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Testing the Role of Action and Inaction Anticipated Regret on Intentions and Behaviour

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Abstract

Anticipated regret has been suggested as a useful addition to the Theory of Planned Behaviour (TPB) that captures affective influences. However, previous research has generally: (1) assessed the impact of anticipated regret in relation to one behaviour (action or inaction) when considering TPB variables in relation to the alternative behaviour; (2) not controlled for affective attitudes or past behaviour; and (3) examined only one or two behaviours. In two studies across several behaviours the present research showed that even when controlling for affective attitudes, past behaviour, and other TPB variables towards action, action and inaction anticipated regret each added to the prediction of intentions across multiple behaviours. The two studies also showed that inaction regret was generally the stronger predictor, although action regret was important for some types of behaviour. Implications and issues for further research are discussed.

Keywords: Theory of Planned Behaviour; anticipated regret, affective attitudes, intentions, behaviour.

The Theory of Planned Behaviour (TPB; Ajzen, 1991) is one of the most widely used models relating attitudes to behaviour. It emphasizes the important mediating role of intentions (Armitage & Conner, 2001). The TPB holds that behaviour is determined by intentions and perceived behavioural control. Intentions are measured as plans or motivation to act, while perceived behavioural control is measured as the perceived degree of control or (similar to self-efficacy) confidence the individual has over performing the behaviour. Intentions are held to be determined by attitudes, subjective norm, and perceived behavioural control. Attitudes are measured as the overall evaluation of the behaviour, while subjective norm is the perceived support from important others for performing the behaviour. The TPB strongly predicts a variety of behaviours (Armitage & Conner, 2001) and has been widely used in applied areas such as health (McEachan, Conner, Taylor, & Lawton, 2011). The theory is, however, firmly grounded in the cognitive tradition and focuses on cognitive at the expense of affective influences. Previous research has noted this failure of the TPB to adequately account for the role of affective influences on intentions and behaviour (e.g., Manstead & Parker, 1995).

One important response to the perceived deficiency of the TPB has been to suggest adding anticipated affective reactions and in particular anticipated regret (AR) to the theory (e.g., Sandberg & Conner, 2008). Regret is a negative, cognitive based affective reaction experienced when we realize or imagine that the present situation could have been better - had we acted differently. Most people experience regret at some time in their life: some regrets stem from things we did that we wish we had not done (action regret for commission of a behaviour), whereas others stem from things we did not do that we subsequently wish we had done (inaction regret for omission of a behaviour). Research into counterfactual thinking (Kahneman & Tversky, 1982), where events are compared to alternative events that could, might or should have happened, demonstrates that the distinction between omission and commission has considerable hedonic consequences. It is also possible to anticipate regret pre-behaviourally and

thus avoid actually experiencing this unpleasant affective reaction (Simonson, 1992; Zeelenberg & Pieters, 2007; see also Epstude & Jonas, 2015 for work on regret and counterfactual thinking). Brewer, DeFrank, and Gilkey (in press) report AR to show a strong correlation with intention and moderate correlation with behaviour across 81 tests. Two meta-analyses have also shown AR to add to predictions of intentions but not behaviour in the context of the TPB (Rivis, Sheeran, & Armitage, 2009; Sandberg & Conner, 2008). However, there are three significant criticisms of the evidence supporting the addition of AR to the TPB that need to be discussed: first, previous studies have generally failed to control for another important affective influence, namely affective attitudes (Conner, McEachan, Taylor, O'Hara & Lawton, 2015); second, studies have generally only examined the impact of AR in relation to one behaviour (action or inaction) when considering TPB variables in relation to the alternative behaviour (e.g., AR about not exercising on exercise intentions and behaviour; Ajzen & Sheikh, 2013); and third, studies have generally focused on single behaviours.

Three Criticisms of Existing Research

First, following methodological commentaries (Ajzen & Fishbein, 2005; Conner & Sparks, 2015) more recent TPB studies have tended to include measures of both affective/hedonic and cognitive/instrumental components of attitudes (e.g., Rhodes, Courneya, Blanchard, & Plotnikoff, 2007). Indeed there is a long established distinction between cognitive and affective attitudes (e.g., Abelson, Kinder, Peters, & Fiske, 1982). Usually affective, hedonic, or experiential components of attitudes are tapped by semantic differentials such as 'unpleasant-pleasant' or 'unenjoyable-enjoyable'. While cognitive or instrumental components of attitudes are tapped by items such as 'harmful-beneficial' or 'worthless-valuable' (Crites, Fabrigar, & Petty, 1994). A number of studies have demonstrated such affective attitudes to be strong predictors of intentions and action (e.g., Lawton, Conner, & McEachan, 2009; Lawton, Conner & Parker, 2007; see Conner et al., 2015 for a meta-analysis).

Affective attitude and AR can be distinguished in three important ways. AR tends to focus on what Giner-Sorolla (2001) describes as self-conscious emotions (e.g. regret, guilt), whereas affective attitudes focus on hedonic emotions (e.g., enjoyment, excitement). Research on AR has tended to examine the negative affect associated with non-performance of the behaviour, while research on affective attitudes has focused on the positive affect associated with performance of the behaviour. Work on AR tends to focus on the affect that is expected to follow performance or non-performance of a behaviour, while affective attitudes has focused on the affect that is expected to occur while the behaviour is being performed. Supporting these conceptual differences, studies have demonstrated the discriminant validity of measures of affective attitude and AR (Conner, Godin, Sheeran, & Germain, 2013). Meta-analyses have confirmed that affective attitude and AR are significant independent predictors of intentions and behaviour even when controlling for other TPB variables (Conner et al., 2015). This suggests that both variables might be useful additions to the TPB to better tap affective influences on intentions and behaviour.

A second weakness with previous research has been a focus on only one of two types of AR. A closer examination of the meta-analysis presented by Conner et al. (2015) makes this clearer. In studies looking at behaviours such as exercise (e.g., Sandberg & Conner, 2011), AR about not exercising (i.e., inaction regret) was assessed although the other TPB constructs were phrased in relation to exercising (i.e., acting). In contrast, in studies looking at behaviours such as exceeding the posted speed limit (Elliot & Thompson, 2010), AR about speeding (i.e., action regret) was the focus even though the other TPB constructs were phrased in relation to not speeding (i.e., not acting). Of importance to the current research is that no previous studies in this meta-analysis of TPB studies examined both inaction and action AR (but see Brewer et al., in press for a review of inaction/action AR studies not in context of TPB). Ajzen and Sheikh (2013) examined drinking alcohol and avoiding alcohol and also eating fast food and avoiding

fast food. Their data show that AR only added to predictions of intentions to act or not act over and above attitudes, subjective norm, and perceived behavioural control when it was assessed in relation to one behaviour (e.g., action) when considering TPB variables in relation to the alternative behaviour (e.g., inaction). However, the Ajzen and Sheikh data show a number of limitations including a failure to measure behaviour and modest sample sizes (Ns = 49, 51 for alcohol and fast food respectively) leading to large confidence intervals around the correlations. This is important because the correlations between intentions and the two types of AR were similar in magnitude (e.g., rs = .43 vs. -.47 for intention to eat fast food with action and inaction regret respectively). This can lead to problems in estimating the power of action and inaction AR to predict intentions after controlling for TPB variables.

A third weakness of previous studies is that they have generally focused on single behaviours. This is potentially problematic because of difficulties in generalizing to other behaviours with different characteristics. Theories like the TPB acknowledge that the perceived extent to which a behaviour leads to positive and negative outcomes is an important determinant of intentions to perform that behaviour. Where behaviours have both positive and negative outcomes then the temporal patterning of how these outcomes unfold may be important. Some behaviours may be mainly performed because they lead to important positive distal outcomes, although the more immediate outcomes may be less positive or at least mixed. We refer to these behaviours as distal benefit behaviours (Giner-Sorolla, 2001 uses the term ‘grim necessities’; approach behaviours or socially approved behaviours would be alternative terms) and include many health protection behaviours such as eating a healthy diet or regularly exercising. In such cases we believe that regret will be mainly anticipated in relation to not acting as failing to act could lead to the loss of the valued positive distal outcome. Action regret is likely to be less predictive in such cases because the immediate outcomes are more mixed in valence and lower in value. Importantly when considered simultaneously it is inaction rather than action regret that

is likely to dominate as a predictor of intentions to perform distal benefit behaviours.

In contrast, some behaviours may be mainly performed because they lead to positive proximal outcomes, although the more distal outcomes may be negative and important. We refer to these behaviours as immediate hedonic behaviours (Giner-Sorolla, 2001 uses the term 'guilty pleasures'; avoid behaviours or socially disapproved behaviours are alternative terms) and includes behaviours such as eating fast food (and many other health-risk behaviours such as smoking) and going on a spending spree. In such cases, although regret may be mainly anticipated in relation to acting, as acting could result in the important but negative distal outcome, regret could also be anticipated in relation to not acting because failing to act could lead to the loss of the positive immediate outcome. Thus for immediate hedonic behaviours, both action and inaction AR may be predictive of intentions although the former might be expected to dominate.

The above distinctions map onto other work noting differences in the temporal pattern of regret (Feldman, Miyamoto, & Loftus, 1999; Gilovich & Medvec, 1994, 1995; Gilovich, Medvec, & Kahneman, 1998; Gleicher et al., 1990; Landman, 1987). So, after performing some behaviours (e.g., immediate hedonic behaviours) there is an almost instant, hot 'kick-yourself' kind of regret (action regret). In contrast, after not performing some behaviours (e.g., distal benefit behaviours) there is, eventually, a cold, wistful, or nostalgic 'if-only-I-had-done-that' kind of regret (inaction regret). Richard, van der Pligt, and de Vries (1996) noted that "it is possible that anticipated affective reactions are more important for behaviours with negative consequences than for behaviours with positive consequences" (p.126).

Present Research

The present research aimed to assess the role of AR in the TPB whilst addressing the above problems with previous research. In particular, affective attitudes and instrumental attitudes were assessed alongside other TPB variables, past behaviour, and both action and

inaction regret in a large sample across multiple behaviours using within subjects analyses. The focus on multiple behaviours allowed us to test whether there was a differential pattern of prediction for different types of behaviour. We also tested whether AR was more predictive for immediate hedonic versus distal benefit behaviours and the role of different forms of AR (action versus inaction) when considered individually or simultaneously.

Study 1

We examined the role of action and inaction AR on a group of distal benefit behaviours. The main focus was on examining the extent to which action or inaction AR predicted intentions to engage in these behaviours controlling for affective and instrumental attitudes and the other components of the TPB (subjective norm and perceived behavioural control) plus past behaviour. We also examined the role of action and inaction AR on prospective measures of behaviour after controlling for other predictors from the TPB (intentions, perceived behavioural control, affective and instrumental attitude, and subjective norm) plus past behaviour. As respondents completed measures in relation to several behaviours we used multi-level modelling in order to allow us to simultaneously examine effects across behaviours whilst controlling for the fact that these measures were clustered within individuals.

The above approach has a number of advantages. First, it is a more appropriate analysis strategy than examining each behaviour individually as the clustered nature of the data would not be controlled for in such an approach. Second, the increase in the number of observations obtained by examining several behaviours simultaneously increases the power of the analyses. Third, this approach could be seen as more consistent with the way the TPB and earlier Theory of Reasoned Action (TRA) had been originally conceptualized (Fishbein & Ajzen, 2010). In most TRA/TPB studies, regression models are used to test for differences between individuals (e.g., is the person with the strongest intention to perform a behaviour the most likely to perform that behaviour). However, when developed, the TRA/TPB was seen as a model of how an

individual decides between courses of action, i.e., the within-person relationship between behaviour and TPB variables (e.g., does the individual perform the behaviour he/she has the strongest intention to perform). Multi-level modelling of the relationship between TPB constructs across multiple behaviours comes closer to testing such relationships in the way in which within-person and between-person variance is divided, i.e., it gives estimates of within-person relationships averaged across individuals.

Method

Sample, Design and Procedure.

Participants were students recruited by email from various departments at eight U.K. universities in Autumn 2002. The email invited participants to log on to a web site, and complete two on-line questionnaires in return for being entered into a prize draw to win £100 (approximately $160). There were four weeks between completion of the T1 and T2 questionnaires. A total of 347 participants (134 female, 213 male; age range = 18-48 years; mean age = 20.6 years) completed the Time 1 questionnaire; 162 participants also completed the Time 2 questionnaire. Questionnaires were matched across time points based on email address. Those completing both questionnaires did not differ from those only completing the Time 1 questionnaire on gender or age, ps > .20. Similarly there were no significant differences for those completing questionnaires at both times or just Time 1 on the cognition measures taken at Time 1, $F(7,995) = 2.09$, $p > .05$.

Measures.

The questionnaires included measures of TPB constructs in relation to three separate behaviours (regular exercise, eating healthily, being organized for work) along with a number of items not reported here[1]. The measures were based upon standard wording recommended for measuring components of the TPB (Ajzen, 1991; Conner & Sparks, 2015). The following measures were taken in the T1 questionnaire: Intentions were assessed for each behaviour with

one item (e.g., 'I intend to be organized for work during the next 4 weeks', strongly disagree-strongly agree; scored 1 to 5 with higher scores indicating stronger intentions to perform the behaviour). Affective attitudes were assessed for each behaviour with a single item (e.g., 'For me, being organized for work during the next 4 weeks would be'; unpleasant-pleasant; scored 1 to 5 with higher scores indicating more positive attitudes). Instrumental attitudes were assessed for each behaviour with two items (e.g., 'For me, being organized for work during the next 4 weeks would be'; bad-good; foolish-wise; scored 1 to 5 with higher scores indicating more positive attitudes; alpha > .60 for each behaviour). Subjective Norm was assessed with one item for each behaviour (e.g., 'People who are important to me think that I should be organized for work during the next 4 weeks', strongly disagree-strongly agree; scored 1 to 5 with higher scores indicating stronger norm). Perceived Behavioural Control was assessed with one item for each behaviour (e.g., 'I am in control of being organized for work during the next 4 weeks, strongly disagree-strongly agree; scored 1 to 5 with higher scores indicating greater control). Action AR was assessed with one item for each behaviour (e.g., 'If I was organized for work during the next 4 weeks I would regret it, strongly disagree-strongly agree; scored 1 to 5 with higher scores indicating greater AR). Inaction AR was assessed with one item for each behaviour (e.g., 'If I were not organized for work during the next 4 weeks I would regret it, strongly disagree-strongly agree; scored 1 to 5 with higher scores indicating greater AR). Past Behaviour was assessed with one item for each behaviour (e.g., 'In the past, I have been organized for work', strongly disagree-strongly agree; scored 1 to 5 with higher scores indicating more past behaviour).

The T2 questionnaire measured self-reported behaviour for each behaviour using a single item (e.g., 'I was organized for work during the past 4 weeks', never-frequently, scored 1 to 5, with high scores indicating greater frequency).

Analyses.

Data were analyzed in SPSS (version 20, SPSS Inc) and HLM (version 7, SSI). For

predictions of intentions there were 1012 person-behaviour data points spread across 343 individuals. For predictions of behaviour there were 450 person-behaviour data points spread across 154 individuals. We computed means and SDs for all measured variables in SPSS.

Although up to 1012 observations were available for testing relationships between variables, the fact that each individual provides multiple observations needed to be controlled for in any analyses (i.e., behaviour is clustered within individuals). The relationships among variables were analyzed using Hierarchical Linear Modeling using HLM7 (Raudenbush & Bryk, 2002). The data contained a two level hierarchical structure, Level 1 being the within-person variation and Level 2 being the between-person variability. The Level 1 predictor variables were centered around the group mean. In relation to predictions of intentions we initially computed baseline models to compare against other models: step 0, intercept only model; step 1, instrumental attitude, affective attitude, subjective norm, perceived behavioural control added. At step 2a we tested the addition of action AR; at step 2b we tested the addition of inaction AR. At step 3 we tested the addition of both action and inaction AR. Finally at step 4 we tested the addition of past behaviour to the model.

In relation to predictions of behaviour we initially computed an intercept-only model to compare other models against. At step 1 we added the main direct predictors of behaviour from the TPB (intention, perceived behavioural control). At step 2 we added the other TPB variables (instrumental attitudes, affective attitudes, subjective norm). At step 3 we added both action and inaction AR. Finally at step 4 we added past behaviour. For each step we report unstandardized coefficients (B), standard errors (SE) and standardized coefficients (β; calculated using the procedure outlined by Hox, 2002) from the analysis with robust standard errors, the deviance statistic to indicate model fit, and a chi-squared test of the change in deviance compared to the earlier model to indicate significance of improvement of fit.

Results

Examination of the means and standard deviations revealed that the measures were not unduly skewed and had reasonable variability. In relation to predictions of intentions, multilevel modelling indicated that adding instrumental and affective attitudes, subjective norm and perceived behavioural control significantly reduced the deviance statistic compared to the intercept only model, $\chi^2(4) = 338.2$, $p < .001$. In this model (step 1, not shown in Table 1), all predictors were significant with subjective norm and perceived behavioural control being the strongest predictors. Adding either action AR, $\chi^2(1) = 15.7$, $p < .001$ (step 2a) or inaction AR, $\chi^2(1) = 173.7$, $p < .001$ (step 2b) significantly reduced the deviance statistic compared to the step 1 model (Table 1) with all variables being significant. Notably each type of AR was significant at this step although the stronger effects were associated with inaction AR. Adding both action and inaction AR simultaneously (step 3) significantly reduced the deviance statistic compared to the step 1 model, $\chi^2(2) = 183.4$, $p < .001$ (Table 1) with both variables being significant although the stronger effects were associated with inaction AR. Addition of past behaviour at step 4 also significantly reduced the deviance statistic compared to the step 3 model, $\chi^2(1) = 16.1$, $p < .001$ (Table 1). All variables were significant at this step with past behaviour and inaction regret being the strongest predictors.

In relation to predictions of behaviour, multilevel modelling (Table 2) indicated that adding intentions and perceived behavioural control (step 1) significantly reduced the deviance statistic compared to the intercept only model, $\chi^2(2) = 74.8$, $p < .001$. Only intentions were significant at this step. Adding instrumental and affective attitude and subjective norm (step 2) significantly reduced the deviance statistic compared to the step 1 model (Table 2), $\chi^2(3) = 16.9$, $p < .001$. However, only intention was a significant predictor at this step. Adding action AR and inaction AR (step 3) did not significantly reduce the deviance statistic compared to the step 2 model (Table 2), $\chi^2(2) = 0.70$, ns. Addition of past behaviour (step 4) significantly reduced the deviance statistic compared to the step 3 model (Table 2), $\chi^2(1) = 9.70$, $p < .001$. Only intention

and past behaviour were significant at the final step.

Discussion

The findings from Study 1 supported our predictions. In particular, both action and inaction AR were predictive of intentions to engage in distal benefit behaviours when controlling for other TPB variables and past behaviour. This was true when either type of AR were entered individually (Table 1, step 2a and 2b) or simultaneously (Table 1, step 3). Also, as predicted, inaction AR was the dominant predictor (cp. Ajzen & Sheikh, 2013). Neither forms of AR were significant predictors of behaviour in the present analyses when controlling for other predictors.

There are a number of weaknesses with Study 1. First, Study 1 only focused on distal benefit behaviours and so did not allow us to test the effects of action and inaction AR for immediate hedonic behaviours as was the case in Ajzen and Sheihk (2013). Second the measure of perceived behavioural control used in Study 1 could be criticized for only assessing the control components of perceived behavioural control and not the self-efficacy components (Armitage & Conner, 2001).

Study 2

Study 2 was intended to be a replication and extension of Study 1. Again we measured TPB variables (including affective and instrumental attitudes, subjective norm and both self-efficacy and perceived control) plus past behaviour alongside action and inaction AR across a set of behaviours. In Study 2 the behaviours were specifically selected (see below) to include distal benefit behaviours as in Study 1 plus a set of immediate hedonic behaviours. We predicted that both types of AR would predict intentions for both types of behaviour but that inaction AR would be the stronger predictor for distal benefit behaviours and action AR would be the stronger for immediate hedonic behaviours. Again we took advantage of multi-level modelling in analysing the data across behaviours simultaneously using interaction terms to test for differences between behaviour types.

Method

Participants were again students recruited by email from various departments at eight U.K. universities (different from those used in Study 1) in Spring 2003. The email invited participants to log on to a web site and complete two on-line questionnaires in return for being entered into a prize draw to win £100 (approximately $160). Participants were randomized to receive no additional information, simple written information on the costs and benefits of different behaviours, or simple written information on the costs and benefits of different behaviours plus the idea that performing or not performing each behaviour could lead to regret (see Sandberg, 2005 for further details). However, as the intervention had no effect on the reported responses or relationship between constructs the three conditions were merged ($p > .20$; see online materials). Similar findings to those reported here were found when using only participants from the no additional information condition. There was four weeks between completion of the T1 and T2 questionnaires. A total of 883 participants (560 female, 323 male; age range = 18-62 years) fully completed the Time 1 questionnaire; 437 participants (i.e. 49% of the original sample) completed a Time 2 questionnaire (150 male; 287 female; age range 18–62 years). Questionnaires were matched across time points based on email address. Those completing both questionnaires did not differ from those only completing the Time 1 questionnaire on gender or age, $ps > .25$. There was a significant difference between those completing questionnaires at both times or just time 1 on the cognition measures taken at Time 1, $F(7,5302) = 3.50$, $p < .01$. Examination of the univariate effects indicated that this was attributable to significant differences for perceived control, $F(1,5308) = 12.98$, $p < .001$. Those who were lost at follow-up reported less perceived control across behaviours ($M = 4.08$, $SD = 1.05$) compared to those who completed questionnaires at both time points ($M = 4.18$, $SD = 0.99$). No other differences were significant in the univariate analyses, $ps > .09$.

Measures.

The questionnaire included measures of the TPB constructs in relation to the three distal benefit behaviours used in Study 1 (regular exercise, eating healthily, being organized for work) and three immediate hedonic behaviours (binge drinking, spending too much money, sending an impulsive communication) along with a number of items not reported here[2]. The measures were based upon standard wording recommended for measuring components of the TPB (Conner & Sparks, 2015).

At Time 1 Intentions, Affective attitudes, Instrumental attitudes, Subjective Norm, Action AR, Inaction AR and Past Behaviour were assessed with one item for each behaviour (see Study 1 for example items and scoring; Instrumental attitude had two items as in Study 1). Self-Efficacy was assessed with one item for each behaviour (e.g., 'If I wanted to, I could easily be organized for work during the next 4 weeks, strongly disagree-strongly agree; scored 1 to 5 with higher scores indicating greater self-efficacy). Perceived Control was assessed with one item for each behaviour (e.g., 'I am in control of being organized for work during the next 4 weeks, strongly disagree-strongly agree; scored 1 to 5 with higher scores indicating greater control). The T2 questionnaire measured self-reported behaviour for each behaviour using a single item (see Study 1 for example items and scoring).

Analyses.

Data were again analyzed in SPSS (version 20, SPSS Inc) and HLM (version 7, SSI). For predictions of intentions there were 5310 person-behaviour data points spread across 883 individuals. For predictions of behaviour there were 2611 person-behaviour data points spread across 437 individuals. We computed means and SDs for all measured variables in SPSS.

As in Study 1, in relation to predictions of intentions we initially computed a baseline intercept only model and a TPB model (instrumental attitude, affective attitude, subjective norm, self-efficacy, perceived control) to compare against other models. At step 2 we tested the inclusion of action (step 2a) or inaction (step 2b) AR. At step 3 we tested the inclusion of both

action and inaction AR. At step 4 we tested the addition of past behaviour to the model. Finally, we tested whether there were differences in the power of each construct to predict intentions for our two types of behaviour (i.e., distal benefit versus immediate hedonic behaviours). This was achieved by testing the power of a dummy coded behaviour type variable plus interactions between that variable and each construct (all mean centred) when added at step 5. Where interactions were significant (indicating differences between types of behaviour) we computed simple slopes to explore the effect of each predictor for the two types of behaviour.

In relation to predictions of behaviour we initially computed an intercept-only model to compare other models against. At step 1 we included the main direct predictors of behaviour from the TPB (intention, self-efficacy, perceived control). At step 2 we added the other TPB variables (instrumental attitudes, affective attitudes, subjective norm). At step 3 we added both action and inaction AR. At step 3 we added past behaviour. Finally, at step 4 we tested whether there were differences in the power of each construct to predict action for our two types of behaviour (i.e., distal benefit versus immediate hedonic) in a similar way to that used in relation to prediction of intentions. Where interactions were significant we again computed simple slopes to explore the effect of each predictor for the two types of behaviour. As in Study 1 for each step we report unstandardized coefficients (B), standard errors (SE) and standardized coefficients (β; see Hox, 2002) from the analysis with robust standard errors, the deviance statistic to indicate model fit, and a chi-squared test of the change in deviance compared to the earlier model to indicate significance of improvement of fit.

Results

Examination of the means and standard deviations revealed that the measures were not unduly skewed and had reasonable variability. In relation to predictions of intentions, multilevel modelling indicated that adding instrumental and affective attitudes, subjective norm, self-efficacy and perceived control (step 1) significantly reduced the deviance statistic compared to

the intercept only model, $\chi^2(5) = 6217.0$, $p < .001$. All predictors except perceived control were significant with subjective norm and self-efficacy being the strongest predictors. Adding either action AR, $\chi^2(1) = 116.0$, $p < .001$ (step 2a) or inaction AR, $\chi^2(1) = 452.0$, $p < .001$ (step 2b) significantly reduced the deviance statistic compared to the step 1 model (Table 3) with all variables except perceived control being significant (perceived control had a small significant positive effect when controlling for action AR). Notably each type of regret was significant when entered although the stronger effects were associated with inaction AR. Adding both action and inaction AR simultaneously (step 3) significantly reduced the deviance statistic compared to the step 2 model, $\chi^2(2) = 587.5$, $p < .001$ (Table 3) with both variables being significant along with all other predictors except perceived control, although the stronger effects were associated with inaction AR. Addition of past behaviour at step 4 also significantly reduced the deviance statistic compared to the step 3 model, $\chi^2(1) = 170.2$, $p < .001$ (Table 3). All variables except perceived control were significant at this step with inaction regret and instrumental attitude being the strongest predictors.

We next tested whether there were differences in the power of each construct to predict intentions for distal benefit versus immediate hedonic behaviours. Adding a dummy coded behaviour type variable plus interactions between that variable and each construct (all mean centred) significantly reduced the deviance statistic compared to the step 4 model in Table 3, $\chi^2(10) = 194.6$, $p < .001$. A series of interactions with behaviour type were significant: action AR ($\beta = .398$, $p < .001$); inaction AR ($\beta = -.107$, $p < .001$); affective attitude ($\beta = -.108$, $p < .001$); instrumental attitude ($\beta = -.188$, $p < .01$); and past behaviour ($\beta = -.055$, $p < .01$). Simple slopes analyses indicating that action AR was a strong significant predictor of intentions for immediate hedonic behaviours (B = .311, SE = 0.028, $p < .001$) but a weak non-significant predictor for distal benefit behaviours (B = .015, SE = 0.024, ns). In contrast inaction AR was a significant predictor of intentions for both types of behaviour, although it was stronger for distal

benefit (B = .299, SE = 0.025, p < .001) compared to immediate hedonic (B = .230, SE = 0.026, p < .001) behaviours. Affective attitude was a strong significant predictor of intentions for distal benefit (B = .122, SE = 0.020, p < .001) but a weak non-significant predictor for immediate hedonic (B = .016, SE = 0.019, ns) behaviours. In contrast, instrumental attitude was a significant predictor of intentions for both types of behaviour, although it was stronger for distal benefit (B = .381, SE = 0.037, p < .001) compared to immediate hedonic (B = .277, SE = 0.061, p < .001) behaviours. Past behaviour was a significant predictor of intentions for both types of behaviour, although it was stronger for distal benefit (B = .144, SE = 0.024, p < .001) compared to immediate hedonic (B = .091, SE = 0.019, p < .001) behaviours.

In relation to predictions of behaviour, multilevel modelling (Table 4) indicated that adding intentions, self-efficacy and perceived control (step 1) significantly reduced the deviance statistic compared to the intercept only model, $\chi^2(3) = 41.4$, p < .001. All variables were significant at this step, with intentions and self-efficacy having positive beta weights and perceived control having a negative beta weight. Adding instrumental and affective attitude and subjective norm (step 2) significantly reduced the deviance statistic compared to the step 1 model (Table 4), $\chi^2(3) = 12.9$, p < .001. Self-efficacy, perceived control (negative), instrumental attitude and affective attitude were significant predictors at this step. Adding action AR and inaction AR (step 3) significantly reduced the deviance statistic compared to the step 2 model (Table 4), $\chi^2(2) = 23.0$, p < .001. Self-efficacy, perceived control (negative), affective attitude and action AR were significant predictors at this step. Addition of past behaviour (step 4) significantly reduced the deviance statistic compared to the step 3 model (Table 4), $\chi^2(1) = 47.5$, p < .001. Only action AR and past behaviour were significant at this step.

We next tested whether there were differences in the power of each construct to predict behaviour for distal benefit versus immediate hedonic type of behaviours. Adding a dummy coded behaviour type variable plus interactions between that variable and each construct (all

mean centred) significantly reduced the deviance statistic compared to the step 4 model in Table 4, $\chi^2(11) = 10.6$, $p < .001$. Three interactions with type of behaviours were significant: action AR ($\beta = .453$, $p < .001$); affective attitude ($\beta = .114$, $p < .05$); and perceived control ($\beta = .104$, $p < .05$). Simple slopes analyses indicated that action AR was a strong significant predictor for immediate hedonic (B = .221, SE = 0.064, $p < .001$) but a weak non-significant predictor for distal benefit (B = .109, SE = 0.069, ns) behaviours. Affective attitudes were a strong significant predictor for immediate hedonic (B = .158, SE = 0.046, $p < .001$) but a weak non-significant predictor for distal benefit (B = .012, SE = 0.046, ns) behaviours. Finally, perceived control was a non-significant negative predictor for immediate hedonic (B = -.095, SE = 0.054, p = .08) but a non-significant positive predictor for distal benefit (B = .084, SE = 0.070, p = .23) behaviours.

Discussion

The Study 2 findings were consistent with predictions, supporting and extending the findings of Study 1. In particular, across behaviours both action and inaction AR emerged as significant predictors of intentions when controlling for other TPB variables and past behaviour. This was true when considering the two variables individually or simultaneously. When examining distal benefit versus immediate hedonic behaviours a more differentiated pattern emerged. For distal benefit behaviours, like Study 1, it was inaction AR that was the stronger predictor, indeed in Study 2 action AR was not a significant predictor of such intentions when considered simultaneously and controlling for other TPB variables and past behaviour. In contrast, for immediate hedonic behaviours (not considered in Study 1) both inaction AR (B = .230, $p < .001$) and action AR (B = .311, $p < .001$) were strong significant predictors of intentions when considered simultaneously and controlling for other TPB variables and past behaviour.

Regarding actual behaviour, a differential pattern emerged for distal benefit versus immediate hedonic behaviours. For distal benefit behaviours, consistent with Study 1, past

behaviour predicted future behaviour; inconsistent with Study 1, intentions did not emerge as a significant predictor. For immediate hedonic behaviours, past behaviour, affective attitudes and action AR emerged as significant predictors. These findings are somewhat consistent with other results for immediate hedonic behaviours (see Conner et al., 2015). Nevertheless the reliance on a single item self-reported measure of behaviour means these findings should be treated with caution, although the fact that we assess effects across several behaviours may partially counter this problem. A further concern in relation to the findings on behaviour is that the sub-sample included in these analyses was biased in relation to perceived control (i.e., they reported higher perceived control) compared to the sub-sample who only completed the Time 1 questionnaire. However, it is not clear that this would unduly bias the analyses of AR that were the focus of this research.

General Discussion

The two studies reported here provide a fairly consistent set of findings. Both action and inaction anticipated regret (AR) are predictive of intentions even when controlling for other TPB variables (including affective attitudes) and past behaviour. This supports the case for adding anticipated affective reactions in addition to affective attitudes to the TPB in order to tap important affective influences on intentions. The current findings show that AR is a significant predictor even when controlling for other affective influences (i.e., affective attitudes) and past behaviour, whether considering either distal benefit or immediate hedonic behaviours. The current findings suggest that the effects for AR are not merely attributable to a failure to match questions on the target behaviour (e.g., testing the effect of inaction AR in conjunction with TPB variables about doing the behaviour or vice-versa; Ajzen & Sheikh, 2013). We suggest that the negative findings reported by Ajzen and Sheikh (2013) are probably attributable to the modest sample sizes and limited number of behaviours in that study.

One important implication of the present research is that it might be useful to add

measures of AR to tests of the TPB. There are both empirical and theoretical reasons for such an addition. Empirically, AR emerges as a strong predictor of intentions in the context of other TPB variables and past behaviour. Theoretically, AR as a measure of anticipated affective reactions taps affective influences on intentions and behaviour that the TPB has been criticized for omitting. In this regard it is interesting to note that the effects of AR are present even when controlling for another affective influence, namely affective attitudes (see Conner et al., 2015 for a relevant meta-analysis).

In showing effects for both action AR and inaction AR the present research leaves open the question of which to include in TPB studies. As Ajzen and Sheikh (2013) rightly point out most studies have shown effects when examining the role of AR in relation to one behaviour (action or inaction) when considering TPB variables in relation to the alternative behaviour (Conner et al., 2015; Rivis et al., 2009; Sandberg & Conner, 2008). The present research generally supports this approach. The present research suggests that for distal benefit behaviours it is mainly (but not solely) inaction AR that adds to predictions of intentions over and above other TPB variables. However, for immediate hedonic behaviours both action and inaction AR may be important predictors of intentions over and above other TPB variables, although the former may be more important.

We earlier suggested that this pattern of results could be attributable to the different temporal patterning of outcomes across these two types of behaviour. A similar argument could be made in relation to the fact that action AR was only a significant predictor of behaviour for immediate hedonic behaviours. This and alternative explanations could be usefully tested in future research (see Brewer et al., in press for further discussion of this issue). The current findings might support the use of both inaction and action AR to TPB studies on immediate hedonic behaviours. Richetin, Conner, and Perugini (2011) showed that including components of the TPB in relation to both action and inaction increased the power to predict action and

inaction intentions and actual behaviour. An avenue for future research would be to test all components of the TPB in relation to action and inaction and include both action and inaction AR. However, the increased respondent burden associated with completing so many measures may be a limitation to such an approach. A related issue is the extent to which AR questions specify the outcome that might elicit regret. The items used here do not specify an outcome because doing so might require multiple items increasing participant burden. The extent to which specification of the regret inducing outcome in AR items influences their predictive power is another issue for future research.

Although the present research had a number of strengths including replication across two studies, large samples tested across multiple behaviours and a prospective design, there were also a number of weaknesses. Importantly these included the use of convenience college samples, an over-reliance on single-item measures and use of self-report measures of behaviour. Replicating the present findings using multi-item measures of each construct within each behaviour and an objective measure of past behaviour and behaviour would be useful extensions to this research.

In conclusion the present research shows that AR adds to predictions of intentions in the TPB. This is not attributable to failing to control for other affective influences (i.e., affective attitude) or past behaviour nor attributable to only measuring AR in relation to one behaviour (action or inaction) when considering TPB variables in relation to the alternative behaviour (inaction or action). This suggests that adding an overall measure of AR to the TPB might be worthwhile in relation to taking account of affective influences and in explaining additional variance in intentions in particular. In addition, our research shows that for distal benefit behaviours it may be mainly inaction AR that is most important, but that for immediate hedonic behaviours both forms of AR may be important. Although the present findings are correlational, research has shown that interventions that successfully change anticipated affective reactions such as regret and guilt also produce small to medium sized effects on intentions and behaviour

(Sheeran, Harris, & Epton, 2013). For example, studies have suggested that merely measuring AR may be sufficient to have impacts on behaviour (Sandberg & Conner, 2009), particularly when such AR questions precede intention questions (Sandberg & Conner, 2011). Future experimental work might usefully assess the individual and combined effects of interventions designed to change other TPB components alongside anticipated affective reactions

Footnotes

1. Study 1 also included measures tapping attitudinal ambivalence at time 1. Measures were also taken in relation to several other behaviours that were excluded due to problems in the wording of specific items (binge drinking, spending too much money, sending an impulsive communication) or the fact that the behaviours were not assessed in Study 2 (approaching someone new, trying an adventurous activity, working hard). For binge drinking, spending too much money, sending an impulsive communication due to a clerical error we failed to assess AR about not doing. The full questionnaires are available from the first author.

2. Study 2 also included measures tapping attitudinal ambivalence, past regret (both action and inaction) and reason for acting (2 items on wanting to act and feeling should act) at time 1 and future intentions (3 items) at time 2. Full questionnaires available from first author.

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Table 1.

Hierarchical Multi-Level Regressions of Intentions onto TPB Variables, Anticipated Regret (AR) and Past Behaviour for Study 1 (N of participants = 343; N of observations = 1012).

	Step 2a			Step 2b			Step 3			Step 4		
Predictors	B	SE	β	B	SE	β	B	SE	β	B	SE	β
Intercept (γ_{00})	4.062	.041		4.060	.041		4.061	.041		4.060	.041	
Instrumental Attitude (γ_{10})	0.318	.043	0.172***	0.214	.060	0.187***	0.206	.058	0.112***	0.192	.059	0.104***
Affective Attitude (γ_{20})	0.156	.041	0.171***	0.129	.035	0.171***	0.122	.035	0.133***	0.089	.038	0.097*
Subjective Norm (γ_{30})	0.318	.043	0.282***	0.177	.039	0.282***	0.173	.040	0.154***	0.189	.039	0.168***
Perceived behavioural control (γ_{40})	0.267	.044	0.250***	0.210	.042	0.250***	0.209	.042	0.195***	0.164	.043	0.153***
Action AR (γ_{50})	0.103	.030	0.091***	-			0.054	.027	0.048*	0.052	.027	0.046*
Inaction AR (γ_{60})	-			0.359	.031	0.413***	0.355	.031	0.408***	0.340	.031	0.351***
Past Behaviour (γ_{70})										0.128	.035	0.391***

* p < .05; ** p < .01; *** p < .001. Note. B = unstandardized coefficient; β = standardized coefficient. Predicting intentions using multilevel modelling with random effects: Step 0 model (not shown), intercept added, Deviance = 3021.3; Step 1 model (not shown), instrumental attitude, affective attitude, subjective norm and perceived behavioural control added (all significant predictors), Deviance = 2683.1, $\chi^2(4) = 338.2$, p < .001 compared to step 0; Step 2a model, action AR entered, Deviance = 2667.4, $\chi^2(1) = 15.7$, p < .001 compared to step 1; Step 2b model, inaction AR entered, Deviance = 2509.4, $\chi^2(1) = 173.7$, p < .001 compared to step 1; Step 3 model, both action and inaction AR entered, Deviance = 2499.7, $\chi^2(2) = 183.4$, p < .001 compared to step 1; Step 4 model, past behaviour added, Deviance = 2483.6, $\chi^2(1) = 16.1$, p < .001 compared to step 3.

Table 2.

Hierarchical Multi-Level Regressions of Behaviour onto TPB Variables, Anticipated Regret (AR) and Past Behaviour for Study 1 (N of participants = 154; N of observations = 450).

	Step 1			Step 2			Step 3			Step 4		
Predictors	B	SE	β	B	SE	β	B	SE	β	B	SE	β
Intercept (γ_{00})	3.191	.063		3.196	.062		3.188	.062		3.186	.063	
Intentions (γ_{10})	0.495	.062	0.445***	0.396	.071	0.355***	0.373	.090	0.335***	0.346	.093	0.311***
Perceived Behavioural Control (γ_{20})	0.132	.092	0.111	0.162	.090	0.136	0.155	.090	0.130	0.106	.090	0.132
Instrumental Attitude (γ_{30})				0.187	.110	0.091	0.178	.116	0.087	0.178	.113	0.132
Affective Attitude (γ_{40})				0.096	.060	0.094	0.095	.061	0.093	0.044	.062	0.132
Subjective Norm (γ_{50})				0.095	.078	0.076	0.090	.079	0.072	0.127	.078	0.132
Action AR (γ_{60})							-0.005	.071	-0.004	-0.011	.069	-0.290
Inaction AR (γ_{70})							0.031	.062	0.032	0.009	.063	0.074
Past Behaviour (γ_{80})										0.188	.075	0.037*

* p < .05; ** p < .01; *** p < .001. Note. B = unstandardized coefficient; β = standardized coefficient. Predicting intentions using multilevel modelling with random effects: Step 0 model (not shown), intercept added, Deviance = 1467.1; Step 1 model, Deviance = 1392.3, $\chi^2(2) = 74.8$, p < .001 compared to step 0; Step 2 model, Deviance = 1375.4, $\chi^2(3) = 16.9$, p < .001 compared to step 1; Step 3 model, Deviance = 1374.7, $\chi^2(2) = 0.70$, ns compared to step 2; Step 4 model, Deviance = 1365.0, $\chi^2(1) = 9.70$, p < .001 compared to step 3.

Table 3.

Hierarchical Multi-Level Regressions of Intentions onto TPB Variables, Anticipated Regret (AR) and Past Behaviour for Study 2 (N of participants = 883; N of observations = 5310).

	Step 2a			Step 2b			Step 3			Step 4		
Predictors	B	SE	β	B	SE	β	B	SE	β	B	SE	β
Intercept (γ_{00})	3.069	.017		3.069	.017		3.069	.017		3.069	.017	
Instrumental Attitude (γ_{10})	0.378	.022	0.404***	0.367	.019	0.392***	0.219	.024	0.234***	0.229	.023	0.245***
Affective Attitude (γ_{20})	0.150	.013	0.139***	0.115	.013	0.106***	0.114	.013	0.105***	0.080	.013	0.074***
Subjective Norm (γ_{30})	0.176	.016	0.170***	0.155	.015	0.150***	0.134	.015	0.129***	0.135	.015	0.130***
Self-efficacy (γ_{40})	0.229	.016	0.156***	0.196	.015	0.133***	0.201	.015	0.137***	0.134	.016	0.091***
Perceived Control (γ_{50})	0.031	.016	0.022*	0.006	.014	0.004	0.016	.014	0.089	0.042	.014	0.029
Action AR (γ_{60})	0.157	.016	0.186***	-			0.164	.015	0.194***	0.141	.015	0.167***
Inaction AR (γ_{70})	-			0.287	.018	0.281***	0.290	.017	0.284***	0.281	.017	0.275***
Past Behaviour (γ_{80})										0.165	.013	0.128***

* p < .05; ** p < .01; *** p < .001. Note. B = unstandardized coefficient; β = standardized coefficient. Predicting intentions using multilevel modelling with random effects: Step 0 model (not shown), intercept added, Deviance = 19132.0; Step 1 model (not shown), instrumental attitude, affective attitude, subjective norm, self-efficacy, perceived control added (all significant predictors except perceived control), Deviance = 13915.0, $\chi^2(5) = 6217.0$, p < .001 compared to step 0; Step 2a model, action AR entered, Deviance = 13799.6, $\chi^2(1) = 116.0$, p < .001 compared to step 1; Step 2b model, inaction AR entered, Deviance = 13463.4, $\chi^2(1) = 452.0$, p < .001 compared to step 1; Step 3 model, both action and inaction AR entered, Deviance = 13327.5, $\chi^2(2) = 587.5$, p < .001 compared to step 1; Step 4 model, past behaviour added, Deviance = 13157.3, $\chi^2(1) = 170.2$, p < .001 compared to step 3.

Table 4.

Hierarchical Multi-Level Regressions of Behaviour onto TPB Variables, Anticipated Regret (AR) and Past Behaviour for Study 2 (N of participants = 437; N of observations = 2611).

	Step 1			Step 2			Step 3			Step 4		
Predictors	B	SE	β	B	SE	β	B	SE	β	B	SE	β
Intercept (γ_{00})	3.231	.029		3.231	.029		3.231	.029		3.230	.029	
Intentions (γ_{10})	0.135	.020	0.142***	-0.002	.039	-0.002	-0.006	.042	-0.006	-0.064	.043	-0.067
Self-efficacy (γ_{20})	0.076	.037	0.054*	0.097	.039	0.069**	0.113	.036	0.081**	0.026	.037	0.019
Perceived Control (γ_{30})	-0.095	.034	0.069**	-0.096	.034	0.070**	-0.078	.034	-0.057*	-0.032	.034	-0.022
Instrumental Attitude (γ_{40})				0.106	.038	0.119**	-0.016	.045	-0.018	0.010	.045	0.011
Affective Attitude (γ_{50})				0.077	.027	0.075**	0.087	.030	0.085**	0.046	.031	0.045
Subjective Norm (γ_{60})				-0.001	.036	-0.001	-0.014	.036	-0.014	-0.010	.035	-0.010
Action AR (γ_{70})							0.178	.034	0.221***	0.159	.034	0.198***
Inaction AR (γ_{80})							0.071	.038	0.073	0.071	.037	0.073
Past Behaviour (γ_{90})										0.238	.034	0.194***

* p < .05; ** p < .01; *** p < .001. Note. B = unstandardized coefficient; β = standardized coefficient. Predicting intentions using multilevel modelling with random effects: Intercept only model, Deviance = 9207.2; Step 1 model, Deviance = 9165.8, $\chi^2(3) = 41.4$, p < .001 compared to step 0; Step 2 model, Deviance = 9152.9, $\chi^2(3) = 12.9$, p < .001 compared to step 1; Step 3 model, Deviance = 9129.9, $\chi^2(3) = 23.0$, p < .001 compared to step 2; Step 4 model, Deviance = 9082.4, $\chi^2(1) = 47.5$, p < .001 compared to step 3.