Perceived difficulty in the theory of planned behaviour: Perceived behavioural control or affective attitude?

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A study was conducted to explore (a) the dimensional structure of perceived behavioural control (PBC), (b) the conceptual basis of perceived difficulty items, and (c) how PBC components and instrumental and affective attitudes, respectively, relate to intention and behaviour. The material stemmed from a two-wave study of Norwegian graduate students (N = 227 for the prediction of intention and N = 110 for the prediction of behaviour). Data were analysed using confirmatory factor analysis (CFA) and multiple regression by the application of structural equation modelling (SEM). CFA suggested that PBC could be conceived of as consisting of three separate but interrelated factors (perceived control, perceived confidence and perceived difficulty), or as two separate but interrelated factors representing self-efficacy (measured by perceived difficulty and perceived confidence or by just perceived confidence) and perceived control. However, the perceived difficulty items also overlapped substantially with affective attitude. Perceived confidence was a strong predictor of exercise intention but not of recycling intention. Perceived control, however, was a strong predictor of recycling intention but not exercise intention. Affective attitudes but not instrumental attitudes were identified as substantial predictors of intentions. The findings suggest that at least under some circumstances it may be inadequate to measure PBC by means of perceived difficulty. One possible consequence may be that the role of PBC as a predictor of intention is somewhat overestimated, whereas the role of (affective) attitude may be similarly underestimated.

It follows from both the social cognitive theory (Bandura, 1977, 1997) and modified learning theory (Wallston, 1992) that even though a person thinks that a behaviour will produce positively valued outcomes, they will only be motivated to (try to) perform the behaviour to the extent that they are confident in their ability to perform it successfully. For behaviours that are dependent on (the perception of) certain skills, competence,
planning, cooperation of others, time, money, or the handling of other external or internal hindrances (Ajzen, 1988, 1991), action will thus be a product of both outcome and efficacy expectancies (Bandura, 1977, 1997).

It is by taking efficacy expectancies into consideration that the theory of planned behaviour (TPB; Ajzen, 1988, 1991) differs from the theory of reasoned action (TRA; Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975). Ajzen (1985, p. 36) has described the difference between the TRA and TPB in this way: ‘the two theories are identical when the subjective probability of success and the degree of control of internal and external factors reach their maximum values. . . . When subjective probabilities of success and actual control are less than perfect, however, we enter the domain of Planned Behavior.’ Ajzen (2002a) argues that when perceived behavioural control (PBC) is understood in this way it is ‘quite similar’ to (or even synonymous to, see Ajzen, 1991) Bandura’s concept of self-efficacy, but only when the latter is defined in relation to the performance of specific behaviours (Bandura, 1998). It is not difficult to agree with Ajzen in this respect since Bandura (1977) has defined self-efficacy (in this specific conceptualization) as ‘. . . the conviction that one can successfully execute the behaviour required to produce the outcomes’.

Despite the overall success of the TPB, the conceptualization of PBC has been controversial. A symptom of this controversy is the disparity in the labels used for the PBC components. More importantly, a disparity in definitions and operationalizations may reflect that empirical research is preceding theory in this area (Rhodes & Courneya, 2003b). Recently, much PBC research has addressed the possibility that PBC is a multidimensional construct (for an overview see Trafimow, Sheeran, Conner, & Finlay, 2002). Along another, related, line of enquiry researchers have examined the discriminant validity of PBC. Specifically, some researchers (for example Leach, Hennesy, & Fishbein, 2001; Trafimow & Duran, 1998) have asked if PBC (at least when operationalized in terms of perceived difficulty) is not just a complementary way of measuring attitude. Others (for example Fishbein, 1997; Rhodes & Courneya, 2003b) seem to doubt if PBC (at least when measured as confidence or self-efficacy) can really be discriminated from intentions.

In the early years of the TPB, Ajzen and Madden (1986) defined PBC in a rather straightforward way as ‘a person’s belief as to how easy or difficult performance of the behaviour is likely to be’. In this conception PBC was intended to reflect perceptions of factors that are both internal (e.g. knowledge, skills, will-power) and external (e.g. time, availability, the cooperation of others) to the actor. However, Sparks, Guthrie, and Sheperd (1997) have pointed out that Ajzen in this early phase (see for example Ajzen & Madden, 1986) also measured PBC by means of items that reflect perceived control over the behaviour, that is the extent to which the actor perceives the behaviour to be under their control (Ajzen, 2002a).

It seems as if the vast majority of TPB studies have followed the early practice of Ajzen and treated PBC as a unidimensional construct measured as a sum (or average) of a mix of at least these two types of items (Ajzen, 2002a). In recent years, however, several researchers have raised critical concerns in this respect. Although much of this research has been quite heterogeneous both methodologically and in terms of empirical findings reported, a certain line of reasoning both chronologically and theoretically seems to support the idea that PBC is a multidimensional construct that consists of two separate, but related components (for an overview see Ajzen, 2002a; Trafimow et al., 2002). Hence after reviewing a sample of relevant research, Ajzen concludes that PBC should be conceived of as a unitary, higher-order concept that consists of two (interrelated)
components which he denotes self-efficacy and controllability, respectively. Although they prefer to use different labels, namely perceived difficulty and perceived control, Trafimow et al. (2002) have apparently provided empirical support for Ajzen’s suggestion both experimentally and by means of a meta-analysis of relevant research.

According to Ajzen (2002b), the self-efficacy component of PBC ‘. . . deals with the ease or difficulty of performing a behavior, with people’s confidence that they can perform it if they want to do so . . .’. He suggests that the self-efficacy component can be measured by two types of items: (a) in terms of perceived difficulty (PD) e.g. ‘For me to . . . perform behaviour . . . would be . . .’, measured on a 7-point scale anchored by very difficult/very easy; and (b) in terms of how confident the actor is that they can perform the behaviour if they wanted to (CON), for example, ‘If I wanted to I could . . . perform behaviour’, measured on a 7-point scale anchored by definitely true/definitely false. The latter type of question most closely resembles ‘can do cognitions’ in the way that Bandura (1986) suggests that self-efficacy should be measured, although Bandura also suggests that self-efficacy is measured in relation to specific situations that represent challenges or impediments to successful performance (see also Schwarzer & Fuchs, 1996). According to Ajzen (2002b), the perceived control component of PBC ‘. . . involves people’s beliefs that they have control over the behavior, that performance or non-performance of the behaviour is up to them’. He suggests that this dimension is measured by two types of items: (c) in terms of perceived control over behavioural performance (PC), for example, ‘How much control do you believe you have over . . . performing the behaviour . . .’, with seven response categories anchored by no control/complete control; and/or (d) in terms of what appears to us to be a locus of control (Rotter, 1966; see also Armitage & Conner, 1999) inspired type of question (LOC), for example, ‘It is mostly up to me whether or not I . . . perform behaviour . . .’, measured by seven categories anchored by strongly agree/strongly disagree.

As mentioned above, it may appear as if a majority of TPB studies have treated PBC as a unidimensional construct that has often been measured by a mix of (all or some of) the items that we have labelled PD, PC, CON, and LOC. However, considerable variation in internal consistency in PBC has been observed between studies (for an overview, see e.g. Notani, 1998). While the α coefficient reported has been moderate or low in some studies (see e.g. Ajzen & Madden, 1986; Beale & Manstead, 1991; Beck & Ajzen, 1991; Courneva, Nigg, & Estabrooks, 1998; Rise, Åström, & Sutton, 1998; Wänkel & Mummery, 1993), it has been quite high in other studies (see for example Conner & McMillan, 1999; McCaul, Sandgren, O’Neill, & Hinsz, 1993; Morrison, Baker, & Gillmore, 1998). Cheung and Chan (2000) reported that the average α coefficient calculated from 90 TPB studies was .65, which is somewhat below what is usually considered to be adequate (Kline, 1993).

However, the α coefficient is only an estimate of the reliability of a total score and does not inform us about the dimensionality of the item set, for which factor analysis is needed (Cortina, 1993; Schmitt, 1996). Ajzen (2002a) has suggested that one possible solution to the problem of low internal consistency is that researchers carefully select items on the basis of formative research. Consequently, it should be determined empirically and in relation to the specific behaviour under study, whether PBC should be represented in terms of one or two components that comprise only one of the types of items described above, or a mixed set of some or all of them. Although we do not wish to devalue the possible usefulness of formative research in developing indirect (belief-based) measures of PBC, we would argue that when PBC is measured globally, the concept should (to a greater extent) be invariant over different behaviours. For one
thing it would have been convenient to have some guidelines on the format of PBC items to lean on for researchers who are tempted to avoid time-consuming formative research and who suffer from weakness of the will (which may perhaps have been the case in most previous TPB studies [see Ajzen, 2002a]). More importantly, research that may lead to such recommendations may potentially also contribute to our conceptual understanding of PBC and hence the motivational and self-regulatory processes that are expected to be represented by PBC in the TPB. Therefore, the first aim of the present research was to examine the dimensional structure of PBC.

Fishbein and co-workers (Chan & Fishbein, 1993; Fishbein, 1997; Leach et al., 2001) voice some concerns about the PBC construct. First, they hold that there is not necessarily a strong association between how difficult the performance of a behaviour is perceived to be and how much control the person feels that they have over performing it (Chan & Fishbein, 1993; Leach et al., 2001). This concern seems to have been addressed by the two-component model of PBC as was described above. Another point made by Fishbein and colleagues is that the ‘easy/difficult’ semantic differential type of items (PD) used to measure PBC overlap empirically and conceptually with several attitude items in semantic differential format (Fishbein, 1997, p. 84; Leach et al., 2001). The logic of this reasoning (see also Trafimow & Duran, 1998) is that the agent probably considers it an advantage if the behaviour is easy to perform and a disadvantage if it is difficult to perform. Since advantages and disadvantages determine attitude, perceived difficulty may just represent a complementary way of measuring attitude. Since perceived difficulty is related to how actual performance of the behaviour is perceived, perceived difficulty probably mainly reflects the affective (experiential) component of attitude since the latter is, for example, related to the affections which are expected to be experienced during performance of the behaviour. The finding that PBC predicts intentions even when the effect of attitude has been controlled for may hence simply indicate that two measures of attitude predict intentions better than one measure does. Running counter to this hypothesis, Trafimow and Duran reported that PBC, as measured by the items effortless/effortful and easy/difficult, was conceptually distinct from attitude, when the latter was measured by the items pleasant/unpleasant, good/bad, beneficial/harmful, and rewarding/punishing. It is interesting to note, however, that Trafimow and Duran did not take into account findings reported by Trafimow and Sheeran (1998).

In the latter study the researchers reported a distinction between the affective (e.g. pleasant/unpleasant, nice/nasty, enjoyable/unenjoyable, gratifying/revolting) versus cognitive determinants (such as harmful/beneficial, wise/foolish, safe/unsafe) of global attitudes towards behaviours (i.e. evaluation in terms of, e.g. positive/negative). This is in accordance with research that has supported the notion that attitude (towards behaviour) comprises both affective and instrumental evaluations (Ajzen, 1991; Ajzen & Driver, 1992; Breckler & Wiggins, 1989; Conner & Armitage, 1998; French et al., in press; Rhodes & Courneya, 2003a). Ajzen (2002b) has suggested that the final set of attitude items should include both the instrumental and affective types of adjectives, advice that seems to have been followed in much TPB research. It may nevertheless seem worthwhile to study in more detail how perceived difficulty items relate not only to a mixed measure of attitude (containing both instrumental and affective items), but more specifically to the affective component. Thus, the second aim of this study was to explore whether PBC, when measured by perceived difficulty items, is conceptually distinct from affective attitude.
This has actually already been done by Leach et al. (2001). By means of confirmatory factor analysis (CFA) they showed that the PD reflected both attitude (measured by affective beliefs) and self-efficacy. Therefore they concluded that PD items are conceptually ambiguous and should be avoided or used with great caution in TPB research. However, the study, as noted by the authors themselves, suffered from several limitations. First, the study focused on condom use, which is a behaviour for males but a goal for females; studies of behaviours that are common to both genders would seem preferable. Second, and perhaps more important, the authors suggest that future research should focus on the predictive relevance of their findings (for intentions and behaviour). We add a third limitation, related to how Leach et al. (2001) treated the attitude component. In their original questionnaires a number of items in semantic differential format were included to measure attitude. However, on the basis of preliminary analyses, the authors decided that the (global) attitude measure that was included in the final analyses should be represented by three items rating consistent condom use in terms of unpleasant–pleasant, like–dislike, and uncomfortable–comfortable. These attitude items are similar to those that we, in accordance with Trafimow and Sheeran (1998), will denote as affective. Leach et al. (2001) reported, however, in keeping with Trafimow and Sheeran, that items such as good–bad and wise–unwise (denoted as cognitive by Trafimow and Sheeran and instrumental by Rhodes & Courneya, 2003a), were ‘dissimilar’ to the other items, and they were unfortunately eliminated from the final analyses. We believe that analysing the relationship between instrumental and affective attitude components and their relationships with the components of PBC and intention, respectively, would represent a valuable contribution to existing research. Accordingly, the third aim of the present research was to study how the PBC and attitude components relate to intention and behaviour.

**Method**

**Material**

Undergraduate students (N = 232; 185 females, 47 males, 3 respondents did not report their gender; mean age = 24 years) at the Bergen College participated in the first wave of this study. Respondents completed a questionnaire about two behaviours: undertaking regular exercise and recycling drinking cartons. Regular exercise was defined as activities (aerobics, swimming, jogging, etc.) performed at vigorous intensity at least one or two times a week for at least 20–30 minutes each time.¹ Nine questions were included to measure PBC, while the remaining questions assessed (among many other things not relevant for this article) attitudes, subjective norms and intentions. One hundred and twelve respondents completed a 2-week follow-up questionnaire in which they reported whether or not they had performed the relevant behaviours during the past 2 weeks (see Rise, Thompson, & Verplanken, 2003, for further details). Although the main aims of the study were studied by analysing data from the first wave of data collection, the attrition of respondents in the second wave caused some concern.

¹ '... three times a week for at least 20 minutes each time...' is often used as a cut point of exercise when health benefits are of interest (see for example US Department of Health and Human Services, 1996). However, one-third of adult Norwegians exercise less often than weekly (for overview, see Andersen, 1995). Since the present study was not concerned with health, we used a definition that would provide less skewed variables.
regarding the prediction of behaviour. The attrition was probably due to non-attendance at wave two of students who attended the lecture at wave one, since the questionnaires were filled in during non-obligatory lectures. Additionally, some students who responded at wave one probably preferred not to participate at wave two. However, no substantial differences were observed between wave two responders and non-responders on a selection of background and TPB variables.

Measures

Intentions
For each behaviour, four items assessed intention: ‘I expect to . . . perform behaviour . . . over the next 2 weeks’; ‘How likely is it that you will . . . perform behaviour . . . over the next 2 weeks’; ‘I intend to . . . perform behaviour . . . over the next 2 weeks’; and ‘I plan to . . . perform behaviour . . . over the next 2 weeks’. All items were responded to on 7-point scales ranging from very unlikely to very likely.

Attitude
Eight items measured with 7-point bipolar adjective scales were used to assess attitudes: ‘My . . . performing behaviour . . . during the next 2 weeks would be’ unwise–wise, harmful–beneficial, useful–useless, wrong–right, good–bad, relaxing–stressful, pleasant–unpleasant, and boring–interesting.

PBC
For each behaviour, PBC was assessed by nine indicators, all measured by 7-point scales. Two items made reference to how easy or difficult (PD) performance of the behaviour was perceived to be: ‘For me to . . . perform behaviour . . . over the next 2 weeks would be’ disagree completely/agree completely; and ‘How easy or difficult would it be for you to . . . perform behaviour . . . over the next 2 weeks’ (very difficult/very easy). Three questions measured how confident (CON) the respondent was that he/she would be able to successfully perform the behaviour: ‘If I wanted to, I would not have problems in succeeding to . . . perform behaviour . . . over the next 2 weeks’ (disagree completely/agree completely); ‘How confident are you that you could . . . perform behaviour . . . over the next 2 weeks’ (completely unconfident/completely confident); and ‘If you actually tried, how likely is it that you would succeed to . . . perform behaviour . . . over the next 2 weeks’ (very unlikely/very likely). Two items were phrased to reflect perceived control (PC): ‘I have full control over . . . performing behaviour . . . over the next 2 weeks’ (no control at all/completely control); and ‘How much control do you feel over . . . performing behaviour . . . over the next 2 weeks’ (disagree completely/agree completely); and ‘It is first and foremost up to myself whether or not I . . . perform behaviour . . . over the next 2 weeks’ (disagree completely/agree completely).

Subjective norm
Four questions (for each behaviour), measured by 7-point scales, assessed subjective norm: ‘I feel under social pressure to . . . perform behaviour . . . over the next 2 weeks’
(disagree completely/agree completely); ‘Most people who are important to me would
wish that I . . . performed behaviour . . . over the next 2 weeks’ (very unlikely/very
likely); ‘Most people who are important to me think that I . . . (should absolutely
not/should absolutely) . . . perform behaviour . . . over the next 2 weeks’; and ‘Most
people who are important to me would . . . (very much dislike/very much like) that I
. . . performed behaviour . . . over the next 2 weeks’.

Behaviour
For both recycling and exercise, behaviour was measured by means of a dichotomous
variable: ‘Have you . . . performed behaviour . . . during the past 2 weeks?’ (yes/no).

Analysis
For testing the validity of factorial structures of the different PBC and attitude factors
(CFAs) and of a causal structure in predicting intentions, we applied structural equation
modelling (SEM) by means of AMOS 4.0 (for overview see Byrne, 2001), based on the
observed variance–covariance matrices. A number of different models were tested to
evaluate specific effects. In some cases, the strategy of analysis involved testing a
sequence of increasingly less constrained models. These models were nested, thus
allowing for chi-squared difference tests that would enable the identification of the
model with the best fit. However, because the chi-squared test is sensitive to small
differences and large samples, we also report a number of additional fit statistics: (a) the
comparative fit index (CFI), which is adequate for relatively small samples and for which
a value close to .95 is considered a lower threshold for good fit; (b) the goodness of fit
index (GFI), which indicates the relative amount of variance and covariance accounted
for by the model and for which a value above .90 is considered good fit; (c) the expected
cross-validation index (ECVI), which is a simple function of chi-squared and degrees of
freedom and can be used to compare the fit of two or more models tested (the lower the
statistic the better the fit of the model), and for testing the validity of the causal structure
in the prediction of intentions; (d) the root mean squared error of approximation
(RMSEA), which asks the question of how well the model, with unknown but optimally
chosen parameter values, fits the population covariance matrix if it were available
(values less than .05 indicate good fit). For more information on these and other fit
measures, see for example Bollen (1989), Hu and Bentler (1999) and Byrne (2001). Since
the sample size for analyses with behaviour was modest for SEM analyses, we preferred
to construct sum scores and perform multivariate regression analyses.

We followed Terry and O’Leary (1995) and conducted the analyses in two stages.
First, we examined by means of CFA the question of multidimensionality of relevant
constructs (PBC and attitude) and the adequacy of the measurement models; that is,
how the empirical indicators used to measure PBC and attitude, respectively, were
related to underlying latent constructs. These analyses were also inspired by earlier
studies reported by Leach et al. (2001) and Rhodes and Courneya (2003b). In these
analyses, the factor loading for the first item on each component was set to one in order
to create a scale. In the second stage of the analyses, intentions and behaviours were
predicted. For the prediction of intentions, SEM analyses were performed. However, due
to the moderate sample size for analysis of behaviour, we preferred to use (mean
centred) sum-scores of intentions and PBC components as independent variables in
ordinary multiple regression analyses to predict behaviour.
Results

Table 1 gives the descriptive statistics and the zero order correlations between the expected TPB components constructed as ordinary sum scores (not latent variables) among respondents who participated in both waves of data collection \((N = 110 \text{ after list-wise deletion})\). All the TPB components showed acceptable internal consistency reliability (particularly when one considers that some of them consisted of two items only). It can be seen that there were only moderate correlations between the instrumental (IA) and affective (AA) attitude components (.24 for recycling and .30 for exercise). The AAs were substantially correlated with the PBC components (except with LOC), while somewhat lower correlations were generally observed between the IAs and the PBC components. Furthermore, the AAs were more strongly correlated with intention than were the IAs.

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*Correlations between sum score components (not latent factors).
**Correlations are significant at the \(p < .05\) level.
***Correlations are significant at the \(p < .01\) level.

Cronbach’s \(\alpha\) coefficients along main diagonal; not computed for behaviour, which was a single item measure.

IA, instrumental attitude; AA, affective attitude; CON, perceived confidence; PD, perceived difficulty; PC, perceived control; LOC, perceived locus of control; I, Intention; B, behaviour. Coefficients calculated from respondents who participated in both data collections.

Dimensionality of PBC

An important aim was to explore the dimensional structure of PBC. To this end, data on the nine PBC items related to recycling and exercise, respectively, from the first wave of data collection \((N = 227 \text{ after list-wise deletion})\) were subjected to CFAs (see Table 2).
<table>
<thead>
<tr>
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<th>Model</th>
<th>One component</th>
<th>Two components: self-efficacy (PD + CON) and controllability (PC + LOC)</th>
<th>Two components: self-efficacy (PD + CON), and controllability (PC)</th>
<th>Three components: PD, CON, PC</th>
<th>Four components: PBC as controllability (PC) and difficulty (PD)</th>
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IA, instrumental attitude; PC, perceived control; AA, affective attitude; PD, perceived difficulty; LOC, perceived locus of control; CON, perceived confidence.
Since the PBC components were not expected to be orthogonal, the factor correlations were freed for estimation. We started by examining the factor structure often assumed in earlier TPB research, namely that PBC is a unidimensional construct (Model 0). For both recycling ($\alpha = .83$) and exercise ($\alpha = .89$) acceptable consistency reliability coefficients were observed when all nine items were used to represent PBC. However, the fit of the unidimensional model to the data was unacceptably poor for both recycling and exercise. In Model 1, which was nested under Model 0, we tested the two-component model recently suggested by Ajzen (2002a), in which PBC consists of two interrelated components denoted self-efficacy (in this case measured by CON and PD items) and controllability (in this case measured by PC and LOC items). Although Model 1 was significantly better fitted than Model 0 ($\Delta \chi^2 = 32.34$, $df = 1$, $p < .001$ for recycling, and $\Delta \chi^2 = 17.68$, $df = 1$, $p < .001$ for exercise), it nevertheless yielded unacceptable fit statistics for both recycling and exercise. The modification indices and residuals indicated that the two LOC items, which were constrained to load on the controllability component, contributed substantially to the lack of fit. Since the correlation analyses (Table 1) had shown that the LOC component was not correlated with recycling intention and was only moderately correlated with exercise intention, the LOC items were excluded from further analysis.

In Model 2 we tested a two-component model with PD and CON items constrained to load on the self-efficacy component and the PC items constrained to load on the controllability component. While acceptable fit measures were now obtained for exercise, the model was a poor fit to the recycling data. The diagnostics suggested that it would be preferable to release some of the constraints, and the next model tested, Model 3, thus assumed PD, CON and PC to reflect three separate but interrelated factors. This model, which was nested under Model 2, yielded acceptable fit statistics and was a significantly better fit than Model 2 to the recycling data ($\Delta \chi^2 = 49.53$, $df = 2$, $p < .001$), but not to the exercise data ($\Delta \chi^2 = 1.99$, $df = 2$, ns). The next model (Model 4) was identical to the model tested by Trafimow et al. (2002) in that self-efficacy was measured by PD items only, while the controllability factor was measured solely by PC items. For both behaviours, this model was an excellent fit. However, that was also the case for Model 5, which was more in line with the recommendations from Leach et al. (2001) in that the PD items were avoided, and self-efficacy was measured solely by CON items, while controllability was measured by PC items (as in Model 4).

**Dimensionality of attitudes**

Initial analysis showed that the Cronbach’s $\alpha$ values were .79 for the eight semantic differential recycling items and .83 for the eight exercise items. Principal components factor analysis showed that the eight attitude items seemed to reflect two dimensions, but that the good–bad item loaded substantially on both factors. This item was thus excluded from subsequent analysis (the item may seem to resemble a more general evaluation, like the positive/negative item in the Trafimow and Sheeran [1998] study). We next performed CFAs to reveal whether the expected instrumental (IA) and the affective attitude (AA) components could be identified (Table 2). The first model we tested (Model 0) was the one-factor model of attitude, while Model 1 consisted of the IA and AA factors, allowed to correlate freely. For both recycling and exercise, Model 0 yielded unacceptable fit statistics. Model 1 fitted significantly better than Model 0 ($\Delta \chi^2 = 502.10$, $df = 1$, $p < .001$ for recycling, and $\Delta \chi^2 = 217.46$, $df = 1$, $p < .001$ for recycling).
exercise). Furthermore, the fit statistics for Model 1 were clearly acceptable for both behaviours.

The IA factor (as .90 and .81) consisted of the instrumental items; that is, the evaluation of outcomes that were perceived to follow as a consequence of the behaviours: unwise–wise; harmful–beneficial; useless–useful; and right–wrong. The AA factor (as .81 and .82), however, reflected the affective items: relaxing–stressful; pleasant–unpleasant; and boring–interesting. The discriminant validity of the two attitude components was further supported by the finding that while AA was highly or moderately correlated with the PBC components (but not with LOC), as well as with intention and behaviour, IA was much more weakly associated with these variables (Table 1).

**Perceived difficulty: self-efficacy or affective attitude?**

Following Leach et al. (2001) and Rhodes and Courneya (2003b), we performed a series of CFAs in order to identify the appropriate location of the PD items (Table 2). Three models were tested. In Model 0 the PD items were allowed to load on the AA factor, but were constrained to zero on the self-efficacy factor (measured by CON items). In Model 1, the PD items were allowed to load on the self-efficacy factor, but not on the AA factor. And finally, in Model 2, the PD items were allowed to load freely on both factors. In all the models the AA and CON factors were free to correlate. For recycling, Model 2, which allowed the PD items to load on both factors, was significantly better fitted than Models 0 ($\Delta \chi^2 = 106.20, df = 2, p < .001$) and 1 ($\Delta \chi^2 = 18.14, df = 2, p < .001$). Furthermore, Model 2 yielded acceptable fit statistics. For exercise, however, both Models 1 and 2 provided an acceptable fit to the data, and fitted significantly better than Model 0 (Models 1 and 0 compared: $\Delta \chi^2 = 138.17, df = 0, p < .001$; Models 2 and 0 compared: $\Delta \chi^2 = 138.28, df = 2, p < .001$). To sum up, for recycling the best solution was to conceive of the PD items as reflecting both AA and self-efficacy (CON). For exercise, however, acceptable fit was obtained when the PD items were conceived of either as reflecting the self-efficacy factor (CON) solely or both factors (self-efficacy and AA).

Comparable analyses were performed to see whether PD would overlap with IA (not expected). However, the only model which obtained acceptable fit was the one in which the PD items were allowed to load on the self-efficacy factor, but not on the IA factor.

**Predicting intentions and behaviour**

By means of SEM, intentions were regressed on the ordinary TPB components, which accounted for 51% and 53% of the variance, respectively, in recycling and exercise intentions (Table 3, Model 0). PBC was a strong predictor of both recycling ($\beta = .54$) and exercise ($\beta = .65$), along with attitude ($\beta = .21$ and .14, respectively). Subjective norms predicted recycling ($\beta = .16$) but not exercise intention.

Since the CFAs had indicated that neither attitude nor PBC were unidimensional, we next performed some more fine-grained analyses. Thus, in Model 1, attitude was represented by IA and AA. Since AA and PD were not really distinct and the models in which PBC was represented by PC and CON showed good fit, PC and CON were used to represent PBC. Some gain in explained variance in intentions was obtained in Model 1 as compared to Model 0. More importantly, a more fine-grained insight into the role of the predictors was obtained. For both behaviours, AA was a much more important predictor
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Attitude, Attitude (7 items); SN, subjective norm (4 items); PBC, perceived behavioural control (9 items); IA, instrumental attitude (4 items); AA, affective attitude (3 items); CON, perceived confidence (3 items); PC, perceived control (2 items).
of intentions ($\beta$ .39 and .33, respectively) than was IA ($\beta$ .17 and .07, respectively). PC predicted recycling intention ($\beta$ .34), but not exercise intention, while CON predicted exercise intention ($\beta$ .47), but not recycling intention.

Behaviour was regressed on intention, PC and CON by constructing sum scores of variables and performing multivariate regression analysis (only respondents who participated in both data collections were included, $N = 110$ after list-wise deletion). Intention was the only significant predictor of exercise (51.2% of variance explained), while intention ($\beta = .74$) and PC ($\beta = .30$) predicted recycling behaviour significantly (60.8% explained). No interactions between attitude and PBC components in predicting intentions were identified, and no interaction terms between intentions and PBC components in predicting behaviour were identified.

**Discussion**

The first aim of the present study was to explore the possible multidimensionality of PBC. The results showed that for the behaviours of exercise and recycling, PBC could not be conceived of as a unidimensional measure that can be measured by a mix of PD, PC, CON and LOC items. Additionally, the data did not support the idea that PBC should be conceived of as comprising self-efficacy, as measured with PD and CON, and controllability, as measured with PC and LOC items. The LOC type of items were clearly different from the other PBC items, indicated both by the correlations between LOC and the other PBC indicators, and by the correlation between LOC and intention. Thus the results indicate that little is lost if the LOC types of items are not used as indicators of PBC. Furthermore, it is possible that the LOC items may stimulate respondents to attribute control along the internal–external dimension, which may be problematic if one is predicting intentions related to goal attainment (for example getting an A, losing weight, becoming pregnant) which has been the focus in some previous TPB studies. In those cases LOC items may reflect contingency expectancies rather than efficacy expectations.

The CFAs suggested that PBC could be conceived of as either three separate but interrelated factors, namely PC, CON and PD, or as two separate but interrelated factors representing self-efficacy (measured by PD + CON or just CON) and PC. These results are not necessarily at odds with Trafimow et al. (2002), who concluded that perceived control and perceived difficulty should be considered as distinct concepts. It seems relevant to note that Trafimow et al. measured perceived control with PC items (i.e. not ‘polluted’ with LOC items), and perceived difficulty with PD items (i.e. not ‘polluted’ with CON items). Our results support those findings in that PC and PD were found to be best conceived of as distinct components. However, none of the studies support the idea that PBC should be conceived of as reflecting self-efficacy (consisting of CON and PD) and controllability (consisting of PC and LOC), as suggested by Ajzen (2002a, 2002b). However, while the findings may reflect that the PC–PD division is correct, they could also have been obtained because the PD and PC items were internally more linguistically similar to each other. Future research may help to reveal whether the obtained division reflects something conceptually substantial, or is a consequence of measurement procedures.

Our second aim was to explore whether PBC, when measured by perceived difficulty items, was conceptually distinct from affective attitude. To get there, we first had to explore the dimensionality of attitude. The hypothesized distinction between
instrumental and affective attitude was supported by the CFAs, they correlated only moderately, and affective attitude was a stronger predictor of intentions than was instrumental attitude. Hence the results support the notion that affective and instrumental measures of attitudes towards behaviours are empirically and conceptually distinguishable, which is in keeping with previous research on a broad range of behaviours (Ajzen, 1991; Ajzen & Driver, 1992; Bagozzi, Lee, & van Loo, 2001; Breckler & Wiggins, 1989; Conner & Armitage, 1998; Manstead & Parker, 1995; Richard, van der Pligt, & de Vries, 1996; Trafimow & Sheeran, 1998; Trafimow et al., 2004), and for exercise specifically (French et al., in press; Lowe, Eves, & Carroll, 2002; Rhodes & Courneya, 2003a).

For both recycling and exercise, affective attitude played a more important role in the intention formation process than did instrumental attitude. It is possible that this was due to lower variation (SD) in IA than for AA (and the other TPB variables), but the predictive primacy of affective attitude has previously been reported by Ajzen and Timko (1986) for an aggregate measure of health behaviours, Ajzen and Driver (1992) for three leisure activities, Godin (1987), Valois, Desharnes, and Godin (1989) and Lowe et al. (2002) for exercise behaviour, and Trafimow et al. (2004) for a broad range of behaviours (while Rhodes and Courneya [2003a] reported more mixed results in predicting exercise intentions). This suggests that it is important in future TPB research to identify and quantify the unique contribution of both attitude components in predicting intentions. Additionally, if one attempts to influence people’s behaviours it seems appropriate (at least for some behaviours) to put less emphasis on the perceived costs and benefits that are expected to follow behavioural performance, and concentrate more on the positive and negative feelings that people engender when they think of performing those behaviours (Lowe et al., 2002).

Returning to our second aim of the study: was PBC, when measured by PD items, conceptually distinct from affective attitude? For recycling, the best model was the one that allowed the PD items to load on both affective attitude and self-efficacy. For exercise, the PD items could well be conceived of as reflecting PBC (confidence), although allowing the PD items to load on both confidence and affective attitude resulted in comparable fit statistics. Strictly speaking these findings may not indicate anything more dramatic than that PD items are correlated with both AA and self-efficacy, although a superior model fit of Model 1 as compared with Model 2, would have made a stronger case for PD items as unpolluted measures of PBC. Additionally, our findings (on recycling) add to the research reported by Leach et al. (2001) on condom use. It hence seems fair to suggest that at least for some behaviours, perceived difficulty is empirically and conceptually associated with both affective attitude and self-efficacy. Therefore Leach et al. concluded that the use of easy–difficult items should be avoided and that studies that measured PBC solely as perceived difficulty need to be re-evaluated. At least one may suspect that to the extent that previous studies have not put enough emphasis on affective beliefs when operationalizing the attitude component, or have treated the attitude component as a unidimensional construct containing both types of items, the importance of the affective attitude component in predicting intentions may have been underestimated (see Manstead and Parker (1995) and van der Pligt, Zeelenberg, van Dijk, de Vries, and Richard (1998) on the underestimated role of affective processes in expectancy-value models in general). Moreover, to the extent that PBC in previous research has been measured solely or partly by means of perceived difficulty items, it is possible that the role of PBC in predicting intentions (at least for some behaviours) has been somewhat overestimated.
However, a notable difference between predicting recycling and exercise intentions should be mentioned. Whereas including PD in the regression model predicting recycling intention nearly halved the predictive power of affective attitude, PD and CON had very much the same effect upon affective attitude in predicting exercise intentions (analyses not reported). Furthermore, while controllability (PC) but not self-efficacy (CON) played an important role in predicting recycling intention (regression Model 1), only CON (but not PC) played an important role in predicting exercise intention. In addition, Table 1 showed that on average the respondents were less confident (CON) about their future exercise than recycling behaviour and that they perceived exercise to be more difficult (PD) than recycling (original PD scores reversed). On the other hand, they had a much less positive affective attitude towards recycling than exercise. These findings may indicate that, for behaviours that are considered difficult to perform, PD may tend to measure self-efficacy in much the same way as CON, whereas for behaviours that are not considered difficult, but perhaps more unpleasant to perform, PD may reflect both affective attitude and self-efficacy. However, Trafimow et al. (2002) offer an alternative interpretation. They argue that for most (volitional) behaviours people consider how difficult it will be to perform the behaviour, or as we would prefer to say, how confident they are that they are able to perform it. For other behaviours, however, people may consider whether performance is controllable or uncontrollable. Thus, while one may have doubts about one's ability to exercise regularly, the recycling of drinking cartons may be impossible (uncontrollable) because there is no established system (or one is not aware of such a system) for the collection of drinking cartons in the area in which you live.

In light of the findings of the present study and the research reported by Leach et al. (2001), it is interesting to note that Ajzen (2002c) has removed the easy/difficult item from his September 2002 guidelines on how to construct a TPB questionnaire. He suggests that the perceived difficulty item is substituted with an item that measures the extent to which the performance of the behaviour is judged to be possible or impossible. Although we are not aware of any studies that have used this measure, intuitively this seems to be a good idea, since possible/impossible appears to resemble more closely the ‘can do cognitions’ that are considered to represent the self-efficacy component (Bandura, 1986; Schwarzer & Fuchs, 1996).

Perhaps it is time to rename the PBC component? Ajzen (2002a) has launched the idea himself by stating that ‘... perceived behavioral control and self-efficacy are quite similar. Both are concerned with perceived ability to perform a behavior (or sequence of behaviors). In retrospect, the decision to use the term “perceived behavioral control” to denote this component in the theory of planned behavior may have been misleading’. Fishbein (1997) has claimed that Ajzen originally (e.g. Ajzen, 1991) saw PBC as equivalent to self-efficacy, but that he later moved in a direction that implied that PBC was an indication of the perception of how easy or difficult it would be to perform a behaviour. If Fishbein is right, it may seem as if Ajzen has returned to the point of departure.

To sum up, the present research supports the idea that PBC could be conceived of as consisting of two separate but interrelated constructs, namely self-efficacy and controllability (Ajzen, 2002a; Trafimow et al., 2002). For the behaviours addressed in this study, CON items are to be preferred for measuring self-efficacy, while PC items are to be preferred for measuring controllability. The hypothesized distinction between the affective and instrumental components of global attitudes was supported, and the role of affective attitude in the intention formation process was clearly demonstrated.
The results raise concern about the adequacy of measuring PBC by means of perceived difficulty items, at least for some types of behaviours.

Acknowledgements
We are appreciative to David Trafimow and two anonymous reviewers for constructive comments and suggestions. We would also like to thank Icek Ajzen and Paschal Sheeran, who commented on an earlier draft of this article.

References


Received 17 March 2004; revised version received 31 August 2004