extension of intention–exercise profiles revealed noticeable distributions to allow for better exercise target group detection. Measures of controllability of exercise behaviour should be promoted in several of these target groups, but research should explore additional predictors of key target groups in order to enhance exercise levels.

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### Introduction

Public health guidelines for (young) adults prescribe that regular bouts of exercise (i.e. three days per week for a minimum of 20 min per bout (Haskell et al., 2007)) are needed in order to accrue well-documented health benefits, including the prevention of weight gain (Kromhout, Bloemberg, Seidell, Nissinen, & Menotti, 2001) and reduced risk for cardiovascular diseases (Aadahl et al., 2009). However, large segments of the population are currently insufficiently active to meet these guidelines and fail to achieve these health benefits. This emphasizes a need to develop interventions that target increased exercise levels. Theories and models of human behaviour are considered to be pivotal in the intervention development phase, because they outline important behavioural determinants that can be altered through the use of educational and promotional efforts (Brug,

Oenema, & Ferreira, 2005). Socio-cognitive behavioural theories have traditionally been utilized in this development phase and one of the most commonly used theories is the theory of planned behaviour (TPB) (Ajzen, 1991). This theory postulates that behavioural enactment (i.e. engaging in exercise) is primarily determined by the intention to act and three socio-cognitive concepts influence this intention concept. These are attitudes (positive or negative evaluations of the outcomes of behavioural performance, in which both an instrumental and affective component is postulated), subjective norms (perceived norms about whether important others in the social environments believe on should perform the behaviour) and perceived behavioural control (PBC): this latter construct reflect the extent to which performance of behaviour is easy or difficult, but also if performance is under one's control or not. Reviews and meta-analysis of the TPB in the exercise domain have demonstrated its sufficiency (Godin, 1994; Hagger, Chatzisarantis, & Biddle, 2002; Hausenblas, Carron, Mack, & Godin, 1997).

Next to the delineation of pathways linking socio-cognitive variables with intention and behaviour, the TPB is also considered to be

\* Tel.: +31 205252636; fax: +31 205253681.

E-mail address: [g.j.debruijn@uva.nl](mailto:g.j.debruijn@uva.nl).

a linear model (Ajzen, 1991) in which higher scores on, for example, attitudes are related to higher scores on intention: a similar linear relationship is also postulated between intention and behaviour. Some evidence, however, indicates that this theoretical linearity may be partly misplaced in the exercise domain. Even though Rhodes and Courneya (2005) found similar linear relationships with exercise behaviour for both PBC and instrumental attitude ( $r = .24$ ), threshold analysis indicated non-significant differences in exercise behaviour between groups based on either high or very high levels of exercise PBC. In another study, Rhodes, Courneya, and Jones (2003) found evidence of threshold effects of intention on exercise behaviour, with those who intended to exercise beyond this threshold being no more successful in exercise enactment than those at the intention threshold. Such findings may indicate that TPB constructs related to exercise behaviour have specific thresholds and that exercise interventions that attempt to target changes above this threshold may be misplaced (Rhodes & Courneya, 2005). Additional evidence from the exercise domain has implicitly demonstrated this threshold effect of intention on exercise behaviour, with a substantial portion of research samples holding positive exercise intentions but not translating those intentions into actual exercise behaviour (De Bruijn, De Groot, Van den Putte, & Rhodes, 2009; Rhodes, De Bruijn, & Matheson, 2010; Rhodes et al., 2003; Rhodes & Plotnikoff, 2006; Rhodes, Plotnikoff, & Courneya, 2008). As a result, linear approaches may be insufficient to fully understand the intention–exercise gap. Categorical approaches have been suggested and applied in exercise action control research (Rhodes et al., 2003; Rhodes et al., 2010; Rhodes et al., 2008; Rhodes & Plotnikoff, 2006) by acknowledging two distinct phases, namely action planning (i.e. forming an intention) and action control (i.e. translating this intention into actual exercise behaviour) (Rhodes & Plotnikoff, 2006; Rhodes et al., 2008; Sniehotta, Nagy, Scholz, & Schwarzer, 2006). Within this type of research, four possible categories or profiles are commonly outlined. These are disinclined abstainers (those who do not intend to exercise and do not exercise), disinclined actors (those who do not intend to, but do exercise), inclined abstainers (those who intend to exercise but do not) and inclined actors (those who intend to exercise and do). Distributions of these profiles have demonstrated considerable asymmetry in the intention–exercise relationship, with the smallest cell size (generally less than 5%) for the disinclined actors and the largest cell sizes for disinclined abstainers and inclined actors and abstainers (Rhodes et al., 2010, 2008; Rhodes & Plotnikoff, 2006). Nevertheless, of those who hold positive exercise intention, between 30% and 50% fail to act upon those intentions and an investigation of predictors of exercise action control should be able to inform exercise interventions targeted at an already motivated population.

Concepts from various socio-cognitive models have been used in this line of research. For instance, applying the TPB to exercise action control, Rhodes et al. (2003) found that inclined actors had significantly higher scores on measures of exercise attitude and PBC than inclined abstainers. Similar results have been found in other studies applying the TPB to exercise action control (De Bruijn et al., 2009; Rhodes & Plotnikoff, 2006; Rhodes et al., 2008), with affective attitude measures generally outperforming instrumental attitudes measures. Similarly, using the constructs detailed in the trans-theoretical model, protection motivation theory and the TPB in exercise action control research has indicated that behavioural processes, self-efficacy and PBC were strong predictors of intention–exercise relationships (Rhodes et al., 2008). Thus, socio-cognitive factors such as PBC and affective attitude should be considered as persuasive message input factors in order to facilitate the enactment of exercise behaviour amongst those who already hold positive exercise intentions.

Notwithstanding the potential of PBC and affective attitude in exercise action control, self-regulatory strategies are also increasingly

suggested as promising constructs to bridge the intention–exercise gap (Gollwitzer & Sheeran, 2006; Sniehotta, Scholz, & Schwarzer, 2005, 2006). These strategies include formulating implementation intentions (Gollwitzer, 1999; Gollwitzer & Sheeran, 2006) and implemental planning or action plans (Lippke, Ziegelmann, & Schwarzer, 2004; Sniehotta, Scholz et al., 2006; Sniehotta, Schwarzer, Scholz, & Schuz, 2005). These latter strategies include the formulation of plans in which one specifies how, when, and/or where to act. Action plans are thought to facilitate behavioural enactment by detailing *how* to act when a specific situational cue is encountered (Bandura, 1998; Gollwitzer & Schaal, 1998; Gollwitzer & Sheeran, 2006). Exercise determinant research applying action planning has shown that intention–exercise relationships are generally stronger when stronger action plans have been formulated (Norman & Conner, 2005; Wiedemann, Schuz, Sniehotta, Scholz, & Schwarzer, 2009). Nevertheless, as previously argued, the asymmetric nature of the intention–exercise relationship suggests that such linear statistical approaches may be insufficient to fully capture important predictors of exercise action control: investigation of the potential relevance of action planning in exercise action control using categorical statistical analyses may hold promise for a better delineation of relevant factors that impede or facilitate the translation of positive exercise intentions.

Recent research endeavours on exercise action control have also demonstrated that the extension of intention–exercise profiles with past exercise behaviour yields relevant knowledge for exercise interventions (Rhodes & Plotnikoff, 2006; Rhodes et al., 2008; Sniehotta, Nagy et al., 2006; Sniehotta, Scholz et al., 2005). First, these studies have demonstrated that the intention–exercise gap exists not only in exercise adopters (those who have not engaged in previous exercise behaviour), but also in exercise maintainers (those who have previously engaged in exercise). For instance, Rhodes and Plotnikoff (2006) found not only that 65% of exercise adopters were not following up on their positive exercise intentions, but also that more than a quarter of exercise maintainers were not following up on their positive exercise intentions. Moreover, these authors found various predictors of action control that were independent of previous exercise status, but also reported predictors of action control that were more pronounced in exercise adopters as compared to exercise maintainers. For instance, control beliefs regarding exercise in bad weather and exercising in the company of other were key discriminators between successful and unsuccessful maintainers, but not between successful and unsuccessful adopters. Thus, exercise relapses in exercise maintainers could be prevented by persuasive messages emphasizing the relevance of exercise company and targeting beliefs regarding exercising in bad weather.

Although practically informative, the application of past exercise behaviour holds little theoretical value for developing new or changing current behavioural models. That is, past behaviour has often been denoted as an empty construct (Eagly & Chaiken, 1993; Verplanken & Aarts, 1999) and viable mechanisms linking past behaviour with current behaviour should be explored in order to enhance behavioural models (Ajzen, 2002; Chatzisarantis & Hagger, 2007; Hagger, Chatzisarantis, & Biddle, 2001). Behavioural recurrence has often been suggested to reflect the operation of habits (Aarts, Paulussen, & Schaalma, 1997; Aarts, Verplanken, & van Knippenberg, 1998; Triandis, 1977), which are conceptualized as behaviours that are automatically set in motion by features of the environment, rather than by planned intentions. Research has indeed indicated that stronger exercise habits make exercise behaviour less intentional (De Bruijn & Rhodes, *in press*). Further, studies have recently begun extending intention–behaviour profiles with a validated measure of habit strength (Verplanken & Orbell, 2003) in both dietary (De Bruijn, 2010) and physical

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