

Watching and participating in exercise videos: A test of the theory of planned behaviour, conscientiousness, and the role of implementation intentions

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Abstract

This study tested an expanded model of the Theory of Planned Behaviour (TPB) in predicting intentions, and behaviour, to watch and actively engage in a short exercise video. Eighty participants completed questionnaire measures of the TPB, conscientiousness and self-concordance. Forty participants were randomly allocated to form an implementation intention by stipulating in writing when and where they intended to watch the video during the subsequent three days. Hierarchical regression analysis revealed subjective norms and perceived behavioural control to be the key predictors of intention. Hierarchical logistic regression analysis revealed direct effects of intention and implementation intentions on behaviour. In addition, conscientiousness interacted with implementation intentions. However, contrary to expectations, conscientiousness failed to predict behaviour among the implementation intention group and negatively predicted behaviour among controls. The current results suggest that the formation of an implementation intention is a powerful technique for facilitating the performance of health behaviour.

Keywords: *Theory of planned behaviour, conscientiousness, implementation intentions, self-congruence*

Introduction

Most health researchers agree that exercise is beneficial, both physically and psychologically (Biddle, Fox, & Boucher, 2000; Biddle & Mutrie, 2001). In the US, studies indicate that increased exercise is associated with lower risk of cardiovascular disease mortality and hypertension (US Department of Health and Human Services, 1996). In the UK, physical

inactivity has been attributed to an estimated 37% of deaths from coronary heart disease (CHD) (British Cardiac Society, British Hyperlipidaemia Association, British Hypertension Society, British Diabetic Association, 2000). In a recent review of the literature Dubbert (2002) reported lower rates of colonic cancer and type 2 diabetes mellitus among those taking more exercise, and also noted that exercise during early years can protect against the later development of osteoarthritis.

Evidence supporting the psychological benefits of exercise is equally impressive. Following a meta-analysis of fourteen studies, Lawlor and Hopker (2001) concluded that the effects of exercise in reducing depression were comparable to those obtained using standard interventions such as cognitive behaviour therapy. Likewise, Fox (2000) reviewed 26 randomised control trials and found positive changes in self-esteem following exercise in 76% of them. Improvements in state affect following acute bouts of exercise have also been reported by Rejeski and colleagues, particularly when participants are feeling more negative at the outset (Gauvin, Rejeski, & Norris, 1996; Gauvin, Rejeski, & Reboussin, 2000; Rejeski, Gauvin, Hobson, & Norris, 1995).

So compelling is the evidence for physical and psychological benefits of exercise, as well as the problems associated with inactivity, that the adoption of regular exercise is now enshrined in Government policy (Biddle et al., 2000; DoH, 1995; Health Education Authority, 1995). The National Service Framework (NSF) for CHD (DoH, 2000) required all NHS bodies to contribute to the delivery of local programmes of effective policies on increasing physical activity, and a National Quality Assurance Framework for Exercise Referral Systems (DoH, 2001) has been set up. The latter supports previous exercise-related initiatives contained within the NSF for CHD (DoH, 2000) and Saving Lives: Our Healthier Nation (DoH, 1999) which specify national health targets that need to be attained in terms of CHD and stroke, cancer, mental health and accident reduction.

Establishing the psychological precursors of taking exercise is clearly important in order to develop theory-based interventions to increase the percentage of people benefiting from exercise. The theory of planned behaviour (Ajzen, 1991) has been employed for this purpose on a number of occasions, generally with good results. For example, in a meta-analysis of over 30 studies Hausenblas, Carron and Mack (1997) reported significant mean correlations between exercise intention and attitude (0.52), subjective norm (0.27) and perceived behavioural control (0.43). In a more recent meta-analysis of 72 studies a similar pattern of correlations was noted, though the magnitude of the coefficients was slightly lower (Hagger, Chatzisarantis, & Biddle, 2002). Significant correlations between exercise *behaviour* and both intention and perceived control have also been reported (e.g., Hausenblas et al., 1997; Norman, Conner, & Bell, 2000). In regression analyses, perceived control has been found consistently to predict intention (Bozionelos & Bennett, 1999; Godin, Valois, & Lepage, 1993; Norman et al., 2000) and, slightly less often, behaviour (Kimiecik, 1992; Norman & Smith, 1995; Norman et al., 2000).

The first objective of this study was to assess the power of the TPB in predicting intentions, and behaviour, and to watch and participate actively in a short exercise video presented by a well-known TV star. Obtaining exercise from videos in the comfort of one's own home may be preferable to joining a gymnasium for many people due to financial outlay, personal exposure or simple convenience. Many studies use generalised measures of exercise (e.g., Norman et al., 2000) which are subject to measurement error in that one cannot always be certain which activities are and are not admissible. The current study employed a more specific measure, i.e., the same 15 min exercise video was supplied to all participants. In addition, such a strategy served to improve the correspondence between predictor and outcome variables.

The TPB is hypothesised to consist of the immediate cognitive precursors of behaviour through which other more distal variables operate. In recent years, however, a number of additional factors have been shown to predict independently both intention and behaviour. Some of these were reviewed by Conner and Armitage (1998) and included variables such as moral norms, affect, self-efficacy and past behaviour. Less often considered in these so-called 'extended' models of the TPB are individual differences in personality. This is somewhat surprising since some dimensions of personality, for example conscientiousness, have been shown to be associated with a variety of health behaviours (Booth-Kewley & Vickers, 1994; Castle, Skinner, & Hampson, 1999; Ingledew & Brunning, 1999; Lemos-Giraldez & Fidalgo-Aliste, 1997; Vollrath, Knoch, & Cassano, 1999). Conscientiousness describes the tendency to make plans and to be well-organised in carrying out one's tasks. Low levels of conscientiousness are associated with hedonism and lackadaisicalness.

A rare example of research which examined the effects of conscientiousness as part of an expanded TPB model is that of Conner and Abraham (2001). Although part of the influence of conscientiousness on intention to look after one's health was mediated by TPB variables, the unmediated (direct) effect was stronger (study 1). In study 2, the effect of conscientiousness on exercise behaviour was wholly unmediated. Rhodes and Courneya (2003) make the point that an appreciation of the role of individual differences may be crucial in terms of designing health promotion programmes to suit the personalities of the recipients.

The second aim of the current study was to see if conscientiousness possessed independent predictive power for exercise intention and a specific health behaviour. It is predicted that conscientious people, because they are more likely to look after their health and take fewer risks (Castle et al., 1999; Friedman et al., 1995) than less-conscientious counterparts, would possess stronger intentions to exercise and be more likely to carry out the behaviour.

One of the main criticisms of the TPB is that intentions do not typically result in behavioural enactment. Meta-analytic studies (e.g., Armitage, & Conner, 2001; Sutton, 1998) suggest that between 23% and 34% of behaviour variance is accounted for by the model, thus leaving the majority of it unexplained. In other words, strong intentions to engage in protective health behaviour, and being in possession of the means to do so, are no guarantee of actual behaviour. However, recent studies (e.g., Orbell, Hodgkins, & Sheeran, 1997; Prestwich, Lawton, & Conner, 2003; Sheeran & Orbell, 1999, 2000; Verplanken & Faes, 1999) suggest that augmenting a behavioural intention with an implementation intention, i.e., a plan regarding when, where and how the behaviour would be carried out (see Gollwitzer, 1999), should increase the likelihood of such behaviour being enacted. For example, Orbell et al. (1997) found that women who specified when and where they were going to carry out breast self-examination over the forthcoming month were more likely to report doing so at follow-up than those who had not been encouraged to formulate such a plan. This formed the basis of the third objective of this study, namely, to determine if the formation of an implementation intention indicating where and when the video will be watched would facilitate the enactment of such behaviour. In addition, it was also possible to ascertain if the formation of such a plan might be differentially beneficial to those who reported higher levels of motivation, as might be expected. This can be determined by examining the predictive impact on behaviour of the interaction between intention and implementation intention in a regression model.

Hitherto, possible interactive effects of personality and implementation intentions have not, to our knowledge, been tested for. The current study provides an excellent opportunity to remedy this situation, and the nature of the variables offers a particularly good chance of detecting such an effect if it exists. As noted above, conscientiousness describes a tendency

to be well-organised and self-disciplined in pursuit of one's goals. It is argued, therefore, that people high in conscientiousness would be particularly receptive to an invitation to create an implementation intention compared with those low in conscientiousness. If so, then additional behavioural variance may be accounted for by the conscientiousness $\times$ implementation intention interaction term over and above that explained by the effects of these variables independently. Testing this rationale constitutes the fourth aim of the study.

The role of identity in goal formation and pursuit has been examined occasionally as part of the extended TPB (cf Conner & Armitage, 1998). Recent work suggests that the extent to which a goal is 'self-concordant' will determine the likelihood of its pursuit and ultimate achievement (Koestner, Lekes, Powers, & Chicoine, 2002). Self-concordance refers to the extent to which a goal reflects personal interests and values *versus* something one feels compelled to do by external or internal pressures. Indeed, Koestner et al. (2002) have shown an interactive relationship between self-congruence and implementation intentions such that when a goal is self-congruent and an individual has formed an implementation intention about how and when to pursue it, the likelihood of goal achievement increases substantially. The final objective of this study was to carry out an independent test of this interaction hypothesis in relation to exercise behaviour.

Method

Participants

A mixed sample of 80 white-collar office workers ($N=40$) and university undergraduates ($N=40$) was obtained. Twenty-seven participants were men and the mean age was 31.2 years with a range of 17 to 62. One of the inclusion criteria was that participants had access to a video recording machine. Participants in this convenience sample were approached directly and given a written invitation to engage in the study. Those who agreed completed the questionnaire on the spot and were given a copy of the video and a response sheet containing return instructions.

Design, measures and procedure

Both correlational and quasi-experimental methods were employed. A questionnaire was designed to assess TPB variables, conscientiousness and self-concordance, as well as demographic details and an indication of the amount of active exercise engaged in during a typical week. Half of the questionnaires contained an additional paragraph inviting participants to indicate the day and time they planned to watch the exercise video. Three days later they were obliged to return the video tape and to indicate honestly whether or not they had watched it and participated in the exercises.

Questionnaire measure

Intention. Three statements were constructed to measure intention to watch and participate in the 15 min exercise video during the next three days (*I intend to...; I will try to...; I plan to...*). Seven point Likert response scales were employed using the following anchors respectively: *extremely unlikely/extremely likely; definitely will not/definitely will; strongly agree/strongly disagree*. Responses were combined such that higher scores indicated stronger intentions. The measure proved to be highly reliable ($\alpha = 0.94$).

Attitude. A direct measure of attitude was obtained by presenting participants with a single statement followed by three semantic differential scales. The statement read '*For me to watch and actively participate in the 15 min exercise video during the next three days would be ...*'. The seven-point options provided were *harmful/beneficial*, *pleasant/unpleasant*, and *enjoyable/unenjoyable*. Higher scores indicated a more positive attitude. The measure proved reliable ($\alpha = 0.70$).

Subjective norms. Three statements were presented with which participants had to indicate their level of agreement or disagreement using seven-point Likert scales. The items were ... *Most people who are important to me think I should watch and participate in the 15 min exercise video during the next three days*; *It is expected of me that I watch and participate in the 15 min exercise video during the next three days*; and *The people in my life whose opinions I value would approve of me watching and participating in the 15 min exercise video during the next three days*. As before, higher scores indicated higher levels of perceived social pressure ($\alpha = 0.71$).

Perceived behavioural control. Two items were presented to participants as follows: *For me to watch and participate in the 15 min exercise video during the next three days would be ...*; and *How much control do you believe you have over watching and participating in the 15 min exercise video during the next three days?* Seven point response scales were anchored as follows for each item respectively: *impossible/possible* and *no control/complete control*. Higher scores indicated greater levels of perceived behavioural control and the measure proved to be reliable ($\alpha = 0.75$).

Conscientiousness. Two facets of the conscientiousness factor, namely dutifulness and self-discipline, were employed from the NEO-PI-R form S (Costa & McCrae, 1992). People scoring high on dutifulness are strongly governed by their conscience and so adhere closely to their ethical and moral obligations. Those scoring high on self-discipline have the ability to bring tasks to a conclusion in the face of distraction or boredom. Each facet contained eight items with which participants had to rate their level of agreement or disagreement using a five-point scale. Examples of items from the two facets respectively are ... *When I make a commitment I can always be counted on to follow through*, and ... *Once I start a project, I almost always finish it*. Facet scores were combined to provide an index of conscientiousness ($\alpha = 0.85$).

Self-concordance. Four reasons for undertaking the behaviour, forming a continuum of self-determination from highly controlled to highly autonomous, were presented to participants (Sheldon & Kasser, 1995). These included ... *I would feel ashamed, guilty or anxious if I did not complete this goal* (introjected), *Somebody else wants me to* (external), *I really believe that it is an important goal to have, I endorse it freely and value it whole-heartedly* (identified) and *I am interested in the experience itself, in the fun and enjoyment it will bring me* (intrinsic). Nine-point scales were provided for participants to indicate the extent to which they endorsed each reason. Combined scores on the first two items were subtracted from combined scores on the second two items. Thus, positive self-concordance scores were indicative of goal pursuit for intrinsic reasons whereas negative scores implied goal pursuit for externally imposed reasons.

Current exercise behaviour. Participants were asked to indicate the amount of active exercise they took in the course of a typical week. Five response categories were provided ranging from zero to more than two hours. Active exercise was defined in terms of... ‘*deliberately engaging in actions designed to increase your heart-rate and respiration, for example aerobics, running, fitness cycling, swimming, etc. It does not include activities such as normal walking, running to catch a bus, housework, gardening, etc.*’.

Implementation intention manipulation. On half of the questionnaires a brief statement was presented as follows: *Psychological research shows that when a person has a goal, they are more likely to achieve it if they specify in advance the time and day on which they will carry out the necessary action to achieve that goal. Please think about the next three days and identify a day and time when you can watch and participate in the video, and please make a commitment to doing so. Kindly write this day and time in the space provided below.* Those in the implementation intention condition duly wrote down the time and day they planned to watch the video. The statement did not appear on the questionnaires of those in the control condition.

Behaviour. Participants took away with them a copy of the exercise video and a single sheet of paper asking them honestly to indicate whether or not they had watched the video during the three days in question and, if so, to specify the time and day they did so. Positive responses were coded 1 in the data-file whilst zeros were used to index those who did not manage to watch the video.

Results

Descriptive statistics were computed initially. Mean scores on the key variables are presented in Table I, both for the sample as a whole and by implementation intention group.

It can be seen that participants positively evaluated watching and participating in the exercise video, felt they had considerable control over doing so, reported some normative pressure to do so, and mostly intended to carry out the behaviour. Conscientiousness levels were fairly widely distributed across the sample though the mean tended to indicate a moderately conscientious group overall. The negative mean score for self-concordance indicates that, in general, extrinsic reasons for watching and participating in the exercise video were more likely to be endorsed than intrinsic reasons. Between-groups comparisons revealed controls to be more conscientious, and more likely to pursue the goal for extrinsic

Table I. Mean values for the main variables, overall and by implementation intention condition.

	Implementation intention group (<i>n</i> = 40)	Control group (<i>n</i> = 40)	Overall (<i>N</i> = 80)
Attitude	14.80	14.68	14.74
Subjective norm	14.48	14.30	14.39
Perceived behavioural control	12.05	11.35	11.70
Intention	18.05	15.83	16.94
Conscientiousness**	61.08	67.27	64.18
Self-concordance*	-0.35	-2.75	-1.55

p* < 0.05; *p* < 0.005.

Table II. Intercorrelations among the main variables.

	ATT	SN	PBC	CONSC	SELF-CON	INT
Attitude	–					
Subjective norm	0.47**	–				
Perceived behavioural control	0.42**	0.43**	–			
Conscientiousness	0.38**	0.34**	0.31**	–		
Self-concordance	–0.26*	–0.26*	–0.09	–0.17	–	
Intention	0.40**	0.54**	0.66**	0.24*	–0.16	–
Behaviour	0.08	0.03	0.09	–0.32**	–0.05	0.19*

$N=80$; * $p<0.05$; ** $p<0.01$.

Table III. Hierarchical multiple regression of intention onto attitude, subjective norm, perceived control (Step 1), and conscientiousness (Step 2).

	B	SE (B)	β
Step 1			
Attitude	0.07	0.13	0.05
Subjective norm	0.35	0.12	0.29*
PBC	1.01	0.18	0.51*
Step 2			
Attitude	0.09	0.13	0.06
Subjective norm	0.36	0.12	0.30*
PBC	1.02	0.18	0.52*
Conscientiousness	–0.03	0.05	–0.05

* $p<0.005$.

Step 1: $R^2=0.52$; $F(3, 76)=27.00$, $p<0.001$.

Step 2: $R^2=0.52$; $F(4, 75)=20.14$, $p<0.001$.

reasons, than those in the implementation intention group. Finally, 40 participants (50%) reported watching the video and carrying out the exercises thereon; of these, most ($N=33$) had formed an implementation intention.

Correlational analyses were then carried out to establish the direction and magnitude of association between the variables (see Table II). Intention was found to correlate positively and significantly with attitude, subjective norm, perceived behavioural control and conscientiousness. Behaviour correlated positively and significantly with intention, and negatively and significantly with conscientiousness. Self-concordance was found to be unrelated to intention or behaviour.

A hierarchical multiple regression analysis was performed to establish the predictors of intention and to assess the impact of conscientiousness in particular (Table III). Attitude, subjective norm and perceived behavioural control were all entered on the first step. This model proved significant [$F(3, 76)=27.00$, $p<0.001$] and accounted for 52% of the variance in intention. Conscientiousness was added on the second step but failed to account for additional variance in intention (R^2 change = 0.002, F change < 1). In the final model, both subjective norm ($\beta=0.30$) and perceived behavioural control ($\beta=0.52$) emerged as significant predictors of intention.

In order to determine the predictors of behaviour, a four-step hierarchical logistic regression analysis was conducted (Table IV). Intention was entered on the first step, conscientiousness on the second step, and implementation intention on the third step. Three interaction terms were entered on the final step: intention $\times$ implementation intention; conscientiousness $\times$ implementation intention; and self-concordance $\times$ implementation

Table IV. Hierarchical Logistic regression of behaviour onto intention, conscientiousness, implementation intentions and interactions.

	B	SE (B)	Wald
Step 1			
Intention (Int)	0.08	0.05	2.80*
Step 2			
Intention	0.15	0.06	6.35**
Conscientiousness (Con)	-0.10	0.03	10.71***
Step 3			
Intention	0.07	0.06	1.26
Conscientiousness	-0.06	0.04	2.51
Implementation Intention (II)	2.74	0.61	19.94***
Step 4			
Intention	0.15	0.07	4.30**
Conscientiousness	-0.06	0.05	1.66
Implementation Intention	3.13	0.74	17.77***
II $\times$ Int	0.20	0.40	0.25
II $\times$ Con	1.10	0.45	5.88**
II $\times$ Self-concordance	0.38	0.38	1.01

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.001$.

R^2 (Nagelkerke) = 0.05 (Step 1); 0.25 (Step 2); 0.52 (Step 3); 0.61 (Step 4).

intention. Having standardised (centred) each predictor, interaction terms were established by multiplying pairs of centred variables (Lindley & Walker, 1993). Results indicate that, on the first step, a marginally significant effect of intention was noted. On the second step, both intention and conscientiousness (negatively) significantly predicted behaviour. However, both factors became non-significant when implementation intention group was entered on the third step. In the final model, both intention and implementation intention group were found to predict behaviour directly. In addition, the interaction between conscientiousness and implementation intention group also proved significant. Overall, 61% of the variance in behaviour was explained.

When decomposing an interaction consisting of at least one dichotomous variable, Aiken and West (1991, p. 12) suggest conducting two regressions, one for each level of the dichotomised predictor. Thus, behaviour was regressed onto intention and conscientiousness separately for those in the implementation intention group and for those in the control condition. Conscientiousness negatively predicted behaviour among controls (Wald = 5.76, $p = 0.016$) whereas in the implementation intention group no association between variables was noted (Wald = 0.65, $p = 0.42$).

Discussion

The first aim of this study was to assess the predictive power of the TPB in terms of watching and actively participating in an exercise video. Regression analyses indicated that perceived behavioural control was the best predictor of intention and, together with subjective norms and attitudes, the TPB model accounted for 50% of the variance in intention. Similar results were reported by Norman et al. (2000). In their study of exercise behaviour over a six-month period, 53% of the variance in intention was accounted for by the TPB variables, with perceived behavioural control again emerging as the primary predictor. Similarly, perceived behavioural control proved to be the key TPB predictor of exercise intentions over a 3-week (Bozionelos & Bennett, 1999) and a 4-week (Dzewaltowski, Noble, & Shaw, 1990; Kimiecik, 1992) period. So, whether one

is attempting to predict intention to take exercise on a one-off occasion, over a relatively short period (weeks), or over a somewhat longer term (6 months), the beliefs that individuals hold about controlling this behaviour appear to be paramount.

Subjective norm was found to influence intention more in the current study than in previous exercise studies (e.g., Hagger et al., 2002; Hausenblas et al., 1997; Norman et al., 2000). Whilst this may be attributable to temporal variations in the proposed behaviour, an alternative explanation is suggested by Ravis and Sheeran's (2003) distinction between descriptive and injunctive norms. In essence, descriptive norms capture one's beliefs about how other people behave, whereas injunctive norms are beliefs about engaging in behaviour that might attract approval from others. This study involved injunctive norms only and it is argued that the target behaviour, being relatively undemanding and one-off in nature, provided an opportunity to obtain (notional) approval from others in return for modest personal investment. The possibility that injunctive norms motivate behaviour through offering potential extrinsic rewards is worthy of further investigation.

Of note, briefly, was the lack of predictive utility of attitudes in the current study. This contrasts with the meta-analytic results of Hausenblas et al. (1997) and Hagger et al. (2002) where attitudes were found to be the best predictor of exercise intention. However, Hagger et al. (2002) reported considerable variation in findings in the studies they analysed, and noted also that the beliefs underlying both attitudes and perceived control may overlap. The observed correlation between attitudes and perceived behaviour control in the current study ($r=0.42$) is consistent with their comments.

In predicting actual behaviour, the theory performed less well. On this occasion perceived behaviour control was not directly related to behaviour, though it may have exerted an effect through intention which emerged as a more important predictor. The amount of variance accounted for was just 5% (see Table IV, Step 1). These results were similar to those of Bozionelos and Bennett (1999) and Godin et al. (1993) in that intention, but not perceived control, emerged as the significant behavioural predictor. However, they contrasted with those of Norman et al. (2000) who found perceived control to be the better behavioural predictor. It may be that whilst perceived control exerts effects on behaviour over longer time periods its role in one-off, relatively easy behaviours, is less important. Enacting the task in question requires very modest levels of control; in effect, once one determines that such control is available it seems that intention takes over as the key TPB predictor.

The second aim of the study was to explore the role of conscientiousness in predicting exercise intention and behaviour, both alone and in conjunction with the TPB. Although a significant zero-order correlation was observed between intention and conscientiousness, the latter did not emerge as predictive of the former in the final regression model, a finding which was similar to that of Rhodes and Courneya (2003). However, actual behaviour was negatively predicted by conscientiousness. This was an unexpected finding and contrary to predictions. Two possible explanations for this result may be considered. First, it may simply have been due to measurement. In an effort to keep the overall length of the questionnaire within reasonable limits only two of the six possible facets of the conscientiousness factor identified by Costa and McCrae (1992) were utilised. Whilst it is tempting to conclude that measurement is the key problem and that future studies should employ the full set of facets, such a conclusion may be premature. The hypothesised link between conscientiousness and health behaviour has been detected in a number of previous studies using a variety of ways of measuring conscientiousness: these include Saucier's Mini-markers measure (40 trait adjectives, see Castle et al., 1999), the NEO-FFI containing 60 behavioural statements (see Ingledew & Brunning, 1999), and Goldberg's 100 unipolar markers (see Arthur & Graziano, 1996). The fact that significant associations emerged

in these studies irrespective of the form of measurement points to the validity of the relationship between conscientiousness and health behaviour and suggests that measurement may not be the underlying problem.

An alternative explanation invokes personality theory and behavioural prediction generally, and relates in part to the person–situation controversy. Personality theorists such as Epstein (1979, 1984) have long accepted that single instances of behaviour cannot be predicted reliably by trait measures; instead, average response tendencies over a sufficient range of time and situations are required. This ‘principle of aggregation’ has been empirically demonstrated on numerous occasions (e.g., Diener & Larsen, 1984; Small, Zeldin, & Savin-Williams, 1983). It may be that conscientiousness is positively predictive of exercise behaviour only over a longer timeframe. One questionnaire item in the current study asked participants to indicate the amount of exercise they took, ranging from zero to more than two hours, in a typical week. A small but significant positive correlation ($r=0.22$, $p<0.05$) was observed such that more conscientious participants tended to report taking more exercise in a typical week than less conscientious counterparts. It may be argued that, since they were already taking more exercise, the offer of a one-off opportunity to work-out to a celebrity video held less appeal to conscientious participants than to their more impulsive, less conscientious, counterparts. More generally, caution is clearly warranted when exploring the role of personality factors in conjunction with the TPB. In particular, measuring single instances of behaviour is ill-advised; instead, sampling behaviour on multiple occasions is needed.

The addition of implementation intentions to the regression model (Step 3) exerted two noticeable effects: it increased the amount of variance in behaviour accounted for by 27%, and supplanted the effects of intention and conscientiousness on behaviour. Clearly, planning when to watch and participate in the exercise video greatly increased the likelihood of behavioural enactment. This finding complements those of Prestwich et al. (2003) who found that an implementation intention intervention increased exercise frequency and total amount of exercise time over a four-week period compared with a motivation-based intervention. As such, implementation intentions can enhance exercise engagement both on one-off occasions and over somewhat longer time-frames. This adds to the growing list of health behaviours wherein implementation intentions have been found to show facilitative effects [e.g., breast self-examination (Orbell et al., 1997); medication adherence (Sheeran & Orbell, 1999), healthy eating (Verplanken & Faes, 1999) and screening attendance (Sheeran & Orbell, 2000)].

Precisely how implementation intentions exert their effects remains open to question but at least two studies have implicated memory processes (Orbell et al., 1997; Prestwich et al., 2003). Linking the intended behaviour to an anticipated stimulus cue creates some form of cognitive association which, when the cue is subsequently encountered, triggers the response and the behaviour unfolds in a relatively automatic fashion. Experimental studies, perhaps manipulating levels of rehearsal, are still required to test this proposal formally.

In the final regression model, intention and implementation intentions, though not conscientiousness, remained significant predictors of behaviour. However, a significant interaction between implementation intention and conscientiousness was noted. In the control condition (i.e., no implementation intention) more conscientious participants were significantly less likely to engage in the behaviour than less conscientious counterparts. As this group is essentially a subset of the overall sample, the reasons discussed earlier for the negative association between behaviour and conscientiousness still apply. However, in the implementation intention condition it appears that the formation of a plan nullifies the effects of personality factors on behaviour. In other words, once an implementation

intention to engage in a particular behaviour is established, conscientiousness is no longer predictive of behaviour. Interestingly, the main effect of conscientiousness proved to be non-significant in the final two steps of the regression once implementation intention was introduced. This is somewhat analogous to Orbell et al.'s (1997) and Sheeran and Orbell's (2000) observation that the creation of implementation intentions suppresses the traditional impact of habitual behaviour on future actions. These conclusions should be treated with caution in view of the one-off nature of the focal behaviour and the fact that the conscientiousness-behaviour association was found to be opposite to that predicted.

The final hypothesis of an interaction between implementation intentions and self-concordance in predicting behaviour was unsupported. This is at odds with Koestner et al. (2002). It is possible that the goal in the current study was not salient enough to activate self-concordance cognitions. Koestner's studies employed goals that were self-selected and, by definition, contained personal relevance. It is unlikely that asking people unexpectedly to watch an exercise video will overlap with their personal current goals. Nevertheless, it would be interesting to explore the effects of self-concordance on self-selected exercise behaviour.

In sum, TPB variables were found to predict intentions to watch and actively participate in an exercise video; intentions tended to be predictive of behaviour. Conscientiousness also predicted exercise behaviour but in a negative direction. However, a more appropriate test of the influence of personality on health behaviour would involve taking repeated measures of behaviour as opposed to a single instance of behaviour as used in the current study. The formation of implementation intentions facilitated the enactment of behavioural intentions, thus confirming their potential utility to health psychologists. In particular, they seemed to be powerful enough to supplant the effects of personality in the same way as they have been shown previously to suppress the effects of past behaviour.

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