"JE NE REGRET RIEN?": THE VALUE OF ADDING ANTICIPATED REGRET TO THE THEORY OF PLANNED BEHAVIOUR

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Abstract

Regret is fundamentally motivational, where there is a desire to be able to undo what has or has not been done; anticipating regret, therefore, seems a useful way of avoiding this negative experience and has been found to be a powerful mechanism for changing behaviour in areas such as economics and litigation (e.g. Larrick & Boles, 1995). Recent research has also been conducted into incorporating this explicitly affective component into the utilitarian-bound Theory of Planned Behaviour (Ajzen, 1985, 1988, 1991). A meta-analysis conducted in this thesis on all previous relevant research established that anticipated affective reactions, including regret, did make a significant contribution to the model in terms of increasing the variance in intentions. The remit of this PhD was to specifically consider anticipated regret's predictive value to a broader variety of behaviours in a completely novel way. Study 1 differentiated between two particular behaviour types, Immediate Hedonic and Distal Benefit Behaviours, which mapped on to action and inaction regret respectively. A selection of these behaviours was used in Studies 2, 3 and 4, with Study 4 using an intervention designed to explicitly increase regret salience. Studies 5 and 6 set out to replicate the results from previous research into exercise behaviour by Abraham and Sheeran (2003; 2004), whilst Study 7 used an objective measure of exercise behaviour. The studies were either traditional pen-and-paper or web studies. The results provide overwhelming evidence that anticipated regret (unambiguously defined) adds significantly and independently to the predictive validity of the TPB in terms of intentions over and above the traditional TPB variables, even when controlling for past behaviour, experiential and instrumental attitudes. Replication of Abraham and Sheeran's (2003; 2004) results (i.e. moderation by anticipated regret on the intention-behaviour relationship, mediated by intention stability) failed in pen-and-paper Study 5, although success was evident in web Study 6. Finally, although Study 7 explicitly established the disparate value of anticipated regret to the predictive validity of intention, there was a failure to detect any moderation or mediation effects: rather the most important predictor of exercise behaviour by Sports Centre members was past behaviour. Issues regarding multi-item versus single-item scales, web versus pen-and-paper designs, student versus 'other' populations, and observational designs are discussed with recommendations for further research.

Contents

List of Tables

List of Figures

List of Abbreviations

AAR	Anticipated Affective Reactions
AR	Anticipated Regret/Anticipated Action Regret
CI	Confidence Interval
DBB(s)	Distal Benefit Behaviour(s)
FSN	Fail-Safe N
IHB(s)	Immediate Hedonic Behaviour(s)
IR	Anticipated Inaction Regret
M	Mean
PBC	Perceived Behavioural Control
PB	Past Behaviour
SD	Standard Deviation
SEU	Subjective Expected Utility
SN	Subjective Norm
SRR	Systematic Research Review
TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action
T1	Time 1
T2	Time 2
T3	Time 3

Chapter 1: Introduction and Research Review

"Regret for the things we did can be tempered by time; it is the regret for the things we did not do that is inconsolable"
- Sydney J. Harris (1917-1986): American writer and journalist

1.1 Overview of Chapter 1

The Theory of Planned Behaviour (Ajzen, 1985, 1988, 1991) is a widely applied model of social cognition. Since the model elucidates the determinants of behaviour, one practical utility of the TPB is that it can be used as a framework to identify areas to be targeted in health campaigns. Despite its widespread application, however, there is substantial evidence that the model can be improved (Conner & Armitage, 1998). This review aims to be systematic and describe, evaluate and suggest directions for research into the value of adding an affective component to the TPB – namely anticipated regret (AR). Past research has revealed that anticipated affective reactions (AAR) – which include emotions such as sad, tense and worried in addition to anticipated regret - appear to make a valid contribution to the model (e.g. Conner & Abraham, 2001; Richard & van der Pligt, 1991): there is also research which demonstrates that AR on its own can be especially important in increasing the variance explained in both intentions and prospective behaviour (e.g. Abraham & Sheeran, 2003). These studies form the basis of this review. Following on from the systematic research review (SRR), there will be a section outlining the concepts of AAR and AR in general, and then specifically how these have been operationalised in TPB research; this will include an evaluation of the attitude construct in relation to anticipated regret, which is subject to current debate. In particular, it is argued that AR has a unique motivational quality which sets it quite apart from both the attitude construct and other AARs, and which makes it an appropriate construct to be included in the TPB. As a prelude to the SRR, however, there will be a brief overview of the TPB. Finally, the chapter ends with a section

summarising the conclusions of this review and outlining the areas which still need to be addressed in order to support the inclusion of an affective component like AR to the existing model.

1.2 The Theory of Planned Behaviour

1.2.1 General Overview

The TPB evolved as a result of social psychology's interest in the relationship between attitudes and behaviour, and in particular has its origins in Fishbein's early work on the failure of attitudes to predict behaviour (Fishbein, 1967). A revision of the Theory of Reasoned Action (TRA: Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975), the TPB uses an expectancy-value framework (Peak, 1955) to posit that intentions and perceived behavioural control (PBC) are the proximal cognitive determinants of behaviour. Intentions represent a person's motivation, conscious plan or decision to exert effort to perform the behaviour (Ajzen, 1991), whereas PBC represents the perceived degree to which performing the behaviour is under the person's control. This latter construct was added to the original TRA to broaden the model's applicability beyond purely volitional behaviours to those of a more complex nature where there may be certain barriers regarding performance, and it is this addition which transforms the model into the TPB. Ajzen (1988, 1991) argued that it is only in the case of volitional behaviours, which are relatively straightforward, that the TRA will provide adequate predictions; under circumstances where there are constraints on action, intentions on their own may not be sufficient to predict behaviour. To the extent that PBC accurately reflects actual control, it should provide a good prediction of behaviour. Indeed, the addition of PBC to the TPB explains the potential restrictions on action as perceived by the actor and thus can explain whey intentions do not always predict behaviour.

Intentions are in turn determined by three constructs: attitudes, subjective norms (SN) and, again, perceived behavioural control (PBC). In the TRA, only attitudes and SN predict behavioural intention. Attitudes are the overall evaluations of the behaviour by the individual and are defined as "a learned disposition to respond in a consistently favourable or unfavourable manner with respect to a given object" (Fishbein & Ajzen, 1976, p.6). Subjective norms refer to a person's perceptions of the social pressure from significant others to engage in the behaviour; significant others are individuals or groups whose preferences about a person's behaviour in this domain are important to him/her. The TPB incorporates a third predictor of intentions, PBC, which is the individual's perception of the extent to which performance of the behaviour is easy or difficult. Control is seen as a continuum with easily-executed behaviours at one end (brushing teeth) and behavioural goals demanding resources, opportunities, and specialised skills (e.g. long distance running) at the other end. Perceived behavioural control has been likened to Bandura's (1977; 1986) concept of self-efficacy (c.f. Luszczynska & Schwarzer, 2005). Conceptually, there is no difference between PBC and self-efficacy, as both refer to peoples' beliefs that they are capable of performing a given behaviour. They do, however, differ operationally in that each are usually assessed in different ways: research with Bandura's concept of self-efficacy usually defines a graded series of potential obstacles to performance of the behaviour, and participants are asked to indicate how likely it is that they could overcome each obstacle; to assess PBC, participants are usually asked to rate the extent to which they have the ability to perform the behaviour, or how much the behaviour is under their control.

Using equations to illustrate, the TPB depicts **behaviour** (equation 1) as a linear regression function of behavioural intention and PBC:

$$B = w_1B1 + w_2PBC \quad \textbf{Equation 1}$$

Where B is behaviour, BI is behavioural intention, PBC is perceived behavioural control, and w_1 and w_2 are regression weights; these weights will vary as a function of both the behaviour and the population under examination and need to be empirically determined. **Behavioural intention**, on the other hand, is a linear regression function of attitudes, subjective norms and PBC (equation 2):

$$BI = w_3A + w_4SN + w_5PBC \quad \textbf{Equation 2}$$

Where BI is behavioural intention, A is attitude toward the behaviour, SN is subjective norm, PBC is perceived behavioural control, and w_3 to w_5 are empirical weights indicating the relative importance of the determinants of intention, which again vary as a function of both the behaviour and population. It will be noted that without PBC, the second equation represents the TRA; it will also be noted that PBC is the only predictor variable included in both equations. The second equation illustrates that people are more likely to intend to engage in behaviours that are perceived as achievable (Bandura, 1986).

Just as intentions are held to have determinants, so the attitude, SN and PBC components are also held to have determinants which follow expectancy-value conceptualisations (Peak, 1955). The determinants are sometimes referred to as *indirect measures*, whilst the components themselves are referred to as *direct measures*. So, the attitude component of the TPB is a function of beliefs about the likely outcomes of the behaviour and the evaluations of these outcomes (behavioural beliefs): the SN component is a function of beliefs about the normative expectations of others and motivation to comply with these expectations (normative beliefs); finally, the PBC component is determined by beliefs about the presence of factors that may facilitate or impede performance of the behaviour and the perceived power of these factors (control beliefs). In their respective aggregates, behavioural beliefs produce a favourable or unfavourable *attitude* towards the behaviour; normative beliefs result in perceived social

pressure or s*ubjective norm*; whilst control beliefs result in *perceived behavioural control* (see Conner & Sparks, 2005, for a more in-depth review). The illustration detailed in Figure 1.1 is a schematic representation of the theory.

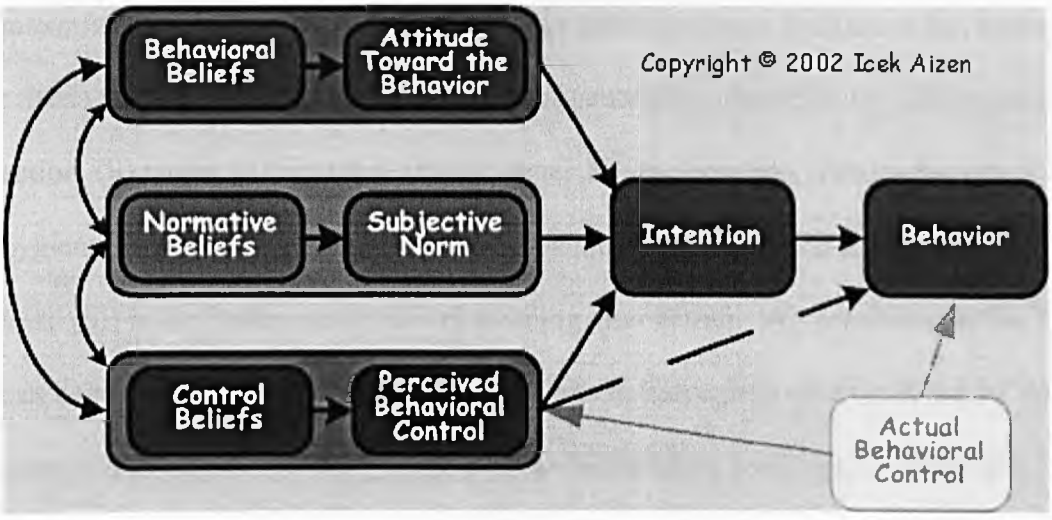

Figure 1.1 Schematic representation of the Theory of Planned Behaviour

Figure 1.1 illustrates that in general, the more favourable the attitude and SN, and the greater the PBC, the stronger should be the person's intention to perform the behaviour in question. Finally, given a sufficient degree of actual control over the behaviour, people are expected to carry out their intentions when the opportunity arises. So intention is assumed to be the immediate antecedent of behaviour, but because some behaviours are difficult to perform and therefore limit volitional control, PBC can be considered a useful extension to intention: to the extent that PBC reflects actual control, it can serve as a proxy for actual control (given that there are innumerable problems of defining and measuring actual control: Ajzen and Fishbein, 2005) and contribute to the behaviour in question. Theoretically, the direct and belief-based (indirect) measures of attitude, SN and PBC are alternative ways of assessing the same underlying constructs: either method can therefore be used to predict intentions. However, as intentions are assessed directly, the direct measures are usually preferred in order to maintain consistency.

1.2.1.1 Direct Measurement of Predictor Variables

Measures of all predictor variables are assessed according to the principle of compatibility (Ajzen, 1988; Ajzen & Fishbein, 1977), which stipulates that in order to maximise correspondence between attitudes and behaviours, predictors and behavioural criteria must be defined at the same level of generality or specificity with regard to (i) action, (ii) target, (iii) context, and (iv) time. So, for example, if the behaviour is oral hygiene, then it will be necessary to employ measures in relation to (i) brushing (ii) teeth (iii) in the bathroom (iv) every morning after eating. All predictors in the TPB can be assessed directly by asking respondents to judge each on a set of scales. Direct measures of intention include items such as "I intend to, I will try to, I plan to + behaviour". Attitudes towards the behaviour are usually assessed by semantic differential scales with bipolar adjectives, and it has been recently recommended (Ajzen & Fishbein, 2005) that these tap into two separable components – one component is *instrumental* in nature, represented by such adjective pairs as valuable-worthless, harmful-beneficial; the second component has a more *experiential* quality and is reflected in such scales as pleasant-unpleasant, enjoyable-unenjoyable. In addition, the use of good-bad is recommended to capture overall evaluation.[1] Subjective Norms can be assessed with items such as "Most people who are important to me think that – I should-should not + behaviour". PBC can be assessed with items such as "I am in control of + behaviour" (c.f. http://www.people.umwass.edu/aizen/search.html: accessed 6.7.05).

1.2.2 Meta-analytic Reviews of the TPB

A series of meta-analyses have now been reported for the TPB, including those across a broad range of behaviours (e.g. Armitage & Conner, 2001) and specific reviews

[1] See section 1.4.4 for a more detailed discussion of the attitude component.

focussing on health behaviours (e.g. Godin & Kok, 1996) and particular behaviours such as exercise (e.g. Hagger, Chatzisarantis, & Biddle, 2002).

Overall, attitude, SN and PBC account for between 40% and 50% of the variance in intentions across studies (Conner & Sparks, 2005). Furthermore, the validity of the model in its predictive power is demonstrated (e.g. Sutton, 1998). Specifically, Godin and Kok (1996) conducted the largest review to date of the application of TPB to a range of health related behaviours (56 studies from 1985 to 1995). It was found that generally a third of the variation in behaviour was explained by the combined effect of intention and PBC, with intention being identified as the most important variable (22.5% of the 34% explained variance was attributed to intention); thus personal motivation is an important factor in health related behaviours. However, for those categories of behaviour where control is a main component, such as addictive behaviours (like smoking), PBC stood out as carrying more weight. This highlights not only the importance of motivation, but also the effect of other control factors such as resources and addiction. Intention was well predicted by the three components of attitude, SN and PBC (with an average 41% of the variance explained).

Other meta-analyses report an average of between 21% and 36% variance explained in behaviour by BI and PBC (Conner & Sparks, 2005), with a meta-analysis of meta-analyses reporting 28% variance explained (Sheeran, 2002). In a recent general meta-analytic review of the model, Armitage and Conner (2001) used a database of 185 studies published up to the end of 1997; similar figures of 27% and 39% of variance were found for behaviour and intention respectively. Of further interest, though, was the difference between self-reported and objective/observed behaviour measures: the TPB accounted for 11% more of the variance in behaviour when measures were self-report; this may simply reflect the fact that measurement correspondence is typically maximised where subjective measures of behaviour are used (Armitage & Conner,

1999), but nevertheless this highlights the problems of self-report data and demonstrates that wherever possible objective measures of behaviour should be used.

1.2.3 Augmenting the TPB

The TPB has the advantage of parsimony. However, although the TPB is held to be a complete model of the proximal determinants of behaviour (in that all other influences are assumed to exert their impact upon behaviour via changes in components of the model), it is evident that behaviour is not totally explained or predicted by the component variables (Sutton, 1998). In this regard, other variables outside the TPB have been shown to add to the predictive power; indeed, Ajzen (1991) conceded that the theory is open to the inclusion of further variables if they can be shown to add to the predictive utility of the model. Specifically, past behaviour (de Vries, Backbier, Kok, & Dijkstra, 1995; Fitzhugh, 1995; Norman, Conner, & Bell, 1999) has been found to make a significant contribution over and above the TPB variables to explaining and predicting intentions and behaviour for smoking. There is, however, another variable which has been shown to augment the predictive validity of the TPB, and which is the subject of this review – anticipated affective reactions (AAR) like anticipated regret (AR). For the purposes of this thesis, the term 'AAR' refers to those emotional responses which can be anticipated as a consequence of performing (or refraining from performing) a given behaviour, such as feelings of anxiety, worry, disappointment, guilt, and which *includes* regret, whereas the term 'AR' refers solely to anticipated regret as one of those AARs. Although it is recommended (Ajzen and Fishbein, 2005) that the attitude construct of the TPB embodies an experiential component to capture affective evaluations such as pleasant, enjoyable, satisfying, it is argued throughout this thesis that such a component does not tap into the more value-laden and intense emotions as defined by AARs, and in particular it does not tap into AR. As recommended by Ajzen and Fishbein (2005), additional predictors should only be added to the TPB with

caution, "and only after careful deliberation and empirical exploration" (p. 201) – this review and, indeed this thesis, hopes to address these concerns in relation to adding AR to the TPB.

1.3 The Systematic Research Process – Search Strategies

1.3.1 Method

A systematic review methodology was followed (Sutton, Abrams, Sheldon, & Song, 1998). As the literature had not been described previously and the studies were quite heterogeneous, a descriptive review was conducted.

1.3.1.1 Inclusion and Exclusion Criteria

Due to the restricted number of studies that have analysed and investigated the concept of AAR/AR, an exhaustive search strategy was used. Studies were divided into (i) those which explicitly mentioned the TPB but in which the TPB was used alongside other theories and models, or those which used the TPB exclusively - and included the additional variable of AAR or AR or (ii) studies which used similar constructs to the TPB without explicit mention of the TPB and/or included AR or an affective component. The latter inclusion criterion was chosen so that the value in general of an affective component to any model which predicts/explains intention and/or behaviour could be considered. Explicit application implies that in the abstract, introduction or method section the authors mentioned that they had used a model which included an augmented TPB. Studies which extended the TPB to form another named model were excluded (e.g. Perugini & Bagozzi, 2001) because it was considered too complicated to evaluate the results. Application of an augmented TPB was defined as including (1) use of the TPB constructs with the additional variable of AAR/AR, or including an affective dimension of attitude in addition to a cognitive dimension of attitude (it is arguable that AAR/AR is a separate construct from attitude, as the review will evaluate, but it was considered to be of equal importance if the attitude component was split so that it

acknowledged both its affective and cognitive dimensions, and could be split up in this way in any analyses); (2) measurement of its augmented components as process and outcome variables; (3) use in explaining/predicting (change in) intention and behaviour; and (4) tests of the augmented TPB. Studies that used the TPB in any of these four ways were included.[2] In recording which TPB constructs were measured, decisions were based on the authors' report and not on whether the measure corresponded to the guidelines given by Fishbein and Ajzen (Ajzen & Fishbein, 1980). Studies which had been published, or were in press or which had been submitted were included. Papers were also included if they reviewed AAR/AR either in general or in terms of the TPB; these were not for inclusion in the study review per se, but for a general overview of the subject area. Inclusion and exclusion of papers was not validated by another person.

1.3.1.2 Identification of Papers

Web of Science (SCI – Expanded and SSCI 1956 to January week 3 2005) and PsycINFO (1984 to January week 3 2005) on-line databases were used as starting points, followed by Embase (1980 to January week 3 2005) and Medline (1980 to January week 3 2005). Search terms are detailed in Appendix 1.1. They were limited to English. Reference lists of all included papers were checked as indicated.

1.3.1.2.1 ISI Web of Science (WOS)

General searches were activated on WOS with the default inclusion setting – keywords were included as being either part of the title or text (i.e. "not mapped to titles"). From each search, articles were discarded if they did not meet the inclusion/exclusion criteria. In total this WOS search generated 66 references. Duplicate references were eliminated and after reading the remaining abstracts, relevant

[2] One study which mentioned the inclusion of AAR to the TPB in the abstract was excluded from the review, because it became apparent in the discussion section that the construct measuring AR explicitly had been excluded from the analysis, leaving others which were more appropriate (by the authors' admission) to the attitude construct (Jackson, Smith, & Conner, 2003).

papers were sourced and used in the report. A descendency search from those references was then adopted. Moving through the reference sections of each of the papers, those that included any of the relevant terms were identified, abstracts were read and relevant papers were sourced (four further papers were sourced in this way). The papers acquired were then read to see if there were any further articles which appeared relevant – this was not the case. Choosing the classic author in this area (Rene Richard), an ascendancy citation search was generated from "Richard, R*" (default setting) revealing 153 citations over four separate references. Again duplicates were eliminated, abstracts were read and only relevant references were sourced (a further four references were found this way). Further descendency searches revealed no more references.

1.3.1.2.2 Other Databases

A search was generated using PsycINFO. Keywords again were not mapped to headings and were the same as those used in WOS. This resulted in 169 references. Duplicate references from both this and the WOS search were eliminated. The remaining references were sourced and used. Again a descendency review was adopted where reference sections of these papers were read to see if any included the key words. None were yielded.

The database was then changed to search EMBASE and Medline using the same search terms. No further references were yielded.

1.3.1.2.3 Other Strategies and Cut-off Deadline for Inclusion

Enquiries were made from experts in the field regarding relevant papers that had been submitted or were in press: this produced three relevant papers. Descendency searches on these papers revealed no further references. Furthermore, searches were made on the Cochrane Database of Systematic Reviews using the same search terms as those for WOS and PsycINFO and this revealed that no such review had been

conducted. A search was also made on Index to Theses: keywords were those chosen from the previous searches, which generated 50 references. Titles and abstracts were read, but only one relevant thesis was found and sourced. However, part of this had been subsequently published in a journal from which a reference had already been generated and used. The bibliography on Ajzen's website was checked manually (http://www.people.umwass.edu/aizen/search.html; accessed 18.1.05); this revealed one further reference. Finally, the current awareness service from Documents Direct was activated to generate a diary search on the keyword terms so that any new articles submitted would be notified via email: none were forthcoming before the cut-off point for inclusion of relevant papers, which was set at week 3, January 2005.

1.3.2 Search Results

In total 28 papers were identified using the inclusion/exclusion criteria to be included in the study review, detailing 36 individual studies (Table 1.1). Of these, 23 papers explicitly mentioned the TPB or used the TPB exclusively, detailing 31 studies; the remaining five papers used constructs similar to those in the TPB, detailing six studies. A further 10 papers reviewed AAR/AR/affective beliefs either in general or in terms of the TPB (Appendix 1.2). Papers used in the study review were published between 1991 and 2004 or were in press. Descriptions of studies explicitly mentioning the TPB and/or using the TPB exclusively are set out in Table 1.2. Results from these studies are set out in Appendix 1.3. Descriptions of non-TPB specified studies are set out in Table 1.3. Results from these studies are set out in Appendix 1.4.

Before considering the main question of the review, brief descriptions about the context of target behaviours, characteristics of the participants, study design and operational definitions of AAR/AR are discussed (refer to Table 1.1 to match reported study numbers to individual studies).

Table 1.1 Studies included in the review (study number, author and year of publication – see reference section for full details)

1.	Abraham, Henderson & Der 2004 *
2.	Abraham & Sheeran, 2003 *
3.	Abraham & Sheeran, 2004 *
4.	Bakker, Buunk & Manstead, 1997
5.	Buunk, Bakker, Siero, van den Eijnden & Yzer, 1998
6.	Conner & Abraham, 2001 *
7.	Conner & Flesch, 2001 *
8.	Conner, Graham & Moore, 1999 *
9.	Conner, Sandberg, Higgins & McMillan, 2005 (in press) *
10.	Conner, Smith, McMillan, 2003 *
11.	Evans & Norman, 2003 *
12.	Frost, Myers and Newman, 2001 *
13.	Gagnon & Godin, 2000 *
14.	Godin , Gagnon, Alary, Noel, Morissette, 2001 *
15.	Murgraff, McDermott, White & Phillips, 1999
16.	de Nooijer, Lechner, Candel & deVries, 2004
17.	O'Connor & Armitage, 2003 *
18.	Parker, Manstead & Stradling, 1995 *
19.	Parker, Stradling & Manstead, 1996 *
20.	Phillips, Abraham & Bond, 2003 *
21.	Rapaport & Orbell, 2000 *
22.	Richard & van der Pligt, 1991*
23.	Richard, van der Pligt & de Vries, 1995 *
24.	Richard, van der Pligt & de Vries, 1996a *
25.	Richard, van der Pligt & de Vries, 1996b
26.	Richard, de Vries & van der Pligt, 1998*
27.	Sheeran & Orbell, 1999(a) *
28.	van Empelen, Kok, Jansen & Hoebe, 2001 *

* denotes studies mentioning TPB &/or using TPB exclusively

Table 1.2 TPB specified studies - description

Study (+ number which corresponds to that used in Table 1.1)	Participants	Target Behaviour	Details of Regret Construct Used	Intention	Behaviour	Intervention (to change intention and/or behaviour)
Abraham et al, 2004 (1)	T1 – 7616 T2 – 5854 But analyses on 4162 or 514 School students	Sexual Behaviour	AR (1 item, regret)	Yes	Yes – 6 months later	Yes – SHARE programme, but AR not measured
Abraham & Sheeran, 2003 (2)	S1 T1 = 384 T2 = 254	Exercise behaviour	AR (regret + upset)	Yes	Yes – 2 weeks later	N/A
	S2 T1 = 229 T2 = 166	Exercise behaviour	AR (regret)	Yes	Yes – 2 weeks later	Yes – AR precedes intention
	S3 T1+ T2 = no details T3 = 97 Students	Exercise behaviour	AR (regret + upset)	Yes	Yes – 2 weeks later	N/A (to test for intention stability)
Abraham & Sheeran, 2004 (3)	S1 = 384	Exercise behaviour	AR (regret + upset)	Yes	N/A	N/A
	S2 = 70 Students		AR (regret)	Yes	N/A	Yes = AR precedes intention

Study (+ number which corresponds to that used in Table 1.1)	Participants	Target Behaviour	Details of Regret Construct Used	Intention	Behaviour	Intervention (to change intention and/or behaviour)
Conner & Abraham 2001 (6)	S1 – 173	Health Protection	AAR (worried, regret, tense)	Yes	N/A	N/A
	S2 – 123 (all students)	Health Protection & Exercise	AAR (worried, regret, tense)	Yes	Yes – 2 weeks later	N/A
Conner & Flesch 2001 (7)	384 students	Casual Sex	AAR (regret, worry, embarrassed, satisfied, pride & happy)	Yes	N/A	N/A
Conner et al 1999 (8)	S2 – 200 Students	Condom Use	AAR (regret, worry, satisfied, relaxed)	Yes	N/A	N/A
Conner et al, in press (9)	S1 = 451	Smoking initiation	AR (regret/worry/sad)	Yes	N/A	N/A
	S2 = 674 School students	Smoking initiation	AR (depressed/wish had not/feel better if did)	Yes	Yes – 9 months later	N/A
Conner, Smith & McMillan, 2003 (10)	162 students	Intentions to Speed	AAR (feel regret and exhilerated)	Yes	N/A	N/A
Evans & Norman, 2003 (11)	1833 school students	Road crossing	AAR (feel big/good)	Yes	N/A	N/A
Frost, Myers and Newman, 2001 (12)	449 students	Take a test for Alzheimer's	AR (1 item, regret)	Yes	N/A	N/A
Gagnon & Godin 2000 (13)	136 students	Condom Use	AAR (regret,anxious and worry),	Yes	N/A	Yes – Vignette placed first (either aids is depicted as a lethal disease or aids is depicted as a chronic disease)
Godin et al 2001 (14)	957 officers in correctional institutions	Making HIV preventable tools accessible to inmates	affective dimension of Attitude (stress, pride, regret + 4 more not detailed)	Yes	N/A	N/A

Study (+ number which corresponds to that used in Table 1.1)	Participants	Target Behaviour	Details of Regret Construct Used	Intention	Behaviour	Intervention (to change intention and/or behaviour)
O'Conner & Armitage, 2003 (17)	55 patients	Self Harm	AAR (feeble, tense, sad)	Yes	N/A	N/A
Parker et al 1995 (18)	598 Drivers	Driving Violations	AR (feel sorry, feel good)	Yes	N/A	N/A
Parker et al 1996 (19)	238 Drivers	Speeding in the Car	AR (feel sorry, feel good)	Yes	N/A	Yes – videos, one focusing on AR : seen before Questionnaire –v- control (no video)
Phillips, Abraham & Bond, 2003 (20)	125 students	Degree performance	AR (regret/upset/disappointed)	Yes	Yes	N/A
Rapaport & Orbell 2000 (21)	41 Students	Motivation to provide practical assistance & emotional support to parents	AR (regret, upset)	Yes	N/A	N/A
Richard et al 1991 (22)	423 school students	Condom Use	AAR (discontent, concern, regret, worry, tense)	N/A	Constructs were used to assess factors affecting condom use	N/A
Richard et al 1995 (23)	584 School Students	Condom Use	AAR (regret, worry, tense)	Yes	N/A	N/A
Richard et al 1996a (24)	506 students	Eating food Using soft drugs Drinking alcohol Studying hard	AAR re. feelings (unpleasant, awful, bad)	Yes	Yes – 4 weeks later	N/A

Study (+ number which corresponds to that used in Table 1.1)	Participants	Target Behaviour	Details of Regret Construct Used	Intention	Behaviour	Intervention (to change intention and/or behaviour)
Richard et al 1998 (26)	451 students	Using Contraception (including condoms)	AR (worry, regret, tense)	Yes	Yes – 4 weeks later	N/A
Sheeran & Orbell 1999 (27)	S1 – 200 General Population			Yes	No	N/A
	S 2 – 111 Students	Playing the Lottery	AR (S1 – S3 regret and upset, S4 - regret)	Yes	No	N/A
	S3 – 66 Students			Yes	Yes – 2 weeks later	N/A
	S4 – 100 Students			Yes	No	Yes – AR preceded measure of intention
Van Empelen et al, 2001 (28)	150 drug users	Condom Use	AR (regret)	Yes	No	N/A

Table 1.3 Non-TPB specified studies - Description

Study (+ Number which corresponds to Table 1.1)	Participants	Target Behaviour	Constructs	Intention	Intention + Behaviour	Intervention (to change Intention and/or behaviour)
Bakker et al 1997 (4)	100 Students	Condom Use	SE, PB, Anticipated feelings AAR (good, satisfied, concerned, regret, worry, tense)	Yes	Only behaviour – 3 months later	N/A
Buunk et al 1998 (5)	711 general public (heterosexuals)	Condom Use	SE, SN, PB, risk of Aids, barriers to condom use, response efficacy, AR (regret, worry, suicide, self-forgiveness)	Yes	N/A	N/A
Murgraff et al 1999 (15)	137 students	Risky single occasion drinking	Feelings AAR 18 positive and 22 negative terms, including regret, PB	Yes	Yes	Yes – focus on "feelings after" or "feelings towards" RSOD
De Nooijer et al 2004 (16)	1,500 Dutch adults	Early detection of cancer behaviours	Attitudes (including AR), Social Norm, Self Efficacy, Knowledge, Fear	Yes	Yes – 3 weeks + 6 months	Yes – providing tailored information or general information

Study (+ Number which corresponds to Table 1.1)	Participants	Target Behaviour	Constructs	Intention	Intention + Behaviour	Intervention (to change Intention and/or behaviour)
Richard et al 1996b (25)	S1 – 103	Condom Use	Feelings AAR 18 positive terms 22 negative terms, including regret	Yes	N/A	Yes - 2 vignettes, 1 where a condom had been used and 1 where a condom had not been used + ask "feelings about" and "feelings towards"
	S2 – 336 (all students)		Feelings (enjoyable, contented, worried, tense, pleasant, regretful, anxious, satisfied, good, ill at ease), PB	Yes	Yes – 3 Qs over 5 months	Yes – 1 vignette re: casual sex + "feelings after" or "feelings towards" using a condom/not using a condom

1.3.2.1 Target Behaviours

Nine studies considered condom use (4, 5, 8, 13, 22, 23, 25, 26, 28), three studied exercise behaviour (2, 3, 6), three studies looked at driving behaviours (10, 18, 19), and one study each looked at early detection of cancer (16), providing support and assistance to parents (21), lottery play (27), casual sex (7), risky single occasion drinking (15), making HIV preventable tools accessible to inmates (14), eating junk food/using soft drugs/drinking alcohol/studying hard (24), taking a test for Alzheimer's (12), teenage sexual behaviour (1), health protection (6), smoking initiation (9), road crossing (11), self harm (17) and degree performance (20).

1.3.2.2 Characteristics of Participants

The majority of the studies used university students (2, 3, 4, 6, 7, 8, 10, 12, 13, 15, 20, 21, 24, 25, 26, 27), two used drivers (18, 19), three used members of the general population (5, 16, 27), five used school students (1, 9, 11, 22, 23) and one each used drug users (28), patients (17) and officers in correctional institutions (14).

1.3.2.3 Study Design

Of the 10 studies which used prospective designs, follow-up was often quite short; three tested again after two weeks (2, 6, 27), two after four weeks (24, 26), one after five months (25), one after six months (1), one after nine months (9), one measured behaviour twice at three weeks and six months (16) and one measured behaviour after 3 months (20). Sample sizes varied from 41 to 4162, with 25 studies having 100+ participants. Most studies employed self-report measures of prospective behaviour, apart from two studies (9, 20).

1.3.2.4 AAR/AR – Operational Definition

Affect was included in the model via one of two constructs: AAR or AR. When AAR was used (6, 7, 8, 10, 11, 13, 17, 22, 23, and 24), the operational definition was achieved by a variety of methods:-

- describing a situation and asking participants to indicate how they would feel using a variety of affective terms with scales (e.g. 6, 13).
- Using a sentence with a selection of affective reactions and asking participants if this was likely/unlikely (e.g. 7, 8).

(In both situations, regret was one of the affective terms with the exception of studies 11, 17 and 24, which did not include regret).

When AR was used (1, 2, 3, 9, 12, 16, 18, 19, 20, 21, 26, 27 and 28) the operational definition was achieved by:-

- using "if I" (+ situation) I would feel regret followed by yes/no or certainly/not certainly or likely/unlikely or strongly agree/disagree (e.g. 2, 27).
- Using "if I" (+ situation) it would make me feel sorry, good followed by likely/unlikely (e.g. 18, 19).
- Using "To what extent would you feel regret if (+ situation), followed by no regret/much regret (e.g. 16).
- Using a situation + I would regret it followed by agree/disagree *plus* an "If I" (+ situation) I would feel followed by a choice of affective reactions, including regret (e.g. 21).
- Using "How would you feel" + a situation followed by a choice of affective reactions, including regret (e.g. 20).

One study used an affective dimension of attitude, but failed to make clear exactly how this had been operationalised (14), whilst one study detailed a regret situation item,

but gave no indication of how it was measured in terms of agreement choice with the item (1).

In summary, there were 11 tests of AAR (from 10 studies) and 16 tests of AR (from 13 studies) with regard to studies explicitly mentioning the TPB, whilst there were three tests of AAR and two tests of AR in the non-TPB studies.

1.4 A General Overview of Anticipated Affective Reactions, Regret and Anticipated Regret

The main tenet of the TPB is the assumption that people are logical and rational in their decision-making, systematically using information available to them (Richard, de Vries, & van der Pligt, 1998). It has been suggested, though, that a possible shortcoming of its utilitarian centred approach is its exclusion of affective processes (e.g. Conner & Armitage, 1998), where emotional outcomes are also factored into decision-making. Much of the literature into the role of affect in behavioural decision-making has centred on its contribution to attitudes (e.g. Abelson, Kinder, Peters, & Fiske, 1982; Breckler & Wiggins, 1989; Fishbein & Ajzen, 1975) and this is still a hotly debated subject (e.g. Ajzen & Fishbein, 2005; Conner & Sparks, 2005) which will be considered in depth later on in this chapter; however, van der Pligt, Zeelenberg, van Dijk, de Vries and Richard (1998) in a review of affect, attitudes and decisions argue that more attention should be paid to affective reactions, principally specific post-behavioural affective outcomes and their role as antecedents of behavioural expectations and behaviour. In particular, several studies have highlighted the role of AR in decision-making (e.g. Bell, 1982; de Nooijer, Lechner, & de Vries, 2003; Lechner, Oenema, & de Nooijer, 2002; Loomes & Sugden, 1982; Ritov & Baron, 1995; Wroe, Bhan, Salkovskis, & Bedford, 2005; Wroe, Turner, & Salkovskis, 2004). Indeed, it is somewhat ironic that the Subjective Expected Utility (SEU) Theory (Edwards, 1954)

which initially inspired the TPB, was modified by Bell (1982) and Loomes and Sugden (1982) to include AR in an attempt to demonstrate that sometimes utility is sacrificed in order to prevent the experience of regret, and that anticipating future regret affects current choices.

Central to the concept of Regret Theory (Bell, 1982; Loomes & Sugden, 1982) is *knowledge* about the outcomes of both the chosen and unchosen option(s) in order to be able to compare what is with what could have been; indeed, the economic approach to the study of regret assumes that regret will only occur when the outcome of rejected alternative is revealed. This theory poses problems for attitude-behaviour models such as the TPB, which predict motivation and future behaviour from subjective perceptions of the *imagined* consequences of performing a behaviour, therefore being based on the presumed rather than the actual outcomes of a decision. However, counterfactual thinking approaches to regret (e.g. Gilovich & Medvec, 1995; Kahneman & Tversky, 1982) posit that when actual feedback is not available, people are assumed to simulate *mentally* what could have been different, so they might be "tormented by what they imagine to be the consequences of roads not taken" (Gilovich & Medvec, 1995, p. 380); this approach is compatible with the TPB. Furthermore, research shows that the experience of regret depends on how the outcome was achieved in terms of action or inaction; in general there is a temporal pattern to the experience of regret, where actions may produce greater regret in the short term, but these pale into insignificance when compared to inactions which generate more regret in the long term (Gilovich & Medvec, 1994; 1995; Gilovich, Medvec, & Kahneman, 1998). Also of relevance is opportunity in life, with research showing that regret intensity increases as a function of greater opportunity; people's biggest regrets are often a reflection of where in life they see their largest opportunities, i.e. where they see tangible prospects for change, growth and renewal (Roese & Summervile, 2005). So, regret itself is a negative, cognitive

based emotion that is experienced when we realise or imagine that the present situation could have been better had we acted differently.

Because people are generally assumed to be regret averse (Zeelenberg, 1999), it has been suggested that "before undertaking any enterprise of 'great pith and moment', we usually delay action and think about what might happen that could cause regret" (Janis & Mann, 1977, p.222) – anticipated regret. The notion that anticipation of negative emotions can motivate behaviour is consistent with Weiner's (1980) model of social motivation, which highlights affect as a proximal determinant of behaviour, and is a robust finding in areas such as economics and litigation (e.g. Bar-Hillel & Neter, 1996; Guthrie, 1999; Inman & Zeelanberg, 1998; Josephs, Larrick, Steele, & Nisbett, 1992; Larrick & Boles, 1995; Ordonez, Benson, & Beach, 1999). By anticipating regret pre-behaviourally, decision makers are shielded from having to actually experience this negative affect in order to be influenced by it; rather they can predict the emotional consequence of a behavioural decision in advance and opt for a choice which minimises this negative emotional experience. Anticipated regret, therefore, seems an appropriate addition to the utility-dependent TPB: furthermore, it conforms with the principle of compatibility (Ajzen, 1988; Ajzen & Fishbein, 1977), in that *future* behaviour is better predicted when matched by a predictor variable corresponding to the same time-frame, e.g. *anticipated* regret. The next section will review the literature sourced in the SRR which has included AAR and AR in the TPB; the results from those non-TPB studies will also be mentioned to provide a more comprehensive picture.

1.4.1 The TPB, Anticipated Affective Reactions and Anticipated Regret - Significant Results

In 1991, inspired by the results from the domain of economic decision-making, Richard, van der Pligt and de Vries found that a modification of AR, i.e. AAR, was a good predictor of sexual behaviour (c.f. Richard & van der Pligt, 1991). A programme

of research then ensued by Richard (Richard et al., 1998; Richard & van der Pligt, 1991; Richard, van der Pligt, & de Vries, 1995, 1996a; van der Pligt & Richard, 1994) to consider the role of anticipated post-behavioural regret within the TPB. Initially, AAR was shown to be a factor affecting condom use among adolescents, specifically by males in a non-monogamous relationship (Richard & van der Pligt, 1991). Subsequent studies revealed that not only was *anticipated affect* generally a distinct construct from attitudes (i.e. evaluations and *general* affective reactions; Richard et al., 1996a), but more specifically so was *anticipated regret* (Richard et al., 1995; Richard et al., 1998). In addition, AR had an independent and significant impact on intentions not to engage in unsafe, casual sex (Richard et al., 1995). To highlight the construct's motivational significance, a later study (Richard et al., 1998) found that AR predicted an independent and significant proportion of variance in intentions to use contraception over the three TPB components, with the four constructs explaining 65% of the variance in intention, and intention explaining 34% of the variance on contraceptive behaviour four weeks later.

Indeed, a wealth of research in the field of sexual behaviour supports the addition of AAR/AR specifically to the TPB and highlights its distinction from attitudes: Abraham, Henderson and Der (2004) found that AR was a significant and independent predictor of intentions towards consistent condom use which added a further 4.6% to the explained variance, and had a further direct impact on the behaviour itself, adding 1.3% to the explained variance; using a scenario involving consumption of alcohol, availability of condoms and casual sex, positive AAR had a significant and direct effect on intentions to engage in casual sex unmediated by the TPB variables (Conner & Flesch, 2001); looking at the impact of alcohol on intentions to use condoms, positive AAR was a predictor of stronger intentions to use condoms unmediated by TPB variables (Conner, Graham, & Moore, 1999); Gagnon and Godin (2000) evaluated the impact on new

antiretroviral treatments on intentions to use a condom with a new sexual partner – AAR was found to be a significant variable in explaining intentions and impacted upon those intentions, particularly when AIDS was depicted as a lethal as opposed to a chronic disease; finally, van Empelen, Kok, Jansen and Hoebe (2001) found that drug users' intentions to use condoms with steady partners was independently predicted by AR.

There was also support for the additive nature of AAR/AR to the explanation of intentions in those studies which did not specifically use the TPB in their research, but which used constructs included in the model: AR was a significant predictor of condom use for those high in self efficacy (Bakker, Buunk, & Manstead, 1997); and Buunk, Siero, van den Eijnden and Yzer (1998) found that AR was an independent predictor of condom use intention amongst heterosexuals at risk from HIV infection, and that it impacted upon those intentions. Regret has also been found to be an important determinant in early cancer detection behaviours (de Nooiger, Lechner, Candel, & de Vries, 2004; Lechner, de Vries, & Offermans, 1997; Lechner et al., 2002).

Moving away from sexual behaviour, and returning to the TPB, Abraham and Sheeran (2003) revealed a moderating effect of AR on exercise intention-behaviour relationships which was further shown to be mediated by the temporal stability of intention - of particular interest was that AR was shown to have a marginally significant *direct* impact on prospective behaviour, an effect which reached significance in a later study into condom use by Abraham et al (2004) – this direct impact effect has been evident in only two out of the seven prospective behaviour studies; in a second study on exercise behaviour, AR contributed a 5% increment to the variance in intentions and also showed that participants who were induced to focus on AR prior to intention formation had significantly stronger intentions to exercise compared to controls (Abraham & Sheeran, 2004); AAR was a significant predictor of intentions about health

protection and exercise behaviour, and conscientiousness had an unmediated effect on prospective behaviour (Conner & Abraham, 2001); two studies on adolescent smoking initiation demonstrated that AR significantly and independently added to predictions of intentions over the TPB, and further that the intention-behaviour relationship was moderated by AR and intention stability (Conner, Sandberg, Higgins, & McMillan, 2005); AAR made an independent and additional contribution to predicting road crossing intentions (Evans & Norman, 2003); AR was a significant additional predictor of intention to take a genetic test for Alzheimer's disease (Frost, Myers, & Newman, 2001); the presence of negative elements in the affective dimension of attitude towards the access of tools needed for the prevention of HIV transmission in prisons, independently explained officers' negative intentions towards distributing those tools to prisoners (Godin, Gagnon, Alary, Noel, & Morissette, 2001); Parker, Manstead and Stradling (1995) showed that the addition of AR to the TPB variables substantially improved the prediction of intentions to commit driving violations – a subsequent study (Parker, Stradling, & Manstead, 1996) also revealed that inducing AR in terms of not feeling good about speeding changed participants' beliefs about speeding; AR not only had an independent affect on intentions to get a good degree from university, but was also the strongest predictor (Phillips, Abraham, & Bond, 2003); AR substantially improved the prediction of intention to provide both practical assistance and emotional support to parents (Rapaport & Orbell, 2000); AAR influenced expectations about eating junk food, using soft drugs and drinking alcohol (although not about studying hard) (Richard et al., 1996a); and finally, regarding lottery playing, Sheeran and Orbell (1999) found that AR not only added to the model independently over three studies, but also moderated the intention-behaviour relationship to the extent that lottery play was greatest when intentions to play were strong and AR about not playing was high.

In sum, there is strong evidence to suggest that the addition of AAR/AR can make significant contributions over and above the TPB variables to explaining and predicting intentions and behaviour. In the majority of the studies where it was tested, AAR or AR independently added to the amount of variance explained in intentions, with the exception of two studies (see section 1.4.2). Furthermore, in three studies AR moderated the intention-behaviour relationship (2, 9 and 27) and in two studies there were variables mediating AR's moderating effect on the intention-behaviour relationship (2 and 9).

1.4.2 The TPB, Anticipated Affective Reactions and Anticipated Regret - Non-significant Results

Only two studies did not support the additive nature of AR/AAR to the model: those by Conner, Smith and McMillan (2003) and O'Connor and Armitage (2003). However, although O'Connor and Armitage in researching intentions to self harm included an AAR construct, they did not specifically measure regret, but instead used evaluative terms of 'feeble/tense/sad'; it could be argued, then, that this is not a direct test of regret's addition to the TPB. Furthermore, although there was no *overall* effect for AAR (which measured feelings of regret and exhilaration) on intentions to speed in the study by Conner, Smith and McMillan, it should be noted that when the results were re-analysed by gender, an effect of AAR was found for females driving with a group of passengers; this then still provides partial support for the inclusion of regret into the TPB, given the moderation effects of gender.

1.4.3 Interventions to Change Intentions and/or Behaviour

It seems logical to assert that anticipated regret will only feature in situations where future regret is expected (Janis & Mann, 1977). Nevertheless, it would appear that regret salience can be manipulated so as to affect behaviour. Simonson (1992) asked consumers to *think about* the regret they would feel after having made a wrong decision,

and found they were more likely to purchase a more expensive, well known brand that would shield them from this possible regret rather than buy the risky, but less expensive and less well known brand. So, "arousal of anticipated regret . . . has the constructive effect of deterring a person from indiscriminately seizing upon a seemingly attractive opportunity without forethought to the consequences" (Janis & Mann, 1977, p. 219). Also Ritov and Baron (1990) found that people who anticipated the regret they would have felt had their children become ill or have died as a result of vaccination were less likely to vaccinate their children.

Increasing regret salience at the time of decision-making seems a particularly relevant manipulation for those behaviours which elicit mixed emotions, where there is a temporal pattern between an evaluative response to a behaviour and the anticipated affective reaction to that behaviour, e.g. it is possible to have positive feelings *about* drinking alcohol or smoking a cigarette ('it will calm me down') but they might be different from the post behavioural feelings ('if I continue, I could become ill'); this approach can be related to the work by Wilson and Hodges (1992) on attitudes and is also similar to a concept in ambivalent attitudes (c.f. Conner & Sparks, 2002), where there is a simultaneous bi-dimensional evaluation of an attitude object/behaviour which is moderated by a temporal factor of immediate or postponed consequences. Indeed, a study by Richard et al (1995) revealed that anticipated post-behavioural regret was independent of other beliefs about sex itself and it is suggested that the use of AR is especially useful in domains where such discrepancies exist (van der Pligt & de Vries, 1998). This was explored in a further study by Richard, van der Pligt and de Vries (1996b) when a strategy was used which emphasised the short-term consequences (as opposed to the long term consequences which may be discounted) of risky sexual practices by asking adolescents to focus on the regret and worry that might ensue ("feelings after") compared to controls ("feelings towards"); not only were there

changes in intentions to use condoms in future casual sexual encounters, but a follow up study five months later revealed a reliable effect of the experimental manipulation on reported condom use in casual sexual relationships (however, this was only evident in males). Even providing information about the target behaviour has been shown to increase regret, intentions and subsequent behaviour; specifically regarding early detection of cancer, help-seeking intentions, behaviour and regret about not seeking help increased from control to tailored information groups (de Nooiger et al., 2004). In contrast, though, a study by Murgraff, McDermott, White and Phillips (1999) into risky single-occasion drinking (RSOD) found that although there were significantly higher negative affect ratings in the feeling after condition compared to a feeling towards condition, these failed to reduce RSOD at follow-up; however, this was attributed to a design flaw in that risk information was provided at a very general level as opposed to a specific, personal level. Notwithstanding, research into intertemporal choice shows that people tend to discount more remote future outcomes, basing decisions on more proximal outcomes (Loewenstein, 1992; Roelofsma, 1996). Studies which require participants to extend their time perspective and think ahead about their post-behavioural feelings reveal a possible cost effective intervention strategy that could be used in the health arena.

Research explicitly using the TPB in this way is limited but has already proved promising. Sheeran and Orbell (1999) induced AR using a subtle manipulation as part of their study; they simply asking participants if they would regret not playing the lottery before completing the measure of intention; the manipulation increased both the number of tickets that participants intended to purchase and also the proportion of people who intended to purchase tickets. It was speculated that anticipated regret might bind people to their intentions, so that they form implementation intentions which later lead to the behaviour being carried out. To address criticisms about the lack of a

control group in the Sheeran and Orbell (1999) study, Abraham and Sheeran (2003; 2004) used a similar experimental manipulation to look at exercise behaviour, employing a prospective design. This time a control group was included, where intentions were reported before AR. Results showed that more people in the manipulation group exercised at least once compared to those in the control group (2004); also, focusing on AR before reporting intentions increased the likelihood that intentions were translated into behaviour for those with positive intentions, so AR moderated the intention-behaviour relationship such that participants were most likely to exercise if they both intended to and anticipated regret if they failed to (2003). In sum, this simple manipulation to increase negative post-behavioural affect seemed to reveal a clear impact on intention and later behaviour; however, it was noted that a better test would include a further intention-only condition to remove any effects from having completed an AR item, wherever it was placed.

Other interventions considered have involved the placement of vignettes (Gagnon & Godin, 2000) or the viewing of videos (Parker et al, 1996) prior to questionnaire completion; both manipulations were shown to have an impact on intentions which were in part explained by AAR/AR. However, in both these studies the strength of the regret-intention relationship was not explored.

1.4.4 Attitudes and Affect – Separate Constructs?

It is evident throughout this review so far that much has been made of the unique contribution of AAR/AR to the model, and in particular of its distinction from the attitude construct; this reflects the ongoing debate over the affect-attitude "crossover" – where it is arguably difficult to differentiate between two separate and distinct constructs. Indeed, the role of affect in attitudinal processes is a complicated subject, and can be traced back to Zajonc's (1980) work on feeling and thinking in information processing. Early research distinguished between affective and cognitive aspects of

attitudes (e.g. Zanna & Rempel, 1988) in support of Rosenberg and Hovland's (1960) tripartite view of attitudes: feeling, thinking, behaviour. This affective-cognitive dichotomy reflects a duality between heart and mind where affective attitudes can be considered as the summed valence of specific emotions and feelings associated with an object or concept, and where cognitive attitudes can be thought of as the summed valence of non-affective properties (Giner-Sorolla, 2004).

This renewed interest in the role of affect in emotions and social cognition extended to research on behavioural decision making, but tended to focus on more specific emotions like regret. This was probably because behavioural decision making almost always involves an element of choice, the consequences of which can lead to particular emotions like regret. To complicate the distinction between affect and cognition in attitudes further, it is generally accepted that regret should be regarded as a cognitive-laden or cognitively determined emotion which requires thought about decisions and outcomes:-

> *"Regret is a more or less painful cognitive and emotional state of feeling sorry for misfortunes, limitations, losses, transgressions, shortcomings or mistakes. It is an experience of felt-reason or reasoned-emotion. The regretted matters may be sins of commission as well as sins of omissions. . . "(Landman, 1993, p. 36)*

So, on the one hand, a distinction between affect and cognition in attitudinal processes is proposed, but on the other it would appear that the two are intrinsically linked because we need cognition to recognise regret! Perhaps a better distinction, then, is that put forward by Breckler and Wiggins (1989) who proposed the term "evaluation" rather than "cognition" to refer to attitudes based on judgements about the attitude object, because it is clear that cognition can include the appraisal of emotions. In this regard, the research reviewed earlier repeatedly demonstrates that with regard to the TPB, AR is clearly a distinct construct from not only the attitude construct, but other

constructs too (e.g. Richard et al., 1998; Richard et al., 1995). Furthermore, in many of the studies reviewed, AAR/AR but not attitude was shown to be a significant contributor to the explanation of variance in intentions (e.g. Gagnon & Godin, 2000; Parker et al., 1995; Parker et al., 1996; Phillips et al., 2003; Rapaport & Orbell, 2000). This could be because attitudes are indeed operationalised as evaluations eliciting behavioural beliefs rather than affective outcomes associated with the performance of behaviours. Moreover, it is the contention of this thesis that the experience of regret is such a uniquely unpleasant emotion that merely its anticipation as a behavioural consequence is a strong motivating factor - something which not only sets it apart from 'evaluative' attitudes, but possibly other emotions too.

To re-iterate, it is proposed that the construct 'attitude' should comprise two distinct processes, i.e. evaluations and affective outcomes. In support of this view, it is now generally accepted that measures of attitude should incorporate items which tap into the evaluative aspect - called 'instrumental' measures (e.g. good-bad, desirable-undesirable) as well as the affective outcomes – called 'experiential' measures (e.g. pleasant-unpleasant, interesting-boring) (c.f. Ajzen & Fishbein, 2005). Confusion, though, still remains about attitude/affect crossovers inasmuch as some authors refer to the 'experiential' aspect of this attitude construct as the 'affective' aspect (e.g. Conner & Sparks, 2005); for the purposes of this thesis, to avoid any confusion, 'experiential' rather than 'affective' will be used in this context; notwithstanding, the proposal remains that AR is a unique construct distinct from the experiential aspect of attitude.

1.4.5 Problems with How Anticipated Regret is Operationalised

A further potential problem confounding the attitude/affect debate relates to the variety of ways in which anticipated regret has been operationalised in the studies reviewed. Tables 1.2 and 1.3 set out details of how the regret construct was worded in different studies, and whether it formed part of a measure for AAR or AR: nearly all of

the studies including a measure of AR incorporated the word "regret" in at least one of the items, apart from those studies by Parker, Manstead and Stradling (1995) and Parker, Stradling and Manstead (1996) who instead used "feel sorry, feel good", which perhaps could be construed as experiential aspects of attitude. Although nearly all the measures of AAR included the word "regret", other emotions were also included (e.g. embarrassed, stressed, disappointed) so that while the results support the inclusion of a separate affective component, it is impossible to single out the contribution of regret to the construct. Indeed, there were only three studies which looked at the contribution of AAR but did not include regret as an item: Evans and Norman (2003) who used "feel big, feel good", O'Connor and Armitage (2003) who used "feeble, tense, sad" (which was not a significant predictor of intentions) and Richard, van der Pligt and de Vries (1996a) who used "unpleasant, awful, bad". These latter constructs could also be construed as experiential aspects of attitude; nevertheless, it is perhaps unfair to criticise this latter study in that it only set out to demonstrate that AAR was different from general evaluations towards behaviours.

A real test of independent effects for AR would perhaps be supported when using constructs directly measuring AR (i.e. to include the word 'regret') whilst controlling for both instrumental and experiential attitudes; the studies reviewed so far have not reported this. These concerns would benefit from a meta-analysis of all the relevant literature to date adding an affective component to the TPB to explicitly consider the attitude constructs used compared to the AAR/AR constructs.

1.5 Summary of Research from the Review and Suggestions for Further Research

Research into augmenting the TPB by adding an explicitly affective component like AR is on the increase, and has been shown to make a valid contribution to the model; indeed, there is some support to show that focusing on how the prospect of feeling

regret after performing or abstaining from a behaviour may serve as a powerful motivating factor in altering intentions and subsequent behaviour. Shimanoff (1984) in a study of verbal expression of emotion in everyday conversation, found regret to be the most commonly named emotion, confirming the salience of this emotion in everyday situations. It is arguable, therefore, that AR could be a common determinant of all intentions/behaviours and therefore merits a permanent place in the current TPB model, along with attitudes, subjective norms and PBC. Indeed, it is this powerful motivational quality of regret which makes it more appropriate for inclusion in the model than any other anticipated affective reaction.

Nevertheless, it is evident from this review that much of this research has been concerned with a single behaviour - casual sex, where just one act of carelessness may lead to a deadly disease like HIV/AIDS – a consequence that warrants forethought and future regret. Although a fairly wide variety of other behavioural domains have been investigated, it is clear that these have been one-offs, with the exception of exercise behaviour which has featured in three separate studies (Abraham & Sheeran, 2003, 2004; Conner & Abraham, 2001). The paucity of replicated research into broader behavioural domains is, therefore, evident and until this is addressed the permanent addition of AR to the TPB cannot truly be recommended (because it is not known if it is a common feature in all behavioural decisions). It is also evident that much of the research has included AR as part of a measure of AAR, making it difficult to assess any unique contribution by regret. However, the few studies where regret was included as a discrete construct on its own (e.g. Abraham & Sheeran, 2003, 2004; Sheeran & Orbell, 1999) demonstrated the power of this particular affective reaction not only in explaining the variance in intentions, but also in prospective behaviour.

One way of expanding research into adding AR to the theory is to run a pilot study to determine which behaviours elicit ambivalent attitudes, i.e. where it is possible to

simultaneously have both positive and negative evaluations about a behaviour depending on the time perspective, and consider whether these behaviours result in anticipated action or inaction regret: in this way a novel approach to the inclusion of regret to the TPB could be adopted. Furthermore, moderation of the intention-behaviour relationship by regret could be assessed in addition to any mediation effects. In this regard, it is evident that there is one variable which has been shown to mediate the effect of AR; this review has identified a TPB study which considered temporal stability as one such variable (Abraham & Sheeran, 2003), and one non-TPB study which looked at the impact of self-efficacy on AR's impact on behaviour (Bakker et al., 1997). Further research would seem appropriate to look at how and under what conditions these additional variables mediate and/or moderate the effect of AR.

There is certainly a practical application to research of this kind, especially in the health arena, with some obvious behaviours being amenable to increasing regret salience with a view to changing future behaviour. For example binge drinking is a particularly prevalent behaviour amongst adolescents. Research shows that those adolescents who are more likely to engage in risky behaviours may be less prone to anticipated regret because they are overly optimistic about the aftermath of their behaviour. Indeed, some are especially prone to a false sense of invulnerability (c.f. Caffray & Schneider, 2000) using strategies to avoid thinking about the potential negative outcomes of their actions. It follows then, that if counter strategies are used to increase the salience of short-term negative consequences resulting from binge drinking, a change in intention and behaviour might follow. The research reviewed in this paper has revealed limited use of such interventions. Indeed, a recent review found that only 24 studies had applied the TPB to behaviour change interventions, with only 13 of these studies examining behaviour change as an outcome (Hardeman, Johnston, Johnston,

Bonetti, Wareham, & Kinmonth, 2002). In a similar vein, the paucity of prospective designs on regret is noticeable in the research to date.

Finally, with regard to the review by Armitage and Conner (2001), it would seem prudent for any future studies to use, wherever appropriate, objective/observational behavioural measures in addition to self-report measures in order to increase reliability. This review has shown that the majority of the studies to date on augmenting the model have been self-report design. There are some obvious areas where more objective measures can be obtained, e.g. attendance at sports centres and health clinics – behaviours which are also appropriate for increasing regret salience.

1.6 Conclusions

This review has considered the value of adding AR to the TPB. Studies have been described which have shown that variables such as AAR/AR have made additional and independent contributions to predictions/explanations of intentions. Furthermore, where tested, this variable impacts upon intentions, moderates the intention-behaviour relationship and has been shown to be mediated by personality constructs and temporal stability; in two studies, AR had a direct effect on behaviour. In the two studies where it was tested, an intervention to change behaviour by increasing regret salience was successful. Although it would appear that AR is not an undifferentiated aspect of the attitude construct (Fishbein & Ajzen, 1975), as mentioned in section 1.4.4, this needs a more rigorous test where both the attitude and regret constructs are clearly defined and operationalised. Furthermore, research is recommended in order to address the limited number of behavioural domains where studies to date have concentrated.

Although this chapter has provided an overview of the research to date in this area, it would seem prudent in the first instance to conduct a statistical review of this literature, in order to quantify these effects in a more concrete manner; in this regard,

the next chapter details the process and outcome of a meta-analysis looking specifically at the contribution of AR to the TPB. The outline of the thesis will then be set out.

Chapter 2: Anticipated Regret as an Additional Predictor in the Theory of Planned Behaviour: A Meta-Analysis

2.1 Introduction

As noted in Chapter 1, there have been meta-analytic reviews of the TPB which demonstrate that effect sizes are impressive (Cohen, 1992), but that a substantial proportion of the variance in intentions and behaviour are yet to be explained. The main contention of this PhD is that this variance could be significantly increased by the addition of an affective component, namely AR, to the theory to complement the experiential/instrumental concept of attitudes. In order to assess the validity of this claim, before any other new data is reported, a further meta-analysis was conducted using the appropriate studies reviewed in the last chapter to statistically determine the additive effects of AR to the prediction of intention after the TPB variables. Furthermore, the direct impact of AR on behaviour was also examined. Moderators of the AR-intention relationship ought also to be mentioned: however, to date there are too few relevant studies to include.

2.2 Method

2.2.1 Sample of Studies

The studies identified in the previous chapter in the systematic research process were included in this study where the inclusion criteria were met. There were three inclusion criteria for the review:

a) The model used to predict intentions and behaviour had to be the TPB, therefore all the non-TPB studies identified in Chapter 1 and set out in Table 1.3 were excluded;

b) the study included a direct measure of anticipated regret, whether it was a solitary item (10 studies) or part of a composite measure of AAR (eight studies) - details of measures are included in Table 2.1; and finally

c) the correlations between study variables (including AR/AAR) had to be reported.

The studies identified in Chapter 1 as measuring AAR but not actually including a direct measure of anticipated regret (i.e. Evans & Norman, 2003; O'Connor & Armitage, 2003; Richard et al., 1996a) were excluded from the meta analysis, but were analysed separately in order to provide a comparison (see footnote 7). Wherever possible, full inter-correlation matrices were used: unfortunately, three studies only contained correlations from LISREL analysis (studies 15, 16, 17 from Table 2.1), but these provided sufficient information for the main study variables and were, therefore, included; one other study contained inter-correlations for all study variables apart from PBC (study 9 from Table 2.1), but this was still included as, again, there was sufficient information. Where correlations were not reported, the authors of the published articles were contacted to see if they could be provided. Unfortunately, inter-correlations were unavailable from three identified studies (Parker et al., 1995; Parker et al., 1996; Richard & van der Pligt, 1991) so these were excluded from the analyses; however, the Parker et al studies were identified in Chapter 1 as not directly measuring anticipated regret, so these would only have been included in the separate comparative analysis if the values had been available.

Using these criteria, a total of 19 articles could be included[3]: this comprised 24 independent tests of the relationship between *intention* and attitudes, subjective norms, and anticipated regret; 23 tests of the relationship with PBC; seven tests of the additional relationship with past behaviour (studies 2, 3 (all studies), 4, 5 and 7); and

[3] Efforts were made to obtain any "grey literature" (i.e., unpublished relevant data): none were forthcoming.

seven tests (or three tests in the case of past behaviour) of the relationship between these variables and *prospective behaviour* (studies 1, 2 , 3 (studies (ii)(a) & (b)), 6 (ii), 13 and 18 (iii)).

2.2.2 Study Characteristics

Table 2.1 presents the characteristics of the included studies in terms of study number, author, sample sizes, behaviour measured and how anticipated regret was defined.

Table 2.1. Characteristics of the Studies included in the Meta-analysis

STUDY NUMBER	AUTHOR(S)	SAMPLE SIZE (N) (Time 1 and Time 2 as appropriate)**	SAMPLE DETAILS	BEHAVIOUR	DEFINITION OF ANTICIPATED REGRET
1	Abraham, Henderson & Der, 2004	T1 = 7616 T2 = 5854 But analyses on 4162 or 548	School Children	Sexual Behaviour (use of condom)	AR = Regret – 1 item
2	Abraham and Sheeran, 2003	(i) T1 =384 T2 =254 (only one appropriate)	Students	Exercise	AR = Feeling regret/upset
3	Conner and Abraham, 2001	(i) = 173 (ii) = 123	Students Students	(i)(a) Health Protection; (ii)(a) Exercising; & (ii)(b) Health Protection	AAR = Worry/regret/relaxed
4	Conner and Flesch, 2001	384	Students	Casual Sex	AR = Regret/worry/embarrass/ satisfied/pride/happy
5	Conner, Graham, Moore, 1999	(ii) = 200	Students	Condom Use	AAR = Regret/worry/ satisfied/relaxed

STUDY NUMBER	AUTHOR(S)	SAMPLE SIZE (N) (Time 1 and Time 2 as appropriate)**	SAMPLE DETAILS	BEHAVIOUR	DEFINITION OF ANTICIPATED REGRET
6	Conner, Sandberg, Higgins & McMillan (2005, in press)[4]	(i) = 347 (ii) = 674	School Children	Smoking Initiation	AR = (i) = regret/worry/sad (ii) = depressed/wish had not/feel better if did
7	Conner, Smith, McMillan, 2003	158	Students	Intentions to Speed	AAR = Feeling regret/exhilaration
8*	Evans & Norman, 2003	1833	School Students	Road Crossing	AAR = Feel big/feel good
9	Frost, Myers & Newman, 2001	449	Students	Genetic Screening for Alzheimer's Disease	AR = Regret – 1 item
10	Gagnon and Godin, 2000	136	Students	Condom Use	AAR = Regret/anxious/ worry
11	Godin, Gagnon, Alary, Noel, Morissette, 2001	957	Officers in Correctional Institutions	Making HIV preventable tools accessible to inmates	Affective Dimension of Attitude = Stress/ pride/ regret
12*	O'Connor and Armitage 2003	55	Patients N= 21 self-harmers N = 34 not self harmers	Self-harm (Para-suicide)	AAR = Sad/tense/ feeble
13	Phillips, Abraham & Bond, 2003	T1 = 125 T2 = 125	Students	Degree Performance	AR = Regret/upset/disappointed
14	Rapaport and Orbell, 2000	185	Students	Support parents a) emotionally b) practically	AR = Regret/upset

[4] The 3 regret items used from Study 6 (ii) show some clear differences from those employed in Study 6 (i). Nevertheless these 3 items showed convergent validity with measures similar to those used in (i) to tap regret. In a sub-sample of the (ii) respondents the correlation between these 3 items and the mean of a set similar to those used in (i) was $r = .65$, $p < .0001$, $N = 486$ (regret/worry/ashamed/ sorry). Consequently, it was deemed appropriate to include (ii) in the meta-analysis. Furthermore, it should be noted that it was necessary to change the scoring for the anticipated regret correlations from negative to positive in order to make this study's results consistent with the scoring from the remainder of the studies; the original negative scoring was purely an artefact from the way the measure was worded and the change to a positive score did not alter the meaning of the original results in any way, but merely correctly reflects the pattern of relationships as determined from the means.

STUDY NUMBER	AUTHOR(S)	SAMPLE SIZE (N) (Time 1 and Time 2 as appropriate)**	SAMPLE DETAILS	BEHAVIOUR	DEFINITION OF ANTICIPATED REGRET
15	Richard, van der Pligt and de Vries, 1995	584	School Students	Unsafe sex a) refraining from Sexual intercourse b) condom use with casual partners	AAR = Worry/regret/tense
16*	Richard, van der Pligt and de Vries, 1996a	506	Students	a) eating junk food; b) using soft drugs; c) drinking alcohol; d) studying hard	AAR = Anticipated feelings (unpleasant/awful/bad)
17	Richard, de Vries, van der Pligt, 1998	451	Students	Using contraception (including condoms)	AR = Worry/tense/regret
18	Sheeran and Orbell, 1999	(i) = 200	Members of the public	Playing the Lottery	AR = Regret/upset
		(ii) = 111	Students	Playing the Lottery	
		(iii) = 115/66	Students	Playing the Lottery	
19	Van Empelen, Kok, Jansen & Hoebe, 2001	150 N = 147 with steady partners; N = 141 with casual sex partners	Drug Users	Condom Use a) Steady Partners b) Casual Sex partners	AR = Worry/regret

* Studies **not** included in main meta-analysis, but analysed separately because no direct measure of "anticipated regret"

** N as used in analysis

2.2.3 Meta-analytic Rationale and Strategy

A detailed review of meta-analysis of correlation coefficients is provided by Field (2001). The basic principle of meta-analysis is to calculate effect sizes for individual studies (in this case, effect size refers to the magnitude of effect observed in the study in terms of the size of a relationship between variables, as opposed to the degree of difference between group means), convert them into a common metric, and then combine them to obtain an average effect size. These studies are typically weighted by the accuracy of the effect size provided (i.e. sampling precision), by using the sample

size (or a function of it) as a weight. Once the mean effect size has been calculated, it can be expressed in terms of standard normal deviations (a Z score) by dividing the standard error of the mean. A significance value (i.e. the probability, p, of obtaining a Z score of such magnitude by chance) can then be computed. The significance of average effect sizes can also be inferred from the boundaries of a confidence interval constructed around the mean effect size. Commonly, the Pearson product-moment correlation coefficient, r, is used to quantify effect sizes.

There are generally three particular issues which meta-analysis sets out to address (Johnson, Mullen, & Salas, 1995): *central tendency*, which is the desire to find the expected magnitude of effect across many studies, from which the population effect size can be inferred – this is provided by the significance of the average effect size, and/or the confidence interval around this average; *variability*, which is the differences of effect sizes across studies, and is measured by tests of homogeneity, i.e. χ^2 (which if non-significant demonstrates homogeneity, but if significant demonstrates variability); and *prediction*, which is the attempt to explain effect size heterogeneity across studies in terms of a moderator (e.g. age, quality of research).

There are two types of models which can be employed in a meta-analysis: fixed effects versus random effects. The fundamental difference between the two is in the calculation of standard errors associated with the combined effect size. In the fixed effects model the effect sizes are assumed to be the same in all studies, as the studies constitute the entire universe of studies (Hunter & Schmidt, 2000), and in this regard there should be homogeneity; consequently there is error introduced because of sampling studies from a population of studies, i.e. within study variability. In the random effects model, effects sizes are assumed to vary randomly across studies, so population effects sizes can be thought of as being sampled from a 'superpopulation' (Hedges, 1992), and in this regard there should be heterogeneity; consequently, there is

an additional factor in calculating the error term, i.e. variability *across* studies as well as within. Furthermore, random effect models allow inferences to be generalised to other studies, whereas fixed effect models restrict inferences to those studies included in the analysis.

For the purposes of this meta-analysis the random effects model will be employed, using the Hunter and Schmidt (1990) method, which utilises untransformed effect-size estimates in calculating the weighted mean effect size. A recent review of the two methods available to test for random effects (Field, 2001) recommended the Hunter-Schmidt method, as the biases in estimates of the population effect size were more conservative than those produced by the alternative Hedges and colleagues' method (Hedges, 1992; Hedges & Olkin, 1985; Hedges & Vevea, 1998), which transforms the correlation coefficients into Fisher's z. Consequently, the Hunter-Schmidt method "tends to provide the most accurate estimates of the mean population effect size when effect sizes are heterogeneous" (Field, 2001, p. 179).

The effect size estimate employed here was the weighted average of the sample correlations, r+. This describes the direction and strength of the relationship between two variables with a range of -1.0 to 1.0. Given that all effect sizes belong to the same universe, it is assumed that each sample effect size r+ represents a deviation from its population effect size rho. Effect sizes of studies with large sample sizes should deviate less from the population effect size than small N effect sizes. Therefore, in combining all effect sizes, it is fair to assign more weight to large N studies. Thus, the best estimate of the population effect size is the *weighted* average of all correlations. Computing the weighted average effect size requires a calculation of the average r+ value and weighting this value by the sample size. In this way, correlations based on larger samples receive greater weight than those from smaller samples (Hedges & Olkin, 1985; Hunter, Schmidt, & Jackson, 1982). For comparison sakes, the

unweighted r is also included from the output. Sometimes they differ considerably, and this would highlight the influence of sample sizes on the parameter estimation. If, for example, the least qualified study (i.e. the study with the smallest effect size) would include the largest sample size, this would be reflected in the weighted figure, but it would be useful to report both the weighted and unweighted solution so that this can be taken into consideration (i.e. that there were more studies with larger effect sizes but smaller samples).

Similarly, a 95% confidence interval (CI) was computed for the population z value that was transformed to a 95% CI for the average correlation; this is a test for random effects and determines if r+ was significant (i.e. only if the interval does *not* contain zero).

The Fail-Safe N (Rosenthal, 1984) was calculated to demonstrate the robustness of r+; FSN provides an estimation of the number of unpublished studies containing null results which would be required to invalidate the relationship. The recommended tolerance is 5k + 10, where k is the number of independent tests. If the FSN is larger than the recommended tolerance then the results are robust.

Total N relates to the total number of participants eligible for inclusion from all the studies for each relationship pairing (e.g. intention-behaviour has a total N of 1879), whilst k relates to the actual number of independent studies used for each relationship pairing.

Homogeneity analyses were conducted using the Chi-square statistic (Hunter et al., 1982) to determine whether variation among estimated correlations was greater than chance. The degrees of freedom for the Chi-square test is k – 1, where k is the number of independent correlations. If Chi-square is non-significant, then the correlations are homogeneous and the average weighted effect size, r+ can be said to represent the population effect size. Conversely, if Chi-square is significant, then it is necessary to

look for moderator effects to elucidate potential causes of the heterogeneity of effect sizes across studies.

Computation of weighted average effect size, 95% CIs and homogeneity statistics were conducted using Schwarzer's (1988) *Meta* computer program. Only the output from the untransformed analysis by the Schmidt-Hunter method was used.

2.3 Results

2.3.1 Bivariate Analyses

Cohen (1992) provides useful guidelines for interpreting the size of sample-weighted average correlations (r+). According to Cohen, r+ = .10 is small, r+ = .30 is medium, and r+ .50 is large. These qualitative indices are used to interpret the findings produced by this meta-analysis. The results are detailed in Table 2.2.

Table 2.2. Sample unweighted and weighted average correlations, confidence intervals, Fail-Safe Ns and homogeneity analyses for study variables

RELATIONSHIP	Total N	*k*	r	r+	95% CI of r+	FSN	χ^2
AR-behaviour	1879	7	0.37	0.30	0.13 to 0.48	35	25.4***
AR-intention	11098	24	0.52	0.47	0.18 to 0.75	200	391.7***
Attitude-AR	9479	21	0.42	0.35	0.02 to 0.69	128	377.9***
Subjective norm-AR	9479	21	0.35	0.35	0.02 to 0.68	125	369.7***
PBC-AR	9030	20	0.28	0.18 n.s	-0.36 to 0.72	52	739.3***
Past behaviour-AR	1549	7	0.33	0.34	0.08 to 0.59	40	40.5***
Intention-behaviour	1879	7	0.51	0.41	0.10 to 0.71	50	73.3***
Attitude-behaviour	1879	7	0.27	0.28	0.18 to 0.37	32	12.2 n.s.
Subjective norm-behaviour	1879	7	0.23	0.23	0.20 to 0.25	25	7.3 n.s.
PBC-behaviour	1879	7	0.28	0.11 n.s.	-0.51 to 0.73	8	198.1***
Past behaviour-behaviour	500	3	0.64	0.65	0.58 to 0.72	36	5.1 n.s.
Attitude-intention	11098	24	0.46	0.44	0.21 to 0.67	187	253.9***
Subjective norm-intention	11098	24	0.41	0.43	0.13 to 0.73	184	419.3***
PBC-intention	10649	23	0.39	0.30 n.s.	-0.24 to 0.83	113	989.2***
Past behaviour-intention	1545	7	0.47	0.47	0.20 to 0.75	59	57.8***

RELATIONSHIP	Total N	*k*	r	r+	95% CI of r+	FSN	χ^2
Attitude-subjective norm	9479	21	0.37	0.37	0.13 to 0.61	135	202.4***
Attitude-PBC	9030	20	0.32	0.30 n.s.	-0.11 to 0.71	99	492.7***
Attitude-past behaviour	1545	7	0.28	0.30	0.11 to 0.48	34	23.1***
Subjective norm-PBC	9030	20	0.25	0.23 n.s.	-0.28 to 0.73	70	678.7***
Subjective norm-past behaviour	1545	7	0.18	0.18 n.s.	-.003 to 0.38	18	25.1***
PBC-past behaviour	1549	7	0.38	0.31 n.s.	-0.13 to 0.76	37	103.2***

Overall, the average correlations between the TPB variables are medium to large, with the strongest r+ being evident for the past behaviour-behaviour relationship (.65), closely followed by the intention relationships (i.e. AR/past behaviour/attitude/SN-intention). All r+ were significant at $p < .001$, but it is usual to refer to the 95% CI for further support; where the CI contains a zero, the r+ is not significant. In this regard, the relationships between PBC and behaviour and between PBC and intention were non-significant, with a small r+ of .11 and a medium r+ of .30 respectively. Of interest to this particular study though, is the r+ for the anticipated regret correlations, especially with intention, behaviour and attitude.

2.3.1.1 The AR-Intention Relationship

Across all studies ($k = 24$, $N = 11098$), a large positive sample size-weighted average correlation between anticipated regret and intention was obtained ($r+ = .47$). The average r+ was significant with a narrow 95% confidence interval (CI) (95% CI = .18-.75). In order to determine the robustness of this correlation, an estimation was calculated regarding the number of unpublished studies containing null results which would be required to invalidate this study's conclusion that anticipated regret and intentions are significantly related ($p < .05$). The 'Fail-Safe N' was 200. The recommended tolerance is $5k + 10$ (= 130), so it is clear that the average correlation obtained here is robust. The homogeneity statistic shows considerable variation in the

correlations reported in previous studies ($\chi^2 = 391.7$, $p < .001$), which highlights the possibility of moderation effects from other variables.

2.3.1.2 The AR-Behaviour Relationship

Again, across all the studies which contained a prospective measure of behaviour ($k = 7$, $N = 1879$) a medium r+ was obtained (.30) with a narrow CI (95% CI = .13-.48), showing significance. However, the FSN of 35 means that the average correlation obtained here is not robust, falling short of the desired minimum of 45, which is perhaps not surprising given the small number of studies included (i.e. seven). Nevertheless, individually, all studies do report significant AR-behaviour relationships, although the homogeneity statistic shows variation in the correlations previously reported ($\chi^2 = 25.4$, $p < .001$.), i.e. that the variation among correlations across studies was greater than chance, again suggesting potential moderation effects.

2.3.1.3 The AR-Attitude Relationship

Across the studies which reported the AR-attitude relationship ($k = 21$, $N = 9479$), a medium r+ was obtained (.35). However, the particularly wide CI (95% CI = .02-.69) suggests this result is not strongly significant. The FSN of 128 is robust. The homogeneity statistic, however, shows large variation in the correlations reported in previous studies ($\chi^2 = 377.9$, $p < .001$). This profile would support the argument that attitude and AR could be two separate measures, thereby providing evidence for discriminant validity, but some factors may make them indistinguishable (e.g. poor measurement).

2.3.2 Multivariate Analyses

In order to examine the extent to which anticipated regret enhances the prediction of both intention and behaviour after accounting for the TPB variables, two x three-step hierarchical regressions were conducted using the average correlations as the input

matrix. The input matrix is detailed in Table 2.3. It is important to note that this particular type of correlation matrix, where there are different Ns for each r+ calculated, has certain characteristics which can lead to a non-positive definite r-matrix.

Table 2.3. Intercorrelations between TPB variables including AR, produced using the r+ from the meta-analysis (input matrix)

	Behaviour	Intention	Attitude	SN	PBC	AR	PB
Behaviour	-	.41	.28	.23	.11	.30	.65
Intention		-	.44	.43	.30	.47	.47
Attitude			-	.37	.30	.35	.30
SN				-	.23	.35	.18
PBC					-	.18	.31
AR						-	.34

N.B. Ns vary between 500 and 11098

First, the amount of variance added by AR to intentions was calculated. Attitude, SN and PBC entered the equation at the first step, and then AR was added at the second step. Past behaviour was entered at the third step, in order to determine its contribution to the model. The results are detailed in Table 2.4.

Table 2.4. Three-step hierarchical regression to predict Intentions using the input matrix from the meta-analysis – AR added at step 2, past behaviour added at step 3[5]

Variables	Step 1	Step 2	Step 3
	β	β	β
Attitude	.29***	.22***	.18***
SN	.29***	.22***	.22***
PBC	.15***	.13***	.07***
AR		.30***	.22***
Past Behaviour			.28***
R^2	.30	.37	.43
R^2 change	.30***	.07***	.06***
Model F	998.91***	1033.30***	1075.41***

$p < .0001$ in all cases

It is evident that the 30% explanation afforded by the TPB variables regarding intentions to perform a variety of behaviours is in line with previous meta-analyses (e.g. Armitage & Conner, 2001). However, although these variables are important and significant predictors of intentions, it is clear that the amount of variance explained can be significantly enhanced by the addition of AR with a 7% increase in the amount of

[5] For N, please refer to Table 2.2.

variance explained (F change = 800.86, $p < .001$) and a strong and significant Beta[6] (.30), revealing that AR is the strongest contributor to the model. This profile is evident even in the presence of past behaviour (Beta = .22, R^2 change = .06, F change = 788.21, $p < .001$), but now past behaviour becomes the strongest contributor. If the criterion for augmentation is strictly set at the amount of variance added *after* the presence of past behaviour is accounted for, then a further 3-step hierarchical regression with past behaviour entered at the 2nd step and AR at the 3rd step revealed that AR added an additional 4% to the amount of variance explained by attitude, SN, PBC and past behaviour alone (Beta = .22, R^2 change = .04, F Change 481.88, $p < .001$). The beta weights for all variables remained the same as those detailed in Table 2.4 at step 3. So, there is either a 4% or 7% increase in the amount of variance explained depending on where past behaviour is included in the regression analyses.

Next, the contribution of AR to the explanation of behaviour over and above the TPB was examined by a 4-step hierarchical regression analysis: intention and PBC were entered into the equation at the first step, followed by the remaining TPB variables of SN and attitudes at the second step; at the third step, AR was added; finally, at step 4 past behaviour was included in the equation. The results are detailed in Table 2.5.

In contrast to previous meta-analyses, just 17% of the variance in behaviour was accounted for by intention (Beta = .41); PBC was not a significant contributor to the model (Beta = -.01, n.s.). Godin and Kok (1996) report a figure of 34%, whilst Armitage and Conner (2001) report a figure of 27%, so the present value is much lower. It is interesting to note that Armitage and Conner (2001) observed that the TPB accounted for 11% more of the variance in behaviour when measures were self-report: given that most of the studies included in this analysis were self-reported behaviour (apart from Study 6 (ii) which, in addition to self-reported behaviour, also included an

[6] i.e. standardised Beta

objective measure to test for recent smoking using physiological profiles; these two measures were assessed as being equivalent), this lower value in the explained variance

Table 2.5. Four-step hierarchical regression to predict Behaviour using the input matrix from the meta-analysis[7]

Variables	Step 1	Step 2	Step 3	Step 4
	β	β	β	β
Intention	.41***	.35***	.31***	.09***
PBC	-.01	-.04	-.04	-.15***
Attitude		.12***	.11***	.06**
SN		.04	.03	.08***
AR			.12***	.03
Past Behaviour				.61***
R^2	.17	.18	.19	.46
R^2 change	.17***	.02***	.01***	.27
Model F	166.52***	92.18***	78.58***	235.44***

*** $p < .001$ ** $p < .01$ * $p < .05$

is somewhat disturbing. Attitude, but not SN, made a significant contribution to the model at step 2, adding a further 2% to the variance explained (F Change = 15.00, $p < .001$). At the third step, the addition of AR made a significant contribution to the model (Beta = .12, $p < .001$), increasing the explained variance from 18% to 19% (R^2 change = .01, F Change = 19.93, $p < .001$). The addition of past behaviour at step 4 made a significant additional contribution to the model (R^2 change = .27, F Change = 823.14, $p < .001$) and was the strongest contributor (Beta = .61): however, AR lost its significance, whilst SN and PBC became significant for the first time. So, AR is a significant, additional contributor to the explanation of behaviour after all the TPB variables are accounted for, but its significance is removed in the presence of past behaviour.[8]

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[7] For N, please refer to Table 2.2.

[8] A separate analysis was conducted on those studies which did not include a direct measure of AR per se, but rather AAR in general, to compare the bivariate and multivariate analyses (i.e. studies 8, 12 and 16): there was no measure of past behaviour in any of these studies; prospective behaviour was reported in study 16 (4 studies), but only in terms of intention-behaviour – there were no other inter-correlations, therefore it was only possible to conduct a two-step hierarchical regression to predict intentions using these studies. In general all the r+ were lower. The r+ for the AAR-intention relationship decreased from .47 to .32 (k = 6), and the r+ for the AAR-attitude relationship also decreased from .35 to .14 (k = 2). In both instances the FSN fell considerably short of the ideal, which is not surprising given the small number of studies. Regarding the regression to predict intention (N = 3406), the TPB variables explained 40% of the variance in intentions (compared to 30%), with AAR (Beta = .20, $p < .001$) adding a further 4% to the

2.4 Discussion and Issues for Further Research

This is the first study to quantify the relationship between AR, intentions and prospective behaviour using meta-analytic procedures. A large and significant sample size-weighted average correlation was calculated between AR and intentions across all studies ($r+ = .47$, $k = 24$, $N = 11098$). A regression analysis revealed that the TPB variables explained 30% of the variance in intentions, which is slightly less than the 39% reported in Armitage and Conner's (2001) most recent meta-analysis of the TPB and the 41% reported in the meta-analysis conducted by Godin and Kok (1996). However, AR added a further 7% to the variance accounted for over and above the TPB predictors, and made a strong, positive, significant contribution to the model (Beta = .30, $p < .001$). Even in the presence of past behaviour, AR remained a significant predictor to the model (Beta = .22, $p < .001$), although its contribution to the accounted variance decreased to 4%.

The sample size-weighted average correlation between AR and behaviour was also calculated ($r+ = .30$, $k = 7$, $N = 1879$). A further regression analysis revealed that intentions but not PBC explained 17% of the variance in prospective behaviour, which is slightly lower than the 27% reported by Armitage and Conner (2001) and the 34% reported by Godin and Kok (1996). But of more interest was that the addition of AR was highly significant (Beta = .12, $p < .001$) after all the TPB variables were accounted for, increasing the amount of variance explained in prospective behaviour from 18% to 19%. However, AR did not remain a significant contributor in the presence of past behaviour (Beta = .03, n.s.). It would appear, then, that AR is an important factor in prospective behaviour until past behaviour is taken into consideration; however, it should be remembered that only three studies included a measure of past behaviour,

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amount of variance explained (compared to 7% and an AR Beta of .30). Given that 3 studies constitute a particularly small meta-analysis, these results (although interesting) should be interpreted with caution.

with only seven reporting prospective behaviour itself, so this result should be viewed with caution.

As referred to in Chapter 1, it is important to note that there has been debate over the conceptualisation of the attitude construct. Just as the TPB itself is criticised for excluding affective processes (Conner & Armitage, 1998), it has recently been argued that the construct of attitude focuses on the instrumental (e.g. desirable-undesirable, good-bad) aspects of attitudes to the detriment of experiential/affective aspects (e.g. pleasant-unpleasant, enjoyable-unenjoyable) (see Ajzen & Driver, 1992; Bagozzi, Lee, & Van Loo, 2001; Crites, Fabrigar, & Petty, 1994). In all the studies included in this meta-analysis, attitude was constructed with both components in the majority of cases (i.e. studies 2, 6, 10, 12, 13, 14, 16, 18 and 19); there were six studies where there were either limited or no details of how the construct was operationalised (i.e. studies 3, 4, 5, 8, 9 and 11); one study where attitudes were determined from consequences of behaviours (study 15); one study which just included experiential measures of attitude (study 17); there was one study which did not follow convention in that measures for attitude were taken of indirect measures, i.e. normative beliefs and motivations to comply (study 7); and another from which 'attitude' was derived from the mean of a set of behavioural beliefs (study 1).

Notwithstanding the above, none of the attitude components included in this meta-analysis actually measured AR. Indeed, one of the aims of this PhD is to consider how AR contributes to the TPB, given that past research has revealed, through factor analysis, that AR is a distinct construct from not only attitudes, but also "general affective reactions" (Richard et al., 1996a). It is also the contention of this thesis that AR is completely different from other experiential/affective aspects of attitude such as "pleasant, enjoyable" in that it is such a uniquely negative and unwanted emotion which has the potential to motivate future behaviour. There is tangential evidence from this

particular study to support this contention, specifically that the attitude-AR weighted correlation was not strongly significant (95% CI = 0.02 to 0.69), but of course there have as yet been no direct tests.

In a similar vein, current research has also highlighted the need to address criticisms about a potential overlap of instrumental/experiential-affective attitudes and measures of AR. Indeed, in a recent review of the TPB, Conner and Sparks (2005) suggest that "for regret to be further considered as an additional predictor of intentions we need research demonstrating independent effects for anticipated regret when controlling for both instrumental and experiential attitudes" (p. 193). The results from this analysis in particular seem to indicate that this is indeed the case, as most of the studies contained instrumental and affective/experiential attitudes in addition to AR measures. Nevertheless, the 'regret question' would certainly benefit from the design of studies specifically addressing such concerns with a direct test splitting attitude into the two components and a separate AR measure.

It is also interesting to note that the behaviours considered by the research so far fall into two distinct categories: Distal Benefit Behaviours (DBBs), which may not be immediately attractive and where the "profit" from performing the behaviour is not evident until much later (e.g. exercise); and Immediate Hedonic Behaviours (IHBs), which provide instant pleasure (e.g. smoking) but may be detrimental to physical or psychological well being in the future. Looking at the way AR is conceptualised in these contexts, there seems a general trend for how the anticipated regret question is worded: for DBBs anticipated regret is worded in terms of inaction (i.e. if I did not do x, I would regret it); for IHBs anticipated regret is worded in terms of action (i.e. If I did do x, I would regret it). The means for all the studies generally support the view that participants have strong intentions to perform a DBB and weak intentions to perform an IHB, with the accompanying strong inaction anticipated regret for not performing a

DBB and strong action anticipated regret for performing an IHB.[9] However, this trend is not consistently easy to determine in that the wording for the intention and anticipated regret items do not always correspond in terms of the behaviour in question: for example, one study (Phillips et al., 2003) looked at 'intentions to get a good degree' (which were strong), whilst the wording for the anticipated regret item was 'regret not working hard' (which was also strong); another study (Frost et al., 2001) looked at 'intentions to take a test for Alzheimer's' (which were low), whilst the anticipated regret item was worded 'regret taking the test if it were positive' (which were high). It is therefore important to stress that the results of this meta-analysis (like many others) are based on measures which are not always compatible in meaning. In this regard, it is also important to note the disparate ways in which anticipated regret was considered, in that eight papers included in this meta-analysis incorporated regret into a measure of AAR, while ten looked at a measure referred to as just "AR": however, the AR measures varied in that some included only items which are traditionally considered to tap into solely regret (i.e. regret, upset) whilst other studies included additional items such as worried, tense, disappointed, which could be interpreted as being more appropriate for measures of AAR rather than AR. Consequently, it is difficult to focus just on the contribution of anticipated regret itself to the TPB in that it is either (a) incorporated as part of a general affective measure, or (b) sometimes defined *incorrectly* when it is considered on its own or (c) defined *correctly* when considered on its own. Notwithstanding, as long as this is taken into account in any conclusions, then the results are still of interest and value, and certainly provide a foundation from which to

[9] As noted in Table 2.1, it was necessary to adjust the scoring in Study 6 (smoking study) which married an IHB with anticipated inaction regret (i.e. If I smoke, I would not regret it); this was apparent in the intention-regret correlation, with strong intentions to smoke being associated with low anticipated action regret. It was therefore necessary to convert the only negative correlation coefficient observed in the intention-regret correlation to a positive relationship, in order to correctly reflect the pattern of relationships evident in the means and to make the data from the other studies comparable, and avoid skewing the results.

inspire further research; such research would certainly benefit from stringent adherence to the principles of compatibility (Ajzen, 1988; Ajzen & Fishbein, 1977), correspondence between scales used to measure intention and behaviour (i.e. either a dichotomously worded measure or a frequency measure for both), and an unambiguous measure of AR, so that the addition of AR can be clearly and easily interpreted.

To sum up so far, then, this comprehensive, statistical review of all the relevant literature provides further support for the inclusion of anticipated regret to the TPB. Over a number of studies, there was a strong anticipated regret-intention relationship, and anticipated regret added significantly and independently to the prediction of intentions over and above the TPB variables; there was a moderate relationship between anticipated regret and behaviour, with anticipated regret having a direct and significant impact on prospective behaviour; and finally, there was support for the uniqueness of anticipated regret measures in the face of attitude measures. However, it is evident that there are issues which warrant further research. First and foremost, there are few studies which explore anticipated regret and prospective behaviour; there are only seven which could be included in this analysis. In this regard, it would be interesting to incorporate moderation effects concerning the relationship between anticipated regret, intention and behaviour in line with research carried out by Abraham and Sheeran (2003), Conner, Sandberg et al (2005) and Rapaport and Orbell (2000) in any further analyses; the dearth of such data to date, and the variation in how the constructs are operationalised, has meant that this could not be investigated here. Of more importance is the scarcity of any objective behaviour measures – five of the seven studies included in this analysis rely on self-report measures (only study 2 of Study 6 included an objective check on the self-reported data, whilst Study 13 used final degree marks as an index of exam performance). In this regard, some of the results in this meta-analysis should be interpreted with caution, as the data from certain relationships included in the

bivariate analysis come from a very small number of studies – the relationships with behaviour have already been discussed (k = 7), where the shortfall in the FSN by 10 studies in the r+ for anticipated regret-behaviour further highlights the need for more behaviour studies in order to make results robust, but there are also those including past behaviour (k = 3 or 7, for behaviour and intention respectively). In fact, Field (2001) observed that meta-analyses which contain less than 15 studies lead to an increase in Type I errors, and recommends that significance tests should not be conducted at all with fewer than 20 studies; apart from the above two relationships, however, the other bivariate analyses comply with this recommendation, although some of the correlations with PBC just meet this criterion (e.g. PBC-AR = 20).

It must be mentioned at this point that one of the benefits from using a random effects model in a meta-analysis is that inferences can be generalised rather than extend only to the studies included. However, by its very nature a random effects model assumes that effect sizes *will* vary across studies in a population; this was indeed the case here, where the majority of the tests for homogeneity were significant. In such circumstances, it is usual to investigate for potential moderators (e.g. age, gender, behaviour or even "quality of research" – a rather subjective evaluation). It may be that one such potential moderator in this case is 'type of behaviour' in terms of the distinction mentioned earlier, i.e. IHB or DBB. However, it was felt that splitting the relatively small number of total studies into sub-groupings would violate the k = 20+ rule, thus leading to unreliable data; therefore this analysis was not included.[10]

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[10] The analysis was conducted and the results were as follows (original r+ detailed in brackets):
For regret-intention (.47) - IHBs (k = 7) r+ = .54, 95% CI = .34-.74, χ^2 = 47.7, p < .001, FSN 68 (robust); DBBs (k = 17) r+ = .45, 95% CI .= 17-.74, χ^2 = 321.9, p < .001, FSN 136 (robust).
For regret-attitude (.35) – IHBs (k = 7) r+ = .52, 95% CI = 23-.80, χ^2 = 85.7, p < .001, FSN 66 (robust); DBBs (k = 14) r+ = .31, 95% CI = .02-.60, χ^2 = 214.3, p < .001, FSN 73 (not robust).
For regret-behaviour (.30) – IHB (k = 2) r+ = .25, 95% CI = .18-.32, χ^2 = 3.0, n.s.; DBBs (k = 5) r+ = .34, 95% CI .= 14-.53, χ^2 = 19.0, p < .001), FSN 29 (not robust).
So, although r+ was higher for IHBs in the regret-intention and regret-attitude relationships, homogeneity was never achieved even after this split, suggesting other moderators had the number of studies been larger. Homogeneity was achieved, however, for IHBs in the regret-behaviour relationship but it will be noted that there were only two studies, which is hardly reliable.

Finally, when considering issues for further research, it will be noted that a wider range of behaviours could be explored: the emphasis so far has been mainly on sexual behaviours – nearly half of the studies included in this meta-analysis fall into this category. In this regard, it would be interesting to poll people with a view to finding out the types of behaviours they do which result in them wishing they had not done, and those behaviours they do not do which they wish they had done – this could distinguish between action regret and inaction regret and also reveal some novel "TPB" behaviours. Appropriate behaviours may also be identified where interventions can be employed to increase regret salience and so affect prospective behaviour: it is of note that there have been only two such studies to date.

2.5 Summary of Issues for Further Research

This meta-analysis and the SRR from Chapter 1 indicate a number of key issues in relation to anticipated regret that this thesis seeks to address:

a) identification of a broader range of behaviours;

b) inclusion of prospective measures of behaviour;

c) use of objective measures of behaviour where possible;

d) use of clearly defined measures of AR;

e) use of interventions to increase regret salience;

f) analysis of moderation effects of AR on the intention-behaviour relationship and mediation effects on AR;

g) inclusion of measures of attitude incorporating both instrumental and experiential aspects; and finally

h) stringent adherence to the principles of compatibility/correspondence.

2.6 Outline of Thesis

A summary of each study reported within this thesis is presented in this section. It states the aims of each individual study, how these aims were addressed along with predictions as to their outcomes.

2.6.1 Study 1 – Chapter 3

A pilot study was designed to identify a broader range of behaviours with which to consider the contribution of AR. The study was inspired by the work of Gilovich et al (1994; 1995; 1998) and Feldman et al (1999) who were interested in the temporal pattern of regret, where performance of some behaviours can lead to action regret whilst non-performance of others can lead to inaction regret. Behaviours were identified which resulted in either action or inaction regret and these were further categorised into two distinct behaviour types: immediate hedonic behaviours (IHBs) which although pleasant at the time, may have detrimental long-term consequences, which can result in action regret; and distal benefit behaviours (DBBs) which are not immediately appealing, but have benefits in the long-term, and which can result in inaction regret. A selection of these behaviours formed the basis for the next three studies.

2.6.2 Study 2 – Chapter 3

A small scale pen-and-paper cross sectional study simultaneously considered multiple behaviours to explore the value of anticipated action and inaction regret to the TPB. It was predicted that anticipated action regret would add to the variance explained in intentions to perform IHBs whilst anticipated inaction regret would add to the variance explained in intentions to perform DBBs, and that this increase would be evident even in the presence of past behaviour and over and above the TPB variables.

2.6.3 Study 3 - Chapter 3

A web study was designed to run simultaneously with the pen-and-paper study, so that comparisons could be made between the two data collection mediums: in addition, prospective behaviour was measured. Further to the same predictions detailed for Study 2, it was also predicted that anticipated regret would moderate the intention-behaviour relationship.

2.6.4 Study 4 - Chapter 4

Study 4 set out to address criticisms regarding the dearth of interventional studies in general in the TPB research (Hardeman et al., 2002), and specifically in regret research. A study was designed with the intention of intervening to motivate future behaviour using anticipated regret to increase regret salience. As with Study 3, a web design was employed. Participants took part in one of three possible conditions: control, intervention to increase performance motivation, or intervention to increase regret salience. As before, it was predicted that the appropriate anticipated regret term would increase the variance in intentions to perform IHBs and DBBs over and above the TPB variables, even in the presence of past behaviour. Moreover, it was predicted that measures of anticipated regret and intentions would vary in accordance with the assigned conditions, so that there would be stronger anticipated action regret and reduced intentions to perform IHBs, and stronger anticipated inaction regret and increased intentions to perform DBBs in the intervention condition compared to the control. It was also predicted that anticipated regret would moderate the intention-behaviour relationship and that this too would vary according to condition, i.e. stronger effects in the intervention condition compared to control.

2.6.5 Study 5 – Chapter 5

This was a pen-and-paper study designed to focus solely on exercise behaviour. As there was only one target behaviour, it was possible to include more detailed measures

for each construct. The aim was to replicate the results observed in Abraham and Sheeran' research (2003; 2004), where anticipated regret moderated the intention-behaviour relationship, and where this effect was mediated by temporal stability of intentions. To enable comparison, the study design broadly followed that of the Abraham and Sheeran studies in terms of items used to measure constructs and definition of exercise behaviour.

2.6.6 Study 6 – Chapter 5

Study 6 was identical to study 5, but employed a web design to allow comparison between the two data collection mediums.

2.6.7 Study 7- Chapter 6

The final study in the thesis again focussed on exercise behaviour, but used an objective measure of behaviour in addition to the usual self-report measure. A local university sports centre agreed to provide data from their entry turnstiles, which used sports centre members' student cards to enable access. This data was matched up to information provided in a web questionnaire completed by sports centre members and acted as an index of exercise behaviour performed in the centre during a specified period. In this way, a comparison was possible between previous exercise studies which relied solely on self-report data. In order to test positioning effects of anticipated regret, three conditions were employed: no regret (control), regret first (where all regret items appeared first) and regret mixed (where regret items appeared randomly throughout the questionnaire). As before, it was predicted that anticipated regret would add to the variance explained in intentions by the TPB variables and that it would moderate the intention-behaviour relationship, particularly in the regret first condition. It was further predicted that any such effect would be mediated by temporal stability of intentions.

2.6.8 Chapter 7

The final chapter in the thesis statistically summarised the results from the above seven studies by performing a bivariate meta-analysis on the main study variables (i.e. intercorrelations of behaviour, intention, anticipated regret, attitude, PBC, past behaviour and the anticipated regret x intention interaction), followed by a multivariate meta-analysis. Implications for the TPB and directions for future research were also considered.

Chapter 3: Studies 1, 2 and 3 - Two Types of Regret for Two Types of Behaviour

3.1 Overview of Three Studies

The previous chapter identified a range of issues which need to be addressed in relation to the question of whether AR makes a valid contribution to the TPB; two of these were the need to identify a broader range of behaviours than previously researched, and the need to measure prospective behaviour. This chapter details three studies which set out to explore these particular issues.

The studies were in part inspired by the work of Gilovich et al (1994; 1995; 1998) and Feldman et al (1999) into the temporal pattern of regret, i.e. how after performing some behaviours there is an almost instant kick-yourself kind of regret (action regret), in contrast to how after *not* performing some behaviours there is, eventually, a wistful, if-only-I-had-done-that kind of regret (inaction regret). A pilot study (Study 1) set out to identify behaviours which resulted in both these types of regret. These behaviours were then classified into two main behaviour types corresponding with the regret that stems from action taken and the regret that stems from failures to act. A selection of these behaviours were subsequently used in a pen-and-paper study (Study 2) and a web study (Study 3). These two latter studies differed from those before in three ways: first, they simultaneously looked at a wider variety of behaviours, some of which were completely novel to the TPB research; second, they considered the constructs of anticipated *action* regret and anticipated *inaction* regret rather than just the composite construct of anticipated regret; and third, two types of behaviour were identified which seemed to correspond to either action or inaction regret. By adopting this approach, it was possible to more comprehensively consider the value of AR to the TPB in terms of both intentions and future behaviour.

3.2 Rationale for Inclusion of Measures in the Pen-and-Paper and Web Studies

3.2.1 Two Types of Regret – Two Types of Behaviour

Richard et al (1996a) 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). Logically, it may be thought that traditional TPB behaviours such as engaging in unprotected sex would fall into this category, whereas exercising would not. However, the latter behaviour could have negative consequences if it is ***not*** performed. Consequently, the studies reported in Chapter 3 make a distinction between regrets of action and regrets of inaction (Gleicher, Kost, Baker, Strathman, Richman, & Sherman, 1990; Kahneman & Tversky, 1982; Landman, 1987). This is because some regrets result from things we did that we wish we had not done, whereas others stem from things we did not do that we subsequently wish we had done. 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; however, the debate continues as to whether people have more regret over events which occur from inaction or action (Feldman et al., 1999; Gilovich & Medvec, 1994; Gilovich & Medvec, 1995; Gilovich et al., 1998; Savitsky, Medvec, & Gilovich, 1997; Zeelanberg, van Dijk, van den Bos, & Pieters, 2002). Nevertheless, there would appear to be a temporal perspective that distinguishes between the two types of regret in that action regret has a "hot, kick-yourself" quality whereas inaction regret has a "wistful, nostalgic" quality (Kahneman, 1995) – 'if only I hadn't' versus the 'if only I had' scenario. Furthermore, the effects of inaction are typically realised much later, when people appreciate the importance of certain missed opportunities, whereas the effects of action are realised quite quickly.

The current studies attempt to demonstrate that these two types of regret each correspond to two different types of behaviour, which also vary in their temporal perspective: immediate hedonic behaviours (IHBs), which are those behaviours which we enjoy doing at the time, but later wish we hadn't done (mapping on to action regret); and distal benefit behaviours (DBBs), which are those behaviours we put off doing because they are not immediately appealing, but which have benefits in the future, so that we subsequently wish we had done them (mapping on to inaction regret). To the author's knowledge, no other TPB study has applied such a measure of anticipated regret to a variety of specific types of behaviour in this way before.

3.2.2 Past Behaviour

The TPB predicts that the effect of past behaviour on intentions and behaviour is mediated by the TPB constructs. Indeed, Ajzen (1991) regards the role of past behaviour as a test of sufficiency of the model and suggests that its effects should be mediated by PBC in particular, because repetition of behaviour should lead to enhanced perceptions of control. However, this argument has been challenged by research which has revealed that, on the contrary, behaviours which have become habit are often associated with less PBC and have a direct impact on future behaviour unmediated by intention (Ouellette & Wood, 1998). Several other studies have also reported independent effects for past behaviour when applying the TPB (see Conner & Armitage, 1998; Conner & Sparks, 2005). In Studies 2 and 3, an analysis is conducted to determine whether an augmented model including AR was sufficient to mediate the effect of past behaviour on intentions and behaviour; studies by Abraham and Sheeran found that even after past behaviour had been accounted for, AR made a significant contribution to the explained variance in intentions (Abraham & Sheeran, 2004) and was almost significant for behaviour too (Abraham & Sheeran, 2003).

3.3 Rationale for Web-based Study 3

The third study detailed in this chapter used the web as a medium for the questionnaire and this section sets out the pros and cons of such a method, and the procedures put in place to counter any "malpractice".

3.3.1 Pros of Web Studies

3.3.1.1 Increasing Size of Samples

Usually, when web studies are used, one of the reasons is to increase the heterogeneity of the population sample, but web studies can also solve some problems of research with homogenous samples, such as undergraduates (Birnbaum, 2004). All the studies reported in this chapter used undergraduates as the participant base, but it was clear that using undergraduates restricted the pool of participants for traditional pen-and-paper surveys to those physically available to the researcher, i.e. in this instance recruiting from lecture theatres/classes from just one university department. Advances made over the last decade in World Wide Web (WWW) and hypertext transfer protocol (HTTP) mean that by using the internet, it is possible to achieve large, geographically diverse samples, making statistical tests very powerful.

3.3.1.2 Ease of Recruitment

In this particular instance, the co-operation of parent departments was sought (to avoid the allegation of unsolicited correspondence) to send an email via their distribution lists to all students; the email contained brief details of the study and a hyper-link to the study web site so they could easily log on.

3.3.1.3 Ease for Participants

The internet means that participants can take part in a study whenever it suits them, as long as it is within the time frame of the study. Therefore, they do not have to rush to complete a questionnaire in a lecture class, or fill one out and remember to get it back to

the researcher. Participants in this particular study could log onto the web site at a time which was convenient to them and spend as long as they wished filling it in, thereby enabling answers to be considered rather than rushed.

3.3.1.4 Equalising Male/Female Ratios

Samples from the web have been found to be more diverse in terms of gender; recent research (Gosling, Vazire, Srivastava, & John, 2004) compared data sets from web data (emanating from a non-commercial, advertisement-free web site targeting those who were interested in "self-insight") and traditional data (selected from studies published in 2002 from the Journal of Personality and Social Psychology). Analysis using both the traditional (i.e. experimental) and correlational designs revealed that the bias towards female participants in traditional studies (71%) and correlational studies (77%) from the JPSP was significantly reduced in internet studies (down to 57% for those who reported their gender). However, as with pen-and-paper non-experimental designs, it remains impossible to validate gender in web studies so, although a reduction in the bias towards female participation is desirable – especially when relying on students from departments such a psychology where there is a pronounced bias towards females – it cannot be assured.

3.3.1.5 Dispelling the Preconception that Web Studies Attract a Particular Kind of Participant

It could be argued that people who take part in web studies are a particular population in themselves, in that they are "maladjusted" - socially isolated computer nerds or social-misfit hackers! This preconception was tested and refuted by Gosling et al (2004) in a comparative analysis, but nevertheless it is probable that this stereotypical view will prevail. Of note, though, is that the studies detailed in this chapter and the rest of the thesis were concerned with a particular sample of the population, i.e. undergraduates from various departments from various U.K. universities: it is usual to

expect that nowadays the vast majority of these students not only have access to the internet but that they also have their own emails, and that use of the internet is actively encouraged to maximise academic potential. Consequently, it could be counter-argued that this particular population are more likely than any other to depend on computers and are thus not "computer nerds".

3.3.1.6 Reduction in Social Desirability Problems

There is evidence that participants engage in less socially desirable responding and survey satisficing when responding to a web questionnaire than to a paper-and-pencil study (c.f. Gosling et al., 2004), perhaps because the researcher is not present.

3.3.1.7 Error-free Data Entry

A further advantage to the researcher is that once a survey is properly programmed, data is immediately stored in a form which is ready for analyses, saving time in data coding and entry, and eliminating the possibility of researcher generated data-entry errors.

3.3.1.8 Completion of Whole Questionnaires

Studies can be set up so that participants can drop out during completion, but this data is not then recorded. The study detailed in this chapter 'forced' participants to complete the whole questionnaire before submission was permitted, navigating them back to uncompleted items. Of course, this means that only a certain sub-population is then included, i.e. those who are prepared to persist, but it also means that there are no missing variables and scales are more complete. However, there is the implication that we know little about respondents who opened the web page but failed to complete the questionnaire. On the other hand, this is also true of pen-and-paper studies where potential respondents look through the questionnaire and elect not to take part.

3.3.1.9 Assurance of Population Sampled

In many web-based studies it is unclear what population is being sampled, other than people who surf the web. In the studies detailed in this thesis participation by university students was desired: the population selection technique of contact by university departmental email increased the likelihood that all participants were university students.

3.3.2 Cons of Web Studies

Despite the many appealing advantages of web research, issues of concern have been identified (e.g. Birnbaum, 2004; Gosling et al., 2004) which need to be addressed to ensure that the quality of data is not compromised. Some of these issues relate the comparability of lab-based studies (where a researcher can personally oversee the completion of a study) to unsupervised web studies; obviously, simple questionnaire studies do not fall into this category, but the main problems in this area are two-fold: the potential for participants on the web to make multiple submissions, especially if there is the lure of monetary gain for taking part; and the difficulty of maintaining contact with participants because of changing email addresses. Protocols to avoid such issues have been developed and are well documented in comprehensive reviews such as Birnbaum (2004), Gosling et al (2004), and Kraut et al (2004). The recommendations were adopted for this and subsequent studies and are as follows:

3.3.2.1 Multiple Submissions

Multiple submissions can be reduced and even eliminated as long as identifiers are utilised for entry to the questionnaire. In the web questionnaire detailed in this chapter, participants had to enter their date of birth, first three initials of their mother's first name and a valid email address. The program was set up to (i) recognise any spurious email addresses and request a valid entry, and (ii) to refuse to accept multiple submissions

from the same ID. These were submitted independently from the questionnaire and the email details were sent to a separate file to ensure anonymity. The use of these identifiers was three-fold: first of all if the participant tried to log on to the web site again and use the same details, they would be refused access; secondly, it enabled data from prospective questionnaires to be matched up to the first questionnaire but only if identifiers were matched between the two studies; finally, the email address allowed direct contact with participants to request participation in the time 2 questionnaire and, of course, to enable contact if successful in the prize draw used to encourage participation. Entry into the prize draw was made dependent on completing both questionnaires, so the incentive to falsify identifiers was reduced - if participants had made multiple entries to access the time 1 questionnaire, it was doubtful that they could remember all these variations for entry to the time 2 questionnaire – deception requires excellent memory! Nevertheless, it is possible that some, but certainly not many, multiple submissions were made at time 1, but this could happen even in a pen-and-paper methodology.

3.3.2.2 Changing Email Addresses

Although people do change their email addresses more frequently than postal addresses or telephone numbers, students enrolled on a university course are more likely to retain the same email throughout their student life. Contact in this study was made via emails sent from parent departments, and these were generally the emails which were provided by participants as an identifier. As detailed above, there was the incentive to provide a valid address so that they could complete the whole study, be included in the prize draw and then contacted if they won.

3.3.2.3 Non-Validation of Participant Characteristics

Despite implementing protocols to avoid multiple submissions and to enable re-contact with participants, the fact remains that participants' characteristics, including

gender and age, cannot be verified in much the same way as that which applies to pen-and-paper designs.

In sum, the WWW offers new possibilities for conducting psychological research; the careful design of a web study, properly tested before its release, enables the benefits of such a design to be realised. It is not only a valid method on its own, but is also a perfect adjunct to a pen-and-paper study which will afford an opportunity for comparisons to be made.

3.4 Study 1 – Which Behaviours Cause Action or Inaction Regret?

3.4.1 Aims and Objectives

Study 1 set out to identify a range of IHBs which elicit action regret and a range of DBBs which elicit inaction regret, in an attempt to broaden the behavioural domain previously considered in this type of research. It was intended that the most popular behaviours would be included in two subsequent studies to test the augmented TPB in a completely novel and more comprehensive way.

3.4.2 Sample and Materials

An opportunity sample of 44 undergraduate psychology students was recruited in four separate practical classes. They were asked to complete a short, open-ended questionnaire (Appendix 3.1) requiring them to list (a) three behaviours that they might consider doing but which if they did do, they would later regret having done, and (b) three behaviours which they might consider doing but not actually do, which they would later regret not having done. They were also asked to detail their age and gender.

3.4.3 Results and Discussion

In total 35 females and nine males completed questionnaires (age range 18-42 years, mean age = 22 years). The responses were analysed by writing each answer down and

compiling a frequency tally for those reoccurring answers; in this way it was possible to identify some popular themes/behaviours; there were 12 behaviours which emerged regarding action regret and 10 behaviours regarding inaction regret. Responses were categorised into these overarching behaviours and tallied again (Appendix 3.2). From these and by using the frequency data, nine behaviours were selected as representative of each form of regret in terms of popularity: three were included as action regrets (namely drinking too much, spending too much, making impulsive communications) and six were included as inaction regrets (namely trying an adventurous activity, approaching someone new who is liked, being organised for work, working hard, eating healthily, exercising regularly). These nine behaviours formed the basis for Studies 2 and 3. It must be noted, however, that ideally the analysis regarding the categorisation of behaviours should have followed qualitative research guidelines, which require critical evaluation of category definitions and inter-coder reliability (i.e. it should have been formally content analysed); criticism could be levelled, therefore, at the informal manner in which analysis was conducted in Study 1.

3.5 Study 2 - Pen-and-Paper Study at a University Campus

3.5.1 Aims and Objectives

Study 1 identified a range of behaviours categorized into either IHBs or DBBs which varied according to the type of anticipated regret reported: Study 2 was cross sectional in design and set out to explore the justification for differentiating between these two types of behaviour and these two types of regret in the TPB, with a view to more comprehensively considering the value of AR to the model in terms of predicting intentions.

3.5.2 Hypotheses

There were two hypotheses regarding this study:-

a) anticipated action regret would significantly add to the explanation of intentions to predict IHBs over and above the TPB variables, even in the presence of past behaviour;

b) anticipated inaction regret would significantly add to the explanation of intentions to predict DBBs over and above the TPB variables, even in the presence of past behaviour;

3.5.3 Method

3.5.3.1 Sample, Design and Procedure

Participants were recruited from lecture theatres at a university campus in the North of England. Those willing to participate completed a questionnaire and included details of a contact email address for entry into a prize draw. They were told the questionnaire related to research being carried out into feelings and behaviour; after they had completed all items and submitted them, they read a debriefing note. A total of 89 participants completed the questionnaire (76 female, 13 male; age range 16-29 years, mean age = 22 years). Respondents were entered into a £50 prize draw.

3.5.3.2 Materials

3.5.3.2.1 Questionnaire

The questionnaire (Appendix 3.3) included measures of the TPB in relation to nine separate behaviours, which were based upon standard wording recommended for measuring components of the TPB (Ajzen, 1991; Conner & Sparks, 1996). The time frame used was six weeks. Three of the behaviours were classified as 'immediate hedonic behaviours' (IHB) in that they had been determined by the pilot study to be the kind of behaviours that people enjoy doing at the time, but then later regret, i.e. drinking too much alcohol in one session, making impulsive communications, and spending too much money; six of the behaviours were classified as 'distal benefit behaviours' (DBB) in that had been determined, by the same pilot study, to be the kind of behaviours that

people put off doing, but later regret not having done, i.e. working hard, regular exercise, eating healthily, trying an adventurous activity, approaching someone new who is liked, and being organised for work. A separate page was used for each behaviour, and the order of the two types of behaviour was arranged throughout the questionnaire so that they were mixed up (i.e. drinking, being organised, approaching someone new, adventurous activity, eating healthily, exercising, impulsive communications, working hard, over-spending). At the top of each page, the behaviour was described in detail with examples for clarification. Across the nine behaviours the same wording was used to tap each construct; reverse coding of responses was carried out where appropriate. Furthermore, the items appeared in the same order for all the behaviours, with the appropriate anticipated regret term appearing first: although previous research (Abraham & Sheeran, 2004) has shown that positioning the anticipated regret item prior to the intention item increases intention strength, a pragmatic decision was made not to include a control in case there were non-equal or small groups. Furthermore, only single items measured most of the TPB constructs (apart from attitude) due to the number of behaviours simultaneously considered – if there had been multi-item constructs, there was the potential of 'completion fatigue' resulting in either participant drop-out or unconsidered completion. Respondents were initially required to indicate their age and gender. The questionnaire contained the following measures along with other items not reported here:

Intentions were assessed in regard to each of the nine behaviours with one item (e.g., 'I intend to be organised for work during the next 6 weeks'), assessed on strongly disagree-strongly agree response formats and scored 1 to 5 with higher scores indicating as follows: for IHBs, stronger intentions *not* to perform the behaviour, for DBBs stronger intentions to perform the behaviour.

Attitudes were assessed in regard to each of the nine behaviours as the mean of three (in some cases two, see Table 3.1) item semantic differential scales (e.g., 'For me, being organised for work during the next 6 weeks would be'; bad-good; unpleasant-pleasant; foolish-wise) all scored 1 to 5 with higher scores indicating more positive attitudes. Cronbach's alpha was calculated for each behaviour and these are detailed in Table 3.1.

Table 3.1. Cronbach's Alpha for attitude measure for each behaviour (N.B. originally 3 items)

Behaviour	Final Cronbach's Alpha	Items Deleted for Improvement	N
Drinking too Much	.83	n/a	86
Impulsive Comm.	.87	n/a	88
Spending too much	.95	Unpleasant/Pleasant	88
Working Hard	.71	Unpleasant/Pleasant	88
Regular Exercise	.70	n/a	88
Eating Healthily	.84	Unpleasant/Pleasant	88
Adventurous Activity	.84	n/a	88
Approaching Someone New	.81	n/a	86
Organised for Work	.78	Unpleasant/Pleasant	89

Subjective Norm was assessed with one item in regard to each of the nine behaviours, on strongly disagree-strongly agree response formats (e.g., ' People who are important to me think that I should be organised for work during the next 6 weeks') all scored 1 to 5 with higher scores indicating as follows: for IHBSs, more pressure *not* to perform the behaviour, for DBBs, more pressure to perform the behaviour.

Perceived Behaviour Control (PBC) was assessed with one item in regard to each of the nine behaviours, on strongly disagree-strongly agree response formats (e.g., 'I am in control of being organised for work during the next 6 weeks) all scored 1 to 5 with higher scores indicating as follows: for IHBs more control over *not* performing the behaviour, and for DBBs more control over performing the behaviour.

In addition, for each behaviour the questionnaire included anticipated regret measures to tap into action regret for IHBs and inaction regret for DBBs, and a past behaviour measure.

Anticipated Action Regret (AR) was assessed with one item in regard to each of the three IHBS behaviours, assessed on strongly disagree-strongly agree response formats (e.g., 'If I did have a binge drinking session during the next 6 weeks I would regret it) all scored 1 to 5 with higher scores indicating more anticipated action regret.

Anticipated Inaction Regret (IR) was assessed with one item in regard to each of the six behaviours, assessed on strongly disagree-strongly agree response formats (e.g., 'If I were not organised for work during the next 6 weeks I would regret it) all scored 1 to 5 with higher scores indicating more anticipated inaction regret.

Past Behaviour was assessed with one item in regard to each of the nine behaviours, on never-frequently response forms (e.g., 'In the past, I have been organised for work') all scored 1 to 5 with higher scores indicating behaviours frequently performed in the past.

3.5.4 Results – Between-Subjects Analyses to Predict Intentions

Means, standard deviations and intercorrelations for all study variables over all the nine behaviours were calculated (Appendix 3.4); the means and standard deviations for intention and anticipated regret per behaviour are detailed in Table 3.2, whilst a summary of means for IHB and DBB is detailed in Table 3.3. Furthermore, a three-step hierarchical regression was conducted to predict intentions in the first instance: step 1

looked at the TPB variables (attitudes, SN and PBC); step 2 included the addition of the appropriate regret term; step 3 included past behaviour. Rather than detail all the regression results for each of the nine behaviours, a summary table has been completed (Table 3.4) and is reviewed in section 3.5.4.2.

Table 3.2. Means and SDs for intention and anticipated regret per behaviour

BEHAVIOUR	N	VARIABLE			
		INTENTION		REGRET TERM	
		Mean	SD	Mean	SD
Over Drinking	86	2.76 (not to)	1.59	3.01	1.42
Impulsive Communic.	88	3.53 (not to)	1.14	3.53	1.19
Over Spending	88	4.01 (not to)	1.05	3.92	1.22
Working Hard	87	4.47	.75	4.52	.91
Regular Exercise	87	3.56	1.32	3.71	1.36
Eating Healthily	88	3.97	1.03	3.86	1.26
Adv. Activity	88	2.90	1.23	2.77	1.27
Approaching Someone new	86	2.01	1.10	2.66	1.51
Being Organised	87	4.36	.68	4.32	1.01

It is evident that for IHBs there were moderate intentions not to over-drink, slightly stronger intentions about not making impulsive communications, and a strong intention not to over-spend: these were accompanied by a moderate anticipated action regret for over-drinking, and strong anticipated action regret about making impulsive

communications and over-spending. So, perhaps not surprisingly given the student population, over-drinking was not the most negatively viewed behaviour in terms of intentions not to do so and anticipating action regret. Regarding the DBBs, there were generally strong intentions to perform them accompanied by a strong anticipated inaction regret with the exception of two behaviours: approaching someone new and adventurous activities: for these two behaviours there were low intentions to perform them accompanied by low anticipated inaction regret. These results suggest that although these behaviours were each categorised as a DBB, they were perhaps perceived as being risky rather than beneficial behaviours.

3.5.4.1 Summary of Means Grouping IHBs Together and DBBs Together

Mean values of intention and anticipated action regret were calculated for the three IHBs, and intention and anticipated inaction regret for the six DBBs; the results are detailed in Table 3.3.

Table 3.3. Means and SDs for IHB and DBB intention and IHB anticipated action regret and DBB anticipated inaction regret overall

Variable	Overall (N = 88)	
	M	SD
IHB int (not to)	3.44	.71
DBB int	3.55	.54
IHB AR	3.50	.86
DBB IR	3.64	.58

A t-test revealed that there were no significant differences between the reported intentions or anticipated regret for either behaviour type: so intentions not to perform IHBs were just as strong as intentions to perform DBBs, and likewise regarding anticipated action and inaction regret for each behaviour type.

3.5.4.2 Summary of Regressions to Explain Variance in Intentions over all Nine Behaviours

The Summary Regression Table is detailed at Table 3.4.

Table 3.4. Summary of regression analyses to predict intentions over all the nine behaviours

BEHAVIOURS		MODEL 1 (Attitude, SN, PBC)		MODEL 2 (+ regret measure)		MODEL 3 (+ past behaviour)	
		% Variance Explained	Significant Contributors	% Variance Explained	Significant Contributors	% Variance Explained	Significant Contributors
IHBS = AR	Drinking Too Much	63	A	67	**A**, PBC, AR	70	**A, AR**, PB
	Impulsive Comm.	46	SN	62	SN, PBC, **AR**	62#	SN, PBC, **AR**
	Over-spending	25	**SN**, PBC	34	**SN**, PBC, IR	34#	SN, PBC, **AR**
DBBs = IR	Working Hard	21	A	40	PBC, **IR**	50	**IR**, PB
	Regular Exercise	37	SN, **A**	61	A, **IR**	65	**A, IR**, PB
	Healthy Eating	28	**A**, PBC	29#	**A**, PBC	45	PB
	Adventurous Act'y	57	**SN**, A	61	**A, SN**, IR	64	**SN**, IR, PB
	Apprch. Someone	51	**SN**, A	55	A, SN, **IR**	57#	A, SN, **IR**, AR
	Organised for Work	34	**SN, PBC**	35#	SN, **PBC**	42	**SN**, PBC, PB

Note: A = attitude, SN = subjective norm, PBC = perceived behavioural control, AR = anticipated action regret, IR = anticipated inaction regret, PB = past behaviour.

Variables in bold indicate strongest predictor.
 # = non significant R^2 Change

It is clear that the addition of the anticipated regret measure significantly and independently contributed to the amount of variance explained in intention over the nine behaviours with two exceptions – being organised for work and eating healthily. It is interesting to note that for these two behaviours, an experiential-related attitude measure

was removed to improve Cronbach's Alpha; perhaps, then, these behaviours are not affect related. The additional variance explained varied from between 1% to 24%. Overall, a positive anticipated action regret was the most significant contributor for IHBs, whereas a positive anticipated inaction regret was the most significant contributor for DBBs. This pattern was still evident when past behaviour was added to the final model. Past behaviour made a significant and independent contribution to the amount of variance explained in intentions across most behaviours, apart from impulsive communications, spending too much money and approaching someone new.

The pattern regarding positive action regret for IHB and positive inaction regret regarding DBBs seems to support the use of these two terms which differ on a temporal perspective.

3.5.5 Summary of Results from Pen-and-Paper Study and Conclusion

The main remit of this particular study was to look at a wider variety of behaviours than previously researched and to consider the value of adding anticipated regret to the TPB in a completely novel manner, i.e. to split behaviours into the two types identified in the pilot study and match the appropriate regret term, unambiguously defined. The results clearly demonstrate that anticipated regret adds to the variance in intentions over a variety of behaviours even in the presence of past behaviour, and even when controlling for attitudes, suggesting that it is a separate construct quite different from the attitude construct. Moreover, it is also possible to differentiate between anticipated action regret for IHBs and anticipated inaction regret for DBBs. This pattern was only disrupted for two DBBs which, with hindsight, could be considered risky, namely 'approaching someone new who is liked' and 'trying an adventurous activity'; the reported weak anticipated inaction regret could, therefore, be attributed to common sense.

Interestingly, there was also a clear pattern in intentions to perform both types of behaviour, in that intentions *not* to perform IHBs were as high as intentions *to* perform DBBs. There are a couple of theories which may explain this finding: regarding DBBs, it may be that although the performance of these behaviours is not immediately appealing, this particular population could either look ahead, or that there was an element of "social desirability" in completing the questionnaire, or the positioning of the regret item before the intention item increased regret salience and impacted on reported intentions (as found in Abraham and Sheeran; 2004). This warrants further investigation. Similarly for the IHBs, in that although they are immediately appealing, most students reported moderate to strong intentions not to perform the majority of them, with the exception of over-drinking: given that the target population in this study was students, and that this latter behaviour is arguably particularly student-relevant, it should perhaps not be surprising that reported intentions not to binge-drink were weak, perhaps reflecting a degree of realism rather than social desirability – and certainly no effect of item-positioning!

There were, however, two DBBs where anticipated regret did not add to the amount of variance explained, namely 'being organised for work' and 'eating healthily'. It has already been noted that the experiential component of the attitude measure had to be deleted to improve Cronbach's Alpha for these two behaviours, with the suggestion that perhaps they are not 'affect' related: this was considered in the web study where there was a larger and more diverse sample.

3.6 Study 3 - Web Study

3.6.1 Aims and Objectives

This study ran simultaneously with the pen-and-paper study, with the additional aim of analysing prospective behaviour. It was hoped that a larger sample would be

obtained, albeit student-based, but from a wider geographical area and from different departments at different universities.

3.6.2 Method

3.6.2.1 Sample, Design and Procedure

Contact was made with various departments at eight U.K. universities (Birmingham, Cambridge, Durham, East Anglia, Manchester, Oxford, St Andrews and UCL: see Appendix 3.5 for a list of participating departments per university). They were asked to circulate an email to students inviting them to log on to a web site, and complete and submit an on-line prospective questionnaire. A total of 350 participants (134 female, 216 male; age range = 18-48 years; mean age = 20.6 years) completed a Time 1 questionnaire, which included details of a contact email address for entry into a prize draw (only if they completed the Time 2 questionnaire) and to enable re-contact for Time 2. At Time 1 they were told the questionnaire related to research being carried out into feelings and behaviour. Four weeks later, these participants were sent another email asking them to complete a Time 2 behaviour measure questionnaire; again those who replied were entered into a prize draw. A total of 139 participants (i.e. 40% of the original sample) completed a Time 2 questionnaire (85 male, 54 female). The web questionnaire was designed so that participants had to complete all sections before submission, and also so that they could not complete the Time 2 questionnaire until four weeks had elapsed. A debriefing note was provided at the end of the Time 2 study.

3.6.2.2 Materials and Hypotheses

The Time 1 questionnaire was identical to the pen-and-paper version, apart from the time frame for prospective behaviour which was reduced to four weeks (for practical reasons the time frame had to be six weeks in the pen-and-paper version). Also, respondents were required to indicate their age, date of birth and first three initials of

their mothers' first name to enable participants to be matched up between Time 1 and Time 2. Furthermore, the hypotheses were identical too, with the additional prediction that both regret terms would moderate the intention-behaviour relationship. However, the alphas for the attitude measure varied from those in the pen-and-paper version and are detailed in Table 3.5.

Table 3.5. Cronbach's Alpha for attitude measure for each behaviour (N = 350)

Behaviour	Final Cronbach's Alpha	Items Deleted for Improvement
Drinking too Much	.83	n/a
Impulsive Comm.	.90	n/a
Spending too much	.94	Unpleasant/Pleasant
Working Hard	.91	Unpleasant/Pleasant
Regular Exercise	.78	Unpleasant/Pleasant
Eating Healthily	.70	n/a
Adventurous Activity	.83	n/a
Approaching Someone New	.80	n/a
Organised for Work	.82	Unpleasant/Pleasant

It will be noted that the same items had to be deleted for the same three behaviours as in the pen-and-paper study (namely spending too much, working hard and being organised), but not for eating healthily this time. Furthermore, there was an additional behaviour in this study where this item had to be deleted for improvement, namely regular exercise.

Participants were contacted using the email provided at Time 1 to send a hyper-link to the study web site so that they could log on and take part in the Time 2 study. The same definition for each behaviour was provided as that detailed at Time 1. The second questionnaire (not attached in the interests of space) contained the

following measure, along with other measures not detailed here; reverse coding of responses was carried out:

Self-reported behaviour was assessed with one item in regard to each of the nine behaviours (e.g., 'I was organised for work during the past 4 weeks') on never-frequently response formats scored 1 to 5, with high scores indicating a frequently performed behaviour.

3.6.3 Results – Time 1 Questionnaire

3.6.3.1 Between-Subjects Analysis to Predict Intentions

Means and standard deviations for all study variables over all these behaviours were calculated; Table 3.6 details those for intention and anticipated regret over each behaviour. Intercorrelations were also calculated (Appendix 3.6).

Table 3.6. Means and SDs for intention and anticipated regret for each behaviour (N = 350)

BEHAVIOUR	VARIABLE			
	INTENTION		REGRET TERM	
	Mean	SD	Mean	SD
Over Drinking	3.23 (not to)	1.37	2.99	1.63
Impulsive Com.	3.58 (not to)	1.07	3.50	1.09
Over Spending	4.00 (not to)	1.05	4.11	1.02
Working Hard	4.38	0.95	4.49	0.99
Reg. Exercise	3.88	1.20	3.67	1.30
Eating H'lthy	3.92	1.06	3.67	1.26
Adv. Activity	3.15	1.20	2.84	1.30
Approach New	2.06	1.19	2.74	1.38
Being Org'ed	4.39	0.80	4.41	0.95

Furthermore, a 3-step hierarchical regression was conducted to predict **intentions** in the first instance: step 1 looked at the TPB variables (attitudes, SN and PBC); step 2 included the addition of the appropriate regret item (i.e. anticipated action regret for IHBs, and anticipated inaction regret for DBBs); step 3 included past behaviour. Table 3.7 summarises the beta weights from the regression analyses from step 3.

It is evident that for IHBs, there was a moderate to strong intention not to perform them and a moderate to strong anticipated action regret; in making a comparison with the previous study, there is a marked difference in the intentions not to over drink in the web study (M = 3.23) compared to the pen-and-paper version (M = 2.76). For most of the DBBs, there was a strong to very strong intention to perform them which corresponded with a strong to very strong anticipated inaction regret; however, this was not the case for approaching someone new or trying an adventurous activity, where there was a weak to moderate intention to perform these behaviours which corresponded with a moderate anticipated inaction regret: these patterns reflect those in the pen-and-paper version.

Turning now to the regressions analyses detailed in Table 3.7, the results show that anticipated regret significantly and independently contributed to the amount of variance explained in intention in each of the nine behaviours; the additional variance explained varied from between 2% to 22%. Moreover, it was the strongest predictor in six out of nine behaviours (drinking too much, adventurous activity and approaching someone new being the exceptions).

The analyses revealed that anticipated action regret produced the largest R^2 change for IHBs: 22% for impulsive communications, and 18% for spending too much. For DBBs, the largest R^2 change was produced for being organised for work

Table 3.7. Summary of Hierarchical regressions across behaviours to explain variance in intentions: standardised Betas at step 3 including all variables (N = 350)

VARIABLE	Intentions: Betas								
	Not to Over-drink	Not to Make Impulsive Communications	Not to Over-spend	To Work Hard	To Exercise Regularly	To Eat Healthily	To Try an Adventurous Activity	To Approach Someone New	To be Organised
Attitude	-.431***	.033	.035	.271***	.105*	.148**	.262***	.353***	.246***
SN	.276***	.319***	.217***	.227***	.111**	.100*	.391***	.262***	.115*
PBC	.047	.068	.161**	.077*	.262***	.216***	.042	.003	.086
Appropriate Regret Term	.188***	.469***	.449***	.370***	.383***	.387***	.234***	.180**	.447***
Past Behaviour	.011	-.206***	-.132**	.130***	.229***	.236***	.161***	.093*	.134**
R^2	.59	.54	.36	.64	.58	.56	.60	.45	.50
R^2 Change from Step 1 to 2 when AR added	.02***	.22***	.18***	.06***	.14***	.13***	.05***	.02**	.16***

*** $p < .001$; ** $p < .01$; * $p < .05$

(16%) and eating healthily (13%): of interest, it was precisely these two behaviours (and only these two) in the pen-and-paper study where anticipated regret did *not* make a significant contribution to the model – this perhaps reflects the importance of procuring a large, diverse sample even when students are the target population. Anticipated regret remained a significant contributor to the model even after the addition of past behaviour. Past behaviour also significantly and independently contributed to the amount of variance explained in intention for eight out of nine behaviours (drinking too much being the exception). Of interest is that 'working hard' was a behaviour previously studied by Richard et al (1996a), but where anticipated regret did not significantly predict the variance in intention: the present result, then, contradicts that finding.

For approaching someone new who is liked, a separate regression analysis was carried out to see if there was a difference between those who were in a relationship and those who were not (Table 3.8). At step 3, the effect of anticipated inaction regret and past behaviour was restricted to those not in a relationship, as would be expected, although the amount of variance explained was larger for those in a relationship (22% -v- 44%).

Table 3.8 Hierarchical regression of intention to approach someone new who is liked for *those in a relationship (Yes)* (n=174) and for those *not* in a relationship (*No*) (n = 176) using study variables

Variable	Step 3	
	Yes Beta	No Beta
Attitude	.398***	(.158*)
Subjective Norm	.220**	(.125)
PBC	-.172**	(.112)
Anticipated Inaction Regret	.079	(.217**)
Past Behaviour	.065	(.214**)
R^2	.44	.22

*** p < .001; ** p < .01; * p < .05

3.6.4 Results – Time 2 Questionnaire

The sample was tested on all Time 1 variables to see if there were any differences between those who completed the Time 1 questionnaire only (N = 211) and those who completed both the Time 1 and Time 2 questionnaires (N = 139). A MANOVA revealed a significant difference for *spending too much* ($F(1, 322) = 2.33$, $p < .05$) which was explored by examining univariate Fs as detailed in Table 3.9

Table 3.9. Results from a MANOVA to determine differences between respondents who completed T1 only (N = 211) and those who completed T1/T2 (N = 139)

Behaviour	Variable(s)	F	df	p	Time 1 only Sample Means (SD)	Time 1 and 2 Sample Means (SD)
Spending	Intentions	7.00	1, 322	.009	3.91 (1.10)	4.18 (.93)
	Attitudes	8.34	1, 322	.004	3.51 (1.65)	3.95 (1.48)

So those who remained in the study reported strong intentions not to spend and had more positive attitudes about spending than those who left the study. Therefore, this attrition analysis indicates that the final sample was biased in this way.

3.6.4.1 Between-Subjects Analyses to Predict Behaviour

Means and standard deviations for all study variables over the nine behaviours were calculated: Table 3.10 shows those for behaviour. Intercorrelations for all the study variables were also calculated: in the interests of space, only correlations for behaviour are detailed in Appendix 3.7. Furthermore, a 4-step hierarchical regression was conducted to predict **behaviour**, which included a moderation analysis to see if anticipated regret moderated the intention-behaviour relationship: interaction terms were generated for intention by anticipated regret per behaviour. Step 1 included the TPB variables of attitude, SN, PBC and intention; step 2 included the appropriate

anticipated regret item (action regret for IHBs and inaction regret for DBBs); step 3 included the intention by anticipated regret interaction term: finally, step 4 added past behaviour. Table 3.11 summarises the results by reporting the beta weights at entry of all contributors.

Table 3.10. Means and Standard Deviations for Performance of Each Behaviour

BEHAVIOUR	Performance of Behaviour during previous 4 weeks	
	Mean	Standard Deviation
Over Drinking	2.49	1.34
Impulsive Communications	2.80	1.30
Over Spending	3.69	1.07
Being Organised for Work	3.61	1.00
Approaching Someone New	1.61	1.04
Trying Adventurous Ac'y	1.90	1.16
Eating Healthily	3.30	0.98
Exercising Regularly	2.86	1.37
Working Hard	3.72	1.13

The means illustrate that during the four week study period, over-drinking was infrequently performed; the sample made a moderate amount of impulsive communications; spending too much money was a fairly frequent behaviour; being organised for work, exercising regularly and eating healthily were moderately performed behaviours; approaching someone new who was liked was a fairly infrequently performed behaviour, as was trying an adventurous activity; and finally, working hard was a fairly frequently performed behaviour.

Table 3.11. Beta weight at entry for contributors per behaviour performed to look at moderation effects of anticipated regret on the intention-behaviour relationship

CONTRIBUTOR	BETA WEIGHT AT ENTRY FOR EACH CONTRIBUTOR PER BEHAVIOUR								
	Immediate Hedonic Behaviours			Distal Benefit Behaviours					
	To Over Drink	To Make Impulsive Communications	To Overspend	To Work Hard	To Exercise Regularly	To Eat Healthily	To Try an Adventurous Activity	To Approach Someone New	To be Organised
Intention #	-.197=	-.370***	-.283**	.281*	.358***	.282**	.212*	.348***	.239**
SN #	.011	.150	.109	-.047	-.023	.112	.105	-.062	-.059
PBC #	-.078	-.039	-.170*	.107	.162=	.210*	.044	.068	.166=
Attitude	.441***	.014	-.056	.090	.001	.100	.105	.210*	.021
AR Term	-.187=	-.030	.156=	-.052	.033	-.112	.063	-.009	.095
Int/AR	.256	-.742=	.240	1.269*	.546	-.512	.498	-.227	-1.014
Past Behaviour	.241**	.328***	.449***	.340***	.300**	.162=	.067	.159*	.243*
R^2 at last step	.44	.20	.32	.25	.28	.29	.14	.24	.16

 # not to for IHBs *** $p < .001$; ** $p < .01$; * $p < .05$; = marginal significance $.05 < p < .10$

Regarding the regression analysis, in support of the TPB, it is evident that intention always predicted behaviour at step 1, although it was only marginally significant for over-drinking. Regarding the addition of anticipated regret at step 2, there was evidently only a marginal negative effect for over-drinking (R^2 change = .02, p = .06), and a marginal positive effect for over-spending (R^2 change = .02, p = .07), but when past behaviour was added this effect became non-significant. So, as in the meta-analysis regression reported in Chapter 2, it would appear that there was a marginal direct contribution of anticipated regret to the explanation of some behaviours, until past behaviour was taken into account whereupon habit took precedence. At step 3, the intention-behaviour relationship was moderated marginally for impulsive communications (where low intentions not to make them and low anticipated action regret about making them predicted subsequent behaviour), and significantly for working hard (with positive intentions to do so and low anticipated inaction regret predicting subsequent behaviour), again until past behaviour was added. By step 4 then (not reported), intention was only significant for over-drinking and eating healthily, PBC was only significant for eating healthily, SN was not significant at all, neither was anticipated regret: however, by far the most important predictor at this step was past behaviour (with the exception of adventurous activity where nothing predicted future behaviour, and eating healthily where only intention and PBC predicted behaviour). So, the results from this particular section suggest that overall, anticipated regret does not moderate the intention-behaviour relationship except for working hard, where the direction of the regret term is unexpectedly negative, despite the anticipated regret-behaviour r = .196, p < .05, suggesting a suppressor effect: nevertheless, when past behaviour is controlled for, this effect becomes non-significant.[11]

[11] Post hoc analysis was carried out splitting intention into high and low and re-re-running a 3-step

3.6.5 Summary of Web Study

Four main hypotheses were proposed for this exploratory research. Regarding the first hypothesis, the results showed that anticipated regret significantly and independently contributed to the amount of variance explained in intention over all the nine behaviours; action regret for IHBs and inaction regret for DBBs. Indeed, anticipated regret was the most significant contributor in the majority of behaviours. Moreover, this effect was evident even after the addition of past behaviour, which supports hypotheses (a) and (b) from section 3.5.2. Of particular interest was that anticipated regret remained a significant additional contributor even when attitude was controlled for, supporting the contention that anticipated regret is quite distinct from the attitude construct.

The effect of anticipated regret directly on behaviour was also explored: there was no direct impact on behaviour other than a marginal effect for over drinking and overspending, but this effect became non-significant on the addition of past behaviour. So, having a weak anticipated action regret about drinking and a strong anticipated action regret about overspending explained future behaviour, but habit far outweighed anticipated regret's contribution. In some respects this result contrasts that from Abraham and Sheeran (2003) who found that the addition of anticipated regret was associated with a marginally significant improvement in the variance explained in exercise behaviour even *after* past behaviour had been considered. However, these results clearly reflect the findings reported in the meta-analysis in Chapter 2.

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hierarchical regression analysis to isolate variable effects: intention and PBC were entered at step 1; the appropriate regret term was added at step 2; finally, the regret by intention interaction term was included at step 3. There were no significant effects for the interaction term at all, even for working hard, when considering high and low intenders.

The moderation analysis demonstrated that on the whole, anticipated regret did not moderate the intention-behaviour relationship apart from working hard, and this effect was again removed in the presence of past behaviour.

There is, therefore, a consistent pattern emerging from this set of results, in that past behaviour far outweighs any effect (however limited) of anticipated regret both directly on behaviour and in terms of moderation analysis.

3.7 Conclusions and Suggested Directions for Further Research

The three studies in this chapter set out to provide evidence for differentiating between IHBs and DBBs, with the respective corresponding constructs of anticipated action regret and anticipated inaction regret, in terms of an augmented TPB.

Together, Studies 2 and 3 supported this differentiation in that it was shown not only that anticipated regret was important in explaining the variance in intentions of these behaviours above and beyond the variables contained in the TPB, but that the nature of anticipated regret varied according to whether the behaviour was immediately hedonic or distally beneficial; specifically, anticipated action regret was important for IHBs whilst anticipated inaction regret was important for DBBs. Both constructs clearly added significantly and independently to the amount of variance explained even in the presence of past behaviour.

In line with the recommendations made in the preceding chapters, the behaviours studied were a broader range than those previously considered, prospective behaviour was measured in Study 3 and an unambiguous measure of anticipated regret was included. Unlike previous research by Sheeran and Orbell (1999) and Abraham and Sheeran (2004), though, evidence for a moderating effect of anticipated regret on the intention behaviour relationship was lacking.

One point which was raised during the analysis was the issue of increasing regret salience. For each of the nine behaviours, the anticipated regret construct was the first item to be completed, just before the intention item: due to worries about just how many students would participate in this study and the large number of behaviours considered simultaneously, a decision was made not to use a control condition in case there were non-equal or small groups. Any further studies would do best to include a control so effects can be more comprehensively assessed: even such a subtle manipulation as the positioning of the anticipated regret item has shown to increase regret salience previously (Abraham & Sheeran, 2004), although certainly in Study 3 there were no clear moderation effects arising from this particular design.

Another issue which should be addressed is that only the appropriate anticipated regret term was included for each behavioural type; it could be argued that a better test would be to include both anticipated action and inaction regret for each behaviour. Likewise, it will be noted that for IHBs, intention/PBC/SN were worded in the negative, e.g. 'I intend *not* to over-drink'; 'people who are important to me think that I should *not* over-drink' etc. Again, it could be argued that participants were primed to view these behaviours in a negative way and so indicate their intentions/PBC/SN as appropriate. Consequently, the results regarding positive intentions *not* to perform IHBs may be viewed by some with caution until this matter is addressed in a further study, where the wording is standardised for both IHBs and DBBs. In a similar vein, it will be noted that there were uneven numbers of IHBs (three) and DBBs (six): this reflected the selection process from Study 1, where only the most popular behaviours in terms of cited frequency were chosen for inclusion. A further study would do well to balance these behaviour types.

Nevertheless, the studies detailed in this chapter clearly illustrate the value of anticipated regret to the TPB in a more comprehensive manner *and* the benefits of web

design research: from contact at a few departments in only eight universities it was possible to procure a much larger sample than the tradition pen-and-paper study, which enabled prospective behaviour analysis.[12] However, the bias towards females in the pen-and-paper Study 2 became a bias towards males in the Web Study 3, perhaps reflecting the types of participating departments (e.g. engineering, maths). Despite this, a web designed questionnaire was considered an appropriate medium for the next study – an intervention designed to increase regret salience that did not depend solely on subtle measures.

[12] It may have been noted from the reported Ns in the correlations from Study 3 that not all measures were completed by all participants: this was caused by a technical error, which was addressed in future web studies.

Chapter 4: Study 4 - Increasing Regret Salience: Intervening to Motivate Future Behaviour

4.1 Aims and Objectives

Studies 2 and 3 explored the additive value to the TPB of anticipated action regret regarding IHBs and anticipated inaction regret regarding DBBs, and Study 3 considered moderating effects on the intention-behaviour relationship. However, it was evident that the design used in either study failed to simultaneously consider both types of anticipated regret for each of the behaviours, that there were unequal numbers of behaviours for the two types of behaviour, and that the focus was just on measured variables to the exclusion of any manipulation. Study 4 set out to address these criticisms, with the aim of intervening to motivate future behaviour using anticipated regret to increase regret salience. In addition, the impact of temporal stability of intentions was explored in regard to anticipated regret's association with the intention-behaviour relationship.

4.2 Intervening to Increase Regret Salience

As outlined in Chapter 1, section 1.4.3, it is logical to assume that anticipated regret by its very nature will only feature in situations where future regret is expected (Janis & Mann, 1977). Although studies have shown that regret salience can be manipulated so as to affect behaviour (e.g. Simonson, 1992), it has been noted that research specifically using the TPB in this way is limited, although promising (Abraham & Sheeran, 2004; Sheeran & Orbell, 1999). Indeed, there is a dearth of intervention studies in general in TPB research (Hardeman et al., 2002), despite the theory's popularity in applied research. Given that the main role of the TPB is in "understanding" and "predicting" behaviour (Ajzen & Fishbein, 1980), it seems a natural progression to want to be able to change certain behaviours in

some way, i.e. either increasing the performance of 'positive' behaviours or decreasing the performance of 'negative' ones. In this regard, Ajzen and Fishbein (2005) assert that the TPB can be assessed by the investigation of interventions, such that the successful modification of the predictors of intentions and/or behaviour should lead to a change in those intentions and/or behaviours. They even suggest that if this is not the case, then the theory can be falsified – this conclusion is perhaps a little harsh, given that it is probable that all the influences on intentions and/or behaviour cannot possibly be measured and monitored (from Conner & Sparks, 2005).

This study sought to tackle this void and further explore the use of interventions in more detail. In developing interventions in the TPB, there are generally two stages (c.f. Sutton, 2002):

a) determining which variables are to be targeted – these must account for some of the variance in intention or behaviour;
b) identifying the message content by either identifying new salient beliefs that the recipient is unaware of, or targeting and changing existing salient beliefs.

So, in regard to (a) above, the variable to be targeted was anticipated regret, which although not a traditional TPB variable, is arguably one which should be included and has been shown to account for some of the variance in intentions at least (e.g. Studies 2 and 3). With regard to (b) above, the aim here was not to change people's *beliefs* per se about the target behaviour, but rather to increase *regret salience* in the hope that this would alter intentions and subsequent behaviour: indeed, this causal sequence should reflect the essence of the TPB, which is sequential at heart. It could be argued that this again perpetuates the attitude/affect argument, in that really the desire is to change peoples' attitudes which will then have an impact on intentions and behaviour: the counter argument

could be that regret is a such a unique emotion, that it does not even fall under the umbrella of 'experiential' component of attitude – as found in Studies 2 and 3 - and that it is possible to increase regret salience and so change intentions and behaviour *without necessarily* impacting on attitudes. Indeed, as noted earlier, it is suggested that the use of AR is especially appropriate for behaviours where discrepancies exist between evaluations about the behaviour and anticipated post-behavioural regret.

Hardeman et al (2002) noted in their review of intervention studies that many did not test the effectiveness of interventions in changing targeted cognitions before examining impacts on intentions and behaviour: they also berated the poor design of many interventions in that they "were seldom explicitly developed to target specific components of the model" (p.149). Study 4 detailed in this chapter set out to account for any such potential criticisms by taking these points into consideration during the design: specifically, the targeted cognition was anticipated regret, which was measured over all conditions, and the specific components of the model targeted were intentions and/or behaviour. Furthermore, as well as including control and 'increased regret salience' conditions, another condition was also explored – motivation to increase behaviour performance. This was included to counter potential criticisms that any effects may not be from anticipating regret per se, but rather just from encouraging people to refrain from or to carry out certain behaviours. The intervention was based on the provision of information about behaviours and was inspired by the work of de Nooiger et al (2004), who had designed an intervention study to encourage early detection behaviours for cancer: provision of information regarding the target behaviour was associated with an increase in reports of regret, intention and subsequent behaviour. Consequently, in this study participants completed one of three possible types of questionnaire which differed incrementally in the explanation provided

under the title for each behaviour. It was hoped that rather than just claiming that the use of anticipated regret measures can change peoples' intentions and behaviour, it would be possible to offer a means as to how this can be achieved, so that the concept of 'applied research' can truly be embraced.

4.3 Intention Stability

This study also examined the moderating role of the temporal stability of intentions in the TPB, where the temporal stability of intentions (i.e. 'intention stability') increases intention-behaviour consistency. As Ajzen (1996) argues, ". . . to obtain accurate predictions of behavior, intentions . . . must remain reasonably stable over time until the behavior is performed" (p. 389). It is logical that intentions can vary over time, and that measures prior to performance of behaviour may differ from measures taken after performance dependent on any new information or unforeseen obstacles in the intervening period. Indeed, if intentions do change prior to performance, then there is a reduction in the predictive utility of the intention construct (Ajzen, 1991). The moderating role of intention stability has been demonstrated across behaviours such as health screening and eating a low fat diet (Conner, Sheeran, Norman, & Armitage, 2000), studying over the winter vacation (Sheeran, Orbell, & Trafimow, 1999) and healthy eating (Conner, Norman, & Bell, 2002). Recently, and more relevantly, Abraham and Sheeran (2003) and Sheeran and Abraham (2003) looked at exercise behaviour and found that moderation of the intention-behaviour relationship by AR was mediated by intention stability and suggest that "AR promotes action by rendering intentions more stable" (Abraham & Sheeran, 2003, p. 507). They also suggest that focusing on AR could promote a person in sustaining and acting on their intentions. Testing intention stability, therefore, seemed particularly appropriate in this study, which was explicitly designed to increase regret salience.

4.4 Synopsis of Study Design

Study 3 identified a number of behaviours as being either immediately hedonic or distally beneficial, and being matched with either anticipated action regret or anticipated inaction regret respectively. Building on that study, an equal number of IHBs and DBBs were selected to be included in this subsequent study: the three IHBs (drinking too much, spending too much, impulsive communications) were retained and three DBBs were selected from the six used in the previous study (i.e. regular exercise, being organised for work, eating healthily) – two of the original DBBs were considered ambiguous in that they could also be considered risky (i.e., approaching someone new and trying an adventurous activity) so these were not selected, and being organised for work produced the largest R^2 change in the variance explained in intentions so this was retained in favour of working hard. Moreover, both anticipated regret terms (inaction and action) were included for each behaviour. The same constructs were used as those from the previous study. A longitudinal web survey design was employed with prospective behaviour measured at two time points separated by four and six weeks respectively, and prospective intention measured at two time points (Time 1 and Time 3), separated by 10 weeks. Participants took part in one of three possible conditions: control (C), intervention to increase performance motivation (M) or intervention to increase regret salience (I), which only differed in the explanation provided before the questionnaire section (see section 4.5.2 for details).

4.5 Method

4.5.1 Sample, Design and Procedure

Contact was made with various departments at eight U.K. universities (Bristol, Brunnel, Cardiff, Derby, Nottingham, Southampton, Sussex and York: see appendix 4.1 for a list of participating departments per university) – these were not the same as those used in the previous study. They were asked to circulate an email to students inviting them to log on to a web site, and complete and submit an on-line, prospective questionnaire. The web site was designed so that the three conditions were systematically assigned as each participant logged on, to ensure equal numbers between conditions. A total of 885 participants (561 female, 324 male; age range = 18-62 years) completed a Time 1 questionnaire, which included details of a contact email address for entry into a prize draw and to enable re-contact for Time 2 and Time 3. There were 275 participants in the Intervention Group (92 male; age 18-30 years: 183 female; 18-27 years); 301 in the Motivation Group (114 male; age 18-56 years: 187 female; age 18-62 years); and 309 in the Control Group (118 male; age 18-48 years: 191 female; age 18-41 years). At Time 1 they were told the questionnaire related to research being carried out into feelings and behaviour. Four weeks later, these participants were sent another email asking them to complete a Time 2 behaviour measure questionnaire; again those who replied were entered into a prize draw. A total of 437 participants (i.e. 49% of the original sample) completed a Time 2 questionnaire (150 male; 287 female; age range 18 – 62 years): there were 134 in the Intervention Group (40 male; age 18-29 years: 94 female; age 18-27 years), 151 in the Motivation Group (52 male; age 18-28 years: 99 females; age 18-62 years) and 152 in the Control Group (58 male; 18-48 years: 94 female; age 18-41 years). Six weeks after the Time 2 questionnaire (i.e. 10 weeks from the Time 1 questionnaire), those participants who completed the Time 2 questionnaire

were sent the final email asking them to complete the Time 3 questionnaire, again with the lure of a prize draw. A total of 417 participants (i.e. 47% of the original sample and 95% of the Time 2 sample) completed this questionnaire (136 male; 281 female; age range = 18-62 years). There were 131 in the Intervention Group (41 male; age 18-29 years: 90 female; age 18-27 years), 137 in the Motivation Group (43 male; age 18-23 years: female 94; age 18-62 years) and 149 in the Control Group (52 male; age 18-27 years: 97 female; age 18-41 years). The web questionnaires were designed so that participants had to complete all sections before submission and also so that they could not complete the Time 2 questionnaire until four weeks had elapsed from completion of the Time 1 questionnaire, or for the Time 3 questionnaire six weeks had elapsed from completion of the Time 2 questionnaire. A debriefing note was provided at the end of the Time 3 questionnaire: contact details for the researcher were always provided so that those not staying into the end could also be debriefed.

4.5.2 Questionnaires

The Time 1 questionnaire included measures of the Theory of Planned Behaviour in relation to six separate behaviours, which were based upon standard wording recommended for measuring components of the TPB (Ajzen, 1991; Conner & Sparks, 1996). The time frame used was four weeks. Three of the behaviours were IHBs (drinking too much, spending too much, making impulsive communications) and three were DBBs (regular exercise, being organised, eating healthily). A separate page was used for each behaviour, and the order of the two types of behaviour was systematically varied as follows: over-drinking, exercising, over-spending, being organised, eating healthily, and impulsive communications. Across the six behaviours the same wording was used to tap each construct; reverse coding of responses were carried out where appropriate. Furthermore,

the items appeared in the same order for all the behaviours: as in Study 3, the regret item appeared before the intention item in all cases. In view of the results from Abraham and Sheeran (2003; 2004) previously detailed, ideally it would have been preferable to have another condition where the regret item appeared after the intention item and a further condition where there was no regret item at all: however, given that there were three conditions already, this would have made a rather complex design with multiple behaviours, and a decision was made not to complicate the study in this way. The questionnaires only differed in the information provided at the top of each page for each behaviour (before completion), providing three conditions which the participants were randomly assigned to on logging on to the web side. The differences were incremental as detailed below:-

(a) the control group (C) were given only a brief definition of each behaviour in question - (e.g., *The following questions relate to doing regular exercise over the next 4 weeks. 'Regular' means at least five 20-minute sessions a week of an exercise such as swimming, aerobics, cycling, running*);[13]

(b) the motivation group (M) also had this information, but were further provided with an extra paragraph comprising an explanation designed to discourage IHBs and encourage DBBs; this was achieved by making explicit the time differential on IHBs (which feel good at the time but have future detrimental consequences) and on DBBs (which may be onerous to perform in the short-term but have future benefits). Participants were thus encouraged to extend their time perspective and think ahead to the consequences of performing the behaviour (IHBs) or not performing it (DBBs) in a factual way - *(e.g., The following questions relate to doing regular*

[13] The frequency determined by a previous exercise study (Jackson et al., 2003) was used for this study.

exercise over the next 4 weeks. 'Regular' means at least five 20-minute sessions a week of an exercise such as swimming, aerobics, cycling, running.

Evidence shows that exercise is beneficial to an individual's health. In the long term, regular exercise has been shown to prevent coronary heart disease, which is caused by the build up of fatty deposits in artery walls; exercise decreases levels of cholesterol and fat in the bloodstream and lowers blood pressure, which in turn slows down the build up of those fatty deposits. In the short term, regular exercise is good both physically and psychologically. So, although doing exercise may seem hard work initially, if you make the time and effort, the rewards will be really worthwhile);

(c) the intervention group (I - increasing regret salience) also received the information in (a) and (b) above, but in addition were provided with a further paragraph personalising the behaviour, by inviting the participants to *imagine* a scenario of either having performed the behaviour (IHBs) or not (DBBs), the consequences of that behaviour, suggesting that they may wish they had not performed it (IHBs) or that they had (DBBs), and finally asking them to consider thinking about how they would feel about this situation, explicitly suggesting that they may experience inaction regret (DBBs) or action regret (IHBs) - (e.g., *The following questions relate to doing regular exercise over the next 4 weeks. 'Regular' means at least five 20-minute sessions a week of an exercise such as swimming, aerobics, cycling, running.*

Evidence shows that exercise is beneficial to an individual's health. In the long term, regular exercise has been shown to prevent coronary heart disease, which is

caused by the build up of fatty deposits in artery walls; exercise decreases levels of cholesterol and fat in the bloodstream and lowers blood pressure, which in turn slows down the build up of those fatty deposits. In the short term, regular exercise is good both physically and psychologically. So, although doing exercise may seem hard work initially, if you make the time and effort, the rewards will be really worthwhile.

Now imagine you've not been exercising as much as you should, in fact you've been a bit of a couch potato - finding the time to go to the gym has been hard and you've managed to even get a car ride into university. But you feel really sluggish, everything is an effort, and your body could do with toning up. You really wish you had exercised more regularly and regret not making the effort. Think about how these things might make you feel).

These questionnaires had been piloted twice: first on a second year undergraduate class (N = 137) and secondly on a third year undergraduate class (N = 60) in order to refine the wording to achieve the desired aims, i.e. incremental differences between conditions in positive intentions to perform DBBs accompanied by positive anticipated inaction regret, and negative intentions to perform IHBs accompanied by positive anticipated action regret, with the strongest effects being observed in the intervention, followed by the motivation, and finally the control conditions. This was accomplished by considering the mean intention and anticipated regret scores over conditions. So to provide an example of some of the changes made, it was observed that the mean intention and anticipated inaction regret scores for 'exercise behaviour' in the first pilot study were higher in the control condition compared to the other two conditions: on looking at the wording used in the first paragraph, one of the examples of exercise had been "brisk walking". It was thought that this may

have been too easy a target behaviour for any differential to have been achieved between conditions, and for the second pilot study this was replaced by 'cycling and running': the means for intention and anticipated action regret now reflected the desired incremental pattern. Likewise for 'being organised for work': in the first pilot study higher scores were again evident in the control condition, with not much difference between the two experimental conditions. On looking at the wording in the first paragraph, the definition may have been too vague ("completing essays on time, going to the library") so the difficulty of being organised was stressed in the second pilot study ("writing essays a couple of weeks before they are even due, going to the library every day to source and read relevant or interesting material, being prepared to get the most out of lectures by reading several articles related to the topics being addressed in those lectures"). Furthermore, the motivation paragraph had included mention of revising for exams in good time, which had also been included in the intervention paragraph: to try and further differentiate between these two conditions, in the second pilot study, reference to exams was left only in the intervention paragraph. Again, the results from this second pilot study showed that differentiation between the mean intention and anticipated regret scores had been achieved.

Respondents were initially required to indicate their age, date of birth and first three initials of their mother's first name; the latter two entries enabled participants to be matched up between Time 1, 2 and 3.

4.5.2.1 Time 1 Questionnaire

The first questionnaire (Appendix 4.2, copy of Intervention condition only as this contains all relevant information) contained the following measures:-

Intentions were assessed in regard to each of the six behaviours with one item (e.g., 'I intend to be organised for work during the next 4 weeks), assessed on strongly disagree-

strongly agree response formats and scored 1 to 5, with higher scores indicating stronger intentions to perform the behaviour.

Subjective Norm (SN) was assessed with one item in regard to each of the six behaviours, on strongly disagree-strongly agree response formats (e.g. 'People who are important to me think that I should be organised for work during the next 4 weeks') all scored 1 to 5 with higher scores indicating more pressure to perform the behaviour.[14]

Perceived Behavioural Control (PBC) was assessed with one item in regard to each of the six behaviours, on strongly disagree-strongly agree response formats (e.g., 'I am in control of being organised for work during the next 4 weeks) all scored 1 to 5, with higher scores indicating more control over performing DBBs or not performing IHBs.

Attitudes were assessed in regard to each of the six behaviours as the mean of three (in some cases two, see Table 4.1) item semantic differential scales (e.g., 'For me, being organised for work during the next 4 weeks would be'; bad-good; unpleasant-pleasant; foolish-wise) all scored 1 to 5 with higher scores indicating more positive attitudes. Cronbach's alpha was calculated for each behaviour across conditions and these are detailed in Table 4.1.[15] Although not specifically designed to consider this, as well as using this composite attitude scale it was also possible to consider the experiential (i.e. pleasant/unpleasant) and instrumental (i.e. wise/foolish) components of attitude separately, as at least one item of each construct was available: this allowed the value of regret to the TPB to be tested whilst controlling for these particular attitude constructs.

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[14] In line with the recommendations made in Chapter 3, high scores on intentions and SN were kept consistent in meaning for both IHBs and DBBs for ease of interpretation. However, for PBC it seemed more appropriate to retain the differentiation.

[15] Alphas were also checked per condition: the results did not differ significantly at all.

Table 4.1. Cronbach's Alpha for attitude measure for each behaviour (N = 885)

Behaviour	Final Cronbach's Alpha	Items Deleted for Improvement
Drinking too much	.80	N/A
Spending too much	.60	Unpleasant/pleasant
Impulsive communications	.87	N/A
Regular exercise	Only one item used	Unpleasant/pleasant; foolish/wise
Being organised for work	.75	Unpleasant/pleasant
Eating healthily	.67	Unpleasant/pleasant

In addition, for each behaviour the questionnaire included regret measures to tap into both anticipated action and inaction regret (the items were separated by a few other items each time), and a past behaviour measure:[16]

Anticipated Action Regret was assessed with one item in regard to each of the behaviours assessed on strongly disagree-strongly agree response formats (e.g., 'If I did have a binge drinking session during the next 4 weeks I would regret it) all scored 1 to 5 with higher scores indicating more action regret.

Anticipated Inaction Regret was assessed with one item in regard to each of the behaviours assessed on strongly disagree-strongly agree response formats (e.g., 'If I did not have a binge drinking session during the next 4 weeks I would regret it) all scored 1 to 5 with higher scores indicating more inaction regret.

Past Behaviour was assessed with one item in regard to each of the behaviours on never-frequently response formats (e.g., 'In the past, I have had binge drinking sessions) all scored 1 to 5 with higher scores indicating behaviours frequently performed in the past.

[16] Additional constructs were included (ambivalence, autonomous and controlled personality, past regret: all measured with single items) but various analysis did not reveal a significant or clear role for any of them and they are, therefore, not reported.

4.5.2.2 Time 2 Questionnaire (Behaviour 1)

The second questionnaire (not attached in the interests of space) initially detailed the definition (i.e. control) paragraph from Time 1 for each behaviour to refresh participants' memories: the behaviours appeared in the same order as the Time 1 questionnaire and contained the following measure (along with other items not reported here):-

Self-reported behaviour was assessed with one item in regard to each of the six behaviours (e.g., 'I engaged in "binge drinking" during the past 4 weeks) on never-frequently response formats scored 1 to 5, with high scores indicating a frequently performed behaviour.

4.5.2.3 Time 3 Questionnaire (Behaviour 2)

The third questionnaire (not attached) took the same format as the Time 2 questionnaire and contained the following measures (along with others not reported here):-

Self-reported behaviour assessed as at Time 2.

Future intention assessed with one item per behaviour (e.g., 'I intend to engage in "binge drinking" during the next couple of months) on strongly disagree-strongly agree response formats, with high scores indicating a strong future intention to perform the behaviour.

The latter item was included to enable assessment of intention stability.[17]

4.5.2.4 Measurement of Intention Stability

Conner et al (2000) recommend using four indices to assess intention stability, i.e. within-participants correlation between intention items at Time 1 and Time 2, the sum of the absolute differences between intention items at the two time points, the absolute difference between the sum of intention items at both time points and, finally, the number of items that exhibited change. For the purposes of this analysis, however, it was

[17] Measures of intention were also to be included in the second questionnaire, but unfortunately a flaw in the web design lead to the failure to collect this data.

considered adequate to employ only one index of intention stability – the absolute difference between the sum of intention items at Time 1 and Time 3. Ideally, measures of intention from the T2 questionnaire should have been used to predict behaviour at T3 as intention stability should not be computed from measures taken before and after the behaviour is performed: this avoids the potential criticism that the measure may be subject to "self-presentation or consistency biases" (c.f. Sheeran, 2002, p. 17); however, since none were taken at this time point, intention measures from T1 were used.

4.6 Hypotheses

To summarize, applications of the TPB to the prediction of intentions and performance of various behaviours are reported. The additional variables of anticipated action and inaction regret were also included. Participants completed one of three different types of questionnaire which differed incrementally in the description provided under each behaviour heading. It was predicted that:-

(i) anticipated action regret would significantly add to predictions of intentions to perform IHBs over and above the TPB variables, and that anticipated inaction regret would significantly add to predictions of intentions to perform DBBs over and above the TPB variables; this effect would be evident even after the addition of past behaviour, irrespective of condition;

(ii) there would be an incremental difference in the means in intentions and anticipated regret over the conditions as follows: for IHBs, intentions to perform them should decrease whereas anticipated action regret should increase from the control to the intervention conditions; in contrast for DBBs intentions to perform them should increase as should anticipated inaction regret from the control to the intervention conditions;

(iii) anticipated regret would moderate the intention-behaviour relationship, and this effect would be stronger in the regret intervention condition than in the control or motivation conditions;

(iv) Intention stability would moderate the intention-behaviour relationship;

(v) Intention stability would mediate the AR moderator effect.

4.7 Results – Time 1 Questionnaire

4.7.1 Inaction Versus Action Regret – Inclusion Criteria in Subsequent Analysis

In the first instance, two t-tests were carried out to determine if there was a difference between anticipated action and inaction regret for both IHBs and DBBs over conditions generally. Regarding anticipated *action regret*, there was a significant difference between the two types of behaviour ($t(884) = 81.22$, $p < .001$) with anticipated action regret being cited more for IHBs than for DBBs (IHBs: $M = 3.76$, $SD = .71$; DBBs: $M = 1.33$, $SD = .50$). Furthermore, a bivariate correlation of $r = -.060$ (n.s.) shows that there is no significant relationship between IHB anticipated action regret and DBB anticipated action regret. Regarding anticipated *inaction regret*, again there was a significant difference between the two types of behaviour ($t(884) = -74.03$, $p < .001$) with anticipated inaction regret being cited more for DBBs than IHBs (DBBs: $M = 4.93$, $SD = .77$; IHBs: $M = 1.59$, $SD = .59$). Again, a bivariate correlation of $r = -.020$ (n.s.) shows there was no significant relationship between IHB anticipated inaction regret and DBB anticipated inaction regret. A final bivariate correlation between IHB action regret and IHB inaction regret revealed an $r = -.378$ ($p < .001$), whilst DBB anticipated action regret and DBB anticipated inaction regret revealed an $r = -.196$ ($p < .001$): this shows that there is an inverse relationship between each construct per behaviour type, as one is obviously the contra-position of the other. So, these results supported the inclusion of the regret term most appropriate for the

type of behaviour in subsequent analyses (i.e., anticipated action regret for IHBs and anticipated inaction regret for DBBs).

4.7.2 Between-Subjects Analyses to Predict Intentions – Descriptive Analysis

Means and standard deviations for all study variables over all the behaviours were calculated. Table 4.2 details those for attitude, SN, PBC and past behaviour for both behaviour types over condition. For clarity, Table 4.3 details those just for intention and anticipated regret for both behaviour types over each condition, whilst Table 4.4 details these for intention and anticipated regret over each behaviour per condition. Intercorrelations were also calculated per condition per behaviour, but due to space limitations these are not reported in detail: however, for IHBs all correlations with intention were significant and positive, apart from PBC and anticipated action regret which were negative[18]; for DBBs, all correlations with intention were significant and positive.

Table 4.2. Means and SDs for attitude, SN, PBC and past behaviour over conditions and behaviour types: Control N = 309, Motivation N = 301, Intervention N = 275

Variable	BEHAVIOUR TYPE, CONDITION, MEANS AND STANDARD DEVIATIONS											
	Immediate Hedonic Behaviours						Distal Benefit Behaviours					
	Control		Motivation		Intervention		Control		Motivation		Intervention	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Attitude	2.12	.58	2.14	.58	1.93	.54	4.75	.39	4.80	.31	4.73	.44
SN	2.05	.71	2.07	.72	1.97	.68	3.87	.77	3.92	.72	3.93	.75
PBC	4.05	.78	4.16	.69	4.11	.69	4.08	.73	4.21	.69	4.18	.66
PB	3.34	.81	3.31	.79	3.28	.79	3.80	.73	3.90	.73	3.78	.71

[18] The negative value for anticipated action regret is in contrast to the positive value obtained in Studies 2 and 3; however, it will be noted that intentions in Studies 2 and 3 were assessed in terms of intentions *not to engage* in IHBs, whereas in this study, measures of intentions were standardised across IHBs and DBBs so that intentions were assessed in terms of *engaging* in the activity. This, therefore, accounts for the discrepancy regarding negative/positive values between the studies.

Regarding the results in Table 4.2 a one-way ANOVA revealed a significant difference in condition only for the attitude measure for IHBs: $F(2, 882) = 11.86$, $p < .001$. A post hoc Tukey revealed that there were significant differences in the expected direction between the control and intervention groups, with the means showing that those in the control condition had a more positive attitude ($M = 2.12$) towards IHBs in general than the intervention group ($M = 1.93$), and between the motivation and intervention groups, with the means showing that those in the intervention condition had more negative attitudes than those in the motivation condition ($M = 2.14$): this signposts a possible effect of the manipulation in the expected direction for IHB attitudes and to some extent for DBB attitudes, in that at least the means in the motivation condition were higher (although not significantly) than the control condition. It was claimed earlier that it was possible to alter intentions and behaviour using regret salience without necessarily impacting on attitudes; these results suggest that attitudes have indeed been affected; however, the real test will be the regression analyses in determining which variable – anticipated regret or attitude - explains more variance. In any event, there is a disparity in attitudes towards each behaviour type with more positive evaluations of DBBs in contrast to the negative evaluations of IHBs. Finally, of interest is the fairly strong perceived social pressure to perform DBBs in contrast the lower pressure perceived for IHBs, and the moderately high frequency of past performance regarding DBBs in comparison to the lower frequency of past performance regarding IHBs.

The results detailed in Table 4.3 reveal a general trend for intentions and anticipated regret in the predicted direction irrespective of condition, in that there is a fairly low intention to perform the IHBs accompanied by a fairly strong anticipated action regret, and a fairly strong intention to perform the DBBs accompanied by a fairly strong anticipated inaction regret. As already mentioned, there was a consistent positive attitude towards

Table 4.3. Means and SDs for intentions re. IHBs and DBBs and appropriate regret terms over conditions

VARIABLE	A) MEANS AND SDs OVER CONDITIONS					
	Control (N = 309)		Motivation (N = 301)		Intervention (N = 275)	
	Mean	SD	Mean	SD	Mean	SD
IHB Intention	2.17	.80	2.11	.79	2.03	.76
DBB Intention	3.96	.73	4.11	.68	4.03	.69
Anticipated Action Regret (IHBs)	3.68	.74	3.71	.72	3.91	.65
Anticipated Inaction Regret (DBBs)	3.92	.78	4.98	.78	4.08	.73

DBBs in contrast to the negative attitude towards IHBs: this is of interest as van der Pligt et al (1998) argue that regret is especially important in behaviours where discrepancies exist between evaluations of the behaviour and anticipated regret about the behaviour; it would appear that in this study at least, there is no such discrepancy between the two as IHBs are negatively evaluated in any event and anticipated action regret is strong, whilst DBBs are positively evaluated and anticipated inaction regret is strong.

An ANOVA was carried out to see if there were any differences for each of these variables between the conditions:

- there was a marginal difference regarding IHB intentions ($F(2, 882) = 2.57$, $p = .08$); a post hoc Tukey HSD indicated that there was a marginal difference between the Intervention and Control conditions ($p = .06$), with the means showing that intentions to perform IHBs were lowest in the Intervention condition;
- there was a significant difference regarding DBB intentions ($F(2, 882) = 3.12$, $p = .05$); a post hoc Tukey HSD indicated that there a significant difference between

the Motivation and Control conditions ($p < .05$), with the means showing that intentions to perform DBBs were highest in the Motivation condition;

- there was a significant difference between anticipated action regret for IHBs over conditions ($F (2, 882) = 9.17, p < .001$); a post hoc Tukey HSD indicated a significant difference between both the Intervention and Motivation condition ($p < .01$) and the Intervention and Control condition ($p < .001$), with the means showing that anticipated action regret was highest in the Intervention condition;
- there was a significant difference between anticipated inaction regret for DBBs over conditions ($F (2, 882) = 4.17, p < .05$); a post hoc Tukey HSD indicated a significant difference between the Intervention and Control conditions ($p < .05$) and the Motivation and Control conditions ($p < .05$), with the means showing that anticipated inaction regret was highest in the Motivation condition. So, it seems that both the intervention and motivation scores for anticipated inaction regret were similar, but both were higher than the control scores.

These results reveal a clear pattern for IHBs in that the lowest intentions to perform these behaviours generally and the highest anticipated action regret are seen in the intervention condition; the results are less clear for DBBs in that the highest intentions to perform them and the most anticipated inaction regret are seen in the motivation condition rather than the intervention condition. However, so far these results support the hypothesis set out in 4.5 (ii) in that there are clear differences from the control condition. The next table details each behaviour individually over the conditions regarding intention and anticipated regret (Table 4.4).

Table 4.4. Means and SDs for each behaviour over conditions for intention and appropriate regret term (N = 275 Intervention; 301 Motivation; 309 Control) – Time 1 Questionnaire

VARIABLE	INTENTION						APPROPRIATE REGRET TERM					
	Condition						Condition					
	I		M		C		I		M		C	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
DRINKING	2.47	1.40	2.62	1.42	2.60	1.37	3.44	1.28	3.26	1.29	3.20	1.30
SPENDING	1.72	.97	1.67	.93	1.82	1.00	4.24	.93	4.17	.89	4.09	.96
IMPULSIVE COMMs	1.89	.99	2.02	.98	2.10	1.01	4.07	1.01	3.71	1.01	3.75	.97
EXERCISE	3.74	1.17	3.96	1.14	3.79	1.22	3.93	1.13	3.92	1.17	3.76	1.22
EATING	4.06	.89	4.00	.94	3.87	.98	3.81	1.18	3.87	1.13	3.67	1.18
BEING ORGANISED	4.30	.84	4.36	.70	4.23	.87	4.50	.79	4.45	.85	4.34	.91

I = Intervention; M = Motivation; C = Control

A MANOVA was then performed to see specifically if there were any differences amongst these variables according to each behaviour; this time, both anticipated regret terms were included in the analyses to further validate the use of the most appropriate regret term (although only the results for the appropriate regret terms are reported). There were a number of significant differences between the conditions for certain behaviours:

a) intentions to **eat healthily** ($F(2, 882) = 3.17$, $p < .05$). The means show that stronger intentions were indicated in the intervention group (Mean = 4.06, SD = .89) compared to the motivation group (Mean = 4.00, SD = .94) or the control group (Mean = 3.87, SD = .98). A post hoc Tukey HSD indicated that there were significant differences between the intervention and control groups ($p < .05$);

b) intentions to make **impulsive communications** ($F(2, 882) = 3.21$, $p < .05$). The means show that there were lower intentions in the intervention group (Mean = 1.89, SD = .99) than in the motivation group (Mean = 2.02, SD = .98) and the control group (Mean = 2.10, SD = 1.07). A post hoc Tukey HSD indicated that there were significant differences between the intervention and control groups ($p < .05$).

c) anticipated action regret about making **impulsive communications** ($F(2, 882) = 10.76$, $p < .001$). The means show that stronger anticipated action regret was indicated in the intervention group (Mean = 4.07, SD = 1.01) compared to the motivation group (Mean = 3.71, SD = 1.10) and the control group (Mean = 3.75, SD = .97). A post hoc Tukey HSD indicated that there significant differences between the intervention and control groups ($p < .01$) and the intervention and motivation group ($p < .001$).

d) anticipated inaction regret about making **impulsive communications** ($F(2, 882) = 3.10$, $p = .05$). The means show that less anticipated inaction regret was reported in the intervention group (Mean = 1.67, SD = .90) compared to the motivation group (Mean = 1.77, SD = .90) and the control group (Mean = 1.85, SD = .99); a post hoc Tukey HSD was not carried out because it was

evident that anticipated action regret was the most appropriate regret term for this IHB.

These results provide some evidence in support of the manipulation being in the predicted direction for both intentions and the appropriate regret term for each behaviour type, for certain behaviours. Nevertheless, it is of interest that these two particular behaviours appeared last in the questionnaire, perhaps suggesting an order effect. However, it is worth noting that there were marginally significant results (i.e., $.05 < p < .10$) for anticipated action regret regarding drinking too much, and anticipated inaction regret over being organized for work and eating healthily; also there were marginally significant results for intentions to exercise, all in the predicted direction (i.e., differences from the control): these behaviours appeared in the first part of the questionnaire, mitigating to some extent the order effect argument.

4.7.3 Between-Subjects Analyses to Predict Intentions – Regression Analysis

A 3-step hierarchical regression was conducted to predict intentions in the first instance over the three conditions: step 1 looked at the TPB variables (attitudes, SN and PBC); step 2 included the appropriate regret term item (i.e. anticipated action regret for IHBs and anticipated inaction regret for DBBs); step 3 included past behaviour. Table 4.5 summarises the beta weights from the regression analyses from step 3 for IHBs and Table 4.6 summarises those for DBBs.

Table 4.5. Summary of Hierarchical regressions across IHBs to explain variance in intentions: Step 3, including all variables (N = 275 Intervention: 301 Motivation: 309 Control)

VARIABLES	INTENTIONS : BETA WEIGHTS OVER 3 CONDITIONS FOR IHBs								
	Drinking too much			Spending too much			Impulsive Communications		
	I	M	C	I	M	C	I	M	C
Attitude	.377***	.261***	.381***	.388***	.237***	.310***	.222***	.251***	.299***
SN	.100**	.213***	.126**	.145**	.177**	.147**	.209***	.289***	.368***
PBC	-.121**	-.066	-.045	-.082	-.227***	-.110*	-.037	-.084	.007
Regret Term	-.279***	-.316***	-.201***	-.129*	-.142*	-.087	-.208**	-.097	-.149***
Past Beh.	.177***	.195***	.235***	.154**	.161**	.223***	.290***	.158**	.156***
R^2	.66	.67	.63	.30	.24	.27	.41	.35	.51
% R^2 Change from step 2 to step 3 (PB +)	2%***	2%***	3%***	2%**	2%**	4%***	8%***	2%**	2%***
% R^2 Change from step 1 to step 2 (AR +)	5%***	4%***	3%***	1%*	2%*	1%	2%**	1%	2%***

*** p < .001; ** p < .01: * p < .05 : I = Intervention: M = Motivation: C = Control

It can be seen that these are interesting results in that low anticipated action regret[19] significantly added to the variance explained in intentions to perform IHBs, apart from the control condition in spending too much and the motivation condition in impulsive communications, where there was no significant contribution of AR. Although positive attitudes towards IHBs were consistently and significantly predictive of intentions across all conditions, these results demonstrate that the addition of anticipated regret to the model did in general add to the predictive validity of the model, but in some instances attitudes were more important (e.g. spending, control condition). Indeed, the pattern for strength of Betas reflects the correlations (not reported) for IHBs in that the correlation for intention-

[19] As mentioned regarding the correlation results, intentions were assessed in Study 4 in terms of *performing the behaviour* for both IHBs and DBBs, whereas in Studies 2 and 3 intentions were assessed in terms of *not performing* IHBs, but *performing* DBBs; again, this accounts for the discrepancies between studies regarding the negative/positive values of anticipated regret.

attitude was strong and positive compared to the correlation for intention-anticipated action regret which was not as strong but negative, and both correlations were strongest in the manipulations compared to the control (apart from impulsive communications, where the control condition produced the strongest r's).

The results on the following table (Table 4.6) are clearer than those previously, in that they show that anticipated inaction regret made a significant and additional contribution to

Table 4.6. Summary of Hierarchical regressions across DBBs to explain variance in intentions: Step 3, including all variables (N as detailed in Table 4.5)

VARIABLES	INTENTIONS : BETA WEIGHTS OVER 3 CONDITIONS FOR DBBs								
	Exercising Regularly			Being Organised			Eating Healthily		
	I	M	C	I	M	C	I	M	C
Attitude	.015	.150***	.077*	.181**	.047	.167**	.073	.164***	.176***
SN	.098*	.001	.016	.100	.177**	.159**	.124**	-.048	.003
PBC	.112*	.165***	.051**	.027	.172***	.159**	.067	.147**	.157***
Regret Term	.531***	.515***	.406***	.258***	.221***	.308***	.336***	.404***	.356***
Past Beh.	.210***	.179***	.320***	.332***	.268***	.231***	.385***	.353***	.307***
R^2	.50	.57	.51	.32	.25	.39	.46	.55	.50
% R^2 Change from step 2 to step 3 (PB +)	4%***	2%***	8%***	9%***	6%***	5%***	12%***	10%***	8%***
% R^2 Change from step 1 to step 2 (IR +)	26%***	28%***	19%***	12%***	5%***	10%***	14%***	20%***	13%***

*** p < .001; ** p < .01: * p < .05 : I = Intervention: M = Motivation: C = Control

the amount of variance explained in DBBs independent of condition over all behaviours; indeed it was the most important contributor for *exercise* over all conditions, the second most important in the intervention and motivation condition and most important contributor in the control condition for *being organised*, and was the most important contributor in the motivation and control conditions and second most important in the intervention condition

for *eating healthily*. It is evident that for both behaviour types, past behaviour was consistently a significant contributor, but that its addition to the model did not detract from anticipated regret's effect. Furthermore, this time attitude was not consistently a significant contributor, and even when it was, anticipated regret was by far the most important variable.

For comparison purposes, it will be noted that the R^2 change percentages have also been included in the tables, both for the difference from step 2 to step 3 when past behaviour was added to the model, and also for the difference from step 1 to step 2, when anticipated regret was added to the model. It is evident from these figures that the addition of anticipated regret significantly added to the variance explained above that from the traditional constructs, and that it was particularly important for drinking too much (where the pattern suggests a clear incremental increase from the control, through to the motivation and intervention conditions), for being organised (with the intervention condition showing the highest increase) and eating healthily (with the motivation condition showing the highest increase): but by far the largest increase in variance explained was evident in exercise behaviour. These results further support the argument against order effects arising from behaviour-position in the questionnaire, in that although exercise appeared second, eating healthily was towards the end of the questionnaire and the profile for the addition of regret to the model was quite similar with regard to R^2 and R^2 Change (Step 1 to 2).

In order to further explore the differences between conditions regarding the contribution of anticipated regret to the model after past behaviour, a series of t-tests using the unstandardised betas at Step 3 were carried out (Edwards, 1984). For over drinking, there was a significant difference between the control and motivation conditions ($t(606) = -1.75$, $p < .05$), with anticipated regret in the motivation condition being stronger than in the

control condition: for exercising regularly, there was a significant difference between the intervention and control conditions ($t(580) = 2.02$, $p < .05$), with anticipated regret being stronger in the intervention condition; finally, for being organised, there was a significant difference between the control and motivation conditions ($t(606) = 1.75$, $p < .05$), with anticipated regret being stronger somewhat surprisingly in the control condition. Other differences were not significant. Again, this provides further evidence against order effects of behaviour position in the questionnaire, as these particular behaviours represent a broad spread throughout the questionnaire.

The same regression analysis was re-run, but this time with the conditions merged, in order to isolate the contribution of regret to the TPB and provide results which could be compared with the previous web study (Study 3). For all behaviours, anticipated regret was a significant additional contributor to the model, even in the presence of past behaviour. It was the strongest predictor, even after the addition of past behaviour, for over drinking, exercising, eating healthily and being organised. The highest increase in the amount of variance explained was again evident in exercising: anticipated regret added a further 23%, increasing the explained variance from 23% to 47%. The second highest increase was in eating healthily, where the variance increased by 16%, from 24% to 40%. It will be remembered that in Study 3, the largest increase was evident for impulsive communications (22%), followed by spending too much (18%), being organised (16%), and then exercising (14%), so the results from Study 4 vary a little.

4.8 Results - Time 2 Questionnaire

The sample was tested on all Time 1 variables to see if there were any differences between those who completed the Time 1 questionnaire only ($N = 448$) and those who completed both the Time 1 and Time 2 questionnaires ($N = 437$). A MANOVA revealed significant differences for being organized ($F(1, 883) = 2.45$, $p < .01$) and for spending

($F(1, 883) = 2.10$, $p < .05$) which were explored by examining univariate F's and are detailed in Table 4.7.

Table 4.7. Results from univariate analysis to determine differences between respondents who completed T1 only (N = 448) and those who completed T1/T2 (N = 437) : d.f. = 1, 883

Behaviour	Variable	F	p	Means/SD Time 1	Means/SD Time 1/2
Spending Too much	Past Behaviour	6.80	.009	3.75 (1.09)	3.56 (1.01)
Being Organised	SN	6.54	.011	4.31 (.81)	4.16 (.91)
	PBC	7.13	.008	4.05 (.98)	4.22 (.86)

- For *spending*, there was a significant difference on past behaviour, with those who remained in the study reporting less past spending behaviour than those who left the study.
- For *being organised*, there was a significant difference on two variables: SN, with those who remained in the study reporting weaker perceptions of social pressure to perform the behaviour than those who left; furthermore, those who remained in the study had stronger perceptions of control compared to those who left.

Overall, these attrition analyses would appear to indicate that the final sample was biased in the aforementioned ways.

4.8.1 Between-Subjects Analyses to Predict Behaviour (Time 2) – Descriptive Analysis

Means and standard deviations for all study variables over the six behaviours were calculated per condition; Table 4.8 shows these for each behaviour. Generally, the results show that over-drinking was an infrequently performed behaviour, whilst the rest were

moderately performed.[20] Intercorrelations for all the study variables were also calculated, but again due to space limitations these are not reported.

Table 4.8. Means and Standard Deviations for behaviour at Time 2 per behaviour per condition

BEHAVIOUR	PERFORMANCE OF BEHAVIOUR DURING PREVIOUS 4 WEEKS PER CONDITION (N.B. behaviour measured on a "never-frequently" scale, with high scores indicating more performance frequency)					
	Control (N = 152)		Motivation (N = 151)		Intervention (N = 134)	
	Mean	SD	Mean	SD	Mean	SD
Over Drinking	2.20	1.16	2.19	1.26	2.09	1.15
Over Spending	3.16	1.45	3.42	1.44	3.69	1.47
Impulsive Comm's	3.47	1.28	3.26	1.24	3.46	1.14
Regular Exercise	3.78	1.39	3.68	1.33	3.69	1.41
Eating Healthily	3.47	1.20	.360	1.25	3.61	1.14
Being Organised	3.01	1.38	3.26	1.34	3.14	1.35

A one-way between-subjects analysis of variance showed that there was a significant difference over conditions in the means for over spending ($F(2, 434) = 4.59$, $p < .05$). A post hoc Tukey HSD indicated that the control group differed from the intervention group (Control M = 3.16, SD = 1.45; Intervention M = 3.69, SD = 1.47: $p < .01$), so over spending was reported more in the intervention group (which was not in the predicted direction). No other significant differences were found.

[20] Comparing these prospective behaviour results to those from past behaviour assessed at Time 1, it was evident that the frequency of past behaviour was higher over all conditions for all behaviours than prospective behaviour.

4.8.2 Regressions to Predict Behaviour (Time 2)

As in Study 3, a 4-step hierarchical regression analysis was carried out for each behaviour to determine if anticipated regret had a direct impact on subsequent behaviour and to determine if anticipated regret moderated the intention-behaviour relationship. Interaction terms were generated for intention by anticipated regret per behaviour. At step 1, attitude, PBC, SN and intention were included; step 2 included the appropriate anticipated regret term (action regret for IHBs and inaction regret for DBBs); step 3 included the intention by anticipated regret interaction term; finally, past behaviour was added at step 4. Table 4.9 summarises the results by reporting the β weight at entry of all contributors from the final step for IHBs whilst Table 4.10 details those from DBBs.

Looking first at IHBs, it is clear that there was no direct impact of anticipated action regret on any of the behaviours in any of the conditions. However, there was a marginal moderation effect of intention/anticipated action regret for *over-drinking* in the intervention condition ($p = .06$).

Turning now to the DBBs, anticipated inaction regret only had a direct impact on *being organised* ($p < .05$) in the intervention condition, but the negative value suggests that it was a rather surprisingly weak anticipated inaction regret which was important here (although as the bivrariate correlation was positive, this could be a suppressor effect). It is also clear that there was a moderation effect of intention/anticipated inaction regret in *exercising regularly* for the motivation condition and an almost significant effect in the intervention condition. ($p = .07$). This suggests that intentions are a stronger predictor of behaviour when anticipated inaction regret is strong. The addition of this interaction term made the

Table 4. 9. Summary of 4-step Hierarchical Regression to predict behaviour (Time 2) using moderation terms : Betas at entry over conditions for IHBs

CONTRIBUTOR	BETA AT ENTRY FOR IMMEDIATE HEDONIC BEHAVIOURS PER CONDITION								
	TO OVER DRINK			TO OVERSPEND			TO MAKE IMPULSIVE COMMUNICATIONS		
	Control	Motivation	Intervention	Control	Motivation	Intervention	Control	Motivation	Intervention
Intention	.294**	.164	.392**	-.041	.057	.243*	.045	.211*	.265**
SN	-.042	-.081	-.008	.065	.005	.074	.041	-.064	.073
PBC	.064	-.121	-.039	-.061	-.061	-.025	.055	.101	-.009
Attitude	.355***	.396***	.057	.012	-.072	-.157=	.062	.056	-.002
AR	.005	-.113	.000	-.130	-.132	-.044	-.050	.051	-.033
Int/AR	.023	-.128	.346=	.056	-.283	.223	.066	-.131	.395
Past Behaviour	.245**	.142	.321**	.200*	.065	.086	.128	.023	.053
Final R^2	.35***	.28	.28**	.05	.03	.08	.03	.05	.11
R^2 Change S1 to S2	.00	.00	.00	.01	.01	.00	.00	.00	.00
R^2 Change S2 to S3	.00	.00	.02	.00	.01	.00	.00	.00	.01
R^2 Change S3 to S4	.03**	.01	.06**	.03*	.00	.01	.01	.00	.00

***** p < .001: ** p < .01: * p < .05: = marginal significance .05 < p < .10**

Table 4.10. Summary of 4-step Hierarchical Regression to predict behaviour (Time 2) using moderation terms : Betas at entry over conditions for DBBs

CONTRIBUTOR	BETA AT ENTRY FOR DISTAL BENEFIT BEHAVIOURS PER CONDITION								
	TO EXERCISE REGULARLY			TO EAT HEALTHILY			TO BE ORGANISED		
	Control	Motivation	Intervention	Control	Motivation	Intervention	Control	Motivation	Intervention
Intention	-.013	.152	.181=	-.118	.012	.156	.010	.105	.308**
SN	-.054	.133	.114	.007	.184*	.072	-.097	.120	.065
PBC	.277**	-.043	.073	.172=	.015	-.073	.084	-.056	.144=
Attitude	-.038	.028	-.165=	-.028	.055	.046	.034	.017	-.013
IR	.115	-.138	-.081	.120	-.119	-.096	.018	.033	-.236*
Int/IR	.435	1.605***	.844=	.313	-.668	-.695	-.477	.753	-.128
Past Behaviour	.112	-.101	-.062	-.094	.045	-.006	.139	.214*	.254*
Final R^2	.10	.15	.10	.04	.07	.07	.04	.08	.22
R^2 Change S1 to S2	.01	.01	.00	.01	.01	.01	.00	.00	.04*
R^2 Change S2 to S3	.01	.08***	.02=	.00	.02	.01	.01	.01	.00
R^2 Change S3 to S4	.01	.01	.00	.01	.00	.00	.01	.04*	.04*

***** p < .001: ** p < .01: * p < .05: = marginal significance .05 < p < .10**

largest contribution to the model, adding a further 8% in the motivation condition. It is interesting that these significant interaction results were only apparent in exercise behaviour – the very behaviour researched by Abraham and Sheeran (2003; 2004), which also produced an interaction result for anticipated regret-intention on behaviour in their moderation analysis. However, despite its non-significance, of note is the negative value of anticipated inaction regret in the model: this may reflect the low r evident in the intercorrelations for anticipated regret- behaviour (intervention r = .088, n.s: motivation r = .103, n.s.). Regarding the amount of variance explained, the largest R^2 was evident in over-drinking, followed by regular exercise. Although minimal amounts of the explained variance were evident in the other behaviours, there was a trend in the predicted direction, in that the intervention conditions generally revealed the largest R^2.

4.9 Results – Time 3 Questionnaire

The sample was tested on all Time 1 variables to see if there were any differences between those who completed the Time 1 questionnaire (N = 468) and those who completed both the Time 1 and Time 3 questionnaires (N = 417). A MANOVA revealed significant differences for *spending too much* ($F(1, 883) = 1.88$, $p < .05$) and *being organised* ($F(1, 883) = 2.33$, $p < .01$) – the same behaviours which exhibited differences between T1 and T1T2 participants. Univariate analysis revealed differences (detailed in Table 4.11) as follows:-

Table 4.11. Results from univariate analysis to determine differences between respondents who completed T1 only (N = 468) and those who completed T1/T3 (N = 417) : d.f. = 1, 883

Behaviour	Variable	F	p	Means/SD Time 1	Means/SD Time 1/3
Spending too much	PB	8.56	.004	3.75 (1.07)	3.55 (1.03)
Being Organised	SN	5.12	.024	4.30 (.84)	4.17 (.89)

- For *spending too much*, there was a significant difference on past behaviour with those who remained in the study reporting less past spending behaviour than those who left.
- For *being organised*, there was a difference on SN, with those who remained in the study reporting less perception of social pressure than those who left.

Overall, these attrition analyses would appear to indicate that the final sample was biased in the aforementioned ways.

4.9.1 Between-Subjects Analysis to Predict Behaviour (Time 3) – Descriptive Analysis

Means and standard deviations for prospective behaviour at Time 3 over the six behaviours were calculated per condition and are detailed in Table 4.12.

The results were similar to the behaviour reported at Time 2, other than impulsive communications and exercising were performed less than previously indicated. A one-way unrelated analysis of variance revealed no significant differences between the means over conditions per behaviour.

Table 4.12. Means and Standard Deviations for behaviour at Time 3 per behaviour per condition

BEHAVIOUR	PERFORMANCE OF BEHAVIOUR DURING PREVIOUS 6 WEEKS PER CONDITION, i.e. 10 weeks from Time 1 (N.B. behaviour measured on a "never-frequently" scale, with high scores indicating more performance frequency)					
	Control (N = 149)		Motivation (N = 137)		Intervention (N = 131)	
	Mean	SD	Mean	SD	Mean	SD
Over Drinking	2.44	1.31	2.15	1.19	2.31	1.33
Over Spending	3.39	1.22	3.56	1.08	3.55	1.14
Impulsive Comm's	2.87	1.25	2.68	1.25	2.63	1.17
Regular Exercise	2.95	1.49	2.88	1.41	2.82	1.43
Eating Healthily	3.46	1.00	3.45	1.03	3.47	1.08
Being Organised	3.19	1.20	3.16	1.09	3.02	1.13

4.9.2 Regressions to Predict Behaviour – Moderation Analyses to Test the Value of Anticipated Regret and Intention Stability to the Intention-Behaviour Relationship

As before, a hierarchical regression analysis was conducted for each behaviour per condition to determine if anticipated regret had a direct impact on behaviour and if anticipated regret moderated the intention-behaviour relationship. Furthermore, although future intention was only measured at Time 3 (a flaw in the web-design meant that it was not included as planned at Time 2), it was possible to test temporal stability of intention to determine if this had an effect on the intention-behaviour relationship by using the intention stability measure described in section 4.5.2.4.

A 6-step hierarchical regression was conducted to comprehensively test intention stability and also test for moderation of the intention-behaviour relationship by intention stability. Interaction terms were generated for intention x anticipated regret and intention x intention stability. At step 1 all the TPB variables were included (attitude, SN, PBC, intention); at step 2 the appropriate regret term was added; at step 3 past behaviour was included, followed by the anticipated regret/intention interaction term at step 4; at step 5 intention stability was included; finally, at step 6 the intention stability by intention interaction term was added. Tables 4.13 and 4.14 detail the Betas at entry solely for IHBs and DBBs respectively.

Regarding IHBs, anticipated regret never had a direct impact on prospective behaviour, but anticipated regret marginally significantly moderated the intention-behaviour relationship for over spending in the motivation condition (Beta = .616, p = .06). There was a further marginally significant moderation by anticipated regret on the intention-making impulsive communications behaviour relationship (Beta = .539, p = .06) in the intervention condition: at Time 2, there had been only a marginal moderation effect for over-drinking in the intervention condition, but evidently not at Time 3. The intention-behaviour relationship was moderated by intention stability either significantly or marginally significantly in most of the behaviours and most of the conditions *apart from* the intervention conditions, where there was never an effect.

Turning to DBBs, for exercising in the motivation condition there was a direct and positive impact of anticipated inaction regret on behaviour (Beta = .287, $p < .05$), which at T2 had been an insignificant but negative value, an intention/anticipated inaction regret

Table 4.13. Moderation Regression analysis for AR and intention stability on the intention-behaviour relationship for IHBs - Betas at entry

STEP	CONTRIBUTOR	BETA AT ENTRY FOR IMMEDIATE HEDONIC BEHAVIOURS PER CONDITION								
		TO OVER DRINK			TO OVER SPEND			TO MAKE IMPULSIVE COMMUNICATIONS		
		Control	Motivation	Intervention	Control	Motivation	Intervention	Control	Motivation	Intervention
1	Intention	.258*	.431***	.403**	.145	.167=	.269**	.322**	.278*	.262**
	Attitude	.247*	.280**	.206=	.069	-.152	-.171=	.019	.023	-.176=
	SN	.061	.014	-.087	.014	.105	.003	-.115	-.068	.113
	PBC	.042	.058	-.094	-.216*	-.052	-.120	-.021	.000	-.012
2	AR	-.018	.022	-.090	-.008	-.021	.011	.125	-.007	-.051
3	Past Behaviour	.177=	.135	.303**	.167=	.270**	.301**	.141	.266**	.240*
4	AR/Intention a	.100	.049	-.062	.121	.616=	-.156	-.146	.134	.539=
5	Intention Stability	-.104	.088	-.122	-.102	-.247**	.073	-.105	-.039	-.226**
6	Int/Int Stability a	.777***	.539**	.072	.357=	.153	-.228	.913***	.711**	.255
	R^2 at Step 6	.38	.50	.41	.15	.20	.19	.23	.19	.21
	R^2 change S4	.002	.000	.001	.002	.024=	.002	.002	.002	.025=
	R^2 change S5	.010	.006	.013	.008	.046**	.004	.010	.001	.047**
	R^2 change S6	.109***	.036**	.001	.019=	.003	.005	.113***	.063**	.010

***** p < .001: ** p < .01: * p < .05: = marginal significance .05 < p < .10**

a = Interaction Term

Table 4.14. Moderation Regression analysis for IR and intention stability on the intention-behaviour relationship for DBBs - Betas at entry

STEP	CONTRIBUTOR	BETA AT ENTRY FOR DISTAL BENEFIT BEHAVIOURS PER CONDITION								
		TO EXERCISE REGULARLY			TO EAT HEALTHILY			TO BE ORGANISED		
		Control	Motivation	Intervention	Control	Motivation	Intervention	Control	Motivation	Intervention
1	Intention	.476***	.415***	.546***	.343***	.335**	.392***	.141	.236**	.249**
	Attitude	.077	-.015	.047	.004	-.188*	.150=	-.024	-.197*	.123
	SN	-.036	.114	.011	-.013	-.079	.017	.026	.013	-.012
	PBC	.183*	.056	.168*	.198*	.138	.111	.299***	.151=	.253**
2	IR	.002	.287*	-.065	.065	.148	.012	.086	.150	.051
3	Past Behaviour	.033	.141	.110	.123	.320**	.283**	.400***	.184*	.165
4	IR/Intention a	.435	1.276**	.003	.046	.185	.277	-.288	.492	.654
5	Intention Stability	-.078	-.008	-.002	-.116	-.092	.052	-.172*	.012	-.039
6	Int/Int Stability a	.596***	.702**	.795***	.002	.134	.286	.418=	.443=	.293
	R^2 at Step 6	.43	.39	.46	.24	.22	.34	.29	.20	.24
	R^2 change S4	.008	.054**	.000	.000	.001	.002	.002	.003	.016
	R^2 change S5	.004	.000	.000	.008	.006	.002	.022*	.000	.001
	R^2 change S6	.065***	.046**	.063***	.000	.003	.006	.018=	.021=	.007

***** p < .001: ** p < .01: * p < .05: = marginal significance .05 < p < .10**

a = Interaction Term

interaction (Beta = 1.28, $p < .01$) *and* an intention/intention stability interaction. This was the same behaviour and the same condition which exhibited a significant moderation of the intention-behaviour relationship by anticipated regret at Time 2. Moreover, this was the only behaviour where intention stability moderated the intention-behaviour relationship over all conditions with the strongest Beta. Given the particular profile for exercise behaviour in the motivation condition especially, mediation analysis was carried out to determine if anticipated regret's moderation of the intention-behaviour relationship was mediated by intention stability; this is set out in detail under section 4.9.2.2, but first additional analysis was conducted looking at high and low intenders.

4.9.2.1 Moderation of Intention-Exercise Behaviour by Anticipated Regret – High versus Low Intenders

Due to the pattern of results emerging for exercise in particular, a further more simplified regression was conducted to look at the moderation of the intention-exercise behaviour relationship by anticipated regret in terms of high versus low intenders: it seems logical to predict that moderation should only occur for those participants reporting stronger intentions to perform the behaviour. Intention was split at the median and a 3-step hierarchical regression analysis was carried out with the traditional TPB prospective behaviour predictors of intention and PBC included at step1, anticipated inaction regret added at step 2, and the anticipated regret-intention interaction term included at step 3.

When conditions were merged, there were no significant interaction effects for either high (N = 267) or low intenders (N = 150) for either behaviour measured at 4 weeks (T2) or at 10 weeks (T3) - this was in contrast to significant moderation effects evident at both time points when conditions were merged and intention was not split. However, when conditions were considered separately, there was a significant

anticipated regret-intention interaction at T3 for those participants reporting strong intentions to exercise in both the motivation condition (Beta = 2.40, p = .05) and intervention condition (Beta = 3.48, p < .01): the amount of variance explained increased by 3% (R^2 = .32) and 7 % (R^2 = .23) respectively. At T2, though, the interaction was only marginally significant for those high intenders in the motivation condition (Beta = 2.54, p = .05), increasing the variance by 4% (R^2 = .12).

So it would seem that anticipated regret moderates the intention-exercise behaviour relationship for those who report stronger intentions to exercise, but only when regret salience has been increased or, to some extent, when participants have been asked to just extend their time perspective. It is not clear why there are such differences between T2 and T3, although it is possible to speculate that for strong intenders, the interventions produced a moderation effect which was expressed exponentially over time.

To sum up so far, although these results do not clarify the effect from the interventions (in that there are no consistent patterns for any particular condition, especially the intervention condition), this particular set of results reveals that again exercise behaviour seems affected by anticipated regret, perhaps highlighting it as a target for further, more detailed exploration: to re-iterate, exercise behaviour was the only behaviour where anticipated inaction regret had a direct impact on actual behaviour (at prospective behaviour T3, motivation condition), and where the intention-behaviour relationship was moderated by anticipated inaction regret at both prospective behaviour T2 and T3, motivation condition, and furthermore where this moderation was significant for those with stronger intentions to exercise both in the motivation and intervention conditions at T3; it is now clear that intention stability also moderates the intention-exercise behaviour relationship. Abraham and Sheeran (2003) and Sheeran and Abraham (2003) found similar results which prompted them to conduct mediation

analyses to test if the moderation of the intention-behaviour relationship by anticipated regret was mediated by intention stability. In light of the outcome so far for exercise behaviour, it was decided to focus on this particular behaviour and test for a mediation effect here.

4.9.2.2 Mediation Analyses

Baron and Kenny (1986) argue that three conditions have to be satisfied in order to say that mediation has occurred:

a) the independent variable should be associated with the dependent variable;
b) the independent variable should be associated with the mediating variable;
c) in a regression of the dependent variable on both the independent variable and the mediator, the independent variable should be reduced to non-significance whereas the mediator should be significant.

The results from the analysis reported previously demonstrate that (a) has been met in that the interaction between anticipated regret and intention (the independent variable) was significantly associated with the behaviour (the dependent variable) in the motivation condition. For ease of interpretation, conditions across exercise behaviour were merged to conduct a more comprehensive mediation analysis. Again (a) was met. Regarding (b), this criterion was tested by (i) regressing intention stability on the AR by intention interaction and (ii) regressing the stability by intention interaction on AR (the mediating variables). The AR x intention variable explained a significant proportion of the variance in intention stability ($R^2 = .19$, $F = 95.14$, $p < .001$), whilst AR explained a significant proportion of the variance in the intention stability by intention interaction ($R^2 = .01$, $F = 6.86$, $p < .05$). The AR by intention interaction had a significant beta in the equation predicting intention stability (Beta = .43, $p < .001$) whilst AR had a significant beta in the equation predicting the stability by intention interaction (Beta =

.11, $p < .05$). So, AR and its interaction with intention are associated with the mediators, satisfying Baron and Kenny's second criterion.

The third criterion (c) was tested with a further 6-step hierarchical regression analysis using a merged set of exercise behaviour data: step 1 included attitude, SN, PBC and intention, step 2 added anticipated inaction regret, step 3 added past behaviour, step 4 included the anticipated regret by intention interaction term, step 5 added intention stability and finally at step 6 the intention stability by intention interaction term was included. The relevant steps of 4 and 6 are detailed in Table 4.15.

Table 4.15. Exercise Behaviour: Moderated regression analysis to test for mediation of IR-intention by intention stability-intention on the intention-behaviour relationship - appropriate steps

Variable	Step 4	Step 6
	Beta	Beta
Intention	.072	.459**
Attitude	.027	-.013
SN	.023	.010
PBC	.089*	.074
Anticipated Inaction Regret	-.301** a	-.163
Past Behaviour	.108*	.088
Ant. Inac. Regret x intention	.635** ☺	.379 ☺
Intention Stability		-.665*** ☺
Intention Stability x intention		.632*** ☺
Change in R^2 (Total R^2 %)	.015** (34%)	.055*** (39%)
Model F	21.91***	29.41***

***** p < .001 ** p < .01 * p < .05 ☺ = criterion met:**

a = anticipated inaction regret had been positive but n.s. when entered at Step 2 (β= .058)

In order to find mediation of moderators, there must be:

(i) a significant anticipated regret-intention interaction beta coefficient at step 4;

(ii) an increment in the variance explained when the intention stability-intention interaction term enters the equation at step 6, accompanied by the beta coefficient for the anticipated regret-intention interaction term becoming non-significant, with significant beta coefficients for both intention stability and the intention stability-intention interaction term.

With regard to (ii), Baron and Kenny assert that there are two levels which support mediation: a significant mediation, where there is a reduction in the beta coefficient for the moderator (i.e., the anticipated regret-intention interaction changes from step 4 to 6); whilst a total mediation can be said to have occurred if there is no longer an effect of the moderator (i.e., the anticipated regret-intention interaction becomes non-significant at step 6). It is evident from the results that all the criteria to support total mediation have been met which indicates that moderation of the intention-behaviour relationship by anticipated inaction regret is mediated by intention stability. Furthermore, this is a complete test of an augmented TPB, in that *all* the TPB variables are included in the analysis, plus past behaviour.[21]

The analysis reported in Table 4.14 was further explored to test the influence of condition on this effect[22]: it will be remembered that in the motivation condition only there was a direct impact of anticipated regret on behaviour at step 2 (Beta = .287, $p < .05$), anticipated regret significantly moderated the intention-behaviour relationship also at step 4 (Beta = 1.276, $p < .001$), but by step 6 the anticipated regret-intention interaction (not reported in Table 4.14) was still significant (Beta = .845, $p < .05$) in the presence of a significant intention stability-intention interaction (Beta = .702, $p < .01$). So, although criterion (ii) of mediation of moderator analysis is not met, the key issue is that the Beta weight for the anticipated regret-intention interaction decreased in the presence of the intention stability-intention interaction, satisfying the criterion that there has been a significant (although not total) mediation. It is possible to propose, then (as

[21] Only a 5-step regression analysis was conducted by Abraham and Sheeran (2003) with the key variables of intention, AR, AR-intention, intention stability and intention stability-intention. It could be argued that a more complete test of mediators of moderators should include at the very least PBC from the TPB; indeed, the analysis reported here was re-run simplifying the comprehensive model to the key moderator variables plus PBC – the same profile emerged providing further support for mediation effects.
[22] Betas had been reported only at entry in Table 4.14: these were expounded upon here to enable appropriate interpretation for mediation analysis.

suggested by Abraham and Sheeran, 2003), that AR promotes action because it is associated with more stable intentions.

4.9.2.3 Looking at High versus Low Intenders regarding Mediation

Again, intention was split at the median and the mediation analysis was re-run to investigate the effect of intention strength to the above results. As there had been no anticipated regret moderation effect for high or low intenders when conditions were merged (reported in section 4.9.2.1), the analysis was run per condition. The complete equation including all TPB measures and past behaviour proved too much of a stringent test to detect any significant results, so the equation was reduced to include only the key variables and PBC to enable effects to be isolated. For those who reported stronger intentions to exercise (N = 267), moderation of the intention-behaviour relationship by anticipated inaction regret was significantly (but not totally) mediated by intention stability *only* in the intervention condition (R^2 = .41, R^2 change = .16, F = 8.40, p < .001: Beta reduced from 3.48, p < .01 to 2.75, p < .05). So, it is possible to expand on the argument proposed in section 4.9.2.1 and further speculate that anticipated regret promotes exercise because it is associated with more stable, *strong* intentions to do so, and that these strong intentions resulting in actual exercise behaviour may have been increased by inducing regret salience, which in turn has impacted on anticipated inaction regret. Referring back to Table 4.4, the mean intention score for exercise was actually higher (but not significantly so) in the motivation condition (M = 3.96, SD = 1.14) compared to the intervention condition (M = 3.74, SD = 1.17): however, the mean anticipated inaction regret score was slightly higher (again, not significantly so) in the intervention condition (M = 3.93, SD = 1.13) compared to the motivation condition (M = 3.92, SD – 1.17), which gives some support to this theory.

4.10 Discussion and Directions for Future Research

Rather than just measure variables, this study set out to intervene to increase regret salience and so influence prospective behaviour using three conditions which varied in the information provided about the target behaviour. In contrast to the previous studies, equal numbers of IHBs and DBBs were considered. Furthermore, both regret terms (anticipated inaction and action regret) were included for each behaviour type; this permitted justification for the inclusion of the proposed appropriate regret term for each behaviour type, i.e. anticipated action regret for IHBs and anticipated inaction regret for DBBs. Again, a web design was adopted, which was extremely successful in procuring large numbers of participants throughout.

By looking at the results from the mean scores for intention and anticipated regret per condition for each behaviour, some evidence was found for support of the manipulation, in that for certain behaviours at least there were differences in the means in the predicted direction: stronger intentions to perform DBBs (e.g. eating healthily) with stronger anticipated inaction regret (e.g. eating healthily and being organized); weaker intentions to perform IHBs (e.g. impulsive communications) and stronger anticipated action regret (e.g. impulsive communications, over drinking) in the intervention groups compared to the motivation and control groups. Nevertheless, no such differences to support the intervention were found in prospective behaviour: the self-reported prospective behaviour results indicate that in general, IHBs were performed infrequently in contrast to frequently performed DBBs irrespective of condition.

Regarding the regressions to predict intention, anticipated regret was found to be an important additional contributor both across conditions and over all conditions, apart from the control condition of spending too much and the motivation condition of impulsive communications. Indeed, it had the strongest Beta in exercise over all

conditions. However, there were no consistent condition effects: indeed, there were only three behaviours where there were significant differences between the unstandardised betas over conditions and even then effects were inconsistent - over-drinking (motivation stronger than control), exercising (intervention stronger than control), which support some kind of intervention effect; however, for being organized the difference was in favour of the control condition. Nevertheless, it is interesting to note that over-drinking and exercising were the first two behaviours in the questionnaire to be rated, suggesting perhaps an order effect. Indeed, regarding the mean scores for intention and anticipated regret, a MANOVA found there to be significant differences between conditions in the expected direction for the two final rated behaviours of eating healthily and impulsive communications, possible highlighting both a primacy and recency effect. However, the fact that these results come from two quite distinct sets of analyses (one means-based and the other correlation-based), and that the addition of anticipated regret in the intention regression analysis was particularly important for two behaviours which appeared in the middle of the questionnaire, does not consistently support a confounding factor of rating position.

Regarding anticipated regret's role in prospective behaviour at T2, regression analysis revealed that anticipated regret only had a direct impact on being organised in the intervention condition, but it was weak anticipated inaction regret which explained the variance in behaviour rather than the predicted strong anticipated inaction regret (this could, however, be a suppressor effect, as the bivariate correlation between anticipated inaction regret-behaviour was positive); in contrast, at T3 anticipated regret had a direct impact on exercising behaviour in the motivation condition; this latter result replicates a marginally significant effect found in one previous exercise study, i.e. Abraham and Sheeran (2003). Nevertheless, when conditions were merged and this analysis was re-run, there was no direct impact of anticipated regret on behaviour,

suggesting that either this result occurred by chance, or that indeed the motivation condition had the desired result; this could be explored in a future study. Moderating effects of anticipated regret on the intention-behaviour relationship were found at T2 only for exercise in the motivation condition, and almost in the intervention condition (this was in contrast to the results from Study 3 detailed in the previous chapter where no such relationship was evident). However, at T3, moderation effects were found for over spending in the motivation condition, and almost for impulsive communications in the intervention condition: of more interest, though, is that again moderation effects were found for exercise behaviour, again in the motivation condition. When conditions were merged, the moderation still remained. So it would appear that there are consistent results for at least one of these six behaviours - exercise – such that intentions are more likely to predict behaviour when intentions to exercise and anticipated inaction regret are strong. Moreover, for this behaviour there seemed to be a moderating role of intention stability on the intention-behaviour relationship: when intentions stability was strong over time (i.e.10 weeks), strong intentions to exercise were more likely to be translated into actual exercise behaviour. This pattern was also evident for over drinking and making impulsive communications, although not in the intervention condition. It is also of note that, in general, the R^2 were higher at T3 than at T2 for all regressions to predict behaviour, but especially high for over-drinking and exercising.

Given the profile for exercise mentioned previously, the mediating role of intention stability on anticipated regret's moderating effect on the intention-exercise behaviour relationship was also explored (at T3). When conditions were merged, the moderation of the intention-behaviour relationship by anticipated regret was totally mediated by intention stability, suggesting that because anticipated regret was associated with more stable intentions it promoted exercise behaviour. This replicated the result evident in Abraham and Sheeran's (2003) study, adding weight to the value of anticipated regret in

the TPB in explaining intention-behaviour relationships. When conditions were analysed separately, a significant (but not total) mediation effect occurred only in the motivation condition. So it would appear that the attempt to explicitly increase regret salience was a step too far, and that it was only necessary to extend participants' time perspective in a factual way, rather than personalize the behaviour by asking them to imagine how they feel.

Separate analysis was also conducted to consider the effect of intention strength in this moderation analyses: it was predicted that moderation of the intention-behaviour relationship by anticipated regret would only be logical for those who reported stronger intentions to exercise. When conditions were merged, there were no significant effects for anticipated regret moderating the intention-behaviour relationship depending on intention strength. However, in the motivation and the intervention conditions, there was a significant interaction at T3 for those people who reported stronger intentions to exercise, an effect which was found to be significantly mediated by intention stability, but only for those in the intervention condition. So it would appear that the prediction regarding intention strength can be supported when viewed in terms of the manipulations to extend time perspectives and/or increase regret salience. Indeed, it may be that the intervention condition which was explicitly designed to increase regret salience had the desired effect at least in exercise behaviour, so that intention stability moderated the intention-behaviour relationship and mediated the moderating role of anticipated regret on this relationship. How exactly this happened is somewhat unclear, given the similar mean scores per condition on intention and anticipated inaction regret, but the manipulation either impacted on intention strength, intention stability or anticipated regret – or perhaps it was the dynamics of these variables acting on each other.

In regard to the results detailed above, one issue of importance relates to the variable 'intention stability': criticism could be levelled at the use of only one index from the four possible indices available to calculate this variable, i.e. the absolute difference between the sum of intention items at T1 and T3. Although this measure is commonly used in the literature (e.g. Conner et al, 2005), recent unpublished research by Conner further indicates that this measure is highly correlated with other stability measures, and that there is no indication that one measure is more likely to be a moderator than any other. In these circumstances, the measure used to assess intention stability in Study 4 can be considered valid.

In sum, these results do not consistently support the use of an intervention designed to increase regret salience and so influence prospective behaviour. However, as predicted, it seems that reported intentions and anticipated regret were affected by the interventions for certain behaviours (for either the motivation condition or the intervention condition) in relation to the control condition, even if these were not translated into differences in actual behaviour. Notwithstanding, it is evident that the attempts to increase regret salience by personalizing and imagining consequences of behaviours were of no more use – and in some instances no use at all – than attempts at extending participants' time perspective solely in a factual and objective manner. This was an exploratory study, though, and perhaps highlights the fact that designing interventions in the TPB it is an unknown quantity in terms of which variables in the model will actually be influenced and by which strategy. Indeed, as Fishbein and Ajzen warn, (2005) "The TPB can provide general guideline(s) . . . but it does not tell us what kind of intervention will be most effective" (p.29). In this regard, the intervention condition designed in this study set out to increase regret salience and impact on anticipated regret (one determinant of intentions which this thesis argues should be included in the TPB), whilst the motivation condition was designed to assess if

increasing regret salience did actually impact on anticipated regret, intentions and subsequent behaviour or whether just the provision of information would have a similar affect. It could be argued, though, that the motivation condition (if not designed to specifically impact on AR) may have had an effect on intentions and/or behaviour via impacting on one or more of the model's *other* components (i.e. attitude, SN, PBC). Although the data do not support this argument, care should be taken when designing future intervention studies to ensure that potential cognition changes in components of the model are accounted for regarding the message content contained in the intervention.

Although the results from this study could be of use when designing manipulations in future research, it is possible to speculate that the lack of any consistent effects may simply be a product of too many behaviours being simultaneously considered, or that students may not be fully engaged when completing questionnaires. Likewise, it may be that some behaviours are more amenable to change than others which may have become entrenched and intransigent. Consequently, the use of such interventions should not be dismissed completely. Conditions aside, though, this study again adds weight to the growing evidence supporting the addition of anticipated regret to the TPB in terms of its significant contribution to the explanation of intentions. Of particular note throughout though, has been the results regarding exercise behaviour - indeed, there have been many references to the research conducted into exercise behaviour by Abraham and Sheeran (2003; 2004): accordingly, it was decided to target this behaviour for more in-depth, comprehensive analysis in the next study, with the intention of replicating some of the results found in the Abraham and Sheeran studies and, indeed, in this study. It will have been noted that because Studies 2, 3 and 4 have been multi-behavioural in nature, it was necessary (in order to avoid "completion fatigue" by participants) to employ single-item scales for the majority of the constructs used to test

the augmented TPB: even attitude was considered in terms one item each for experiential, instrumental and moral components. By focusing on just one behaviour, it will be possible to use more comprehensive scales. Also the possible situation of participants becoming ambivalent towards the importance of providing considered answers was probably increased by having so many behaviours included in one questionnaire; by just considering one behaviour, it was hoped to overcome this potential confounding situation.

Chapter 5: Studies 5 and 6 – Anticipated Inaction Regret and Regular Exercise: A Pen-and-Paper Study versus a Web Study

5.1 Aims and Objectives

Studies 2, 3 and 4 used multiple behaviours to consider the value of anticipated regret to the TPB. Of note throughout were the consistent results for exercise behaviour, in that anticipated inaction regret increased the amount of variance explained in intentions over and above the TPB variables, even in the presence of past behaviour. Furthermore, in Study 4 (a web-designed study) when participants were encouraged to extend their time perspective, anticipated regret also moderated the intention-behaviour relationship, an effect which in turn was mediated by intention stability. When regret salience was increased, this pattern of results was evident for those participants who had reported stronger intentions to exercise in the first place. Studies 5 and 6 detailed in this chapter were designed to focus solely on exercise behaviour, using a more comprehensive set of measures to test the effect of anticipated regret in the TPB than had been previously viable in a multi-behavioural design. Indeed, the aim was to replicate two previous pen-and-paper studies into exercise behaviour which had found similar moderation and mediation results, but without the need to use such explicit and detailed manipulations, i.e. Abraham and Sheeran (2003; 2004). So, Studies 5 and 6 set out to further explore anticipated regret's contribution to exercise behaviour, by using multi-item scales to test constructs and by comparing the results from a pen-and-paper study (i.e., Study 5 - the design medium of Abraham and Sheeran's studies) to a web-designed study (i.e., Study 6 - the design medium of the studies so far considered in this thesis). In particular, the focus was on the contribution of data collection medium to the anticipated regret x intention interaction. To enable equitable comparison, the same items used to measure constructs in the Abraham and Sheeran studies were included, as well as the same definition of regular exercise.

5.2 Review of Differences between Abraham and Sheeran's Exercise Studies (2003; 2004) and Findings to Date from Studies 2, 3 and 4

Before moving on to describe in detail Studies 5 and 6, it will be useful to fully understand the differences between the findings of this thesis so far regarding exercise behaviour and those from Abraham and Sheeran's (2003; 2004) exercise studies. For ease of comparison, Table 5.1 sets out the main details and results from the Abraham and Sheeran studies and the exercise component of Studies 2, 3 and 4. All studies targeted undergraduates and all relied on self-report measures for prospective behaviour. Regarding measures of anticipated regret, both used anticipated inaction regret: Studies 2, 3 and 4 of the thesis relied on one measure of anticipated regret which always preceded the intention measure, whilst the anticipated regret construct and position was as reported in the Table for Abraham and Sheeran. Scales in the thesis studies for intention and anticipated regret were always 1-5, whilst they were as reported in Table 5.1 for Abraham and Sheeran's.

Regarding regressions to predict intention, in the Abraham and Sheeran (2004) paper, anticipated regret added a further 5.3% to the amount of variance explained *after* past behaviour (study 1): intentions were stronger when anticipated regret appeared first in the questionnaire. For Study 2 of the thesis anticipated regret added 24%, in Study 3 it added 14% and in Study 4 it added between 19% and 28% over the three conditions *before* past behaviour was included, but remained significant and most important contributor *after* past behaviour. Regarding regressions to predict behaviour, there was a marginal direct impact of anticipated regret on prospective behaviour in Abrahams and Sheeran (2003: study 1). In Study 4 of the thesis, there was a significant and direct impact of anticipated regret on prospective behaviour at Time 3, but only in the motivation condition. Furthermore, anticipated regret moderated the intention-behaviour relationship in Abraham and Sheeran (2003), in study 1, whilst study 2

Table 5.1. Study Details and Results from Abraham & Sheeran (2003; 2004) and Thesis Studies 2, 3 and 4 ('exercise' component) to allow comparison

Study	N	Definition of Exercise	Defined Frequency of Performance	Time Frame for Prospective Behaviour Measure	R^2 Increase to prediction of Intentions when anticipated regret added	R^2 Increase to prediction of Behaviour when anticipated regret added	Moderation of Intention-Behaviour relationship by anticipated regret	Mediation of AR x intention interaction by intention stability
Abraham & Sheeran 2003	S1 T1 = 384 T2 = 254	"Exercise includes activities such as aerobics, badminton, jogging, rugby etc, but not activities which form part of your daily life such as walking to the bus stop, dancing at discos etc."	At least 6 times over the next 2 weeks	2 weeks	Reported in 2004 study 2 x AR items (regret and upset) 2 x intention items	1%, p = .06 Mean Behaviour = 0.02 (Standard-ised)	Yes, R^2 increase = 2%, p < .001	-
	S2 T1 = 229 T2= 166	"Would you regret it if you did not exercise in the next 2 weeks?" INTERVENTION STUDY TO TEST *FREQUENCY* OF BEHAVIOUR (regret measure first –v- second) MEASURING ONLY INTENTION AND REGRET (one measure each) AT T1 AND BEHAVIOUR AT T2	Not specified	2 weeks	N/A	N/A Differences between manipulation condition and control condition re: exercise performance. Differences in expected direction (i.e. more in intervention 4.11 vs. 3.34, self report scale) but not significant)	Moderation of I-B relationship by experimental condition tested. Intentions predicted behaviour significantly better for intervention group, especially when intentions were more positive in the first place	-

Study	N	Definition of Exercise	Defined Frequency of Performance	Time Frame for Prospective Behaviour Measure	R^2 Increase to prediction of Intentions when anticipated regret added	R^2 Increase to prediction of Behaviour when anticipated regret added	Moderation of Intention-Behaviour relationship by anticipated regret	Mediation of AR x intention interaction by intention stability
Abraham & Sheeran 2003 cont/. . .	S3 T1 and T2 as S1 T3 = 97	As Study 1	At least 4 times over the next 2 weeks	2 weeks	N/A 2 x AR items 5 x intention items	N/A	Yes Predictive validity of intention increased as AR increased from low through to high	Yes
Abraham & Sheeran 2004	S1 = 384	As Study 1, 2003	At least 6 times over the next 2 weeks	2 weeks	Yes, + 5.3% after past behaviour. Mean Int = 4.07 (Scale 1-6) Mean AR = 5.22 (Scale 1-11) 2 x AR items 2 x intention items	-	-	-

Study	N	Definition of Exercise	Defined Frequency of Performance	Time Frame for Prospective Behaviour Measure	R^2 Increase to prediction of Intentions when anticipated regret added	R^2 Increase to prediction of Behaviour when anticipated regret added	Moderation of Intention-Behaviour relationship by anticipated regret	Mediation of AR x intention interaction by intention stability
Abraham & Sheeran 2004 cont/. . .	S2 = 70	"Would you regret it if you did not exercise in the next 2 weeks?" INTERVENTION STUDY TO TEST STRENGTH OF INTENTIONS (regret measure first –v- second) MEASURING ONLY INTENTIONS AND INACTION REGRET (one item each)	Not specified	2 weeks	Not tested AR scores did not differ significantly in either condition, although trend shows lower Mean in AR 1st (3.12) compared to AR 2nd (4.14). Scale = 1-8. So Intention formation did not increase AR. Intention scores did differ across conditions, with AR 1st intention scores (6.18) being significantly higher than AR 2nd (3.67)	Not tested	-	

Study	N	Definition of Exercise	Defined Frequency of Performance	Time Frame for Prospective Behaviour Measure	R^2 Increase to prediction of Intentions when anticipated regret added	R^2 Increase to prediction of Behaviour when anticipated regret added	Moderation of Intention-Behaviour relationship by anticipated regret	Mediation of AR x intention interaction by intention stability
Thesis Study 2	89	"Have you ever wished you had gone to the gym a bit more often or taken an exercise class? The following questions relate to doing regular exercise over the next 2 weeks. Regular means at least twice per week."	Twice per week	2 weeks	+24% $p < .001$ BEFORE past behaviour, but remaining most imp contributor AFTER past behaviour Final Model R^2 = 65% Mean Int = 3.56 Mean AR = 3.71 All Scales 1-5	N/A	-	-
Thesis Study 3	T1 = 350 T2 = 139	As Study 2	As study 2	As study 2	+ 14% $p < .001$ BEFORE past behaviour, but remaining most important contributor AFTER past behaviour Final Model R^2 = 58% Mean Int = 3.88 Mean AR = 3.67 All scales 1-5	None	No	-

Study	N	Definition of Exercise	Defined Frequency of Performance	Time Frame for Prospective Behaviour Measure	R^2 Increase to prediction of Intentions when anticipated regret added	R^2 Increase to prediction of Behaviour when anticipated regret added	Moderation of Intention-Behaviour relationship by anticipated regret	Mediation of AR x intention interaction by intention stability
Thesis Study 4	T1 = 885 T2 = 437 T3 = 417	"The following questions relate to doing regular exercise over the next 4 weeks. 'Regular' means at least five 20 minute sessions a week of an exercise such as swimming, aerobics, cycling, running."	5 x 20 minute sessions a week	4 weeks	Control = + 19% Motivation = + 28% Intervention = + 26% All $p < .001$ BEFORE past behaviour, but remaining most important contributor AFTER past behaviour Final Model R^2 : C = 51% M = 57% I = 50% Mean Intention: C = 3.79 M = 3.96 I = 3.74 Mean AR: C = 3.76 M = 3.92 I = 3.93 All scales 1-5	T2 = None Final Step R^2 = between 10-15% Mean Behaviour: C =3.78 M = 3.68 I = 3.69 T3 = Yes, Motivation only. Final Step R^2 = between 39-46% C = 43% M = 39% I = 46% Mean Behaviour: C = 2.95 M =2.88 I = 2.82 (frequency scale 1-5)	T2 : Yes in Motivation, Marginal in Intervention, & No in Control T3 : Yes, in Motivation, No in Intervention, No in Control + at T3, high intenders only = interaction in Motivation and Intervention Conditions. (At T2, only a marginal interaction for high intenders in Motivation)	T3 : Yes When conditions merged, total mediation. When conditions split, significant mediation (but not total) in motivation only.

showed that when anticipated regret appeared first, moderation was significantly better than when it appeared second: study 3 revealed that the predictive validity of intention increased as anticipated regret increased from weak to strong. No such moderation was evident in thesis Study 3, whilst in Study 4 there was a significant effect at Time 2 and Time 3 in the motivation condition only, which when investigated further revealed a significant effect only for those who had strong intentions to perform exercise – again in the motivation condition and in the intervention condition. Anticipated regret's impact on the intention-behaviour relationship was shown to be mediated totally by intention stability in Abraham and Sheeran (2003: study 3); in thesis Study 4 at Time 3, the mediation was total when conditions were merged, but was only significant in the motivation condition when conditions were split.

Table 5.1 and the accompanying summary show clearly the consistencies and inconsistencies between results from all these studies into exercise: this is not surprising, given that the designs varied significantly. To reiterate, the remit of Study 5 in particular was to run a replica study comparable to the Abraham and Sheeran studies (2003; 2004), using the details provided in their papers as a basis for Study 5, so evaluation of results could come from common ground and therefore be equitable.

5.3 The Benefits of Regular Exercise

There are both physical and mental health benefits to physical activity: regular exercise substantially reduces the risk of dying of coronary heart disease, the nation's leading cause of death, and decreases the risk for stroke, colon cancer, diabetes, and high blood pressure. It also helps to control weight; contributes to healthy bones, muscles, and joints; reduces falls among older adults; helps to relieve the pain of arthritis; reduces symptoms of anxiety and depression; and is associated with fewer hospitalisations, physician visits, and medications. However, in the UK, 60% of males and 70% of females do not undertake enough physical activity to benefit their health

(c.f. Norman & Conner, in press). Theoretical models like the TPB have been adopted to explain the reasons why people do not exercise with the aim of providing theoretical grounded interventions to increase this beneficial behaviour. Increasing regret salience, then, seems an appropriate way of encouraging this beneficial behaviour.

5.4 Method

5.4.1 Sample – Study 5 (Pen-and-Paper Study)

Participants were year 1 and 2 psychology undergraduates (single and joint honours) at a university in the U.K. who volunteered to take part in the study during lectures. The Time 1 (T1) questionnaire (Appendix 5.1) which contained measures of TPB constructs, past behaviour, anticipated action regret and anticipated inaction regret, along with other measures, was completed by 387 people (18.6% were Males, N = 72; 81.1% were Females, N = 314; No indication, N = 1). Fifty-seven per cent of this sample (N = 222) reported their behaviour in a second questionnaire (T2), two weeks later (18% were Males, N = 40; 82% were Females, N = 182). Ages ranged from 17 – 41 years (M = 19.90; SD = 3.09). Participants who completed both questionnaires were entered into a £75 prize draw. These participant numbers were similar to Abraham and Sheeran's (2003) pen-and-paper study, which was completed by 384 undergraduates at T1 and 254 at T2.

5.4.2 Sample – Study 6 (Web Study)

Participants were recruited from the various departments of seven U.K. universities (Bath, Bradford, Cambridge, Durham, East Anglia, Manchester, and Queens Belfast: see Appendix 5.2 for a list of participating departments per university). Universities had been selected randomly from an internet university search site (http://www.webmaster.bham.ac.uk/ukuwww.html) and departments were contacted by phone and asked to send an email onto their students; this email requested participants to log onto the questionnaire web site. The questionnaire was completed anonymously,

but at Time 1 participants submitted a contact email address so that they could be reminded after two weeks to return to the web site to complete the Time 2 questionnaire; this email address was kept separate from the questionnaire so that at no time could participants be identified. There was a time lock on the site so that two weeks had to have elapsed between completion of the Time 1 and the Time 2 questionnaires. Participants who completed both questionnaires were entered into a £100 prize draw. Exactly the same questionnaire as was used in the pen and paper study (Study 5) detailed in the measure section 5.4.3.1 was used in this web study; however, the web questionnaires could only be submitted if all items had been completed (there were, therefore, no missing items). The Time 1 questionnaire was completed by 1360 people (38.5% were Males, N = 524; 61.5 % were Females, N = 836). Fifty-seven per cent of this sample (N = 777) reported their behaviour in a second questionnaire, two weeks later (33.3% were Males, N = 259; 66.7% were Females, N = 518). Ages ranged from 17-56 years (M = 20.46; SD = 3.35). It is clear, then, that the gender split was more even in this web study compared to the pen-and-paper version, the latter mainly comprising females. Details of the design and procedure are set out for each study below.

5.4.3 Design and Procedure – Study 5

5.4.3.1 Questionnaire 1

A brief definition of exercise ('Exercise includes activities such as aerobics, badminton, jogging, rugby etc, but not activities which form part of your daily life such as walking to the bus stop, dancing at discos etc') was printed at the top of the Time 1 and Time 2 questionnaires, in line with previous research (e.g. Abraham & Sheeran, 2004).

Respondents were initially required to indicate their age, date of birth and first three initials of their mother's first name; the latter two entries enabled participants to be

matched up between Time 1 and 2. They also had to select from a choice of nine what they were studying (e.g. Engineering; Languages; Psychology): as the participants were recruited during a psychology lecture, all of them had an element of psychology in their studies in contrast to Study 6 where participants were recruited from various university departments and, therefore, only a few were psychology based.

The questionnaire included measures of the TPB based upon standard wording recommended for measuring components of the TPB (Ajzen, 1991; Conner & Sparks, 1996), in addition to anticipated action and inaction regret, and past behaviour. The principles of compatibility and correspondence were adhered to. A pilot study established that N = 4 was the median number of times that student participants would exercise over a 2-week period. In this regard, all TPB and anticipated regret measures specified exercising 'at least 4 times over the next 2 weeks'. As in Abrahams and Sheeran (2003, study 2; 2004, study 2), one measure of inaction regret came first, immediately preceding one of the intention measures. To enable comparison between studies, the same variables as those from Abrahams and Sheeran (2003; 2004) were used, in addition to others not included in theirs but which were thought useful to enhance the design. Unless otherwise stated, items employed 7-point response options and were reverse coded where appropriate. Furthermore, means were computed for all multi-item scales and these were used in subsequent analyses.

Intentions to exercise were assessed with four items, two of which were included after the first action regret item (i.e., 'I intend to exercise at least 4 times over the next 2 weeks', strongly disagree-strongly agree; 'I will definitely exercise at least 4 times over the next 2 weeks', strongly disagree-strongly agree; 'How likely is it that you will exercise at least 4 times over the next 2 weeks', very unlikely-very likely; and 'How strong is your intention to exercise at least 4 times over the next 2 weeks', not at all

strong-very strong), with higher scores indicating stronger intentions to perform the behaviour (Cronbach's alpha = .93, N = 382).

Attitudes were assessed as the mean of six semantic differential scales (i.e., 'For me, exercising at least 4 times over the next 2 weeks would be': bad-good; unpleasant-pleasant; not enjoyable-enjoyable; unsatisfying-satisfying; harmful-beneficial; negative-positive) with higher scores indicating more positive attitudes (Cronbach's alpha = .82, N = 384).

Subjective Norm (SN) was assessed with three items (i.e., 'Most people who are important to me think that I should exercise at least 4 times over the next 2 weeks', strongly disagree-strongly agree; 'People who are important to me would disapprove-approve of me exercising at least 4 times over the next 2 weeks'; 'If I exercised at least 4 times over the next 2 weeks my friends would approve', strongly disagree-strongly agree), with higher scores indicating more pressure to perform the behaviour (Cronbach's alpha = .67, N = 382).

Perceived Behavioural Control (PBC) was assessed with four items (i.e., 'I am in control of exercising at least 4 times over the next 2 weeks', strongly disagree-strongly agree; 'If I wanted to, I could easily exercise at least 4 times over the next 2 weeks', strongly disagree-strongly agree; 'How much control do you have over exercising at least 4 times over the next 2 weeks', no control-complete control; 'For me to exercise at least 4 times over the next 2 weeks would be' . . . very difficult-very easy), with higher scores indicating more control over performing the behaviour (Cronbach's alpha = .82, N = 383).

Anticipated Action Regret (AR) was assessed with three items (i.e. 'If I did exercise at least 4 times over the next 2 weeks I would later wish I had not', strongly disagree-strongly agree; 'If I did exercise at least 4 times over the next 2 weeks I would feel regret', strongly disagree-strongly agree; 'If I did exercise at least 4 times over the next

2 weeks I would feel upset', definitely no-definitely yes), with higher scores indicating strong action regret (Cronbach's alpha = .60, N = 385).

Anticipated Inaction Regret (IR) was assessed with three items, the first of which was placed at the very start of the questionnaire (i.e. 'If I did not exercise at least 4 times over the next 2 weeks I would feel regret', definitely no-definitely yes; 'If I did not exercise at least 4 times over the next 2 weeks I would later wish I had', strongly disagree-strongly agree; 'If I did not exercise at least 4 times over the next 2 weeks I would feel upset', definitely no-definitely yes), with higher scores indicating strong inaction regret (Cronbach's alpha = .85, N = 382).

In addition, a past behaviour measure was included, along with other measures not reported.

Past Behaviour was assessed with three items (i.e. 'In the past, I have exercised at least 4 times over a 2 week period', never-frequently; 'How many days did you exercise in the last 2 weeks', scale 0-8+; 'In the past six months I have exercised at least twice per week', never-frequently), with higher scores indicating frequent past exercise behaviour. Scores were standardized (Cronbach's alpha = .74, N = 380).

5.4.3.2 Questionnaire 2

The second questionnaire (not attached in the interests of space) repeated the same definition of exercise as detailed at Time 1 and contained the following measures:-

Self-reported behaviour was assessed with two items (i.e., 'How often did you exercise over the last two weeks?' not all the time-all the time; 'How many days did you exercise over the last two weeks', open ended), with higher scores indicating more exercise behaviour. Scores were standardized (Cronbach's alpha = .89, N = 220).

Future Intentions were measured with three of the items used at Time 1 (i.e. 'I intend to exercise at least 4 times over the next two weeks'; 'How strong is your intention to

exercise to exercise at least 4 times over the next 2 weeks'; 'I will definitely exercise at least 4 times over the next 2 weeks'). High scores indicated strong intentions (Cronbach's alpha = .96, N = 222).

Intention Stability was measured by calculating the absolute difference between the sum of intention items at Time 1 and Time 2: unpublished research by Conner has shown that this measure is highly correlated with other indices of intention stability and is no more likely to be a moderator than any other index.

5.4.4 Design and Procedure – Study 6

5.4.4.1 Questionnaire 1

As the questionnaire was identical to the pen-and-paper version, only the alphas varied and are detailed below for the appropriate scales. For Time 1 scales N = 1360, for Time 2 scales N = 777.

Intentions:	Cronbach's alpha = .94
Attitudes:	Cronbach's alpha = .82
Subjective Norms:	Cronbach's alpha = .73
PBC:	Cronbach's alpha = .83
Anticipated AR:	Cronbach's alpha = .65
Anticipated IR:	Cronbach's alpha = .86
Past Behaviour:	Cronbach's alpha = .80
Self-reported behaviour:	Cronbach's alpha = .92
Future Intentions:	Cronbach's alpha = .97

5.5 Hypotheses

The main predictions were the same as those from the previous studies, namely that in both web and pen-and-paper versions:-

(i) The addition of anticipated inaction regret will add to the variance explained in intentions over and above the traditional TPB variables, even in the presence of past behaviour;

(ii) Anticipated inaction regret will moderate the intention-behaviour relationship, such that when inaction regret is strong intentions are more likely to be translated into actions;

(iii) The above effect will be mediated by intention stability, such that anticipated regret promotes intentions being translated into actions because they are associated with more intention stability.

5.6 Results

5.6.1 Differences between T1 and T2 – Study 5

The sample was tested on all Time 1 variables to see if there were any differences between those who completed the Time 1 questionnaire only (N = 165) and those who completed both the Time 1 and Time 2 questionnaires (N = 222). A MANOVA revealed no significant multivariate effects ($F(1, 386) = .524$, n.s.).

5.6.2 Differences between T1 and T2 – Study 6

The sample was tested on all Time 1 variables to see if there were any differences between those who completed the Time 1 questionnaire only (N = 583) and those who completed both the Time 1 and Time 2 questionnaires (N = 777). A MANOVA revealed a significant multivariate effect ($F(1, 1360) = 4.60$, $p < .001$). Examination of univariate F ratios revealed a number of significant differences:-

(i) *Intentions* were higher in those participants who completed both questionnaires (M = 4.84, SD = 1.98) compared to those who just completed the first (M = 4.61, SD = 1.96) – $F(1, 1360) = 4.65$, $p < .05$;

(ii) *Attitudes* were more positive in those who had completed both questionnaires (M = 6.02, SD = .86) compared to those who completed T1 only (M = 5.89, SD = .95) – F (1, 1360) = 7.13, p < .01);

(iii) *Past Behaviour* (standardized score) was more frequent in those who had completed both questionnaires (i.e. T1T2 participants) compared to those who had only completed Time 1 questionnaires (T1 participants) – F (1, 1360) = 2.74, p = .05. The differences between the means and SDs of each past behaviour item are detailed below:-

a) Measure 1: T1T2 - M = 5.86, SD = 1.45; T1 – M = 5.68, SD = 1.58;

b) Measure 2: T1T2 - M = 4.72, SD = 2.65; T1 – M = 4.49, SD = 2.61;

c) Measure 3: T1T2 - M = 4.90, SD = 1.92; T1 – M = 4.78, SD = 1.94;

(iv) Anticipated action regret was lower in T1T2 participants (M = 1.50, SD = .78) compared to T1 only (M = 1.65, SD = .94) – F (1, 1360) = 10.39, p < .01;

There were no other significant differences on any other measured variables. So, attrition analysis shows it is clear that the final sample in Study 6 probably over-represents those whose intentions were stronger, attitudes were more positive, past behaviour was more frequent, anticipated action regret was lower.

5.6.3 Descriptives, Correlations and Regressions – Comparison of Results between Studies

The means and standard deviations for the study variables relating to Study 5 and Study 6 are detailed below in Table 5.2 to facilitate comparison. It is evident that the means, although around the same mark, were higher in all the variables in Study 6 (the web study), and especially in the self-reported past behaviour and actual behaviour measures. To see if there were any significant differences between the variable means of the two studies, t-tests were conducted on each variable; no significant differences

were revealed. In general, though, exercise had been moderately performed in the past and had been moderately performed, intentions were fairly strong, as was anticipated inaction regret, attitudes were very positive towards exercise as were SN and PBC, future intentions were moderately strong as were all the personality measures, apart from PBC which was just moderate.

Table 5.2. A comparison of the means and standard deviations for all study variables per study

Variable	Pen-and-Paper Study – Study 5			Scale Range	Web Study – Study 6		
	M	SD	N		M	SD	N
PAST BEHAVIOUR 1 (frequency measure)	5.55	1.61	380	1-7	5.79	1.51	1360
PAST BEHAVIOUR 2 (measure of actual days)	2.31	2.28	380	0-8+	4.62	2.63	1360
PAST BEHAVIOUR 3 (frequency measure)	4.32	1.97	380	1-7	4.85	1.93	1360
PAST BEHAVIOUR STANDARDISED	-1.84 - 1.58	.81	380	-	-2.18 - 1.19	.85	1366
BEHAVIOUR 1 (frequency measure)	3.40	1.87	215	1-7	3.71	1.85	777
BEHAVIOUR 2 (measure of actual days)	3.24	3.26	215	0-14/16*	4.39	3.35	777
BEHAVIOUR STANDARDISED	-1.14 - 2.61	.95	215	-	-1.39 - 2.35	.96	777
INTENTION	4.35	1.80	380	1-7	4.84	1.98	1360
ANTICIPATED IR	4.28	1.77	380	1-7	4.57	1.79	1360
ANTICIPATED AR	1.62	.81	380	1-7	1.50	.78	1360
ATTITUDE	5.78	.91	380	1-7	6.02	.86	1360
SN	5.05	1.07	380	1-7	5.20	1.15	1360
PBC	5.38	1.22	380	1-7	5.65	1.17	1360
FUTURE INTENTION	4.47	1.98	380	1-7	4.78	2.06	1360

* 0-14 for Pen and Paper Study : 0-16 for Web Study (open ended scale)

A t-test established that there were significant differences between anticipated inaction and action regret for both Study 5 ($t(379) = -25.01$, $p < .001$) and Study 6 ($t(1359) = -51.25$, $p < .001$) with the means showing that anticipated inaction regret was higher than anticipated action regret in both versions. Consequently, anticipated inaction regret was deemed the appropriate regret term to include in all future analysis as, obviously one term is the contra-position of the other.

Table 5.3 compares the correlations of most interest between the two studies, whilst

Table 5.4 details the correlations between all the study variables for both versions of the study. All the TPB variables and the additional variables of past behaviour and anticipated regret are strongly and significantly correlated. The correlations of most interest (Table 5.3) are stronger in the web version (Study 6), apart from intention-regret, which is stronger in the pen and paper version (Study 5). However, tests of significance between the two r's have revealed only one significant result; namely the intention-behaviour correlations were significantly different from one another, with the web study (Study 6) correlation being higher. These correlations are higher than those revealed in the meta-analysis, where the r+ for intention-anticipated regret was .47 whilst the r+ for regret-behaviour was .30.

Table 5.3. Comparison of main correlations between the two studies, and tests of significance results

Correlation	Pen and Paper Study – Study 5 r 1	Web Study – Study 6 r 2	Transformation of r1 and r2 into z score	Significance of z score
Intention-Behaviour	.636***	.740***	-2.564	p <.05
Intention-IR	.822***	.796***	0.923	n.s
IR-Behaviour	.565***	.620***	-1.090	n.s

Note. * p<0.05, **p<0.01, ***p<0.001
Pen-and-paper N = 215; Web N = 777

Table 5.4. Correlations between variables for both Study 5 (right hand, above the diagonal in normal font, N = 215) and Study 6 (left hand, below the diagonal in bold font, N = 777)

Variables	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Intention		.571***	.352***	.557***	.697***	.822***	.636***	.758***	.931***
2. Attitude	**.547*** **		.363***	.415***	.532***	.533***	.444***	.481***	.546***
3. Subjective Norm	**.243*** **	**.278*** **		.199**	.335***	.427***	.286***	.304***	.381***
4.Perceived Behavioural Control	**.608*** **	**.399*** **	**.171*** **		.539***	.351***	.367***	.443***	.476
5. Past Behaviour	**.793*** **	**.487*** **	**.194*** **	**.559*** **		.589***	.664***	.646***	.683***
6. Anticipated Inaction Regret	**.796*** **	**.537*** **	**.353*** **	**.460*** **	**.653*** **		.565***	.689***	.938***
7. Behaviour	**.740*** **	**.425*** **	**.189*** **	**.468*** **	**.727*** **	**.620*** **		.727***	.631***
8. Future Intention	**.833*** **	**.515*** **	**.253*** **	**.491*** **	**.710*** **	**.738*** **	**.762*** **		.740***
9. Intention/Anticipated IR interaction	**.922*** **	**.550*** **	**.299*** **	**.559*** **	**.756*** **	**.936*** **	**.734*** **	**.806*** **	

Note. * p<0.05, **p<0.01, ***p<0.001

5.6.4 Discriminant and Convergent Validity

5.6.4.1 Study 5

The discriminant and convergent validity of the attitude and anticipated inaction regret measures were assessed using Principal Components Analysis using varimax rotation. It was expected that only two factors would be revealed; however, this analysis revealed three factors explaining more than an average amount of variance (i.e. eigenvalues > 1). The three factors explained 73.9% of the variance in total: from the rotated factors, the first factor explained 46.5% of the variance (eigenvalue = 4.18); the second factor explained 15.8% of the variance (eigenvalue = 1.42); the third factor explained 11.7% of the variance (eigenvalue = 1.05). Table 5.5 details the correlation matrix.

Table 5.5. Correlation Matrix between attitude items and IR items (p < .001)

Variables	Pleasant/ Unpleasant	Enjoyable/ Not Enjoyable	Satisfying/ Unsatisfying	Beneficial/ Harmful	Positive/ Negative	Inact. Regret	Wish had	Upset
Good/ Bad	.309	.334	.552	.345	.605	.236	.363	.238
Pleasant/ Unpleasant		.724	.420	.250	.325	.406	.320	.377
Enjoyable/ Not enjoyable			.538	.253	.408	.365	.306	.362
Satisfying/ Unsatisfying				.394	.630	.340	.381	.329
Beneficial/ Harmful					.508	.202	.301	.225
Positive/ Negative						.251	.384	.270
Inaction Regret							.623	.703
Wish had								.628

Table 5.6 details the correlations between each item and the three factors. All but two of the attitude items loaded on the first factor (loadings = .77, .69, .70, .85) but not on the second nor third factors; items 2 and 3 (pleasant and enjoyable) loaded on the third factor (loadings .87, .88), but not on the first nor second factor. Anticipated

inaction regret items loaded on the second factor (loadings = .86, .80, .86) but not on the first nor third factor.

Table 5.6. Rotated factor loadings

VARIABLES	FACTORS		
	1	2	3
Good/ Bad	**.77**	.13	.17
Pleasant/ Unpleasant	.16	.24	**.87**
Enjoyable/ Not enjoyable	.25	.17	**.88**
Satisfying/ Unsatisfying	**.69**	.18	.42
Beneficial/ Harmful	**.70**	.15	.02
Positive/ Negative	**.85**	.13	.19
Inaction Regret	.09	**.86**	.24
Wish had	.33	**.80**	.06
Upset	.12	**.86**	.21

It would appear then that attitude items 2 and 3 (pleasant/unpleasant: enjoyable/not enjoyable) tap into a different construct completely from attitude and anticipated inaction regret; these items are usually referred to as experiential measures, and these results yet again support the view that anticipated regret is a totally different construct from the attitude measure when attitude is defined as incorporating experiential and instrumental aspects. As a matter of interest, a "cleaner" measure of attitude was recalculated, removing these items from the scale, resulting in a Cronbach's alpha of .80 as opposed to .82. The mean of these four remaining items was calculated and used to produce another correlation matrix between variables, with means and SDs to see if there were any differences. The mean of attitude increased from 5.78, SD = .91 to 6.19, SD = .46. The correlation between attitude and anticipated inaction regret was reduced from $r = .533$ to $r = .456$, $p < .001$. The analyses detailed subsequently used the original

attitude measure, but where significant results were obtained, the analyses were re-run with the cleaner measure to compare results. However, analysis was also conducted to evaluate the contribution of anticipated regret to the TPB after controlling for experiential and instrumental components of the attitude measure.

5.6.4.2 Study 6

Again, the discriminant and convergent validity of the attitude and IR measures were assessed using Principal Components Analysis using varimax rotation. Three factors were extracted which explained 73.1% of the variance in total: the first factor explained 47.3% of the variance (eigenvalue = 4.25), the second accounted for 15.3% of the variance (eigenvalue = 1.38), whilst the third accounted for 10.6% of the variance (eigenvalue = 0.95).[23] Table 5.7 details the correlation matrix.

Table 5.7. Correlation Matrix between attitude and IR items ($p < .001$)

Variables	Pleasant/ Unpleasant	Enjoyable/ Not Enjoyable	Satisfying/ Unsatisfying	Beneficial/ Harmful	Positive/ Negative	Inaction Regret	Wish had	Upset
Good/ Bad	.365	.376	.571	.374	.548	.322	.362	.265
Pleasant/ Unpleasant		.705	.399	.263	.387	.431	.354	.345
Enjoyable/ Not enjoyable			.518	.228	.414	.465	.380	.387
Satisfying/ Unsatisfying				.382	.540	.362	.374	.312
Beneficial/ Harmful					.488	.191	.270	.208
Positive/ Negative						.299	.355	.254
Inaction Regret							.671	.694
Wish had								.648

Table 5.8 details the correlations between each item and the three factors. As in Study 5, all but two attitude items loaded on the first factor (loadings = .72, .66, .78, .78), but not on the second nor third factors; items 2 and 3 (pleasant, enjoyable) loaded

[23] Analysis was originally conducted searching for eigenvalues > 1; although this produced only 2 factors, the 'experiential' component of attitude loaded on both, but loading figures were weak, .e.g. .47. A clearer result was produced forcing 3 factors, with the third factor being only slightly < .1 (i.e. .95).

on the third factor (loadings .85 and .86) but not on the first nor second factor. Anticipated inaction regret items loaded on the second factor (loadings = .84, .83, .87) but not on the first or third factors.

Table 5.8. Rotated factor loadings

VARIABLES	FACTORS		
	1	2	3
Good/ Bad	**.72**	.17	.25
Pleasant/ Unpleasant	.20	.21	**.85**
Enjoyable/ Not enjoyable	.23	.25	**.86**
Satisfying/ Unsatisfying	**.66**	.19	.41
Beneficial/ Harmful	**.78**	.12	.04
Positive/ Negative	**.78**	.13	.25
Inaction Regret	.13	**.84**	.30
Wish had	.27	**.83**	.12
Upset	.12	**.87**	.16

So again, it would appear that attitude items pleasant/unpleasant and enjoyable/not enjoyable tap into a different construct completely from the other attitude measures and anticipated inaction regret, suggesting an experiential and instrumental attitude measure along with an anticipated regret measure. As before, a "cleaner" measure of attitude was recalculated, removing the experiential items from the attitude scale, resulting in a Cronbach's alpha of .79 as opposed to .82. The mean of these four remaining items was calculated and used to produce another correlation matrix between variables, with means and SDs to see if there were any differences. The mean of attitude increased from 6.02 (SD = .86) to 6.34 (SD = .79). The correlation between attitude and anticipated inaction regret was reduced from $r = .537$ to $r = .456$, $p < .001$. The analyses detailed below used the original attitude measure, but where significant results

were obtained, the analyses were re-run with the cleaner measure to compare results. However, as in Study 5 analysis was also conducted to evaluate the contribution of anticipated regret after controlling for these experiential and instrumental components of the attitude measure.

5.6.5 Regressions to Predict Intentions

A 3-step hierarchical regression was carried out to predict intentions in the first instance, to test the augmented TPB. At step 1, attitude, SN and PBC were included; at step 2, anticipated regret was added; and at step 3, past behaviour was added. The results are detailed in Table 5.9. The variance reported at step 1 in both studies is in line with the results reported in various meta-analyses looking at the TPB and physical activity (Godin & Kok, 1996; Hagger et al., 2002; Hausenblas, Carron, & Mack, 1997). However, it would appear that anticipated inaction regret is not only a significant addition to the TPB in both studies, but also makes the strongest contribution to the model, even after the addition of past behaviour. Indeed, anticipated inaction regret is especially strong in Study 5 - the pen-and-paper version (Study 5, Beta = .602, $p < .001$: Study 6, Beta = .443, $p < .001$), which probably reflects the stronger r in the correlation analysis between intention/anticipated regret (Study 5, $r = .822$, $p < .001$: Study 6, $r = .796$, $p < .001$). A test of significance for regression coefficients was carried out (Edwards, 1984) on anticipated inaction regret; there was a significant difference ($t(1,738) = 3.69$, $p < .001$) between the two Betas. The R^2 Change for both studies was larger than the .07 attained in the meta-analysis, with R^2 Change for Study 5 = .31 and R^2 Change for Study 6 = .22. Indeed, the regression was re-run to replicate the steps reported in Abraham and Sheeran (2003), so that anticipated regret was added *after* past behaviour at step 3 for equivalence: in Study 5, regret added a further 21% to the variance explained whilst in study 6 regret added a further 10%, but both R^2 Changes were larger than the 5.3% revealed in Abraham and Sheeran (2004).

Table 5.9. Comparison between the two studies of the 3-step hierarchical regression to predict intentions (Study 5 N = 380; Study 6 N = 1360)

Variable	Step 1		Step 2		Step 3	
	Study 5	Study 6	Study 5	Study 6	Study 5	Study 6
	β	β	β	β	β	β
Attitude	.326***	.330***	.098**	.137***	.040	.081***
SN	.106*	.078***	-.059	-.068***	-.044	-.050***
PBC	.403***	.464***	.260***	.305***	.171***	.179***
IR			.686***	.605***	.602***	.443***
Past Beh.					.249***	.370***
R^2	.42	.49	.73	.71	.76	.77
R^2 change	-	-	.31***	.22***	.03***	.06***

Note. * p<0.05, **p<0.01, ***p<0.001

Table 5.10. Comparison between the two studies of the 3-step hierarchical regression to predict intentions controlling for experiential and instrumental measures of the attitude construct – anticipated inaction regret added at Step 3 *after* past behaviour (Study 5 N = 380; Study 6 N = 1360)

Variable	Step 1		Step 2		Step 3	
	Study 5	Study 6	Study 5	Study 6	Study 5	Study 6
	β	β	β	β	β	β
Exp. Attitude	.313***	.342***	.149**	.155***	.093**	.105***
Ins. Attitude	.068	.049	.060	.047*	-.034	-.010
SN	.122**	.097***	.101**	.054*****	-.036	-.043**
PBC	.395***	.446***	.209***	.206***	.177***	.178***
Past Beh.			.453***	.554***	.226***	.353***
IR					.603***	.443***
R^2	.44	.51	.56	.68	.77	.78
R^2 change	-	-	.12***	.17***	.21***	.09***

5.6.5.1 Attitude and Anticipated Regret – Regressions Re-run to Control for Experiential Effects

It will be noted from Table 5.9 that attitude remained a significant predictor at Step 2 in Study 6: in view of the results revealed by the factor analysis about the attitude measure in Study 6, the above regression to predict intention was re-run using the cleaner measure of attitude (i.e., without two of the items which loaded on both factors). The results were almost identical, and therefore are not reported in full. To further discriminate between anticipated regret and the experiential component of attitude, the analysis was also re-run for both studies, controlling for the two experiential measures of the attitude construct (i.e., pleasant, enjoyable) and the instrumental measure of attitude (i.e. good, satisfying, beneficial, positive): in order to compare with the results from Abraham and Sheeran (2003), anticipated regret was added after past behaviour at step 3 for equivalence. The results are reported in Table 5.10. It is clear for both studies that although the experiential component of the attitude construct makes a significant contribution to the model, when anticipated regret is added at step 3 it makes the strongest contribution. These results demonstrate the discrete nature of anticipated regret in relation to even experiential attitudes. Finally, intercorrelations revealed that anticipated regret and experiential attitude were significantly but not strongly related (pen-and-paper $r = .438$, $p < .01$: web $r = .484$) and were similar to anticipated regret and instrumental attitude (pen-and-paper $r = .433$, $p < .01$: web $r = .430$).

5.6.6 Regressions to Predict Behaviour – Impact of AR Directly and Moderation of AR on the Intention-Behaviour Relationship

To test the study hypothesis, a 4-step hierarchical moderated regression analysis was conducted (c.f. Baron & Kenny, 1986). As in Abraham and Sheeran (2003 – study 1), all TPB variables were entered at step 1, past behaviour at step 2, anticipated inaction regret at step 3, and the intention by anticipated inaction regret interaction term in the

final step. Measures of intention and anticipated inaction regret were mean-centred to reduce multicollinearity (Aiken & West, 1991). Table 5.11 shows that the TPB variables explained 42% of the variance in behaviour in Study 5, which increased to 55% in Study 6. Intention was the only significant contributor in both studies, but was strongest in Study 6. These results are much higher than those reported in previous meta-analyses focussing on physical activity, where the average variance explained is between 27% (Hager et al, 2002) and 36% (Godin & Kok, 1996), and higher than the 38% reported in Abraham and Sheeran's (2003) study. The addition of past behaviour increased the explained variance by 8% in Study 5 (F change = 36.15, $p < .001$) and by 5% in Study 6 (F change = 100.16, $p < .001$). Intention remained significant, and past behaviour had significant beta coefficients; in Study 6 intention remained the strongest contributor even in the presence of past behaviour, but past behaviour was the most significant contributor in Study 5. Anticipated inaction regret entered the regression equation at step 3, but did not make a significant contribution to the model in either study; this is in contrast to the results from Abraham and Sheeran (2003) Study 1.[24] Finally, the entry of the intention by anticipated inaction regret interaction term produced a significant 2% increment in the variance explained **only** in Web Study 6 (F change = 49.48, $p < .001$).[25] This again is in contrast to the results from Abraham and Sheeran's (2003) pen-and-paper study. Intention remained the most significant contributor, past behaviour was also still significant, and anticipated inaction regret x intention interaction had a significant beta coefficient. The final model for Study 6

[24] The regression was re-done, with past behaviour included at the final step in order to isolate potential effects: the addition of anticipated inaction regret remained insignificant in the pen-and-paper study, but became marginally significant in the web study (Beta = .083, $p = .05 < R^2 = .55$, R^2 Change = .002). However, the significance was lost at the next step.

[25] The interaction term became marginally significant in the pen-and-paper version when the regression was re-done as above (Beta = .097, $p = .08$, $R^2 = .43$, R^2 Change = .009): however, its 'significance' was lost completely when past behaviour was included at the final step.

Table 5.11. Comparison between the two studies of a 4-step hierarchical regression to predict behaviour using the intention x anticipated regret interaction term (Study 5 N = 215; Study 6 N = 777)

Variable	Step 1		Step 2		Step 3		Step 4	
	Study 5	Study 6	Study 5	Study 6	Study 5	Study 6	Study 5	Study 6
	β	β	β	β	β	β	β	β
Attitude	.118	.025	.050	.000	.043	-.007	.052	.007
SN	.043	.005	.012	.010	.000	.000	.005	.010
PBC	-.001	.025	-.085	-.019	-.070	-.015	-.074	-.029
Intention	.552***	.710***	.341***	.447***	.271*	.405***	.286**	.508***
Past Beh.			.435***	.380***	.432***	.377***	.421***	.350***
IR					.088	.062	.080	.055
IR/Intention							.039	.176***
R^2	.42	.55	.50	.60	.50	.60	.50	.63
R^2 in A&S Study	.38		.53		.54		.55	
R^2 change	-	-	.085***	.052***	.002	.001	.001	.024***

Note. * p<0.05, **p<0.01, ***p<0.001

explained 63% of the variance in exercising. The R^2 are included in Table 5.11 from Abraham and Sheeran's (2003) study to allow comparison with Study 5 in particular: it is evident that the R^2 were higher in their study at all steps, apart from step 1 where Study 5 produced the largest R^2.

Tests of significance for the intention, anticipated inaction regret and interaction regression coefficients from step 4 were carried out to see if there were significant differences between the studies. Significant effects were found for intention ($t = (990)$ 1.76, $p < .05$) and for the interaction ($t (990) = 2.176$, $p < .025$), with the Betas evidently being stronger in Study 6, but not for anticipated inaction regret ($t (990)$ $= -0.240$, n.s.).

5.6.7 Single-item versus Multi-item Measures – A Comparison

Studies 3 and 4, both web studies, also found moderation effects, but used only single items to measure constructs: although there had been a pen-and-paper study (Study 2), there was no behaviour analysis due to small participant numbers. To allow comparison between these web studies then, the analyses detailed above were re-run using the same single item scales for intention, SN, PBC, PB and IR as used in Studies 3 and 4 to see if the differences between the results from Study 5 and Study 6 arose not just because of data collection medium, but because of multi-item scales; the results are detailed in Table 5.12 for Study 6. It is evident that there are a number of differences: attitude and PBC make significant contributions to the model throughout all the steps, unlike the multi-item scale results; past behaviour is not as strong as in the multi-item scale; importantly though, anticipated inaction regret makes a positive and significant contribution to the model at step 3, unlike the multi-item scale results, although by step 4 it becomes a *negative* and significantly reduced contributor (this same pattern of positive becoming negative in the face of the interaction was also evident in Study 4,

Table 5.12. Comparison of Study 6 Regression for Interaction using (1) only single-item scales, i.e. as in past studies reported in previous chapters and (2) multi-item scales, i.e. Study 6 results reported at Table 5.10

Variable	Step 1		Step 2		Step 3		Step 4	
	Single-item Scales (1)	Multi-item Scales (2)	Single-item Scales (1)	Multi-item Scales (2)	Single-item Scales (1)	Multi-item Scales (2)	Single-item Scales (1)	Multi-item Scales (2)
	β	β	β	β	β	β	β	β
Attitude	.096**	.025	.080**	.000	.069*	-.007	.074*	.007
SN	-.004	.005	-.007	.010	-.019	.000	-.014	.010
PBC	.159***	.025	.145***	-.019	.131***	-.015	.124***	-.029
Intention	.531***	.710***	.510***	.447***	.375***	.405***	..153*	.508***
Past Beh.			.079*	.380***	.061*	.377***	.065*	.350***
IR					.197***	.062	-.264*	.055
IR/Int.							.666***	.176***
R^2	.48	.55	.49	.60	.50	.60	.51	.63
R^2 change	-	-	.004*	.052***	.012***	.001	.015***	.024***

Note. * p<0.05, **p<0.01, ***p<0.001

section 4.9.2.2); and the interaction, although still with the same level of significance, is much stronger in the single-item scale results. Interactions tend to have fairly small effects by definition, and it could be argued that by changing the measures to single items, this creates the explanatory space in which an interaction might be detected. However, it is clear that there is a 10% difference in the variance explained at step 3 between the single-item model (R^2 = .50) and the multi-item model (R^2 = .60), therefore although the explanatory space to detect an interaction is *reduced* in the single-item model, the Beta is stronger. The variance increased less in the single item model (R^2 = .015) than in the multi-item model (R^2 = .024), which further confirms that the stronger Beta in the single-item scale cannot be said to have occurred due to increasing the explanatory space (i.e., the space available where variance can be determined): so, it seems that despite there being less space to detect an interaction, the effect is stronger with single items as opposed to the usually preferred multi-item model.

Due to this outcome, the regression for Study 5 was also re-run using the single-item scales, and the results are detailed in Table 5.13. This time there was a 9%

difference in the variance explained at step 3 between the single-item model ($R^2 = .41$) and the multi-item model ($R^2 = .50$), therefore the explanatory space to detect an interaction was again *reduced* in the single-item model. Nevertheless, the variance explained increased by .012 ($R^2 = .42$), as the anticipated regret-intention interaction made a significant contribution to the model this time (Beta = .547, $p < .05$).

Table 5.13. Comparison of Study 5 Regression for Interaction using (1) only single-item scales, i.e. as in past studies reported in previous chapters and (2) multi-item scales, i.e. Study 5 results reported at Table 5.10

Variable	Step 1		Step 2		Step 3		Step 4	
	Single-item Scales (1)	Multi-item Scales (2)	Single-item Scales (1)	Multi-item Scales (2)	Single-item Scales (1)	Multi-item Scales (2)	Single-item Scales (1)	Multi-item Scales (2)
	β	β	β	β	β	β	β	β
Attitude	.091	.118	.069	.050	.054	.043	.068	.052
SN	.135*	.043	.127*	.012	.114	.000	.121*	.005
PBC	.119	-.001	.076	-.085	.083	-.070	.058	-.074
Intention	.430***	.552***	.419***	.341***	.351***	.271*	.153	.286**
Past Beh.			.123	.435***	.115	.432***	.116	.421***
IR					.109	.088	-.262	.080
IR/Int.							.547*	.039
R^2	.39	.42	.41	.50	.41	.50	.42	.50
R^2 change	-	-	.010	.085***	.005	.002	.012*	.001

Note. * p<0.05, **p<0.01, ***p<0.001

So, although the multi-item model would usually be regarded as a stringent test, the single-item model appeared not only to be more conservative regarding the explained variance, but was also the model where a significant interaction was revealed for the first time in Study 5 and where the interaction was strongest in Study 6: this was despite the explanatory space to detect a difference being less than the multi-item model. Nevertheless, although using a single-item model established a moderation effect for anticipated regret on the intention-behaviour relationship in *both* studies, it is important to remember that the multi-item model detailed in this chapter was designed to replicate

the pen-and-paper study used by Abraham and Sheeran (2003), and that there was no replication of effect in Study 5 despite a similar design.

5.6.8 Decomposition of the AR-Intention Interaction

Regarding the multi-item model results for Study 6, the interaction term was decomposed using simple slope analyses (Aiken & West, 1991). Regression lines for intention were examined at three levels of the moderator (anticipated inaction regret), i.e. at the mean and at one standard deviation above and below the mean. Figure 5.1 plots the strength of the intention-behaviour relationship as a function of anticipated inaction regret.

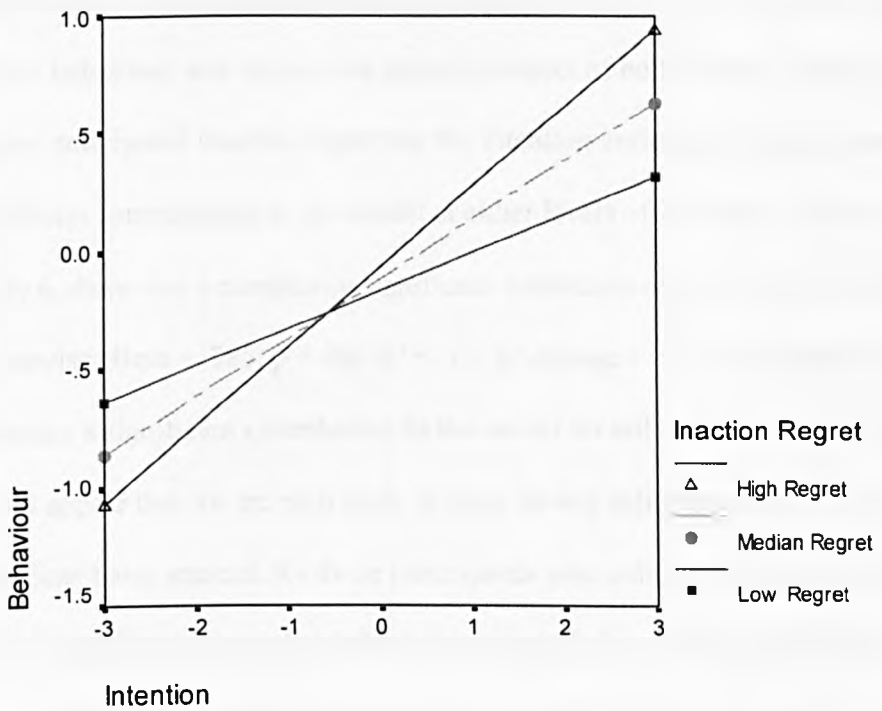

Figure 5.1. Study 6: Interaction between inaction regret and intention on exercise behaviour. *Note* **Simple slopes for regression of exercise behaviour on intention for low anticipated regret** (M - 1SD), **moderate anticipated regret** (M), **and high anticipated regret** (M + SD). **The measure of exercise behaviour is the mean of two z scores, allowing negative scores.**

Even when anticipated inaction regret is low, intentions positively predict behaviour (Beta = .16, $p < .001$), but as anticipated inaction regret increases from low to moderate,

and from moderate to high, the predictive validity of intentions increases (Betas = .25 and .34, respectively, $p < .001$). When intentions were high, participants who anticipated greater regret exercised on 27% more days compared to participants who anticipated less regret.

5.6.9 Regression to Predict Behaviour – High versus Low Intenders

Further analyses were carried out to see if the significant hierarchical regression was specific to only those people who indicated strong intentions to exercise regularly. A median split based on those participants who completed T1 and T2 measures was used to differentiate between high and low intention; then the 4-step hierarchical regression to predict behaviour was carried out again in respect of both studies. Regarding Study 5, neither anticipated inaction regret nor the intention-anticipated regret interaction made significant contributions to the model at either levels of intention. However, regarding Study 6, there was a marginally significant interaction only for those with strong intentions to exercise (Beta = .285, $p = .06$, $R^2 = .43$, R^2 change = .01): anticipated inaction regret did not make a significant contribution to the model for either high or low intenders. So it would appear that for the web study at least, strong anticipated regret led to strong intentions being enacted for those participants who indicated stronger intentions to exercise.

5.6.10 Regression to Predict Behaviour – Study 6 Re-analysed Using Only Psychology Students and then Excluding Psychology Students

The data for Study 6 was re-analysed selecting only those participants who had indicated that they were studying psychology; this was to ensure equivalence with Study 5, which had only used psychology students, to see if there were differences between the web and pen-and-paper version (S5) due to the wider participant base used in the web study (S6). At the Time 1 questionnaire, there were 107 students in this category whose ages ranged from 17-41 years ($M = 20.18$, $SD = 2.48$). Of these, 17% were males ($N = 18$) and

83% were females (N = 89), which accurately reflects the gender breakdown in Study 5. Of this sample, 72% (N = 77) went on to complete the Time 2 questionnaire: age ranged from 17-25 (M = 19.94, SD = 1.39); 18% were males (N = 14) and 82% were females (N = 63).

The 4-step hierarchical regression to predict behaviour was re-run on these participants and the results are detailed in Table 5.14. It can be seen that at step 1, the intention beta

Table 5.14. A 4-step hierarchical regression to predict behaviour in the web study for psychology students only (n = 77)

Variable	Step 1	Step 2	Step 3	Step 4
	β	β	β	β
Attitude	.065	.066	.067	.027
SN	-.017	.007	.009	.002
PBC	.184	.092	.092	.030
Intention	.587***	.279*	.289	.436*
Past Behaviour		.448**	.447**	.458***
IR			-.011	.103
IR/Intention				.288**
R^2 (R^2 for S6)	.56 (.55)	.62 (.60)	.62 (.60)	.66 (.63)
R^2 change	-	.07**	.00	.04**

Note. * p<0.05, **p<0.01, ***p<0.001

coefficient was higher than the pen-and-paper version (Beta = .552) but lower than the web version (Beta = .710). The addition of past behaviour at step 2 led to a higher beta coefficient than both studies previously (pen-and-paper Beta = .435; Web Beta = .380). When anticipated inaction regret was added at step 4, it remained non-significant like

previously found. Finally, the beta coefficient for the interaction term was significant – unlike the pen-and-paper and version – and indeed was stronger than that in the web version (Beta = .176). It is also evident that all of the R^2 were slightly higher than Study 6.

So, it can be concluded that the significant interaction found in Study 6 previously was not due to the wider participant base, and that when compared using only participants on the same type of course, these differences prevailed. The regression was then again redone *excluding* psychology students from the participant base to allow further comparisons. The results are outlined in Table 5.15.

Table 5.15. A 4-step hierarchical regression to predict behaviour in the web study using all participants *except* psychology students (n = 700)

Variable	Step 1	Step 2	Step 3	Step 4
	β	β	β	β
Attitude	.021	-.088	-.016	.003
SN	.008	.011	.001	.011
PBC	.010	-.029	-.024	-.035
Intention	.721***	.465***	.419***	.514***
Past Behaviour		.372***	.367***	.338***
IR			.069	.056
IR/Intention				.163**
R^2 (R^2 for S6)	.55 (.55)	.60 (.60)	.60 (.60)	.62 (.63)
R^2 change	-	.05***	.00	.02***

Note. * p<0.05, **p<0.01, ***p<0.001

At step 1, the intention beta coefficient was higher than the pen-and-paper version (.552), the whole web version (.710) and the psychology only version (.587). The addition of past behaviour at step 2, although still significant, was due to a weaker beta coefficient than the pen-and-paper version (.435), the whole web version (.380), and the psychology only version (.448). Anticipated inaction regret remained non-significant at step 3.

Finally, at step 4, the interaction term was significant, albeit the beta coefficient was lower than the web version (.176) and the psychology only version (.288). It is also clear that the R^2 are almost identical to Study 6. Nonetheless, however Study 6 is analysed, the intention-exercise behaviour relationship would seem to be moderated by anticipated inaction regret.

5.6.11 Mediation Analysis – The Role of Intention Stability in AR's Moderation of the Intention-Behaviour Relationship

As in Study 4, the effect of intention stability on the intention-behaviour relationship was tested, but only in Study 6 where it had been established that the interaction between anticipated regret and intention was significantly associated with exercise behaviour.[26] Then mediation analysis was conducted to assess whether anticipated regret's influence on the intention-behaviour relationship was mediated by this effect. Initially, intention stability was tested by establishing the absolute difference between the sum of intention items at Time 1 and Time 2. Analysis was also conducted to establish that anticipated inaction regret and its interaction with intention were associated with the mediators: the anticipated regret-intention interaction was significantly associated with intention stability ($R^2 = .04$, $F = 32.52$, $Beta = .20$, $p < .001$); anticipated inaction regret was also significant

[26] Post-hoc analysis was also conducted on Study 5 using the single items previously shown to reveal moderation effects. Interaction terms were generated for intention stability x intention also using single items. Moderation of the intention-behaviour relationship by anticipated inaction regret was shown to be totally mediated by intention stability (β reduced from .547. $p < .05$ to .292, n.s.: intention x intention stability β = .554, $p < .001$: R^2 Change = .07).

associated with the intention stability-intention interaction ($R^2 = .18$, $F = 166.87$, Beta = -.42, $p < .001$). Then a 6-step hierarchical regression analysis controlling for other TPB variables and past behaviour was conducted (as mentioned in Chapter 4, this was a more stringent test that that described in Abraham and Sheeran, 2003, study 3, who only included the main variables of intention, anticipated regret, intention stability and interaction terms). A further interaction term was generated for intention x intention stability: step 1 included attitude, SN, PBC and intention, step 2 added anticipated inaction regret, step 3 added past behaviour, step 4 included the anticipated regret by intention interaction term, step 5 added intention stability and finally at step 6 the intention stability by intention interaction term was included. To re-iterate, in order to find mediation of moderators there must be an increment in the variance explained when the intention stability-intention interaction term enters the equation at step 6, in addition to either a reduction in the beta coefficient for the anticipated regret-intention moderator ('a significant mediation') or the moderator becoming non-significant ('a total mediation'). The results from the relevant steps are detailed in Table 5.16.

Step 4 establishes the significant moderator effect, and is as previously reported in Table 5.11. Step 5 shows that intention stability significantly adds to the explained variance in exercise behaviour. Step 6 reveals that moderation of the intention-behaviour relationship by anticipated inaction regret is significantly (but not totally) mediated by intention stability, in that the beta coefficient for the anticipated regret-intention interaction is reduced (from .176 to .151). In Abraham and Sheeran's (2003) study, there was a total mediation in that the anticipated regret-intention moderator lost its significance at the final

Table 5.16. Moderated regression analysis to test for mediation of IR-intention by intention stability-intention on the intention-behaviour relationship - appropriate steps

Variable	Step 4	Step 5	Step 6
	Beta	Beta	Beta
Intention	.508***	.496***	.624***
Attitude	.007	.008	.002
SN	.010	.015	.006
PBC	-.029	-.031	-.023
IR	.055	.050	.029
Past Behaviour	.350***	.348***	.327***
IR x intention	.176** ☺	.157***	.151*** ☺
Intention Stability		.057* ☺	.073**
Intention Stability x intention			.162*** ☺
Change in R^2 (R^2 %)	.024*** (63%)	.003* (63%)	.016*** (65%)
Model F	184.04***	162.76***	154.67***

***** p < .001 ** p < .01 * p < .05 ☺ = criterion met**

step (this effect was also replicated in Study 4 when conditions were merged), but the final R^2 of 65% is higher than Abraham and Sheeran's 55% and the 39% from Study 4. In line with previous findings, it is asserted that anticipated regret promotes action because it is associated with more stable intentions.

5.7 Discussion and Directions for Future Research

Studies 5 and 6 set out to replicate the results obtained in Abraham and Sheeran's (2003; 2004) research into regular exercise behaviour. The design and analysis broadly followed the plan from their studies; Study 5 in particular was an almost identical replica of their study in terms of the medium used (pen-and-paper), items included to test constructs, sample numbers and target population. These studies also investigated factors accounting

for discrepancies in results between the two data collection mediums, specifically testing single versus multi-item constructs, and conducting sub-population analysis in the web study focussing on psychology-only undergraduates versus others. Although both Studies 5 and 6 further supported the addition of anticipated regret to the TPB in terms of increasing the amount of variance explained in intentions, Study 5 failed to replicate the moderation of the intention-behaviour relationship by anticipated regret evident in Abraham and Sheeran's research. However, regression analysis using single-item measures achieved a similar effect, but this merely serves to further contradict the replication of results from the multi-item measure design used in Abraham and Sheeran's research. Only in the web study (Study 6) was such an effect replicated (using either single or multi-items), and where replication of anticipated regret's mediation by intention stability was also evident, albeit in Study 6 this was significant rather than total as in Sheeran and Abraham (2003). It is of note that moderation and mediation effects for exercise behaviour were established in Study 4: the fact this was also a web designed study begs the question whether it was something about the mode of questionnaire delivery which consistently produced these results. This leads to the possibility that differences between the web and pen-and-paper study could have been as a result of the broader participant base procured in the web study, but this was tested (and refuted) by focussing on the sub-section of results from the psychology undergraduate population, to ensure equivalence between the pen-and-paper population and the web population. This test also dealt with the argument that an effect was achieved due to the power from using large numbers of participants, as the N was significantly reduced and the effect remained.

In sum, then, it seems that the pen-and-paper version of the study was sensitive to the number of items used to measure scales, whereas the web study was not. But this latter design does not replicate that from Abraham and Sheeran's research. These results are

surprising, especially as anticipated regret was measured first before intention, the very manipulation which achieved particularly strong results in Abraham and Sheeran's pen-and-paper studies (2003; 2004). Furthermore, the disparity between Studies 5 and 6 cannot be attributable to the different populations, because even when this was made equivalent by analysing only psychology undergraduates in the web study, the effect in Study 6 remained. It therefore seems likely, although not certain, that the delivery medium is a confounding variable in the studies described in this chapter. Even so, it is clear that ***exact*** replication of the Abraham and Sheeran findings (2003; 2004) has not been fully achieved, thereby highlighting the need to perhaps conduct a further pen-and-paper study to investigate this again. Nevertheless, the body of evidence from Studies 2 to 6 in this thesis indicate that *overall* anticipated regret, clearly defined, makes a significant and additional contribution to the prediction of intentions over a wide variety of behaviours, and that there is evidence to suggest that for exercise behaviour at least anticipated regret moderates the intention-behaviour relationship, an effect which has been shown to be mediated by intention stability.

It is possibly of more concern that so far none of the studies included in this thesis have addressed one of the main criticisms outlined in Chapters 1 and 2, namely the dearth of objective measures of behaviour in the regret/TPB research to date. The final study in this thesis was designed with the aim of addressing this criticism by using not only self-report measures of behaviour, but also objective measures to enable comparison between the two measures. To continue the comparisons, exercise behaviour was targeted.

Chapter 6: Study 7 – Predicting Objectively Assessed Regular Exercise Behaviour by Members of a Sports Centre

6.1 Aims and Objectives

Having established that anticipated regret makes an important contribution to the TPB, both regarding intentions to perform a variety of behaviours and consistently for exercise behaviour, it was decided to explore this effect further using an objective measure of behaviour, rather than just a self-report measure as previously employed. Exercise behaviour can easily be measured objectively by enlisting the co-operation of health clubs/sports centres which utilise a card barrier system for their members (e.g. Sparks, Harris, & Lockwood, 2004), and given the results from Studies 4, 5 and 6 this seemed an appropriate behaviour to target. For Study 7, a local university sports centre agreed to participate in the study by allowing data from the software of their entry barrier unit to be analysed to assess the number of times participating members used the system. This was used as a proxy for exercise behaviour based on the assumption that participants would enter the Sports Centre in order to do some form of exercise. The aim of this final study was to further establish the additive effect of anticipated regret to the TPB using a reliable objective behaviour measure along with a comparative self-report measure too. Given the success of the previous web design studies, this medium was again employed, but the target population was local undergraduates as opposed to a nation-wide student participant base. In addition, reference has been made to the positioning of the anticipated regret items in the previous studies, inasmuch as it could be argued that regret salience was simply increased by positioning one of the construct's items before the intention measure. In this final study three conditions were employed: one questionnaire did not contain any anticipated regret

measures, i.e. control condition (C); one questionnaire positioned all of the anticipated regret items at the beginning of the survey *before* the intention items, i.e. regret first condition ('First'); one questionnaire randomly positioned the anticipated regret items throughout the questionnaire, but after two initial intention measures, further into the survey, i.e. regret mixed condition ('Mixed'). In this way it was hoped to more comprehensively test the addition of anticipated regret to the TPB. Only measures of anticipated inaction regret were included in this final study (the previous studies for exercise having highlighted the fact that the anticipated action regret measure merely results in being the contra-position of the inaction regret measure). Finally, to take up one of the issues raised in Chapter 2 (section 2.5), measures of attitude were included *specifically* incorporating both instrumental and experiential aspects: although it had been possible in Studies 5 and 6 previously reviewed in this thesis to control for the experiential component of attitude when considering the value of anticipated regret to the TPB, these studies had not been designed to specifically address this concern. Study 7, then, sought to accept the challenge presented by Conner and Sparks (2005) who proposed that "for regret to be further considered as an independent predictor of intentions we need research demonstrating independent effects for anticipated regret when controlling for both instrumental and experiential attitudes" (p.193).

6.2 Hypotheses

A number of hypotheses were proposed:-

a) The addition of anticipated inaction regret would significantly increase the variance explained in intentions, even in the presence of past behaviour and after controlling for experiential/instrumental attitudes;

b) The increase in variance would be greater in the regret first condition;

c) There would be a difference in intentions to perform exercise between the conditions, with the strongest effect being evident in the regret first condition;

d) There would be a difference in prospective behaviour between the conditions, with the strongest effect being evident in the regret first condition;

e) Anticipated inaction regret would moderate the intention-behaviour relationship such that when anticipated inaction regret was strong, intentions would be more likely to be translated into actions;

f) The above effect would be more pronounced in the regret first condition; and

g) Anticipated inaction regret's moderating role on the intention-behaviour relationship would be mediated by intention stability.

6.3 Method

6.3.1 Sample

Participants were recruited via the various departments from Leeds University: all departments were contacted by phone and asked to send an email onto their students which contained a hyperlink to the questionnaire web site. Only sports members were invited to take part in the study. Participants were informed that the questionnaire related to research being carried out by the University together with the Sports Centre to find out members' views about exercising at the University Sports Centre. In total 25 departments agreed to forward on the email to their undergraduates and some to their postgraduates; the departments represented a diverse selection of academia including most disciplines. For this study it was possible to determine quite detailed information about the number of "hits" the web pages received: At Time 1 the introductory page was viewed 1099 times. The actual questionnaire, which was accessed by pressing a submit button at the end of the introductory page, was viewed 777 times, but a total of 651 participants actually submitted the completed questionnaire (i.e. 126 did not go on to submit). These 651 participants were

aged between 17 and 49 years (M = 20 years, SD = 2.80): 61% were female (N = 396) whilst 39% were male (N = 255). Table 6.1 details the numbers per condition according to

Table 6.1. Participant Numbers at Time 1 according to gender and condition

Gender	Condition		
	Control	Regret Mixed	Regret First
Male	95	85	75
Female	129	132	135
Total	224	217	210

gender. Objective measures of prospective behaviour (i.e. number of times the card was used to enter the Sports Centre over a specific two week period) were provided for all these 651 participants using the student card data recorded from the Sports centre turnstiles: this two week period where attendance was monitored was specified in a second questionnaire used to collect self-report data (Time 2). The second questionnaire was sent out five weeks after the Time 1 questionnaire. Fifty-four per cent of the Time 1 sample (N = 349) self-reported their exercise behaviour in this Time 2 questionnaire (39% were males, N = 136; 61% were females, N = 213). Again ages ranged from 17 to 49 years (M = 21 years, SD = 3.10). Table 6.2 details the numbers per condition according to gender. The introductory

Table 6.2. Participant Numbers at Time 2 according to gender and condition

Gender	Condition		
	Control	Regret Mixed	Regret First
Male	51	42	43
Female	69	69	75
Total	120	111	118

page from this second questionnaire was viewed 531 times. A total of 361 people viewed the actual questionnaire: 349 went on to successfully complete and submit the questionnaire page, while 12 did not. Of course, it is important to remember that students may have viewed the introductory pages and decided either not to take part at all, or that they would

return to the web site at a later time; consequently, it is only possible to specify "hits" and completion data.

Participants who completed the Time 1 questionnaire were entered into a £100 prize draw, and those who completed the Time 2 questionnaire were entered into a further £50 prize draw. A debriefing note was provided at the end of the Time 2 questionnaire, with contact details in the accompanying email for those not staying in to the end.

6.3.2 Design and Procedure

As participants logged on to the web site, they were systematically assigned to one of the three conditions to ensure equal numbers between conditions. As in the previous studies, the questionnaire was completed anonymously, but at Time 1 participants submitted a contact email address so that they could be reminded to return to the web site to complete the Time 2 self-report behaviour questionnaire; this email address was kept separate from the questionnaire so that at no time could participants be identified. Furthermore, participants were asked to detail their student card numbers at Time 1 so that these could be matched up, using a computer program, to the student card number data collected at the entrance turnstiles at the Sports Centre; this allowed an objective measure of exercise behaviour to be assessed for all Time 1 participants, as students needed to swipe their student cards to gain access to the Centre, and this information was stored on software made available to the researcher in terms of number of attendances per card number. Participants were assured that the researcher would not use this information for any other purpose than to determine the number of times they used the Sports Centre, and they were told that the information would be destroyed after this had been ascertained. The card numbers were also used to match up participants between Time 1 and Time 2 questionnaires. The Time 1 questionnaire was worded in terms of performing regular exercise "at least twice per week over the next two months". Participants were contacted

five weeks after completion of the Time 1 questionnaires asking them to log on to another web site to complete a second (Time 2) questionnaire; this was co-ordinated with the data collection from the Sports Centre entry systems. Objective data was collected during week 4 and week 5 from the start of the study, and the Time 2 questionnaire referred to exercise behaviour performed during these two particular weeks so that the objective data could be matched up using the student card numbers to the self-report data. The study was designed to fit in with these two particular weeks which had been identified by the Sports Centre as convenient for them to assist in the study: it is important to note that this system had only recently been installed, but the Sports Centre were confident that any teething problems would have been resolved at the latest by this time point. There was, therefore, both an objective measure and a self-report measure of exercise behaviour during a specified two week period, to provide both a safety net in case the entry system failed *and* to allow comparison: the objective measure allowed analysis of exercise behaviour on *all* Time 1 participants, whereas the Time 2 measures were used to compare the objective analysis with the self-report analysis.

6.3.2.1 Questionnaire 1 (Time 1)

Respondents were initially required to indicate their age, gender, student card number and email address. The questionnaire (Appendix 6.1: for space reasons, regret first condition only) then defined the behaviour in question: "Exercise includes activities available at the Sports Centre such as aerobics, badminton, table tennis, football etc". It was stressed that the questionnaire only related to exercise performed in the University Sports Centre unless otherwise stated. The time frame used was "at least twice per week over the next two months": exercise frequency was the median number of times that student participants had indicated they would exercise per week in the pilot study reported in Chapter 5, whilst the two month time frame ensured exact correspondence between the

TPB and the prospective behaviour measures (self report and objective) which were to take place during that two month period. Measures of the TPB were included, which adhered to the principles of compatibility and correspondence, and were based upon standard wording recommended for measuring components of the TPB (Ajzen, 1991; Conner & Sparks, 1996); in addition a measure of past behaviour was included. All three conditions of the questionnaire contained the same TPB + past behaviour constructs in the same order, and only differed regarding the inclusion and positioning of the anticipated inaction regret measure as follows:

a) Control Condition – anticipated inaction regret was not measured;

b) Regret Mixed Condition – anticipated inaction regret measures were dispersed throughout the questionnaire;

c) Regret First Condition – all anticipated inaction regret measures were completed first.

Two measures of intention were completed first in the control and regret mixed conditions, whereas they were completed immediately after the anticipated inaction regret measures in the regret first condition: this was designed to test order effects of regret on measures of intention in order to address regret salience issues.

Unless otherwise stated, items employed 7-point response options and were reverse coded where appropriate. Furthermore, means were computed for all multi-item scales and these were used in subsequent analysis. All The Time 1 questionnaires contained the following measures (N = 651):-[27]

Intentions were assessed with four items (i.e. 'I intend to exercise at least twice per week over the next 2 months at the Sports Centre', strongly disagree-strongly agree; 'I will

[27] Alphas quoted are across conditions, but were almost identical when calculated per condition and are, therefore, not reported.

definitely exercise at least twice per week . . .', strongly disagree-strongly agree; 'How likely is it that you will exercise . . .?', very unlikely-very likely; and 'How strong is your intention to exercise . . .?', not at all strong-very strong), with higher scores indicating stronger intentions. Cronbach's alpha = .93 after deleting the 'How likely' item.

Attitudes were assessed with seven semantic differential scales which appeared after the root statement, 'For me, exercising at least twice per week over the next 2 months at the Sports Centre would be': three items tapped into experiential (or affective) attitudes (unpleasant-pleasant; not enjoyable-enjoyable; and unsatisfying-satisfying; Cronbach's alpha = .74); four items tapped into instrumental attitudes (harmful-beneficial; negative-positive; not worthwhile-worthwhile; good-bad; Cronbach's alpha = .67 after deleting the 'worthwhile' item). Higher scores indicated more positive attitudes. The total Cronbach's alpha for the composite attitude scale was .81 after deleting the 'worthwhile' item.

Subjective Norm (SN) was assessed with four items tapping into both injunctive and descriptive norms (i.e. 'Most people who are important to me think that I should exercise at least twice per week over the next 2 months at the Sports Centre', strongly disagree-strongly agree; 'Most people who are import to me would disapprove-approve of me exercising at least . . .'; 'Most of my friends exercise at least twice per week', strongly disagree-strongly agree; 'Most people who are important to me exercise at least twice per week', strongly disagree-strongly agree), with higher scores indicating more perceived social pressure to exercise (Cronbach's alpha = .68 after deleting the 'Most people who are important to would disapprove-approve' item).

Perceived Behavioural Control (PBC) was assessed with six items tapping into perceptions of confidence and control (i.e. 'I am in control of exercising at least twice per week over the next 2 months at the Sports Centre', strongly disagree-strongly agree; 'If I wanted to, I could easily exercise . . .', strongly disagree-strongly agree; 'How much control do you

have over exercising at least . . .?', no control-complete control; 'I am confident that I will exercise at least . . .', strongly disagree-strongly agree; 'I am not at all confident-very confident that I will exercise at least . . .'; 'For me to exercise at least twice per week over the next 2 months at the Sports Centre would be', very difficult-very easy), with higher scores indicating more perceived control over exercising (Cronbach's alpha = .85).

Past Behaviour was assessed with three items (i.e. 'In the past, I have exercised at least twice per week at the Sports Centre', never-frequently; 'How many days did you exercise at the Sports Centre last week?', scale 0-6+; 'In the past few weeks, I have exercised at least twice per week at the Sports Centre', never-frequently), with higher scores indicating frequent past exercise behaviour. Scores were standardized (Cronbach's alpha = .83).

Furthermore, for the two experimental conditions (N = 427), a measure of inaction regret was incorporated.

Anticipated Inaction Regret (IR) was assessed with three items (i.e. 'If I did not exercise at least twice per week over the next 2 months at the Sports Centre I would feel regret', definitely no-definitely yes; 'If I did not exercise at least twice per . . . I would later wish I had', strongly disagree-strongly agree; 'If I did not exercise at least twice per . . . I would feel upset', definitely no-definitely yes), with higher scores indicating strong inaction regret (Cronbach's alpha = .88).

6.3.2.2 Questionnaire 2 (Time 2)

Participants were initially provided with a brief reminder of the definition of exercise, along with the specific dates for the two weeks in question. The second questionnaire (Appendix 6.2) contained the following measures (N = 349):-

Self-reported behaviour was assessed with three items (i.e. 'I have exercised at least twice per week over the past two weeks at the Sports Centre', strongly disagree-strongly agree; 'How many days did you exercise at the Sports Centre over the last two weeks?', scale 0-

6+; 'And how many sessions of exercise did you do at the Sports Centre over the last two weeks (for example 1 session = an aerobics class)', scale 0-6+), with higher scores indicating more frequent exercise behaviour. Scores were standardized (Cronbach's alpha = .88, after the 'And how many sessions' item was deleted).

Future Intention was measured with one item from the first questionnaire, i.e. 'I intend to exercise at least twice per week over the next two months at the Sports Centre', strongly agree-strongly disagree, with higher scores indicating stronger intentions to exercise in the future.

Intention Stability was measured by calculating the absolute difference between the sum of intention items at Time 1 and Time 2: unpublished research by Conner has shown that this measure is highly correlated with other indices of intention stability and is no more likely to be a moderator than any other index.

Due to the recent introduction of the barrier access system, measures were also taken to investigate whether participants experienced problems when trying to use their card in the barrier entry system (i.e. 'I have experienced problems when using my student card to access the barrier in the Sports Centre over the past two weeks', strongly disagree-strongly agree), and also to see how frequently access to the Sports Centre was permitted without the use of a student card (i.e. 'How many times have you been to the Sports Centre to exercise over the past two weeks and just been allowed through the barrier without using your card?', scale 0-6+), with higher scores indicating more problems and non-use of cards. Obviously if these results were high, the objective behaviour measure could be flawed. Furthermore, a measure was taken of other exercise which could have been performed in addition to that performed in the Sports Centre (i.e. 'Over the past two weeks I have exercised in places other than the Sports Centre, e.g. jogging with friends, playing tennis, doing a gym class elsewhere etc', strongly disagree-strongly agree; 'Roughly estimate how

many other sessions of exercise you have done over the past two weeks which have not been in the Sports Centre', scale 0-6+), with higher scores indicating more exercise in other places. Scores were standardized (Cronbach's alpha = .84).

6.4 Results

6.4.1 Differences between T1 and T2

The sample was tested on all TPB Time 1 variables to see if there were any differences between those who completed the Time 1 questionnaire only (N = 302) and those who completed both the Time 1 and Time 2 questionnaires (N = 349). A MANOVA did not reveal any significant multivariate effects between these two groups of participants: $F(1, 645) = 1.65$, $p = .09$, n.s. A further MANOVA looking separately at each condition also revealed no significant differences: control $F(1, 222) = 0.75$, n.s.; regret mixed $F(1, 215) = 1.33$, n.s.; regret first $F(1, 208) = 1.74$, n.s.

6.4.2 Descriptives, Correlations and Regressions – Comparison of Conditions

6.4.2.1 Descriptives – Study Variables

The means and standard deviations for the study variables are detailed per condition in Table 6.3 to facilitate comparison. Overall it would appear that intentions to exercise were fairly strong, attitudes were very positive, perceptions of social pressure were moderate, perceptions of control were fairly strong, anticipated inaction regret was fairly strong as were future intentions. Of interest, though, is that most participants reported exercising on average only once in the week prior to Time 1, although in general they said that they exercised at least twice a week fairly frequently. Regarding self-reported prospective exercise behaviour, it was evident that exercising twice per week during the study period was moderately performed using the frequency scale, which translated into an self-reported figure of only two occasions over the whole two weeks (2/14), i.e. once a week. The objective measure of behaviour, however, revealed that the most participants had exercised

over the two study weeks in question had been on average only once (1/14)! The means reveal that there were few problems experienced by participating members with using the new barrier system, supported by the fact that there were hardly any occasions when participants were admitted to the Sports Centre without using their card (on average 0.5 times over the two week

Table 6.3. A comparison of the means and standard deviations for all study variables per condition, including standardised measures for past behaviour, behaviour and other exercise

VARIABLE	SCALE RANGE	CONDITION					
		Control (T1 N = 224: T2 N = 120)		Mixed Regret (T1 N = 217: T2 N = 111)		Regret First (T1 N = 210: T2 N = 118)	
		Mean	SD	Mean	SD	Mean	SD
Intention*	1-7	4.93	1.76	4.96	1.80	4.92	1.75
Attitude*	1-7	5.99	.79	6.06	.86	6.01	.73
Exp.Attitude*	1-7	5.62	1.01	5.75	1.08	5.68	.93
SN*	1-7	3.60	1.27	3.52	1.44	3.48	1.44
PBC*	1-7	5.04	1.16	4.99	1.25	4.95	1.40
Past Beh1*	1-7	4.43	2.12	4.15	2.20	4.41	2.17
Past Beh 2*	0-6+	1.32	1.21	1.20	1.19	1.43	1.31
Past Beh 3*	1-7	4.16	2.22	3.89	2.29	4.17	2.33
Past Behaviour Composite*	Min & Max Values	-1.32 -2.10	.84	-1.32 -2.10	.86	-1.32 -1.83	.90
IR*	1-7	-	-	4.78	1.70	4.52	1.60
Self-report Beh 1	1-7	3.27	2.44	3.51	2.52	3.86	2.49
Self-report Beh2	0-6+	2.11	1.87	1.93	1.63	2.46	1.71
S.R. Behaviour Composite	Min & Max Values	-1.13 -1.79	.99	-1.13 -1.79	.90	-1.13 -1.79	.93
Obj. Behaviour	0-8	1.27	1.66	1.20	1.61	1.48	1.85
Future Intention	1-7	4.67	2.02	4.56	2.12	4.50	2.21
Other Exercise 1	1-7	4.35	2.56	4.05	2.50	4.23	2.35
Other Exercise 2	0-6+	2.36	2.01	2.06	2.04	1.87	1.73
Other Exercise Composite	Min & Max Values	-1.20 -1.57	.97	-1.20 -1.57	.96	-1.20 -1.57	.85
Problems	1-7	2.74	2.15	2.50	2.10	3.00	2.26
Entry no Card	0-6+	.60	1.28	.50	1.05	.35	.88

* Time 1 variables

period). The means for the variable 'other exercise' (i.e. exercise performed in other places than the Sports Centre) show that in addition to exercise performed in the Sports Centre, participants exercised elsewhere during the same period fairly frequently: the actual number of times specified was generally at least twice over the two week study period (i.e. once per week). So, along with the self-reported exercise behaviour it appears that participants did exercise twice per week, although only one of these days was at the Sports Centre.

To determine if there were any significant differences between the variable means between conditions, a one-way ANOVA was performed. Only one marginal difference emerged, regarding the self-reported behaviour 2 measure (actual days): $F(2, 346) = 2.75$, $p = .07$. A post hoc Tukey revealed that there was a marginal difference between the regret first and regret mixed conditions ($p = .06$), with the means showing that exercise was performed on more days in the regret first condition ($M = 2.46$ -v- 1.93). There were no other differences.

6.4.2.2 Veracity of Objective Measure in relation to Self-Report Measures

Analysis was conducted in the first instance to consider the self-report measures of behaviour for those participants who had not actually visited the Sports Centre (i.e. objective measure data = 0). The results detailed in Table 6.4 show the number of non-attending T2 participants who had self-reported exercise at the Sports Centre as either zero or in excess of 0. Of course, it could be that those who were identified as not "visiting/exercising" could have visited the Sports Centre and just been allowed through without swiping their card, accounting for any anomalies between the objective measure and the self-report behaviour measure: indeed the self-report measure was included into the design as a safety net for such an event, and not just as a check on validity. In this regard,

as mentioned earlier, the system was fairly new at the time of the study and the Centre was aware of some teething problems. Consequently, analysis was conducted solely on those participants who had not visited the Centre (i.e. objective data = 0) and who had completed the T2 questionnaire to determine how many times they had been allowed in without using their card.

Table 6.4. Frequency Analysis regarding Non-attenders who completed T2 self-report behaviour measures and information regarding card use

Condition	Total N/Non-Attenders	Total T2 N/ Non-Attenders at T2	No. of non-attenders at T2 who self-report > 0 days exercise	No. of non-attenders at T2 who self-report > 0 days exercise + who do not use card 1+ times	No. of non-attenders at T2 who self-report = 0 days exercise	No. of non-attenders at T2 who self report = 0 days exercise + who do not use card 1+ times
Control	224/105	120/47	18	9	29	1
Regret Mix	217/109	111/46	19	9	27	1
Regret First	210/97	118/43	23	5	20	0

So, 47% of the control sample, 50% of the regret mixed sample and 46% of the regret first sample did not visit the Sports Centre (i.e. swipe their card through the barrier) during the two week measurement period. Of the participants who completed the T2 questionnaire, 39% of the control sample, 41% of the regret mixed sample and 36% of the regret first sample were non-attenders. Of these T2 (objectively determined) non-attenders, 38% of the control sample, 41% of the regret mixed sample, and 53% of the regret first sample self-reported having done 1+ days of exercise over the study period. Of this sample, about 50% in the control and regret mixed conditions and 22% in the regret first condition self-reported being allowed in without using their card on at least one occasion. Furthermore, the number non-attenders who self-reported zero attendance but self-reported being let in without using their card was negligible, showing that the data was not being overtly corrupted. This reveals that a certain proportion of the anomaly between objective and self-reported behaviour could be accounted for by teething problems with the system,

but the argument could be levelled that both the T2 behaviour and card use measures were self-report, thereby leaving the issue of honesty problems with self-report measures unresolved. Consequently, as there may be some doubt about the veracity of the self-reported behaviour measures (and potentially the self-reported card usage problem measure!), this Chapter will initially report regression and correlation results from both measures. Although the emphasis should perhaps be placed on the objectively determined measure[28], a further regression analysis was conducted focussing on Time 2 participants whose self-reported behaviour, objective behaviour and card use measures corresponded: results are reported in section 6.4.2.8.

6.4.2.3 Intercorrelations

Table 6.5 compares the correlations of most interest between the three conditions using the zr transformation and tests of significance, whilst Table 6.6 details the correlations between all study variables for the two regret conditions, and Table 6.7 details those from the control condition.

It is evident from Table 6.5 that although there were no significant differences between any of the conditions, in general the correlation coefficient was higher in the regret first condition, except for intention-objective behaviour, where the control condition has the strongest r. However, when compared to the regret mixed condition, the r for the regret first condition is stronger. It is interesting to note that the intention-IR r was different in the correlations which excluded the T2 variables (not reported in full in the interest of space) where r = .780 in regret mixed and r = .744 in regret first (again, no significant difference).

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[28] It could be argued that some of the objectively determined attenders may not have actually performed any exercise at the Centre (there is a coffee bar in the building too). However, separate analysis on objectively determined attenders revealed that this can be refuted as the numbers were negligible: of the 119 participants in the *control* group who attended the Sports Centre, only 5 self-reported no exercise; of the 108 participants in the *regret mixed* condition who attended the Sports Centre, only 2 self-reported no exercise; and of the 113 participants in the *regret first* condition who attended the Sports Centre, only 1 self-reported no exercise.

Table 6.5. Comparison of main correlations between conditions, and tests of significance results

Correlation	Control r1	Regret Mixed r2	Regret First r3	Transformation of r1 and r2 into z score	Transformation of r1 and r3 into z score	Transformation of r2 and r3 into z score
Intention-Self report Behaviour	.544***	.507***	.631***	.410 n.s.	-.970 n.s.	-1.381 n.s.
Intention-objective Behaviour	.481***	.371***	.444***	.821 n.s.	.276 n.s.	-.545 n.s.
Intention-IR	-	.712***	.745***	-	-	-.025 n.s.
IR-Self report Behaviour	-	.351***	.435***	-	-	-.627 n.s.
IR – objective Behaviour	-	.211*	.242**	-	-	-.231 n.s.

N.B. *** p < .001: ** p < .01: * p < .05

Finally, the correlations detailed in Table 6.6 show that self-reported and objective behaviour were highly correlated in both experimental conditions: regret mixed $r = .618$ and regret first $r = .650$, $p < .001$, with no significant differences between the two conditions.

To control for any potential influence by past exercise behaviour, a regression with intention as the dependent variable and past behaviour as the independent variable was run: the Betas (which were a proxy for the partial correlation between intention and past behaviour), although high and significant (control $\beta = .745$: regret mixed $\beta = .671$: regret first $\beta = .723$, $p < .001$) were not significantly different from one another between conditions when tested with the zr transformation.

Table 6.6. Correlations between study variables for Regret Mixed (N = 111: right hand, above the diagonal in normal font) and Regret First (N = 118: left hand, below the diagonal in bold font) Conditions

Variables	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Intention		.386	.387	.732	.760	.712	.507	.371	.582	.887
2. Attitude	**.337**		.121a	.378	.329	.322b	.089a	.095a	.279b	.394
3. Subjective Norm	**.325**	**.177a**		.392	.353	.424	.137a	-.045a	.298b	.457
4.Perceived Behavioural Control	**.833**	**.415**	**.273b**		.679	.533	.443	.389	.419	.688
5. Past Behaviour	**.738**	**.295b**	**.303b**	**.698**		.579	.519	.445	.480	.741
6. Anticipated Inaction Regret (IR)	**.745**	**.279b**	**.346**	**.649**	**.552**		.351	.211c	.493	.911
7.Self-report Behaviour	**.631**	**.228c**	**.262b**	**.643**	**.648**	**.435**		.618	.446	.468
8. Objective Behaviour	**.444**	**.232c**	**.173a**	**.405**	**.469**	**.242b**	**.650**		.236c	.307b
9. Future Intention	**.678**	**.278b**	**.255**	**.654**	**.523**	**.529**	**.645**	**.404**		.537
10. Intention/IR interaction	**.908**	**.347**	**.349**	**.781**	**.706**	**.920**	**.567**	**.375**	**.617**	

Note: a = n.s.; b = p<.01; c = p<.05; all other values significant at p < .001.

This table focuses on "listwise" deletion: the figures did not look very different when Ns were considered separately for intention, objective behaviour and self-report behaviour

Table 6.7. Correlations between variables for the Control Condition (N = 120)

Variables	1.	2.	3.	4.	5.	6.	7.	8.
1. Intention		.444	.234c	.736	.735	.544	.481	.580
2. Attitude			.177a	.428	.321	.298b	.260b	.294b
3. Subjective Norm				.225c	.364	.240b	.336	.284b
4.Perceived Behavioural Control					.638	.596	.491	.434
5. Past Behaviour						.572	.543	.522
6.Self-report Behaviour							.695	.481
7. Objective Behaviour								.402
8. Future Intention								

Note: a = n.s.; b = p<.01; c = p<.05; all other values significant at p < .001

This table focuses on "listwise" deletion: the figures did not look very different when Ns were considered separately for intention, objective behaviour and self-report behaviour

6.4.2.4 Discriminant and Convergent Validity

The discriminant and convergent validity of the attitude and anticipated regret measures were assessed using Principal Components analysis with varimax rotation, over conditions.[29] All the anticipated regret measures were included, with the experiential and instrumental items from the attitude measure, i.e. 'pleasant, enjoyable, satisfying, beneficial, positive' and opposites: 'worthwhile/not worthwhile' was excluded from the analysis as it did not form part of the final composite attitude scale, as was 'good/bad' as this is currently thought to tap into a moral component of attitude (c.f. Conner & Sparks, 2005). Three factors were entered to be extracted which explained 73.4% of the variance in total.[30] From the rotated factors, the first factor explained 30.1 % of the variance (eigenvalue = 3.38); the second factor explained 22.8% of the variance (eigenvalue = 1.71); the third factor explained 20.5% of the variance (eigenvalue = .78). Table 6.8 details the correlation matrix.

Table 6.8. Correlation Matrix between attitude and IR items

Variables	Enjoyable/Not enjoyable	Satisfying/ Unsatisfying	Beneficial/ Harmful	Positive/ Negative	Inaction Regret	Wish had	Upset
Pleasant/Unpleasant	.607	.307	.389	.380	.216	.183	.185
Enjoyable/Not enjoyable		.506	.284	.437	.229	.218	.179
Satisfying/Unsatisfying			.315	.513	.216	.277	.131a
Beneficial/Harmful				.376	.205	.263	.147a
Positive/Negative					.268	.294	.191
Inaction Regret						.759	.707
Wish had							.656

Note: a = $p < .01$; all other values $p < .001$

[29] Analysis per condition was performed, but the results were very similar.

[30] When Eigenvalues > 1 was selected, only two factors emerged which distinguished between all the attitude measures and the anticipated regret measures. To further discriminate between the attitude measures regarding experiential and instrumental components, the analysis was forced to select three factors.

Table 6.9 details the correlations between each item and the three factors. Of note is that all the anticipated inaction regret items loaded only onto the first factor (loadings .90, .87 and .88) but not the other two, providing support for the discrete nature of this construct when compared to attitude measures. The profile for the expected experiential and instrumental measures of the attitude scale was not so clearly defined: only two of the three

Table 6.9. Rotated factor loadings

VARIABLES	FACTORS		
	1	2	3
Pleasant/Unpleasant	.10	.15	**.92**
Enjoyable/Not enjoyable	.09	.39	**.75**
Satisfying/Unsatisfying	.08	**.85**	.16
Beneficial/Harmful	.14	***.48***	***.37***
Positive/Negative	.15	**.79**	.22
Inaction Regret	**.90**	.14	.11
Wish had	**.87**	.25	.04
Upset	**.88**	.00	.12

experiential items cleanly loaded on to the third factor (loadings .92 and .75) but not factors one or two, namely 'pleasant-unpleasant' and 'enjoyable-not enjoyable', whilst the other proposed experiential measure, 'satisfying-unsatisfying' (loading .85) formed the basis of the second factor along with instrumental items 'beneficial-harmful' and 'positive-negative'. Although 'satisfying' and 'positive' loaded only on this second factor and not the other two (loadings .85 and .79), 'beneficial' loaded onto factor two (loading .48) and three (loading .37). It seems, therefore, that the experiential and instrumental scales need reviewing in terms of the items which traditionally define them. Nevertheless, these results

yet again support the view that anticipated regret is a different construct from the attitude measure, even when that measure includes an experiential component. As in previous studies reported in this thesis, analysis was also conducted to evaluate the contribution of anticipated regret to the TPB after controlling for experiential components of the attitude measure (i.e. 'pleasant, enjoyable') and instrumental components ('satisfying, beneficial and positive').

6.4.2.5 Regressions to Predict Intentions

For the two experimental conditions, a 3-step hierarchical regression was carried out to predict intentions in the first instance: at step 1, attitude, SN and PBC were included; at step 2, anticipated inaction regret was added; and at step 3, past behaviour was added. For comparison purposes a 2-step hierarchical regression was carried out for the control, omitting the anticipated regret step. The results from the three conditions are detailed in Table 6.10.

Table 6.10. Comparison between conditions of the hierarchical regression to predict intentions (Control N = 224: Regret Mixed N = 217: Regret First N = 210)

Variable	Step 1			Step 2			Step 3		
	Cont	Mix	First	Cont	Mix	First	Cont	Mix	First
	β	β	β	β	β	β	β	β	β
Attitude	.196***	.150**	.126**	-	.056	.077*	.157***	.064	.068=
SN	.097*	.131**	.086=	-	-.010	.013	.047	-.022	-.004
PBC	.647***	.618***	.721***	-	.390***	.525***	..405***	.281***	.403***
IR	-	-	-	-	.542***	.411***	-	.492***	.369***
PB	-	-	-	-	-	-	.411***	.210***	.224***
R^2	.61***	.55***	.66***		.72***	.76***	.70***	.75***	.79***
R^2 Change		-	-		.18***	.11***	.09***	.02***	.03***
F	112.42	85.70	130.88		138.49	163.61	126.28	124.25	149.87

Note. * p<0.05, **p<0.01, ***p<0.001, = marginal significance .05 < p < .10
Cont = control condition; Mix = regret mixed condition; First = regret first condition

It is clear that the largest amount of variance explained is consistently in the regret first condition. The addition of anticipated regret at Step 2 makes a further significant contribution to the model in both experimental conditions, although the largest contribution

and strongest Beta is evident in the regret mixed condition (R^2 change = .18 -v- .11 : Beta = .542 –v- Beta = .411), which probably reflects the stronger r in the intention-only correlation analysis between intention/IR (Regret Mixed, r = .780; Regret First, r = .744; both $p < .001$). This R^2 change is much larger than the .07 noted in the meta-analysis; indeed, all the R^2 are higher than the meta-analysis (37% at step 2 and 43% at step 3). As in previous studies reported in this thesis, anticipated regret remains significant even in the presence of past behaviour at step 3: indeed, in the regret mixed condition, anticipated regret remains the strongest component of the model in contrast to the regret first condition, where past behaviour is the strongest component. A test of significance for regression coefficients was carried out (Edwards, 1984) on anticipated inaction regret for both steps: there was a significant difference ($t(205) = 1.79$, $p < .05$) between the two Betas at step 2 and at step 3 ($t(204) = 1.69$, $p < .05$), with the Betas revealing that anticipated regret was strongest at both points in the regret mixed condition.

6.4.2.5.1 Attitude and AR – Regressions Re-run to Control for Experiential Effects

The intention regressions for the experimental conditions were re-run including (i) the original measure of experiential attitude ('pleasant, enjoyable, satisfying') and (ii) a revised measure ('pleasant, enjoyable' only) to account for the findings in the factor analysis detailed at section 6.4.3. The instrumental attitude construct was also included. This was to specifically take up the challenge put forward by Conner and Sparks (2005), i.e. to test the model whilst controlling for both experiential and instrumental attitudes. The results are detailed in Table 6.11, where the experiential measure included only 'pleasant and enjoyable': the results were almost identical when the experiential measure added 'satisfying' as well.

Table 6.11. Hierarchical regression to predict intentions in the two experimental conditions, controlling for experiential and instrumental attitude (Regret Mixed N = 217: Regret First N = 210)

Variable	Step 1		Step 2		Step 3	
	Mix	First	Mix	First	Mix	First
	β	β	β	β	β	β
Exp. Att.	.092	.009	.088=	.034	.088=	-.002
Ins. Att.	.050	.128**	-.049	.047	-.038	.075=
SN	.127*	.086=	-.011	.012	-.023	-.003
PBC	.630***	.736***	.383***	.532***	.276***	.410***
IR	-	-	.555***	.409***	.505***	.360***
PB	-	-	-	-	.207***	.235***
R^2	.54	.66	.73	.76	.75	.79
R^2 Change	-		.18***	.10***	.02***	.03***
F	62.80	99.08	111.37	129.91	103.72	125.10

Note. * p<0.05, **p<0.01, ***p<0.001, = marginal significance .05 < p < .10
Mix = regret mixed condition; First = regret first condition

It is clear that the experiential component of the attitude measure did not make a significant contribution in either condition (although it was marginally significant in the regret mixed condition), but anticipated regret was a significant and strong contributor to the model whilst controlling for both experiential and instrumental attitudes.

6.4.2.6 Regressions to Predict Self-Reported Behaviour

To test one of the study hypotheses, a 4-step hierarchical moderated regression analysis was conducted (c.f. Baron & Kenny, 1986) for the experimental conditions. At step 1, all TPB variables were entered, followed at step 2 by anticipated inaction regret, and then the intention by anticipated inaction regret interaction term was entered at step 3, and finally past behaviour was included at step 4. Measures of intention and anticipated inaction regret were mean-centred to reduce multicollinearity (Aiken & West, 1991). A 2-step hierarchical regression was conducted for the control condition, with all the TPB variables being entered at step 1 followed by past behaviour at step 2. The results between conditions are detailed in Table 6.12 to enable comparison.

Table 6.12. Comparison between the three conditions of a hierarchical regression to predict self-reported behaviour, using the intention x IR interaction as appropriate (Control N = 120; Regret Mixed N = 111; Regret First N = 118)

Variable	Step 1			Step 2			Step 3			Step 4		
	C	M	F	C	M	F	C	M	F	C	M	F
	β	β	β	β	β	β	β	β	β	β	β	β
Int	.211=	.452***	.287*	-	.439**	.364*	-	.523**	.401*	.054	.343=	.193
Att	.017	-.153=	-.049	-	-.154=	-.048	-	-.166=	-.055	.026	-.164=	-.050
SN	.096	-.102	.067	-	-.105	.081	-	-.120	.082	.042	-.121	.056
PBC	.412***	.210=	.405**	-	.211=	.416**	-	.184	.411**	.357**	.124	.324*
IR					.020	-.120	-	.050	-.109	-	.020	-.110
IR/Int a								.135	.069	-	.078	.002
PB										.280*	.281*	.338**
R^2	.40***	.30***	.45***	-	.30	.46	-	.31	.46	.42	.34*	.50**
R^2 Change	-	-	-	-	.00	.01	-	.01	.00	.03*	.03*	.05**
F	18.27	11.08	22.95	-	8.78	18.66	-	7.66	15.60	16.53	7.41	15.92

Note. * p<0.05, **p<0.01, ***p<0.001, = marginal significance .05 < p < .10
C = control; M = regret mixed; F = regret first conditions
a = Interaction Term

As for the intention regressions, it was evident again that the largest amount of variance in self-reported behaviour was explained in the regret first condition, with 45% being explained just by the TPB variables at step 1: the regret mixed condition explained less variance at this step than the control condition (30% -v- 40%). Unusually, only PBC was a significant predictor of prospective self-reported behaviour in the control condition, whilst it was intention in the regret mixed condition and intention and PBC in the regret first condition which were the significant predictors. As in Studies 5 and 6, anticipated inaction regret did not have a direct impact on behaviour when its addition was considered at step 2 (although the Beta was unusually negative in the regret first condition), but unlike Study 6, neither was there a moderation effect of intention-anticipated inaction regret in either of the experimental conditions. Past behaviour was a significant contributor when it was considered at the final step in all conditions, but was especially important in the regret first condition where, together with PBC, it explained 50% of the variance in self-reported behaviour. As there had been no significant anticipated regret/intention interaction, intention stability analysis was not conducted.

6.4.2.7 Regressions to Predict Objective Behaviour

Even though the correlation analysis demonstrated that self-reported and objective behaviour were strongly correlated in both conditions (i.e. regret mixed r = .618: regret first r = .650), the analysis set out at 6.4.2.2 reveal that there were discrepancies between self-reported behaviour and objective behaviour measures. Specifically, some of those who had not visited the Sports Centre at all during the two week study period, self-reported exercise behaviour during that time (although a proportion of this sample also self-reported being allowed into the Sports Centre without using their card). Consequently, a further regression analysis was conducted to test objective behaviour, with the same steps as used in 6.4.2.6. The results are detailed in Table 6.13.

Table 6.13. Comparison between the three conditions of a hierarchical regression to predict objective behaviour, using the intention x IR interaction as appropriate (Control N = 224; Regret Mixed N = 217; Regret First N = 210)

Variable	Step 1			Step 2			Step 3			Step 4		
	C	M	F	C	M	F	C	M	F	C	M	F
	β	β	β	β	β	β	β	β	β	β	β	β
Int	.344***	.261**	.250*	-	.258*	.368**	-	.296*	.406**	.137	.086	.222
Att	.013	-.101	.015	-	-.102	.019	-	-.103	.019	.019	-.076	.017
SN	.088	-.176**	-.033	-	-.177*	-.014	-	-.179*	-.011	.064	-.200**	-.036
PBC	.140	.298**	.197=	-	.299**	.187=	-	.278**	.174	.061	.159	.085
IR					.004	-.158	-	.015	-.141	-	-.007	-.155
IR/Int a								.055	.073	-	-.017	.009
PB										.364***	.401***	.328**
R^2	.25	.20	.18	-	.20	.19	-	.20	.19	.31	.28	.24
R^2 Change	-	-	-	-	.00	.01	-	.00	.00	.06***	.07***	.05**
F	18.21	13.46	11.08	-	10.71	9.49	-	8.99	8.04	19.14	11.53	8.95

Note. * p<0.05, **p<0.01, ***p<0.001, = marginal significance .05 < p < .10
C = control; M = regret mixed; F = regret first conditions
a = Interaction Term

It is worth remembering that participants on average only went to the Sports Centre once during the two week period (i.e. 1/14), in comparison to the two occasions during the same period indicated in the self-report measure (i.e. 2/14).

It is immediately apparent that there were quite marked differences between the regression results. First of all, the amount of variance explained overall is much less.

Secondly, of the two experimental conditions, the regret mixed produced the largest explained variances at each step, although generally it was the control condition which produced the largest explained variance overall. The differences between the two regressions may in part reflect a 'measurement artefact' (Conner, Warren, & Close, 1999; Sheeran, 2002), in that self-reported behaviour was a standardised measure comprising frequency and numerical indices compatible with the intention measure, whereas the objective measure was just a numerical index: it is evident then that correspondence between the intention-behaviour measures was not equivalent between the two measures. Nevertheless, as in the self-reported behaviour regression analysis, neither anticipated inaction regret nor the anticipated inaction regret/intention interaction made a significant contribution to the model. Also of interest was that the Beta for anticipated inaction regret, although not significant, was negative in the regret first condition – as observed in the self-report regression..

Intention was a significant predictor over all conditions at each step until the final step, where it was demonstrated that past exercise behaviour superseded intention's contribution to the TPB. For the regret mixed condition, intentions, low perceptions of social pressure and perceptions of control were important predictors of actual subsequent behaviour until past behaviour was added to the model, when PBC and intention lost their significance. In the regret first condition, intention was the only significant predictor (apart from a marginally significant contribution at steps 1 and 2 of PBC), until past behaviour was added at the final step, when intention lost its significance. So, by the final step, past behaviour

was the most important contributor in all conditions. Again, there was no need to conduct temporal stability analysis.[31]

6.4.2.8 Means, Correlations and Regressions to Predict Behaviour Using Consistent Data

Given the results regarding discrepancies between the self-report (numerical scale) and objective measures of behaviour, the analyses were redone including only those participants whose data were consistent between these measures and the measure about being allowed into the Centre without using the card (so for example, those participants who self-reported 1+ sessions of exercise behaviour on the numerical scale, but were objectively determined to have done no exercise, *but* who had reported being let into the Sports Centre *without* swiping their card were considered "consistent data" : Total N = 305: Control N = 106; Regret Mixed N = 100; Regret First N = 99). The means for self-reported behaviour (numerical scale only), objectively determined behaviour, intentions and anticipated inaction regret are set out in Table 6.14, with the previous results for comparison (in

Table 6.14. Means and Standard Deviations per condition for self-reported behaviour and objectively-determined behaviour (amount over 14 days), intentions and IR using data consistent between these measures and card usage measure: previous results in brackets

Behaviour Measure	Condition					
	Control N = 106		Regret Mixed N = 100		Regret First N = 99	
	M	SD	M	SD	M	SD
Self-report	**2.25** (2.11)	**1.92** (1.87)	**1.89** (1.93)	**1.62** (1.63)	**2.54** (2.46)	**1.79** (1.71)
Objective	**1.59** (1.27)	**1.78** (1.66)	**1.57** (1.20)	**1.62** (1.61)	**2.19** (1.48)	**1.99** (1.85)
Intentions	**5.02** (4.93)	**1.82** (1.76)	**5.03** (4.96)	**1.78** (1.80)	**5.13** (4.92)	**1.80** (1.75)
IR	-	-	**4.70** (4.78)	**1.72** (1.70)	**4.60** (4.52)	**1.61** (1.60)

brackets). A one-way ANOVA determined that there were significant differences between conditions for behaviour (self-report $F(2, 302) = 3.28$, $p < .05$: objective behaviour $F(2, 302) = 3.84$, $p < .05$): a post hoc Tukey indicated that regarding self-report behaviour, there

[31] Given the results reported previously regarding exercise being performed in other places than the Sports Centre, the regressions were re-run to control for this variable: other exercise was never a significant predictor in the model at any step or for any condition for either self-reported behaviour objective behaviour analyses.

was a significant difference between the regret mixed and regret first conditions ($p < .05$) with the means revealing that behaviour was more frequent in the regret first condition (2.54 –v- 1.89); regarding objective behaviour, there was a significant difference between the control and regret first conditions ($p < .05$), and regret mixed and regret first conditions ($p < .05$) – again the means show that behaviour was more frequent in the regret first condition. These results mirror those previously reported, although objective behaviour was much higher in the consistent data (2.19) compared to the original data (1.48); also, previously there had only been a moderate significant difference in self-reported behaviour. There were no significant differences regarding intention or regret, as before.

Inter-correlations between the study variables of most interest, i.e. anticipated regret, intention, self-report and objective behaviour, were also recalculated and are detailed in Table 6.15, along with previous results for comparison (in brackets).

Table 6.15. Comparison of main correlations between conditions for consistent data (original results in brackets)

Variable	Control	Regret Mixed	Regret First
Intention-IR	-	.710*** (.712***)	.738*** (.745***)
Intention-S.R. Beh.	.582*** (.544***)	.500*** (.507***)	.654*** (.631***)
Intention-Obj. Beh.	.497 *** (.481***)	.413*** (.371***)	.547*** (.444***)
IR-S.R. Beh.	-	.338** (.351***)	.469*** (.435***)
IR-Obj. Beh.	-	.264** (.211*)	.296 ** (.242**)

N.B. *** $p < .001$: ** $p < .05$

Although similar, correlations are in the main higher in the consistent data objective behaviour measures.

It is clear that there remain discrepancies between self-reported behaviour and objectively determined behaviour. Of course, rather than cast doubt on the validity of the self-report measure, it can be speculated that participants entered the Sports Centre (using their card once) but performed more than one session of exercise whilst there. For this

reason, the hierarchical regression which follows used self-reported behaviour as the dependent variable.[32]

For the two experimental conditions, a 6-step moderated hierarchical regression was performed to test for an anticipated regret-intention interaction in addition to intention stability analysis. Intention stability was tested by establishing the absolute difference between the sum of intention items at Time 1 and Time 2, then interaction terms were generated for intention x anticipated regret and intention stability x intention. Measures of intention and anticipated inaction regret were mean centred to reduce multicollinearity (Aiken & West, 1991). At step 1 all TPB measures were included (attitude, SN, PBC and intention); at step 2 anticipated inaction regret was added followed by the anticipated regret x intention interaction term at step 3; at step 4 intention stability was included; at step 5 the intention x intention stability interaction term was added, followed by past behaviour at step 6. For the control condition, a 4-step hierarchical regression was performed eliminating steps 2 and 3. The results using self-reported behaviour as the dependent variable are set out in Table 6.16.

Similar amounts of variance were evident in steps 1 and 2 as reported previously, and again there was neither a direct impact of anticipated regret on behaviour, nor was the intention-behaviour relationship moderated by anticipated inaction regret. Intention stability was a significant, but negative, contributor across conditions showing that, surprisingly, inconsistency of intentions was an important predictor of exercise behaviour. Perhaps this reflects the importance of past behaviour, which when added at the final step (so that the impact of the other variables would not be affected by this variable) proved to be a very important determinant. This again demonstrates the power of habit in exercise

[32] The results were similar to those previously reported when using objective behaviour as the dependent variable.

Table 6.16. Regression to predict self-reported behaviour after eliminating inconsistent objective and self-report data (Control N = 106: Regret Mixed N = 100; Regret 1st N = 99)

Variables	Step 1			Step 2			Step 3			Step 4			Step 5			Step 6		
	C	M	F	C	M	F	C	M	F	C	M	F	C	M	F	C	M	F
	β	β	β	β	β	β	β	β	β	β	β	β	β	β	β	β	β	β
Intention	.208=	.448**	.337*	X	.430**	.390*	X	.517**	.433**	.245*	.692***	.644***	.400	.898*	.810**	.281	.739*	.571=
Attitude	.018	-.127	-.026	X	-.129	-.025	X	-.145	-.031	.042	-.156	-.023	.037	-.166=	-.027	.038	-.140	-.013
SN	.128	-.167=	.056	X	-.173=	.069	X	-.188=	.072	.113	-.227*	.057	.115	-.232*	063	.072	-.224*	.025
PBC	.436***	.224	.370*	X	.225	.391**	X	.198	.382**	.449***	.197	.294*	.449***	.198	.278*	.388**	.117	199
IR					.030	-.101	X	.056	-.095	-	.020	-.164	-	.017	-.170	-	-.035	-.180=
Int x IR								119	.069	-	.184	.096	-	.175	101	-	.094	034
Int. Stability										-.173*	-.291**	-.324***	-.178*	-.311**	-.337***	-.147=	-.295**	-.322***
Int. x Int. Stab.													159	.207	.151	.177	.264	145
Past Beh																.250*	.314*	.363***
R^2	.44	.30	.47	X	.34	.53	X	.34	.54	.46	.34	.54	.47	.40	.62	.49	.41	.63
R^2 Change					.05	.06**		.00	.01	.03*	.00	.00	.00	.06**	.09***	.02*	.01	.00
F	19.66	9.95	20.85		9.79	21.17		8.08	17.82	17.33	6.89	15.11	14.42	7.71	18.62	13.48	6.92	16.49

Note. * p<0.05, **p<0.01, ***p<0.001, = marginal significance .05 < p < .10
C = control; M = regret mixed; F = regret first conditions

performance (see Conner & Sparks, 2005 for a review). Finally, it is clear that unlike Studies 4 and 6 (and Study 5, using single measures), the intention-behaviour relationship was not moderated by intention stability.

6.5 Discussion and Directions for Further Research

The main aim of this study was to further explore the value of anticipated inaction regret to the TPB utilising an objective as well as a self-report measure of prospective exercise behaviour. Using a web design and enlisting the support of a local university Sports Centre, it was possible to assess the number of times participating members visited the Sports Centre via the student card data collected at the entrance turnstile: this data acted as a proxy for exercise behaviour, as it was assumed that most participants would only enter the Sports Centre to carry out some form of exercise.

As in the previous studies, the sample was biased towards female participation, although participants were recruited from various departments at the university to try and counter this situation. This is interesting in itself as traditionally it has been argued that web design studies reduce this bias (Gosling et al., 2004). The descriptive analysis revealed that although exercise was defined in terms of being performed twice per week and measured over a two week period (resulting in an expected profile of 4/14), self-reported exercise averaged at a total of once a week (i.e. 2/14) whilst objective behaviour averaged at a total of once over two weeks (i.e. 1/14). This gives rise to two issues regarding this data: one concerns the discrepancy in results between measures, whilst the other concerns the shortfall in the expected profile of exercise behaviour.

Dealing with the first issue, analysis to determine the veracity of the self-report measures concluded that there were some problems with the card entry system which confounded a certain proportion of the results, but it seemed unlikely to have caused such a large discrepancy between the two behaviour measures: rather it is speculated that participants may have entered the Sports Centre on a particular single occasion but

have performed more than one session of exercise. Nevertheless, both behaviour measures were analysed to allow comparison, although concerning the analysis performed on *consistent* exercise behaviour data, the self-reported measure was used. It is clear though that quite different behaviours were assessed by the self-report measure (which defined the types of exercise available at the Sports Centre, such as badminton, football, aerobics) and the objective behaviour measure (which merely recorded entry into the Sports Centre and which clearly did not equate to exercise). Perhaps rather than speculating about the *reasons* for the differences between the two measures, a better way of verifying such barrier entry measures in future research would be to include the use of observational methods, where members are observed from entry to exit and their behaviour recorded. In this way it would be possible to determine how many actually exercise, which types of exercise are performed, how many sessions of exercise are performed, and how many solely use the other facilities such as cafes and bars. Regarding the shortfall from the expected exercise behaviour profile of twice per week, it was established that participants reported performing exercise in other places than the Sports Centre, averaging at about once a week (i.e. 2/14): coupled with the self-reported exercise behaviour, it appears that this ideal was met although obviously not in one location.

The study employed three conditions to assess the influence of the placement of anticipated regret items in a questionnaire. Analysis revealed a moderate significant difference ($p < .06$) in self-reported behaviour between the two experimental conditions with more exercise being reported in the regret first condition (Mean = 2.46) in comparison to the regret mixed condition (Mean = 1.93). However, analysis using the consistent data revealed a significant difference ($p < .05$) between the regret mixed and regret first conditions in *both* self-reported and objective behaviour, with the means revealing that behaviour was more frequent in the regret first condition, especially with

the objective measure (regret first condition M = 2.19: regret mixed condition M = 1.57). So it would appear from differences between the means that there was indeed an order effect for anticipated inaction regret, in that when the measure of anticipated inaction regret was assessed first and in bulk, as opposed to being placed randomly throughout the questionnaire, this was associated with a significant increase in both self-reported behaviour and objective behaviour. This was the first study in this thesis to control for the placement of the experimental items, in that previously at least one anticipated inaction regret item had appeared before any other items. Although there were no significant differences between conditions regarding the correlation analysis, all the anticipated inaction regret correlation coefficients were also higher in the regret first condition (i.e. intention-IR; self-report behaviour-IR; objective behaviour-IR) in both the original data set and the 'consistent' data set.

When considering the regressions to predict intentions to exercise, there was a substantial R^2 Change when anticipated inaction regret was added to the model in both experimental conditions, with an 18% increase in the regret mixed condition compared to an 11% increase in the regret first condition. Although the Beta for anticipated regret was also stronger in the regret mixed condition (Beta = .542) compared to the regret first condition (Beta = .411), the largest amount of variance explained was evident in the regret first condition (76% -v- 72%). The addition of anticipated regret remained significant even in the presence of past behaviour. These proportions of variance compare almost equally with those revealed in Studies 5 (73%) and 6 (71%) and are much higher than the 37% obtained in the meta-analysis (Chapter 2). Factor analysis on the attitude and anticipated inaction regret items demonstrated discriminative validity for anticipated inaction regret, which was further supported when the regressions were re-done to control for experiential and instrumental components of the attitude construct: anticipated inaction regret remained a strong and significant

additional predictor of intentions even in the face of these constructs. Although only one study, this result goes some way to answer the concerns set out by Conner and Sparks (2005) by demonstrating the unique nature of anticipated inaction regret when compared with experiential/instrumental attitudes.

The regressions to predict behaviour, whether self-report or objective, were consistent in revealing that for this study at least there was neither a direct impact of anticipated inaction regret on subsequent exercise behaviour, nor was the intention-behaviour relationship moderated by anticipated inaction regret. The largest amount of variance, however, was observed in the self-report measure: at step 1, using just the TPB variables, 45% of the variance in the regret first condition and 30% in the regret mixed condition was explained; the figures were more conservative in the objective measure, with 18% in the regret first and 20% in the regret mixed condition being explained at this step: as mentioned, this probably reflects a measure artefact. The result from the latter measure, though, compares with the 18% observed in the meta-analysis detailed in Chapter 2. Nevertheless, somewhat surprisingly, the largest amount of variance explained in the objective measure of behaviour was seen in the control condition. So, it is evident that the regret first condition produced the larger variance between all conditions in the self-report behaviour regression, whilst in the objective behaviour regression the regret mixed condition produced a larger variance than the regret first condition, but that the control condition was stronger over all here. Regarding the regression to predict behaviour using the consistent data set, again there was neither a direct impact of anticipated inaction regret on prospective behaviour nor was the intention-behaviour relationship moderated by anticipated inaction regret. Furthermore, unlike Studies 4 and 6, the intention-behaviour relationship was not moderated by intention stability. In spite of these results, there does appear to be a manipulation effect, in that the largest amount of variance in exercise behaviour was

evident when anticipated regret items were completed first. Although this did not translate into the expected moderation of the intention-behaviour relationship, there were obviously other as yet elusive factors at play which resulted in stronger predictive validity. This result supports previous research (Abraham & Sheeran, 2003) which highlight manipulation effects on behaviour frequency.

Overall, then, this final study has again demonstrated the unique and contributory nature of anticipated inaction regret to the explanation of intentions to exercise, even after specifically controlling for experiential components of the attitude measure. This serves to re-enforce the arguments for its inclusion into the TPB. As far as prospective exercise behaviour is concerned, although there was not, as expected, either a direct impact of anticipated inaction regret on behaviour nor moderation effects, it is clear that when anticipated regret was placed first in the questionnaire, a larger amount of variance was explained in self-reported prospective behaviour, whether using the original data set or the consistent data set. Moreover, exercise behaviour was significantly more frequent in the regret first condition, whichever method of behaviour assessment was used, and was particularly high when objectively determined in the consistent data set. Nevertheless, this begs the question as to why there was such a difference between the behaviour regression results in this study and Studies 4 and 6. All were web studies, and all used undergraduates. However, Study 7 did focus, by its very nature of data collection, on *local* undergraduates. It is of note that the only other study which failed to replicate moderation effects was Study 5 – a pen-and-paper study, but again targeting *local* undergraduates. It can only be speculated that there is something about this particular population which has perhaps confounded the results. In order to address this concern further, it would be necessary to conduct similar research in other locations. Indeed, Study 7 has shown, like Sparks et al (2004), that using members of a sports centre is one way of collecting reasonably objective data,

based on the assumptions that (a) most people visit these locations to perform some sort of exercise; (b) there are not too many competing and different distractions at the centre (e.g. a bar!) and (c) the entry system is reliable. To address these assumptions, as mentioned previously, this particular objective measure could be improved by validating it with observational data to assess the behavioural profile of members: in this way speculation about differences between objectively determined behaviour and self-reported behaviour can be reduced and assumptions about the validity of the measure avoided. Nevertheless, by using objective behaviour data, and self-report measures of behaviour and card use, the design of this study enabled inconsistent data to be discarded providing a reasonably bona fide population. In addition, it was possible to speculate about the exercise behaviour patterns of participants in terms of sports centre use and exercise performed elsewhere. This method of determining 'consistent' data, though, could arguably be discredited due to its inherent contradiction of valuing objective data but checking it against potentially corrupted *self-report* measures of behaviour and card use. As Ajzen and Fishbein (2005) warn, some self reporting raises suspicions that they may be less than accurate, meriting critical scrutiny. For Study 7, this double edged sword was a necessary design due to the recent introduction of the barrier system and the resulting potential problems. This serves to highlight the need for more research using concrete objective measures, like observational data (e.g. attendance for a cervical smear or not), which not only addresses the ubiquitous criticisms regarding the over-reliance on student populations for much research, but also extends the behavioural domains examined.

Chapter 7: Summary and Discussion

"Regrets are like taxes: nearly everyone must suffer them"
- Gilovich and Medoc, 1994

7.1 Introduction

This chapter reviews the outcomes of the seven studies described in this thesis and explains implications for the TPB. To evaluate as a whole the empirical results described from each of the various studies, a statistical overview was conducted by way of a bivariate and multivariate meta-analysis on the main variables of interest, i.e. behaviour, intention, anticipated regret, attitude, PBC, past behaviour and the anticipated regret x intention interaction term. This also enabled comparisons to be made with the meta-analysis described in Chapter 2. Following this, limitations of this work are discussed and suggestions for further research presented.

7.2 Summary of Findings

7.2.1 Study 1

Inspired by the work of Gilovich et al (1994; 1995; 1998), Study 1 was an exploratory study designed to identify behaviours which varied in the temporal pattern of post behavioural regret, i.e. action versus inaction regret. A broad range of behaviours were revealed which were then classified into two main behaviour types which mapped on to these two types of regret, i.e. Immediate Hedonic Behaviours (IHBs) mapping on to action regret, and Distal Benefit Behaviours (DBBs) mapping on to inaction regret. The most popular behaviours from each behaviour type were selected as the basis for Studies 2 and 3 (i.e. over-drinking, over-spending and impulsive communications for IHBs: healthy eating, regular exercise, being organised, working hard, approaching someone new and adventurous activities for DBBs).

7.2.2 Study 2

The aim of Study 2 was to explore the justification for differentiating between these two behaviour types and the these two types of regret in the TPB, with a view to assessing the value of anticipated regret to the model in this novel way. A pen-and-paper study was designed with multiple behaviours, where constructs tapped by single-items were used to test the augmented TPB in terms of intentions. The results showed that anticipated regret was a significant additional contributor to the TPB in terms of the amount of variance explained in intentions to perform a wide variety of behaviours, even in the presence of past behaviour. However, the results were not significant for two of the behaviours – being organised and eating healthily. It was suggested that as the experiential component from the attitude construct had to be removed to improve the Cronbach's Alpha, these two behaviours may not be affect related. Nevertheless, there was an average increase in the variance explained in intentions of 9%, which compared favourably with the 7% detailed in the meta-analysis from Chapter 2, and there was support for the inclusion of the appropriate regret term for each behaviour type.

7.2.3 Study 3

This web-designed study was identical to Study 2 in content but aimed to procure a larger student sample from a wider geographical area. Again, the two discriminant anticipated regret measures significantly added to the variance explained in intentions by the TPB variables, with an average increase of 11%, even in the presence of past behaviour. Somewhat surprisingly, not only were 'being organised' and 'eating healthily' included in this effect, but these two particular behaviours exhibited the largest amount of R^2 change for the DBBs overall: it was speculated that this highlights the need for larger, diverse samples. Regarding prospective behaviour, there were no significant effects of anticipated regret on any behaviour, other than marginal effects for

two IHBs (over-spending, over-drinking); however, this disappeared in the presence of past behaviour. This result contradicted two previous studies (Abraham et al., 2004; Abraham & Sheeran, 2004), but reflected the results from the meta-analysis conducted in Chapter 2. Moderation analysis demonstrated that the only significant interaction was for 'working hard', but that this effect was removed again in the presence of past behaviour: this highlighted the importance of habit over regret for prospective behaviour and was in direct contrast to the results reported by Sheeran and Orbell (1999) and Abraham and Sheeran (2004). Although Studies 2 and 3 supported the differentiation between anticipated action and inaction regret for two distinct behaviour types over a broad range of behaviours, the weakness of not including both regret measures for each behaviour type to support this conclusion was identified and addressed in the next study.

7.2.4 Study 4

Using equal numbers of behaviours per behaviour type and simultaneously considering both types of anticipated regret, Study 4 set out to intervene to (a) increase regret salience, (b) increase intentions to perform DBBs and (c) decrease intentions to perform IHBs. A longitudinal study design measuring prospective behaviour at two time points (separated by four and six weeks respectively) afforded the opportunity of assessing intention stability, and extended the anticipated regret x intention moderation analysis to test for mediation by intention stability. Two incrementally different experimental conditions were designed, with one either encouraging DBBs or discouraging IHBs ('motivation), with the second additionally attempting to overtly increase regret salience ('intervention'). Again, use of the appropriate regret term was justified with anticipated inaction regret for DBBs and anticipated action regret for IHBs. Descriptive analysis revealed manipulation effects as predicted for IHB intentions (i.e. lower in the intervention condition) and anticipated action regret (i.e.

higher in the intervention condition); intentions to perform DBBs and anticipated inaction regret, however, were stronger in the motivation as opposed to the intervention condition. There was no effect of condition on prospective behaviour, other than to increase spending in the intervention group – not exactly the desired result! Regarding the variance to explain intentions, anticipated regret made a significant additional contribution to the model in all behaviours and over all conditions, apart from the control condition in over-spending and the motivation condition in impulsive communications. The increase for IHBs averaged at 2.3%, whilst that for DBBs averaged at 16.3%, with an overall increase of 9.3%. Again, this compares favourably with the 7% reported in the meta-analysis detailed in Chapter 2.

Regarding the prospective behaviour analyses at Time 2 and 3, the only consistent results were apparent for one particular behaviour – regular exercise. However, the effect of the two experimental manipulations was less clear. Anticipated inaction regret had a direct and positive impact on exercise behaviour at Time 3 in the motivation condition, but this was not evident when conditions were merged. The intention-behaviour relationship was moderated by anticipated regret at both Time 2 and Time 3 when conditions were merged, which translated into a condition effect at both these time points but only for the motivation group. So intentions were more likely to predict exercise behaviour when intentions to exercise and anticipated inaction regret were strong, especially when participants were encouraged to extend their time perspective. When participants were split into high versus low intenders, there was no moderation effect when conditions were merged, but at Time 2 for strong intenders only there was a marginal interaction in the motivation condition, which by Time 3 transpired into significant effects for both motivation and intervention groups. This pattern suggests that attempts to increase regret salience were realised over a longer period of time than attempts to motivate future behaviour, and that the effects from the latter manipulation

remained constant over time. However, when conditions were merged, anticipated regret's moderation of the intention-behaviour relationship was totally mediated by intention stability, whilst when conditions were split a significant mediation was reported in the motivation condition, supporting Abraham and Sheeran's (2003) assertion that anticipated regret promotes action because it is associated with more stable intentions. However, for those reporting stronger intentions, this significant mediation effect was only evident in the intervention condition, suggesting that increasing regret salience resulted in some kind of a dynamic interaction between intention, intention stability, anticipated regret and behaviour. Study 4, then, clearly demonstrated that anticipated regret was again an important variable in explaining variance in a variety of behavioural intentions, that the intention-exercise behaviour relationship was moderated by anticipated inaction regret, and that this effect was mediated by intention stability. The success of the manipulations, however, was not as clear, but was not totally discredited in view of the study design, which involved multiple behaviours and student populations.

7.2.5 Study 5

Study 5 specifically set out to replicate the design and findings from two previous exercise studies involving an augmented TPB, i.e. Abraham and Sheeran (2003; 2004). This pen-and-paper study, then, involved local psychology undergraduates focussing on only one behaviour, which meant that more comprehensive scales to measure constructs could be utilised, rather than single-item measures. Yet again, there was support for the contributory nature of anticipated regret to the variance explaining intentions both in the presence of past behaviour and when controlling for the experiential and instrumental aspects of attitude. However, using this replica of Abraham and Sheeran's study design, there was no moderation of the intention-behaviour relationship by anticipated regret, contradicting the findings by Abraham and Sheeran (2003). To compare with

previous thesis studies using single-item scales, though, the regression was re-run using these same single items: not only did a moderation effect now emerge, but as in previous studies this moderation was shown to be totally mediated by intention stability.

7.2.6 Study 6

Study 6 was identical in design to Study 5 in all but medium of delivery and target population: a web design was employed targeting a wider variety of undergraduates in terms of degree programme and geographical location. As in Study 5, anticipated regret added to the variance explained in intentions over and above the TPB variables, even when controlling for past behaviour and experiential/instrumental attitudes. This time, though, a moderation effect was evident which was significantly mediated by intention stability: the latter result slightly contrasts with that from Abraham and Sheeran (2003), who found total mediation: this pattern of results was evident even when using single-item scales. In order to enable equivalence between Studies 5 and 6, the analysis was re-run focussing only on psychology undergraduates; the moderation remained. The moderation and mediation effects evident in Study 4, then, were duplicated in this more comprehensive study. Because both Study 4 and Study 6 were web studies, it was proposed that there may have been a quality in the web research not found in the pen-and-paper method. Nevertheless, all single-item scale studies, whether pen-and-paper or web, evidently did detect both moderation and mediation effects.

7.2.7 Study 7

The final study in the thesis used an objective measure of behaviour as an adjunct to the usual self-report measures, resulting in a third measure of behaviour – 'consistent reporters'. Exercise behaviour was again targeted to enable further exploration regarding the addition of anticipated regret to the TPB and also because it was amenable to the two types of behaviour data collection. The previous studies had always placed at least one regret measure before the measure of intention: Study 7 was designed to

counter potential criticism regarding regret salience order effects by including three conditions – no regret measure (control), regret first and regret mixed. Yet again, this study added to the accumulating evidence showing that anticipated regret significantly contributes to the variance in intentions to perform exercise, even when controlling for past behaviour. Furthermore, this particular study set out to demonstrate that anticipated regret possess a unique quality which differentiates it from any experiential/affective measures included in the attitude construct by specifically controlling for these factors: the results obtained certainly supported this assertion, and therefore go some way to addressing the concerns set out by Conner and Sparks (2005). Indeed, anticipated regret was a particularly strong contributor in the regret first condition, where by the final model the variance explained reached an impressive 79% compared to the 70% in the control condition. There was, however, neither a direct impact of anticipated regret on exercise behaviour nor a moderation of the intention-behaviour relationship by anticipated regret, which ever measure was used: self-report, objective or consistent. The largest variance in prospective self-report behaviour, though, was evident in the regret first condition. Furthermore, the differences between the means suggested that there was a condition effect on both self-reported and objective behaviour in that behaviour was more frequent in the regret first condition. This was the second exercise-only study in the thesis with a similar pattern of non-significant moderation results: as the first (Study 5) also used local undergraduates, concerns were expressed about the representativeness of the population.

7.3 Meta-analysis of Studies in Thesis

7.3.1 Bivariate Meta-analysis

A bivariate meta-analysis was performed using the data from all the above studies to provide a statistical assessment of anticipated regret's contribution to the TPB in this thesis. Only the main variables of interest were included, i.e. behaviour, intention,

anticipated regret, attitude, PBC and past behaviour which enabled comparison with the meta-analysis reported in Chapter 2. In order to permit analysis on the moderating effect of anticipated regret on the intention-behaviour relationship, anticipated regret x intention interaction term variables were also included. Cohen's power primer (1992) was used to interpret the size of the sample weighted average correlations: r+ = .10 is small, r+ = .30 is medium and r+ = .50 is large. The results are set out in Table 7.1, with the results from the previous meta-analysis detailed in brackets where available (i.e. all correlations except the interaction terms).

Table 7.1. Sample unweighted and weighted average correlations, confidence intervals, Fail-Safe N's and homogeneity analyses for main thesis study variables: previous bivariate meta-analysis results in brackets where applicable, i.e. all except interaction terms

RELATIONSHIP	Total N	*k*	r	r+	95% CI of r+	FSN	χ^2
AR-behaviour	5019 (1879)	5 (7)	0.35 (0.37)	0.15 (0.30)	-0.38 to 0.68 (0.13 to 0.48)	10 (35)	389.4*** (25.4***)
AR-intention	10231 (11098)	6 (24)	0.67 (0.52)	0.57 (0.47)	0.39 to 0.76 (0.18 to 0.75)	63 (200)	206.3*** (391.7***)
Attitude-AR	10231 (9479)	6 (21)	0.29 (0.42)	0.07 (0.35)	-0.40 to 0.55 (0.02 to 0.69)	3 (128)	615.87*** (377.9***)
PBC-AR	10231 (9030)	6 (20)	0.29 (0.28)	0.16 (0.18)	-0.06 to 0.39 (-0.36 to 0.72)	14 (52)	149.9*** (739.3***)
Past behaviour-AR	10231 (1549)	6 (7)	0.32 (0.33)	0.11 (0.34)	-0.26 to 0.47 (0.08 to 0.59)	7 (40)	370.2*** (40.5***)
AR/intention interaction-behaviour	5019	5	0.43	0.27	-0.18 to 0.72	22	312.6***
AR/intention interaction-intention	10231	6	0.88	0.84	0.78 to 0.91	95	125.2***
AR/intention interaction-Attitude	10231	6	0.39	0.31	0.15 to 0.46	30	82.8***

RELATIONSHIP	Total N	*k*	r	r+	95% CI of r+	FSN	χ^2
AR/intention interaction-PBC	10337	6	0.36	0.16	-0.18 to 0.50	13	330.1***
AR/intention interaction-past behaviour	10337	6	0.46	0.33	-0.08 to 0.73	33	567.1***
AR/intention interaction-regret	10231	6	0.84	0.68	0.29 to 1.08	76	1481.9***
Intention-behaviour	5125 (1879)	5 (7)	0.52 (0.51)	0.41 (0.41)	0.08 to 0.74 (0.10 to 0.71)	36 (50)	215.3*** (73.3***)
Attitude-behaviour	5125 (1879)	5 (7)	0.28 (0.27)	0.20 (0.28)	-0.03 to 0.43 (0.18 to 0.37)	15 (32)	81.3*** (12.2 n.s.)
PBC-behaviour	5125 (1879)	5 (7)	0.39 (0.28)	0.26 (0.11)	-0.24 to 0.76 (-0.51 to 0.73)	21 (8)	385.9*** (198.1***)
Past behaviour-behaviour	5125 (500)	5 (3)	0.50 (0.65)	0.34 (0.65)	-0.08 to 0.77 (0.58 to 0.72)	29 (36)	312.6*** (5.1 n.s.)
Attitude-intention	10337 (11098)	6 (24)	0.42 (0.46)	0.40 (0.44)	0.25 to 0.55 (0.21 to 0.67)	42 (187)	93.2*** (253.9***)
PBC-intention	10337 (10649)	6 (23)	0.40 (0.39)	0.18 (0.30)	-0.19 to 0.55 (-0.24 to 0.83)	16 (113)	398.3*** (989.2***)
Past behaviour-intention	10337 (1545)	6 (7)	0.50 (0.47)	0.38 (0.47)	-0.04 to 0.80 (0.20 to 0.75)	40 (59)	656.6*** (57.8***)
Attitude-PBC	10337 (9030)	6 (20)	0.22 (0.32)	0.08 (0.30)	-0.17 to 0.32 (-0.11 to 0.71)	3 (99)	166.9*** (492.7***)
Attitude-past behaviour	10337 (1545)	6 (7)	0.34 (0.28)	0.26 (0.30)	0.10 to 0.41 (0.11 to 0.48)	25 (34)	81.3*** (23.1***)
PBC-past behaviour	10337 (1549)	6 (7)	0.34 (0.38)	0.14 (0.31)	-0.22 to 0.50 (-0.13 to 0.76)	10 (37)	367.6*** (103.2***)

Interaction terms apart, it is clear that the strongest r+ is evident for anticipated regret-intention (0.57): indeed, it is stronger than that obtained in the previous meta-

analysis (0.47) and stronger than the attitude-intention r+ (0.40). This average weighted correlation was significant with a narrow 95% confidence interval (CI). In order to determine the robustness of this correlation, an estimation was calculated regarding the number of unpublished studies containing null results which would be required to invalidate the conclusion that anticipated regret and intentions are significantly related ($p < .05$). The FSN was 63: the recommended tolerance is 5k + 10 (=40), clearly indicating that the r+ is robust. This illustrates unequivocally that anticipated regret and intention were strongly related over a variety of behaviours.

The second largest r+ was evident for intention-behaviour (0.41): although the wide CI indicates that this is only just significant, the FSN of 36 exceeds the desired minimum of 35, meaning the result is robust. On looking through the studies, it is clear that for some behaviours and some experimental conditions the intention-behaviour relationship was not as strong as others, e.g. past behaviour-behaviour for 'over-spending', 'being organised', 'making impulsive communications' and 'exercise', and this result obviously reflects this trend.

Of more interest, though, is the negligible relationship between anticipated regret and attitude (r+ = 0.07): over a number of studies with a considerable number of participants, there was a non-significant relationship between attitude and anticipated regret, and furthermore the FSN was not robust. This statistically illustrates that anticipated regret and attitude could indeed be construed as separate constructs, a claim corroborated by the two post hoc - and one specific - regression analyses controlling for both the experiential and instrumental factors of the attitude construct. Indeed, the correlations for anticipated regret-experiential attitude range from 0.20 to 0.48 whilst those for anticipated regret-instrumental attitude range from 0.20 to 0.43 over the studies where such analysis was conducted (i.e. studies 5, 6 and 7).

Regarding anticipated regret-behaviour relationships, the r+ result was small (0.15), with the CI revealing that this was not significant and the FSN showing that neither was it robust. This reflects the sparse evidence in the thesis for a direct impact of anticipated regret on behaviour, rather anticipated regret tended to assert its influence by moderating the intention-behaviour relationship. As in the previous meta-analysis all the average weighted correlations were not homogenous, indicating moderator effects.

7.3.2 Multivariate Analyses

In order to examine the extent to which anticipated regret enhances the prediction of both intention and behaviour after accounting for the TPB variables, a three-step and five-step hierarchical regression analysis was conducted respectively using the average correlations from the input matrix. The input matrix is detailed in Table 7.2. It will be noted that SN was omitted from the analysis, as the studies reported reveal little impact of this construct in the model; however, account should be made of this omission when interpreting these results. It is also important to note that this particular type of correlation matrix, where there are different Ns for each r+ calculated, has certain characteristics which can lead to a non-positive definite r-matrix.

Table 7.2. Intercorrelations between TPB variables (except SN) including AR, produced using the r+ from the meta-analysis (input matrix)

	Behaviour	Intention	Attitude	PBC	Past Behaviour	Regret	Regret/Intention interaction
Behaviour	-	.41	.20	.26	.34	.15	.27
Intention		-	.40	.18	.38	.57	.84
Attitude			-	.08	.26	.07	.31
PBC				-	.14	.16	.16
Past Beh.					-	.11	.33
AR						-	.68

N.B N's vary between 5019 and 10337

First, the amount of variance added by anticipated regret to intentions was calculated. Attitude and PBC entered the equation at the first step, followed by anticipated regret at the second step; past behaviour was included at the final step. The results are detailed in Table 7.3.

Table 7.3. Three-step hierarchical regression to predict Intentions using the input matrix from the meta-analysis

Variables	Step 1	Step 2	Step 3
	β	β	β
Attitude	.39***	.36***	.30***
PBC	.15***	.07***	.04***
Anticipated Regret		.53***	.52***
Past Behaviour			.24***
R^2	.18	.46	.51
R^2 change	-	.28***	.05***
Model F	564.1***	1435.7***	1329.1***

$p < .0001$ in all cases

It is evident that attitude and PBC on their own explained 18% of the variance in intentions to perform a wide variety of behaviours, but the addition of anticipated regret made a significant contribution to the model adding a further 28% to the variance explained (F change = 2600.45, $p < .001$): the Beta shows that its contribution was stronger than both attitude and PBC's, reflecting the r+ results. Although past behaviour made a significant contribution to the model at the third step, increasing the variance explained in intentions by a further 5%, AR remained a significant contributor. Indeed, by the final step the beta coefficients clearly indicate that anticipated regret made the strongest contribution to the model (Beta = .52). If the criterion for augmentation is strictly set at the amount of variance added *after* controlling for past behaviour, then a further three-step hierarchical regression with past behaviour entered at the 2nd step and AR at the 3rd step revealed that anticipated regret added an additional 26% to the amount of variance explained by attitude, PBC and past behaviour alone (Beta =. 52, R^2 change = .26, F change = 2672.03, $p < .001$). So, there is either 26% or 28% increase in the amount of variance explained in intentions depending on where past behaviour is included in the regression analyses.

Next the contribution of anticipated regret to the explanation of behaviour over and above the TPB variables of intention, attitude and PBC was examined by a five-step hierarchical regression analysis, which also included past behaviour: in order to examine moderation of the intention-behaviour relationship by anticipated regret, the

anticipated regret x intention interaction term was also included. Intention and PBC were entered into the equation at the first step, followed by attitude at the second step; at the third step, anticipated regret was included; the anticipated regret x intention interaction term was added at step 4 followed by past behaviour at step 5. The results are detailed in Table 7.4.

Table 7.4. Five-step hierarchical regression to predict Behaviour using the input matrix from the meta-analysis[33]

Variables	Step 1	Step 2	Step 3	Step 4	Step 5
	β	β	β	β	β
Intention	.38***	.36***	.45***	.58***	.52***
PBC	.19***	.19***	.20***	.20***	.18***
Attitude		.04**	.02	.02	.00
AR			.14***	.08***	.04*
AR/intention interaction				.21***	.24***
Past Behaviour					.20***
R^2	.20	.21	.22	.23	.26
R^2 change	-	.01**	.01***	.01***	.03***
Model F	649.27***	436.54***	352.06***	298.18***	295.87***

*** $p < .001$: ** $p < .01$

As in the previous meta-analysis set out in Chapter 2, intention was the strongest predictor of prospective behaviour at step 1, and together with PBC explained 20% of the variance. This value is lower than the 34% reported by Godin and Kok (1996) and the 27% reported by Armitage and Conner (2001), but higher than the 17% reported the meta-analysis from Chapter 2. The addition of attitude at step 2 only added a further 1% to the explained variance; at step 3, attitude lost its significant contribution to the model, and anticipated regret made a direct impact on prospective behaviour, increasing the variance explained by 1%. The addition at step 4 of the anticipated regret x intention interaction term added a further 1% to the variance explained, indicating that the intention-behaviour relationship was moderated by anticipated regret. Past behaviour was shown to be a significant additional predictor of behaviour at step 5, adding a further 3% to the variance explained. However, unlike the previous meta-

[33] For N, please refer to Table 7.1.

analysis from Chapter 2, anticipated regret remained a significant direct contributor to the model (Beta = .04, $p < .05$); the significant interaction also remained and, indeed, the beta coefficient indicated that it was stronger than past behaviour's contribution to the model. Nevertheless, the most important predictor of prospective behaviour throughout was intention; this is in contrast to the results obtained in Chapter 2 where intention was the most important predictor until the addition of past behaviour, which then became the most important contributor to the model. In this regard, it will be remembered that only three studies had included a measure of past behaviour and caution was advocated when interpreting the results: in contrast, all the studies reported in this thesis included a measure of past behaviour, so the results reported in this meta-analysis are a better reflection of the value of past behaviour to the augmented model.

Overall, these results illustrate that even when controlling for past behaviour, anticipated regret was a significant predictor of intentions to perform a wide variety of behaviours, that it was a different construct from attitude, that it can have a direct (but minimal) impact on prospective behaviour and, finally, that it moderated the intention-behaviour relationship. As previously mentioned, SN was not included in this summary analysis, and therefore account must be made of this when interpreting the results: however, the individual studies in the thesis indicate that SN was, in general, not a significant contributor to the prediction of behaviour in the presence of regret and this is why is was excluded.

7.4 Implications for the Theory of Planned Behaviour

This section provides an explanation of how the findings from the experimental studies within this thesis have implications for the TPB.

7.4.1 Intentions to Predict Behaviour

The TPB states that intention, predicted by a combination of attitudes, SN and PBC, is a direct precursor of behaviour. However, Ajzen (1991) conceded that the TPB is

open to the inclusion of further variables if they are shown to increase the predictive validity of the model, and "only after careful deliberation and empirical exploration" (Ajzen & Fishbein, 2005, p. 201). The results detailed in this thesis add to the growing body of evidence demonstrating that anticipated regret has met this remit, at least in terms of increasing the variance explained in the motivational aspect of behaviour, i.e. intentions: over a broad range of behaviours, anticipated regret made a valid additional contribution to the TPB, increasing the variance explained by on average 10% (mean value of R^2 Change including all TPB predictors: the meta-analysis revealed that anticipated regret added 26% when attitude, PBC and past behaviour - but not SN - were included in the model): this compares favourably with the 7% increase reported in the meta-analysis set out in Chapter 2. Moreover, the effect of past behaviour was found to be significantly mediated by the addition of anticipated regret. Regarding the two small pen-and-paper sub-studies where there were insignificant effects (in Study 2), it is of note that when subsequently tested in large web study (Study 3), the inclusion of anticipated regret to the behaviours in question made the largest significant contribution to the explained variance in intentions. To address the criticisms regarding the way in which anticipated regret had been previously operationalised (highlighted in sections 1.4.5 and 2.4), care was taken to include only psychometrically reliable measures, directly measuring regret and not any other affective construct, which conformed stringently to the principles of compatibility set out by Ajzen (1988) and Ajzen and Fishbein (1977). Furthermore, by directly measuring anticipated regret *and* controlling for experiential/instrumental attitudes (post hoc analysis in Studies 5 and 6 and specifically in Study 7), it was possible to rigorously test anticipated regret's contribution to the variance in intentions. So, the evidence accumulated in this thesis suggest that it can be asserted with confidence that anticipated regret is a unique affective construct quite distinct from any affective component of the attitude measure,

which makes a valid contribution to the TPB in terms of adding to the motivational aspect of the model. This is arguably because regret is such a negative emotion which people strive to avoid, thereby making its anticipation motivational in quality and as such an ideal addition to the model.

7.4.2 Predictions of Behaviour

Although Weiner (1980) asserted that affect is a proximal determinant of behaviour in his Social Motivation Model, there was little evidence to suggest that anticipated regret had a direct impact on prospective behaviour using the TPB, although there were effects in Study 4, T2 'being organised' (intervention condition), T3 'exercising' (motivation condition) and Study 6 when using single items: given the vast majority of results where no direct impact emerged though, it seems that these could be construed as artefacts rather than effects. Nevertheless, the results from the multivariate meta-analysis (section 7.3.2) interestingly reveal a direct impact of anticipated regret when omitting SN, although the Beta was small (0.14 reduced to 0.04 by the final step), and the increase in variance explained was only 1%. In line with previous research (e.g. Abraham & Sheeran, 2003), there was some evidence that anticipated regret influenced the intention-behaviour relationship, such that when anticipated regret and intentions were strong, intentions were more predictive of behaviour (Study 4, Study 6). However, this effect seemed to be consistently significant only in exercise behaviour, questioning the validity in other broader behavioural domains.

Moderation of anticipated regret's impact on the intention-exercise behaviour relationship, though, was shown to be mediated by intention stability (Study 4, Study 5 using single-item measures, and Study 6 using both single and multi-item measures). This shows that intention is not central on its own for predicting behaviour, rather stability of intentions over time is. This could indicate that intention stability, being more proximal to behaviour, mediates anticipated regret's impact on the intention-

behaviour relationship, but that the mechanism by which regret influences the intention-behaviour relationship is by *promoting* intention stability (as proposed by Abraham & Sheeran, 2003), i.e. anticipated regret exerts its influence on the intention-behaviour relationship by affecting intention stability. Indeed, the results from Study 4 seem to corroborate this assertion, in that the two manipulations to motivate future behaviour and increase regret salience resulted in intention stability being strengthened to the extent that it mediated the impact of anticipated regret on the intention-behaviour relationship. The design of Study 7 looking specifically at regret salience afforded an ideal opportunity to test this further, as the placement of the anticipated regret items was varied over conditions in relation to whether they were completed before or after intention items: the prediction could be that anticipated regret promotes intention stability significantly more when it precedes the intention measure in contrast to following it. However, the failure of Study 7 to detect any moderation effects by anticipated regret on the intention-behaviour relationship precluded this analysis.

7.4.3 Interventions to Increase Intentions and Behaviour

To address concerns identified by Hardeman et al (2002) in their systematic review, two of the seven studies in this thesis set out to explicitly intervene to increase regret salience and change intentions and behaviour. It was clear that in Study 4 there were inconsistent patterns between conditions for reported intentions and anticipated regret per behaviour, and the subsequent regression analyses into intentions and behaviour. There was certainly no effect on behaviour measured at two prospective time points, although the regressions to predict behaviour indicated a trend in the correct direction with the intervention condition producing, in general, the largest R^2. As mentioned in 7.4.2, there also seemed to be an effect of the interventions on intention stability (exercise behaviour), albeit the results were rather complicated in that (a) the moderating effect of anticipated regret was mediated by intention stability in the

motivation group, but (b) when participants were split into high and low intenders, this effect was only apparent in the intervention group for those with high intentions. The reason for this is not absolutely clear given that the mean scores on intention and anticipated regret did not significantly differ over conditions, although it appears that some kind of dynamic interaction was at play, yet to be determined; alternatively, it could have been an artefact.

The second intervention study in this thesis, Study 7, was designed to specifically consider position-effects of the anticipated regret items, as all the previous studies (2 to 6) had placed the regret measure *before* the intention measure: although only subtle, this can be construed as a manipulation in itself which has previously produced differences in intention strength and behaviour frequency (Abraham & Sheeran 2004; 2003 respectively). Although there were no significant differences between conditions in reported intentions and anticipated inaction regret, there were significant increases in the variance explained in intentions in the predicted direction, i.e. the R^2 was higher when anticipated regret items were placed first and in bulk in the questionnaire. There were, however, significant differences in all the behaviour measures with behaviour being reported and objectively observed more in the regret first condition. Notwithstanding, this study failed to detect either a moderation effect of anticipated regret on the intention-behaviour relationship or any effects for intention stability in any of the conditions. The explanation proposed regarding the target population (i.e. local undergraduates) needs to be explored by perhaps running a further study using different locations; nevertheless, it is arguable that exercise is a regularly performed behaviour, especially by members of a Sports Centre, which requires strong intentions to initiate, but where habit subsequently becomes important for such a population, perhaps more so than anticipating regret and intention stability. The regressions onto all behaviour measures (self-report, objective and consistent) support this further explanation as to

why the intention-behaviour gap was not enhanced by either regret or intention stability, revealing a strong effect of past behaviour even when added at the very end of the model.

Of interest, though, is that despite van der Pligt et al (1998) suggesting that anticipated regret is useful where discrepancies exist between evaluations towards a behaviour and the post-behavioural affective reactions, there was no evidence in any of the studies reported in this thesis that such a differentiation exists: Studies 2, 3 and 4 demonstrated that evaluations of IHBs were generally negative whilst those for DBBs were positive, and anticipated action regret for IHBs and inaction regret for DBBs were moderately strong. This may highlight a social desirability effect, or alternatively an effect from the inclusion of the regret question. However, the key point about the intervention studies in this thesis (irrespective of their effect on intentions and behaviour), is their failure to demonstrate a consistent impact on *regret strength*, especially in Study 4 which was designed specifically to target regret strength in the model. Consequently, beyond utilising the inclusion or not of anticipated regret questions, the quest for a good manipulation of regret remains.

7.4.4. Single versus Multi-item Measures

Due to the multi-behavioural design of three of the studies included in this thesis, the use of single-item measures was a necessary requisite (i.e. Studies 2, 3, and 4). The three other studies which focussed solely on exercise behaviour (i.e. Studies 5, 6 and 7) used the traditional design of multi-item measures. However, it was apparent that the single-item measures were just as successful at detecting regret effects as their counterparts: indeed, for Study 5 the single items detected moderation and mediation effects not previously apparent with the multi-item measures, despite the explanatory space available to detect interaction effects being reduced. This raises the question of

sufficiency regarding items needed per construct, in that single items were obviously more sensitive. This is also an area for further research.

7.4.5 Delivery Medium: Web versus Pen-and-Paper

Several of the studies detailed in this thesis were the first to utilise a web design in testing the contribution of regret to the TPB (Studies 3, 4, 6 and 7). Many of the attributes set out in Chapter 3 about web studies were supported in this series of research: recruitment was simpler leading to increased sample sizes both at initial launch and then prospectively; all items were filled-in, resulting in complete scales (apart from a technical hitch in Study 3 which demonstrated the importance of meticulous pre-study testing); the female participant bias was addressed; and, above all, researcher-generated data entry errors were eliminated. Indeed, when the web was used to widen the geographical catchment area (Studies 3, 4, 6) the results regarding anticipated regret's moderation on the intention-behaviour relationship were more successful than when the web was used in the local area (Study 7), despite the target population remaining unchanged (i.e. undergraduates). This, then, is another area which needs further research.

7.4.6 Two Types of Regret: Two Types of Behaviour

The studies in this thesis were the first to consider the addition of regret to the TPB in a completely novel manner. Previous research had identified two types of regret (e.g. Kahneman & Tversky, 1982), i.e. action and inaction, which vary in their temporal perspective. It seemed only natural that these would map on, in a mutually exclusive way, to behaviours which had been identified as either being immediately appealing but with negative future consequences (IHBs and action regret) or not immediately appealing but with positive future consequences (DBBs and inaction regret). The multi-behavioural studies detailed early on in the thesis support this novel approach (Studies 2, 3 and 4), with Studies 4, 5 and 6 in particular illustrating that it is only necessary to

include the appropriate regret term, one being the contra-position of the other in terms of results. The evidence in this thesis, then, promotes a new design possibility for future regret studies which will aid interpretation of results.

7.5 Limitations and Suggestions for Further Research

Whilst the studies within this thesis address a number of the issues raised in Chapter 2, it is clear that some criticisms could be levelled at the research. This section discusses the limitations of the studies conducted in this thesis and provides suggestions for further research, any of which would tackle the stated limitations.

7.5.1 Range of Behaviours Included

Section 2.5 identified the key issues that this thesis set out to address: one of them was to identify a broader range of behaviour than previously considered. Although the first few studies did indeed attempt to address this imbalance, the design was multi-behavioural in nature leading to a few potential confounding variables. First of all, it was impossible to consider anything but a very basic design, using single items to measure constructs (not a problem in itself, as detailed in 7.4.4) and placing the anticipated regret item prior to the intention item: this meant that it was not possible to consider placement order effects. Secondly, the sheer number of behaviours included (nine in Studies 2 and 3, six in Study 4) raised the issues of both 'completion fatigue' by participants, where ambivalence towards completing the questions was a possible problem, and the effects of completing so many regret items by the time the final few behaviours were tackled. The variety of outcomes over these studies regarding the regressions to predict behaviour may indeed indicate a problem with so many behaviours being considered in one study; however the issue of regret primacy effects was discarded in the appropriate study chapters. Of note, though, is that the studies represented an 'evolving' thesis, in that the results from one study would inspire the design for the next. So, for example, the outcome of Studies 2 and 3 lead to the

equalisation of behaviour types and inclusion of both types of anticipated regret for Study 4, whilst the results from Study 4 regarding exercise behaviour lead to the focus of attention concentrating on exercise behaviour in the subsequent studies. This in itself means that this thesis could be open to the same criticism levelled in Chapter 2 towards past studies in this area – the failure to consider a broader range of behaviours *in detail.*

In defence of this approach, it could be argued that the gold standard of research is replication, so although in-depth analysis of the broader range of identified behaviours was eschewed in favour of concentrating on a previously researched behaviour (exercise), this in itself could be construed as a valid approach as it added an interesting perspective to the results from Abraham and Sheeran's body of research (2003; 2004). Indeed, the studies focussing on exercise behaviour raised some issues which could be addressed in future studies, e.g. broadening the geographical area for participant inclusion, focussing on populations other than undergraduates, conducting more pen-and-paper studies. In fact, Study 7 concluded that further research into interventions would do well to target a behaviour where habit was not such an important feature (as in exercise by members of a Sports Centre) but where the intention-behaviour gap (Sheeran, 2002) could be decreased by increasing regret salience: in this respect, the consequences of the behaviour should be considered, in terms of whether they are severe or not. The consequences of not performing exercise could hardly be deemed as severe, but the consequences of failing to attend for a cervical smear when invited to do so by a local PCT could be serious. Therefore, one possible new target behaviour is increasing uptake of cervical screening by invitation. This both addresses the issue of a broader behavioural domain and would move the participant base away from student populations (or at best allow comparisons with them).

Finally, it will be noted that this thesis began with identifying behaviours which people would either regret doing or regret not doing, a selection of which formed the

basis of the research undertaken. As such, inferences regarding anticipated regret's addition to the TPB are restricted to these studies and cannot be generalised to other behaviours, where regret may not be a behavioural consequence, although it is difficult to think of any which do not feature in traditional TPB research! Indeed, any behaviour which involves decision-making involves an element of choice, and where choice is a factor the potential for regret exists.

7.5.2 Objective Measures

Whilst pointing out the need for further objective measures of prospective behaviour in Chapter 2, only Study 7 addressed this issue. Even then, the objective measure was not a direct measure of exercise per se, but rather a proxy. Indeed, the veracity of this objective measure had to be validated against the self-reported measures due to the problems being experience with the new entry system in the Sports Centre, and this in turn could only be done by checking the self-reported card use. The irony of using self-reported data to check objective data, although a necessary evil in this study, cannot be ignored and is not ideal. Rather, it is obvious that objective but *observational* data is a preferable alternative to self-report measures, as used by Phillips et al (2003) who examined degree marks. Indeed, it was suggested that one way of validating the objective data collected in Study 7 would have been to *observe* and record members' behaviour from entry to exit. In regard to future studies though, as already detailed above, this could easily be addressed by conducting research in the health arena, using patients who, for example, are invited to attend for a screening test of some kind, like cervical smears, where the objective data could be attendance or not.

7.5.3 Student Samples

Due to the ease with which student samples can be obtained, all of the seven studies used a student-based sample. The fact that Sheeran (2001) found stronger effects in student samples compared to non-student samples regarding implementation intentions,

begs the question whether the results from the studies in this thesis would vary if non-student populations had been included. Further research needs to directly test student and non-student samples within the same study to determine any such differences: this could easily be carried out looking at Sports Centre use by members, and it will be interesting to assess the argument regarding the importance of past behaviour in this particular population. Comparisons could also be made using attendance for screening as the target behaviour, to introduce a preventative behaviour where inaction risk consequences could be severe.

7.5.4 Active Controls

Only two studies in the thesis included active controls: Study 4 and Study 7. However, criticism could be levelled at Study 4 in that although the control paragraph which preceded the questionnaire made no reference to regret, anticipated regret items were still included in the questionnaire which followed and furthermore, the anticipated regret item was completed before intention. As previously detailed, even placement of the anticipated regret item can be construed as a manipulation/intervention, however subtle this may appear, which has revealed effects before (e.g. Abraham & Sheeran, 2003; 2004). Study 7, though, contained a true control, in that anticipated regret items were not included at all in the questionnaire. The complicated design of many of the studies in this thesis precluded the inclusion of a true control condition, but more research addressing this issue is essential.

7.5.5 Inclusion of Other Affective Reactions

The remit of this thesis was to consider the value of anticipated regret to the TPB, therefore the sole emphasis was on this variable. Although experiential aspects of the attitude construct were also included and found not to detract from the importance of regret to the prediction of intentions, there is a need to include other affective reactions not incorporated into the attitude construct. Many of the studies reviewed in Chapter 1

used the construct 'AAR' (anticipated affective reactions) to augment the TPB (e.g. Conner & Abraham, 2001; Gagnon & Godin, 2000), and the argument was levied that when some of the studies included anticipated regret into this construct it was difficult to isolate its sole effect: nevertheless, the review clearly illustrates that the addition of AAR also made a significant contribution to the TPB. To truly support the inclusion of anticipated regret to the model, further studies are needed which control for other affective reactions like guilt, sad, tense, worry. In suggesting this, account must be made of the feasibility of including appropriate terms for the behaviour in question, so for example using tense and worried with exercise behaviour seems rather inappropriate, whereas regarding attendance for a cervical smear these emotions would appear valid.

7.5.6 Mediators of Moderators

In line with previous research into exercise behaviour, Studies 4 and 6 (and Study 5 using single items) identified intention stability as mediating the moderating role of anticipated regret on the intention-behaviour relationship. Although sustaining intentions over time is important for the enactment of behaviour, Studies 4, 5 and 6 hinted at the importance of anticipated regret in this relationship, with the assertion that anticipating regret helps to promote behaviour because it helps sustain intentions over time. However, previous research has identified other moderators of the intention-behaviour relationship, such as personality (Conner & Abraham, 2001): more research is need in this area to assess if personality factors mediate any moderation by anticipated regret or whether anticipated regret mediates any moderating role by personality.

7.5.7 Interventions

The studies described in this thesis provide mixed results for the value of interventions. It may be, as proposed by Fishbein and Ajzen (2005) that the TPB is

better suited to revealing the variables to be targeted in interventions to increase behaviour, rather than utilising interventions to influence variables in the model. This seemed to be true for anticipated regret, where manipulations failed to impact on regret strength in a consistent manner. Certainly, though, the value of using subtle measures to increase regret salience (i.e. inclusion of anticipated regret measures or not) or using explicit measures (e.g. provision of information) requires further consideration. In this regard, as noted earlier, it is obvious that some behaviours are more amenable to change than others. It follows, therefore, that interventions used to impact on the model may have more success with risk behaviours (like the unsafe sex behaviours much favoured in regret research) or with preventative behaviours where risk from inaction is not salient (e.g. health screening behaviours). As such, the use of interventions in anticipated regret and TPB research should not be totally disregarded, inasmuch as single behaviours other than exercise need to be explored in more detail.

7.6 Concluding Comment

This thesis has focussed exclusively on the addition of anticipated regret to the TPB, using behaviours identified as causing either inaction or action regret. This very narrow remit has enabled careful deliberation and rigorous testing so that conclusions can be made with confidence. The reported studies are also novel, with Study 1 identifying two types of behaviour which can be matched with the appropriate regret term to enable effective testing of the augmented model. It measured prospective behaviour using either self-report or objective measures at one and sometimes two time points, and controlled for the effect of past behaviour. By adhering rigidly to the principles of compatibility and correspondence, and using clearly defined measures of anticipated regret, the studies in the present thesis show beyond doubt that anticipated regret adds significantly more to the explained variance in intentions than previously determined, and that this effect was evident over a wider variety of behaviours.

Furthermore, by directly controlling for experiential and instrumental factors in the attitude construct, the concerns of Conner and Sparks (2005) and Ajzen (1991) can be allayed, resulting in the confident assertion that anticipated regret is a discrete construct different from any affective component in the attitude measure. For this alone it is possible to state that anticipated regret, therefore, represents a useful extension to the TPB - with the codicil 'as long as the behaviour in question involves an element of choice'. It also tested for moderation effects. Moderation of the intention-behaviour relationship by anticipated regret was observed in some of the studies, but not all; however, there did seem to be consistent results for exercise behaviour in all but the final study. It also tested, where possible, intention stability which was found in most instances to mediate the moderating role of anticipated regret on the intention-behaviour relationship. Interventions were designed, which had some success in either increasing prospective behaviour (Study 7) or increasing reported intentions and anticipated regret (Study 4), but not in a consistent manner. However, regret strength per se was not consistently affected by any of the manipulations.

Whilst this work answers many of the issues set out in Chapter 2, it raises a number of questions which need to be addressed by further research. These centre around the use of observational data collection, extending the participant base to beyond undergraduates, and focussing on behaviours which do not rely on habit or past behaviour for their performance, so that increasing regret salience can be a valid intervention. Nevertheless, it seems that if regret is such a ubiquitous emotion, especially one which we want to avoid, then its addition to the utilitarian laden TPB now merits serious consideration.

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APPENDIX 1.1

SEARCH TERMS GENERATED FOR WOS/PSYCINFO ETC
1 theory of planned behavio?r and anticipated affective reaction*
2 theory of planned behavio?r and anticipated regret
3 theory of planned behavio?r and affective belief*
4 theory of planned behavio?r and anticipated feelings
5 theory of planned behavio?r and anticipated beliefs
6 theory of planned behavio?r and thinking ahead
7 theory of planned behavio?r and postbehavio?ral regret
8 theory of planned behavio?r and postbehavior?ral anticipated regret
9 theory of planned behavio?r and anticipated affect
10 theory of planned behavio?r and anticipation of affect
11 theory of planned behavio?r and anticipation of beliefs
12 theory of planned behavio?r and anticipation of emotions
13 theory of planned behavio?r and anticipated emotions
14 theory of planned behavio?r and anticipated feelings
15 theory of planned behavio?r and anticipated post behavio?ral regret
16 theory of planned behavio?r and future regret
17 theory of planned behavio?r and future beliefs
18 theory of planned behavio?r and regret
19 anticipated affective reaction*
20 anticipated regret
21 affective beliefs
22 anticipated feelings
23 anticipated beliefs
24 thinking ahead
25 postbehavio?ral regret
26 postbehavio?ral anticipated regret
27 anticipated postbehavio?ral regret
28 anticipated affect
29 anticipation of beliefs
30 anticipation of affect
31 anticipation of emotions
32 anticipated emotions
33 anticipated beliefs
34 future regret
35 future beliefs

APPENDIX 1.2

Papers which review anticipated regret, anticipated affective reactions or affective beliefs in the TPB or in general (see reference section for full details)

Conner & Armitage, 1998 : Extending the TPB : a review and avenues for further research

Feldman, J, Miyamoto, J & Loftus, E, (1999) : Are Actions Regretted More than Inactions

Gilovich & Medvec, 1994 : The Temporal Pattern to the Experience of Regret

Gilovich & Medvec, 1995 : The Experience of Regret: What, when and why

Gilovich, Medvec & Kahneman, (1998) : Varieties of Regret: A Debate and Partial Resolution

Savitsky, K, Medvec, V & Gilovich, (1997) : Remembering and Regretting: The Zeigarnik Effect and the Cognitive Availability of Regrettable Actions and Inactions

van der Pligt & Richard, (1994) : changing adolescents' sexual behaviour – perceived risk, self-efficacy and anticipated regret

van der Pligt et al, 1998 : affect, attitudes and decisions – let's be more specific

Zeelenberg, 1999 : anticipated regret, expected feedback and behavioural decision making

APPENDIX 1.3

Table of TPB specified studies - Results

Study (+ Number which corresponds to Table 1.1)	AAR/AR + to model independently	AAR/AR moderated intention-behaviour relationship	Variables mediating AAR/AR
Abraham, Henderson & Der, 2004 (1)	Yes	N/A	N/A
Abraham & Sheeran, 2003 (2)	S1 – not tested for intention, but marginal for behaviour S2 – not tested S3 – N/A	Yes Yes Yes	N/A N/A Intention stablility
Abraham & Sheeran 2004 (3)	S1 – Yes S2 – N/A	N/A N/A	N/A N/A
Conner & Abraham 2001 (6)	S1 – Yes S2 – Yes	N/A N/A	N/A
Conner & Flesch 2001 (7)	Yes (strongest Beta)	N/A	N/A
Conner et al 1999 (8)	Yes	N/A	N/A
Conner et al, in press (9)	S1 – yes S2 - yes	N/A Yes + intention stability	N/A N/A
Conner, Smith & McMillan, 2003 (10)	Overall, no; BUT Significant effect of AAR on females with a group of passengers	N/A	N/A
Evans & Norman, 2003 (11)	Yes	N/A	N/A

Study (+ Number which corresponds to Table 1.1)	AAR/AR + to model independently	AAR/AR moderated intention-behaviour relationship	Variables mediating AAR/AR
Frost, Myers & Newman, 2001 (12)	Yes	N/A	N/A
Gagnon & Godin 2000 (13)	Yes	N/A	N/A
Godin et al 2001 (14)	Yes – affective dimension of attitude	N/A	N/A
O'Conner & Armitage, 2003 (17)	No	N/A	N/A
Parker et al 1995 (18)	Yes (strongest Beta on 2/3 behaviours)	N/A	N/A
Parker et al 1996 (19)	Not tested	N/A	N/A
Phillips, Abraham & Bond, 2003 (20)	Yes (strongest Beta)	N/A	N/A
Rapaport & Orbell 2000 (21)	Yes (strongest Beta on 1 behaviour/2)	N/A	N/A
Richard et al 1991 (22)	Not tested	Not tested	Not tested
Richard et al 1995 (23)	Yes	N/A	N/A
Richard et al 1996a (24)	Yes, but not to "studying hard"	N/A	N/A
Richard et al 1998 (26)	Yes	N/A	N/A
Sheeran & Orbell 1999	S1 – Yes (strongest Beta)	N/A	N/A

Study (+ Number which corresponds to Table 1.1)	AAR/AR + to model independently	AAR/AR moderated intention-behaviour relationship	Variables mediating AAR/AR
(27)	S2 – Yes S3 – Yes S4 - Yes	N/A YES N/A	N/A N/A N/A
Van Empelen et al 2001 (28)	Yes (but only to steady partners, not casual partners) – strongest Beta	N/A	N/A

APPENDIX 1.4

Table of Non-TPB Studies – Results

Study (+ Number which corresponds to Table 1.1)	AAR/AR + to Model	Any other Results
Bakker et al 1997 (4)	Yes	Self efficacy moderated AR impact on behaviour
Buunk et al 1998 (5)	Yes – independently	N/A
Murgraff et al 1999 (15)	N/A	Increasing salience of negative affect failed to produce safer intentions and reduction in RSOD at follow-up BUT differentiation of affect in "feelings after" and "feelings towards"
De Nooijer et al 2004 (16)	Not tested	AR increased from control, to general info to tailored info groups, as did intentions to perform detection behaviours
Richard et al 1996b (25)	S1 – N/A S2 – N/A	"feelings after" condition = stronger intentions; "risky" situation = stronger –ve feelings -ve affect terms ass'd with not using condom in "feelings after" condition; stronger intentions to use condoms in "feelings after"; Behaviour 5 months later = more males used condoms after "feeling after" condition.

APPENDIX 3.1

UNIVERSITY OF LEEDS

School of Psychology

QUESTIONNAIRE

READ THIS FIRST!!!

The questions below relate to research being carried out by the School of Psychology into behaviour and regret. I am interested in two things in particular: the types of behaviour which you do but which you later wish you hadn't done (e.g. eating that piece of chocolate cake!); and the types of behaviour which you don't do, but later wish you had done (e.g. going for that session to the gym). Please take a few minutes to complete the questions honestly; you answers are *completely anonymous*.

How old are you? .....

Are you male or female? Please tick a box.

☐ **Male** ☐ **Female**

1. Think of some behaviours that you might consider doing, but which if you did them you would later regret having done. Please write them down (one behaviour per line).

   .....

   .....

   .....

2. Think of some behaviours that you might consider doing but not actually do, and would later regret not having done; please write them down (one behaviour per line).

   .....

   .....

   .....

THANK YOU FOR COMPLETING THIS QUESTIONNAIRE

APPENDIX 3.2

Behaviours identified as causing action or inaction regret

TYPE OF REGRET	BEHAVIOUR	TALLY
ACTION REGRET	Saying things you regret in anger	9
	Eating unhealthily	17
	Drinking too much	19
	Using Drugs	7
	Smoking	5
	Relationships	14
	Not doing enough work	16
	Not getting enough sleep	10
	Overspending	9
	Impulsive actions	5
	Giving up	1
	Getting stressed out	1
INACTION REGRET	Travel/drugs/adventure sports	18
	Exercise	20
	Work organisation	27
	Relationships	21
	Altruism	4
	Being healthy	8
	Pleasure activities (e.g. reading)	2
	Being assertive	2
	Saving	2
	Going to Church	1

APPENDIX 3.3

UNIVERSITY OF LEEDS
School of Psychology

QUESTIONNAIRE

READ THIS FIRST

Instructions for Completing the Questionnaire

The questions which follow relate to research being carried out as part of a PhD study into feelings and behaviour. Listed over the next pages are several behaviours which students have indicated that they do (such as 'eating healthily'). For each behaviour there are a few questions which require you to either tick an appropriate box or to put a cross at an appropriate point on the scale between two words (the middle point means "neutral").

The questionnaire is totally PRIVATE and ANONYMOUS. However, I will ask you to complete a second (shorter!) questionnaire at a later date, and because I need to match up participants from Time 1 and Time 2 (repeated measures design!), I would like you to fill in *your* date of birth and first three letters of your *mother's* first name below. There is a **prize draw of £50** which you can enter by (a) completing this questionnaire and returning it to the box marked "Tracy's study" in the foyer in the School of Psychology and then (b) completing the *tear off slip below* and putting it in the box marked "Tracy's prize draw" also in the foyer by 19 March at the latest.

I am interested in what you think, so please carefully read and answer each question, be honest and work on your own. You are not obliged to fill in the entire questionnaire, or take part at all if you don't want to; however, I would be grateful for your support, so please complete **BY 19 MARCH at the latest**.

TRACY SANDBERG, PhD Student

What is your age? (put one number in each box) ☐☐ (years)

Are you male or female? (tick one box) male ☐ female ☐

What is your date of birth? (e.g. 08/05/84) _____/_____/_____

What are the first three letters of you mother's first name? (put one letter in each box)

☐☐☐

----------(please tear off carefully)----------

I have completed Tracy's questionnaire: please enter me into the £50 prize draw.

Name .....

e.mail address .....

Section A : DRINKING TOO MUCH ALCOHOL IN ONE SESSION DURING THE NEXT 6 WEEKS

The questions in this section relate to "binge drinking" (i.e. drinking too much alcohol within a single session) during the next 6 weeks and the consequences involved (like making a fool of yourself or missing lectures because of a hangover).

1. For me, a binge drinking session during the next 6 weeks would be ..... (PUT A CROSS ON EACH LINE BELOW)

   Good /_____/_____/_____/_____/_____/_____/ bad

   Unpleasant /_____/_____/_____/_____/_____/_____/ pleasant

   Foolish /_____/_____/_____/_____/_____/_____/ wise

2. If I did have a binge drinking session during the next 6 weeks I would regret it

   Strongly Agree /_____/_____/_____/_____/_____/_____/ Strongly Disagree

3. I intend **not** to have a binge drinking session during the next 6 weeks

   Strongly Agree /_____/_____/_____/_____/_____/_____/ Strongly Disagree

4. People who are important to me think that I should **not** have a binge drinking session during the next 6 weeks

   Strongly Agree /_____/_____/_____/_____/_____/_____/ Strongly Disagree

5. I am in control of **not** having a binge drinking session during the next 6 weeks

   Strongly Agree /_____/_____/_____/_____/_____/_____/ Strongly Disagree

6. In the past, I have had binge drinking sessions

   Frequently /_____/_____/_____/_____/_____/_____/ Never

7. If I had a binge drinking session during the next 6 weeks I would **not** regret it

   Strongly Agree /_____/_____/_____/_____/_____/_____/ Strongly Disagree

8. I have mixed feelings about **not** having a binge drinking session during the next 6 weeks

   Strongly Agree /_____/_____/_____/_____/_____/_____/ Strongly Disagree

Section B : BEING ORGANISED FOR WORK DURING THE NEXT 6 WEEKS

The following questions relate to "being organised for work" during the next 6 weeks, i.e. completing essays on time, having good study habits (like revising in good time for exams and going to the library), and being time efficient.

1. For me, being organised for work during the next 6 weeks would be ..... (PUT A CROSS ON EACH LINE BELOW)

Good /____/____/____/____/____/ bad

Unpleasant /____/____/____/____/____/ pleasant

Foolish /____/____/____/____/____/ wise

2. If I were **not** organised for work during the next 6 weeks I would regret it

Strongly agree /____/____/____/____/____/ strongly disagree

3. I intend to be organised for work during the next 6 weeks

Strongly Agree /____/____/____/____/____/ Strongly Disagree

4. People who are important to me think that I should be organised for work during the next 6 weeks

Strongly Agree /____/____/____/____/____/ Strongly Disagree

5. I am in control of being organised for work during the next 6 weeks

Strongly Agree /____/____/____/____/____/ Strongly Disagree

6. In the past, I have been organised for work

Frequently /____/____/____/____/____/ Never

7. If I were organised for work during the next 6 weeks I would regret it

Strongly Agree /____/____/____/____/____/ Strongly Disagree

8. I have mixed feelings about being organised for work during the next 6 weeks

Strongly Agree /____/____/____/____/____/ Strongly Disagree

Section C : APPROACHING SOMEONE NEW YOU ARE ATTRACTED TO DURING THE NEXT 6 WEEKS

Imagine you are out and see someone you fancy across the room: would you make the first move? This section is about those types of situations during the next 6 weeks.

1. For me, approaching someone new I am attracted to during the next 6 weeks would be ..... (PUT A CROSS ON EACH LINE BELOW)

Good /_____/_____/_____/_____/_____/_____/ bad

Unpleasant /_____/_____/_____/_____/_____/_____/ pleasant

Foolish /_____/_____/_____/_____/_____/_____/ wise

2. If I did **not** approach someone new I was attracted to during the next 6 weeks I would regret it

Strongly agree /_____/_____/_____/_____/_____/_____/ strongly disagree

3. I intend to approach someone new I am attracted to during the next 6 weeks

Strongly Agree /_____/_____/_____/_____/_____/_____/ Strongly Disagree

4. People who are important to me think that I should approach someone new I am attracted to during the next 6 weeks

Strongly Agree /_____/_____/_____/_____/_____/_____/ Strongly Disagree

5. I am in control of approaching someone new I am attracted to during the next 6 weeks

Strongly Agree /_____/_____/_____/_____/_____/_____/ Strongly Disagree

6. In the past, I have approached someone new I was attracted to

Frequently /_____/_____/_____/_____/_____/_____/ Never

7. If I did approach someone new I was attracted to during the next 6 weeks I would regret it

Strongly Agree /_____/_____/_____/_____/_____/_____/ Strongly Disagree

8. I have mixed feelings about approaching someone new I am attracted to during the next 6 weeks

Strongly Agree /_____/_____/_____/_____/_____/_____/ Strongly Disagree

9. I am currently in a relationship (tick one box) YES ❑ NO ❑

Section D : TRYING AN ADVENTUROUS ACTIVITY DURING THE NEXT 6 WEEKS

The questions for this section relate to trying an adventurous activity during the next 6 weeks, i.e. doing something which involves taking a chance, like going on a scary ride at the theme park.

1. For me, trying an adventurous activity during the next 6 weeks is ..... (PUT A CROSS ON EACH LINE BELOW)

Good /_____/_____/_____/_____/_____/_____/ bad

Unpleasant /_____/_____/_____/_____/_____/_____/ pleasant

Foolish /_____/_____/_____/_____/_____/_____/ wise

2. If I did **not** try an adventurous activity during the next 6 weeks I would regret it

Strongly agree /_____/_____/_____/_____/_____/_____/ strongly disagree

3. I intend to try an adventurous activity during the next 6 weeks

Strongly Agree /_____/_____/_____/_____/_____/_____/ Strongly Disagree

4. People who are important to me think that I should try an adventurous activity during the next 6 weeks

Strongly Agree /_____/_____/_____/_____/_____/_____/ Strongly Disagree

5. I am in control of trying an adventurous activity during the next 6 weeks

Strongly Agree /_____/_____/_____/_____/_____/_____/ Strongly Disagree

6. In the past, I have tried adventurous activities

Frequently /_____/_____/_____/_____/_____/_____/ Never

7. If I did try an adventurous activity during the next 6 weeks I would regret it

Strongly Agree /_____/_____/_____/_____/_____/_____/ Strongly Disagree

8. I have mixed feelings about trying an adventurous activity during the next 6 weeks

Strongly Agree /_____/_____/_____/_____/_____/_____/ Strongly Disagree

Section E : EATING HEALTHILY DURING THE NEXT 6 WEEKS

Chocolate cake, chips and burgers – a particularly unhealthy meal if consumed regularly. This section relates to healthy eating during the next 6 weeks and what you think about it.

1. For me, eating healthily during the next 6 weeks is ..... (PUT A CROSS ON EACH LINE BELOW)

Good /____/____/____/____/____/ bad

Unpleasant /____/____/____/____/____/ pleasant

Foolish /____/____/____/____/____/ wise

2. If I did **not** eat healthily during the next 6 weeks I would regret it

Strongly agree /____/____/____/____/____/ strongly disagree

3. I intend to eat healthily during the next 6 weeks

Strongly Agree /____/____/____/____/____/ Strongly Disagree

4. People who are important to me think that I should eat healthily during the next 6 weeks

Strongly Agree /____/____/____/____/____/ Strongly Disagree

5. I am in control of eating healthily during the next 6 weeks

Strongly Agree /____/____/____/____/____/ Strongly Disagree

6. In the past I ate healthily

Frequently /____/____/____/____/____/ Never

7. If I did eat healthily during the next 6 weeks I would regret it

Strongly Agree /____/____/____/____/____/ Strongly Disagree

8. I have mixed feelings about eating healthily during the next 6 weeks

Strongly Agree /____/____/____/____/____/ Strongly Disagree

Section F : DOING REGULAR EXERCISE OVER THE NEXT 6 WEEKS

Have you ever wished you had gone to the gym a bit more often or taken an exercise class? The following questions relate to doing regular exercise over the next 6 weeks. 'Regular' means at least twice per week.

1. For me, doing regular exercise during the next 6 weeks would be ..... (PUT A CROSS ON EACH LINE BELOW)

Good /____/____/____/____/____/____/ bad

Unpleasant /____/____/____/____/____/____/ pleasant

Foolish /____/____/____/____/____/____/ wise

2. If I did **not** do regular exercise during the next 6 weeks I would regret it

Strongly agree /____/____/____/____/____/____/ strongly disagree

3. I intend to do regular exercise during the next 6 weeks

Strongly Agree /____/____/____/____/____/____/ Strongly Disagree

4. People who are important to me think that I should do regular exercise during the next 6 weeks

Strongly Agree /____/____/____/____/____/____/ Strongly Disagree

5. I am in control of doing regular exercise during the next 6 weeks

Strongly Agree /____/____/____/____/____/____/ Strongly Disagree

6. In the past, I have done regular exercise

Frequently /____/____/____/____/____/____/ Never

7. If I did regular exercise during the next 6 weeks I would regret it

Strongly Agree /____/____/____/____/____/____/ Strongly Disagree

8. I have mixed feelings about doing regular exercise during the next 6 weeks

Strongly Agree /____/____/____/____/____/____/ Strongly Disagree

Section G : MAKING IMPULSIVE COMMUNICATIONS DURING THE NEXT 6 WEEKS

Have you ever said something in anger, or sent a text message/e.mail impulsively? The following section relates to impulsive communications such as these made during the next 6 weeks.

1. For me, **not** making impulsive communications during the next 6 weeks is..... (PUT A CROSS ON EACH LINE BELOW)

Good /_____/_____/_____/_____/_____/ bad

Unpleasant /_____/_____/_____/_____/_____/ pleasant

Foolish /_____/_____/_____/_____/_____/ wise

2. If I made impulsive communications during the next 6 weeks I would regret it

Strongly agree /_____/_____/_____/_____/_____/ strongly disagree

3. I intend **not** to make impulsive communications during the next 6 weeks

Strongly Agree /_____/_____/_____/_____/_____/ Strongly Disagree

4. People who are important to me think that I should **not** make impulsive communications during the next 6 weeks

Strongly Agree /_____/_____/_____/_____/_____/ Strongly Disagree

5. I am in control of **not** making impulsive communications during the next 6 weeks

Very Easy /_____/_____/_____/_____/_____/ Very difficult

6. In the past, I have made impulsive communications

Frequently /_____/_____/_____/_____/_____/ Never

7. If I made impulsive communications during the next 6 weeks I would **not** regret it

Strongly Agree /_____/_____/_____/_____/_____/ Strongly Disagree

8. I have mixed feelings about **not** making impulsive communications during the next 6 weeks

Strongly Agree /_____/_____/_____/_____/_____/ Strongly Disagree

Section H : WORKING HARD DURING THE NEXT 6 WEEKS

Have you been working hard and attending most of the lectures for your degree? The following questions relate to working hard during the next 6 weeks.

1. For me, working hard during the next 6 weeks would be ..... (PUT A CROSS ON EACH LINE BELOW)

Good /____/____/____/____/____/ bad

Unpleasant /____/____/____/____/____/ pleasant

Foolish /____/____/____/____/____/ wise

2. If I **did not** work hard during the next 6 weeks I would regret it

Strongly agree /____/____/____/____/____/ strongly disagree

3. I intend to work hard during the next 6 weeks

Strongly Agree /____/____/____/____/____/ Strongly Disagree

4. People who are important to me think that I should work hard during the next 6 weeks

Strongly Agree /____/____/____/____/____/ Strongly Disagree

5. I am in control of working hard during the next 6 weeks

Strongly Agree /____/____/____/____/____/ Strongly Disagree

6. In the past, I have worked hard

Frequently /____/____/____/____/____/ Never

7. If I worked hard during the next 6 weeks I would regret it

Strongly Agree /____/____/____/____/____/ Strongly Disagree

8. I have mixed feelings about working hard during the next 6 weeks

Strongly Agree /____/____/____/____/____/ Strongly Disagree

Section I : SPENDING TOO MUCH MONEY DURING THE NEXT 6 WEEKS

This section relates to spending too much money, for example going on shopping sprees, or spending over your budget during the next 6 weeks.

1. For me, **not** spending too much money during the next 6 weeks would be ..... (PUT A CROSS ON **EACH** LINE)

Good /_____/_____/_____/_____/_____/_____/ bad

Unpleasant /_____/_____/_____/_____/_____/_____/ pleasant

Foolish /_____/_____/_____/_____/_____/_____/ wise

2. If I spent too much money during the next 6 weeks I would regret it

Strongly agree /_____/_____/_____/_____/_____/_____/ strongly disagree

3. I intend **not** to spend too much money during the next 6 weeks

Strongly Agree /_____/_____/_____/_____/_____/_____/ Strongly Disagree

4. People who are important to me think that I should **not** spend too much money during the next 6 weeks

Strongly Agree /_____/_____/_____/_____/_____/_____/ Strongly Disagree

5. I am in control of **not** spending too much money during the next 6 weeks

Strongly Agree /_____/_____/_____/_____/_____/_____/ Strongly Disagree

6. In the past, I have spent too much money

Frequently /_____/_____/_____/_____/_____/_____/ Never

7. If I spent too much money during the next 6 weeks I would **not** regret it

Strongly Agree /_____/_____/_____/_____/_____/_____/ Strongly Disagree

8. I have mixed feelings about **not** spending too much money during the next 6 weeks

Strongly Agree /_____/_____/_____/_____/_____/_____/ Strongly Disagree

THANK YOU FOR TAKING PART. **PLEASE RETURN TO THE BOX MARKED "TRACY'S STUDY" IN THE SCHOOL OF PSYCHOLOGY FOYER BY *19 MARCH.***

REMEMBER TO ENTER THE £50 PRIZE DRAW BY TEARING OFF THE SLIP ON PAGE 1 AND PUTTING IN THE BOX MARKED "TRACY'S PRIZE DRAW! Good Luck!

APPENDIX 3.4

Means, standard deviations and intercorrelations for all study variables – "Drinking Too Much" (N = 86).

Variables	1.	2.	3.	4.	5.	6.	Mean	SD
1. Intention	-	.567***	.231*	-.777***	-.619***	.739***	2.76	1.59
2. Subjective Norm		-	.106	-.632***	-.341**	.676***	3.19	1.39
3. Perceived Behavioural Control			-	.121	-.334**	.109	4.44	0.88
4. Attitude				-	.566***	-.779***	2.73	1.08
5. Past Behaviour					-	-.428***	3.30	1.27
6. Action Regret						-	3.01	1.42

Means, standard deviations and intercorrelations for all study variables – "Impulsive Communications" (N = 88).

Variables	1.	2.	3.	4.	5.	6.	Mean	SD
1. Intention	-	.656***	-.031	.303**	-.168	.673***	3.53	1.14
2. Subjective Norm		-	-.204	.254*	.023	.487***	3.57	1.02
3. Perceived Behavioural Control			-	-.013	-.359**	-.192	3.55	1.18
4. Attitude				-	.054	.448***	3.65	0.98
5. Past Behaviour					-	-.242*	3.34	0.96
6. Action Regret						-	3.53	1.19

Note. * $p<0.05$, ** $p<0.01$, *** $p<0.001$

Means, standard deviations and intercorrelations for all study variables – "Spending Too Much Money" (N = 88).

Variables	1.	2.	3.	4.	5.	6.	Mean	SD
1. Intention	-	.407***	.236*	.143	.078	.408***	4.01	1.05
2. Subjective Norm		-	-.066	.145	.443***	.229*	3.98	1.03
3. Perceived Behavioural Control			-	-.133	-.326**	.097	3.66	1.13
4. Attitude				-	.163	-.011	4.65	0.83
5. Past Behaviour					-	-.055	3.59	1.19
6. Action Regret						-	3.92	1.22

Means, standard deviations and intercorrelations for all study variables – "Working Hard" (N = 87).

Variables	1.	2.	3.	4.	5.	6.	Mean	SD
1. Intention	-	.275*	.286**	.406***	.396***	.561***	4.47	0.75
2. Subjective Norm		-	.334**	.453***	-.139	.277**	4.45	0.77
3. Perceived Behavioural Control			-	.202	.309**	.036	4.28	0.91
4. Attitude				-	-.036	.435***	4.82	0.40
5. Past Behaviour					-	.077	4.06	0.89
6. Inaction Regret						-	4.52	0.91

Note. * $p<0.05$, ** $p<0.01$, *** $p<0.001$

Means, standard deviations and intercorrelations for all study variables – "Regular Exercise" (N = 87).

Variables	1.	2.	3.	4.	5.	6.	Mean	SD
1. Intention	-	.503***	.331**	.540***	.530***	.712***	3.56	1.32
2. Subjective Norm		-	.288**	.497***	.212*	.460***	3.85	1.01
3. Perceived Behavioural Control			-	.417***	.350**	.292**	4.09	0.97
4. Attitude				-	.431***	.365**	4.35	0.57
5. Past Behaviour					-	.343**	3.52	1.29
6. Inaction Regret						-	3.71	1.36

Means, standard deviations and intercorrelations for all study variables – "Eating Healthily" (N = 88).

Variables	1.	2.	3.	4.	5.	6.	Mean	SD
1. Intention	-	.315**	.247*	.459***	.548***	.358**	3.97	1.03
2. Subjective Norm		-	.127	.372***	.045	.317**	4.05	0.99
3. Perceived Behavioural Control			-	.056	.366***	.109	3.94	1.12
4. Attitude				-	.299**	.451***	4.68	0.63
5. Past Behaviour					-	.144	3.73	1.06
6. Inaction Regret						-	3.86	1.26

Note. * $p<0.05$, ** $p<0.01$, *** $p<0.001$

Means, standard deviations and intercorrelations for all study variables – "Trying an Adventurous Activity" (N = 88).

Variables	1.	2.	3.	4.	5.	6.	Mean	SD
1. Intention	-	.669***	.350**	.574***	.448***	.619***	2.90	1.23
2. Subjective Norm		-	.225*	.406***	.183	.499***	2.82	0.95
3. Perceived Behavioural Control			-	.337**	.236*	.191	4.13	1.07
4. Attitude				-	.445***	.549***	3.89	0.78
5. Past Behaviour					-	.401***	3.63	1.05
6. Inaction Regret						-	2.77	1.27

Means, standard deviations and intercorrelations for all study variables – "Approaching Someone New who is Liked" (N = 86).

Variables	1.	2.	3.	4.	5.	6.	Mean	SD
1. Intention	-	.652***	-.110	.633***	.130	.626***	2.01	1.10
2. Subjective Norm		-	-.275*	.648***	-.097	.623***	2.36	1.37
3. Perceived Behavioural Control			-	-.222*	.042	-.268*	3.85	1.35
4. Attitude				-	.003	.621***	2.85	1.29
5. Past Behaviour					-	.031	3.24	1.29
6. Inaction Regret						-	2.66	1.51

Note. * $p<0.05$, ** $p<0.01$, *** $p<0.001$

Means, standard deviations and intercorrelations for all study variables – "Being Organised for Work" (N = 87).

Variables	1.	2.	3.	4.	5.	6.	Mean	SD
1. Intention	-	.425***	.403***	.279**	.413***	.272*	4.36	0.68
2. Subjective Norm		-	.113	.229*	-.010	.249*	4.29	0.93
3. Perceived Behavioural Control			-	.074	.435***	.107	3.90	1.07
4. Attitude				-	.177	.200	4.91	0.26
5. Past Behaviour					-	.129	3.71	0.99
6. Inaction Regret						-	4.32	1.01

APPENDIX 3.5

UNIVERSITIES AND DEPARTMENTS PARTICIPATING IN WEB STUDY 3

Birmingham	American and Canadian Studies; Biomedical Engineering; Maths; Modern Languages; Philosophy; Psychology.
Cambridge	Geography; German; Medicine; Music.
Durham	Chemistry; English; History; Law; Politics.
East Anglia	Economics; Environmental Studies; Film and TV Studies; Nursing and Midwifery.
Manchester	Accounting; Biomedical Sciences; Computer Engineering; Dentistry; Fashion and Textile.
Oxford	Experimental Psychology; Earth Sciences; Classics; PPE.
St Andrews	Anthropology; Ancient History; Divinity; Greek; Management; Russian.
UCL	Art History; Law; Physics and Astronomy, Pharmacology.

Appendix 3.6

Means, standard deviations and intercorrelations for all study variables – **"Drinking Too Much"** (N = 331).

Variables	1.	2.	3.	4.	5.	6.	Mean	SD
1. Intention#	-	.574***	.281***	-.711***	-.413***	.632***	3.23	1.37
2. Subjective Norm#		-	.125*	-.500***	-.321***	.444***	3.09	1.40
3. Perceived Behavioural Control#			-	-.328***	-.364***	.301***	4.39	0.99
4. Attitude				-	.536***	-.717***	2.68	1.12
5. Past Behaviour					-	-.462***	3.16	1.24
6. Action Regret						-	2.99	1.63

Means, standard deviations and intercorrelations for all study variables – **"Making Impulsive Communications"** (N = 326).

Variables	1.	2.	3.	4.	5.	6.	Mean	SD
1. Intention#	-	.496***	.139*	.087	-.349***	.637***	3.58	1.07
2. Subjective Norm#		-	-.70	.044	-.041	.366***	3.37	1.05
3. Perceived Behavioural Control#			-	.024	-.326***	.040	3.83	1.11
4. Attitude				-	-.030	.077	3.35	1.10
5. Past Behaviour					-	-.208***	3.17	1.08
6. Action Regret						-	3.50	1.09

Note. * p<0.05, **p<0.01, ***p<0.001
IHB = not to

Means, standard deviations and intercorrelations for all study variables – **"Spending Too Much"** (N = 327).

Variables	1.	2.	3.	4.	5.	6.	Mean	SD
1. Intention#	-	.365***	.174**	.047	-.149**	.530***	4.00	1.05
2. Subjective Norm#		-	-.042	.062	.149**	.387***	3.75	0.98
3. Perceived Behavioural Control#			-	.002	-.412***	-.055	3.87	1.06
4. Attitude				-	-.013	.003	3.67	1.60
5. Past Behaviour					-	.066	3.50	1.10
6. Action Regret						-	4.11	1.02

Means, standard deviations and intercorrelations for all study variables – **"Working Hard"** (N = 325).

Variables	1.	2.	3.	4.	5.	6.	Mean	SD
1. Intention	-	.628***	.216***	.693***	.142*	.727***	4.38	0.95
2. Subjective Norm		-	.130*	.613***	-.067	.630***	4.36	0.95
3. Perceived Behavioural Control			-	.128*	.214***	.120*	4.30	0.84
4. Attitude				-	-.038	.743***	4.70	0.75
5. Past Behaviour					-	0.38	4.02	0.96
6. Inaction Regret						-	4.49	0.99

Note. * p<0.05, **p<0.01, ***p<0.001
IHB = not to

Means, standard deviations and intercorrelations for all study variables – **"Regular Exercise"** (N = 323).

Variables	1.	2.	3.	4.	5.	6.	Mean	SD
1. Intention	-	.383***	.513***	.409***	.528***	.630***	3.88	1.20
2. Subjective Norm		-	.133*	.377***	.191**	.402***	3.72	0.94
3. Perceived Behavioural Control			-	.214***	.406***	.304***	4.14	0.96
4. Attitude				-	.279***	.390***	4.67	0.61
5. Past Behaviour					-	.367***	3.86	1.19
6. Inaction Regret						-	3.67	1.30

Means, standard deviations and intercorrelations for all study variables – **"Eating Healthily"** (N = 326).

Variables	1.	2.	3.	4.	5.	6.	Mean	SD
1. Intention	-	.286***	.407***	.544***	.529***	.598***	3.92	1.06
2. Subjective Norm		-	.043	.339***	.162**	.234***	3.88	0.93
3. Perceived Behavioural Control			-	.278***	.309***	.182**	3.87	1.07
4. Attitude				-	.555***	.444***	4.40	0.68
5. Past Behaviour					-	.332***	3.75	0.95
6. Inaction Regret						-	3.67	1.26

Note. * $p<0.05$, ** $p<0.01$, *** $p<0.001$

Means, standard deviations and intercorrelations for all study variables – **"Trying an Adventuruous Activity"** (N = 326).

Variables	1.	2.	3.	4.	5.	6.	Mean	SD
1. Intention	-	.636***	.107	.588***	.422***	.540***	3.15	1.20
2. Subjective Norm		-	.106	.430***	.195***	.424***	2.95	0.99
3. Perceived Behavioural Control			-	-.005	.124*	.005	4.25	0.85
4. Attitude				-	.439***	.355***	4.01	0.83
5. Past Behaviour					-	.271***	3.85	0.93
6. Inaction Regret						-	2.84	1.30

Means, standard deviations and intercorrelations for all study variables – **"Approaching Someone New"** (N = 328).

Variables	1.	2.	3.	4.	5.	6.	Mean	SD
1. Intention	-	.553***	-.198***	.597***	.006	.489***	2.06	1.19
2. Subjective Norm		-	-.342***	.604***	-.176**	.558***	2.48	1.35
3. Perceived Behavioural Control			-	-.240***	.324***	-.280***	3.94	1.18
4. Attitude				-	.003	.514***	2.98	1.17
5. Past Behaviour					-	-.189**	2.95	1.17
6. Inaction Regret						-	2.74	1.38

Note. * $p<0.05$, ** $p<0.01$, *** $p<0.001$

Means, standard deviations and intercorrelations for all study variables – **"Being Organised for Work"** (N = 329).

Variables	1.	2.	3.	4.	5.	6.	Mean	SD
1. Intention	-	.400***	.195***	.507***	.225***	.650***	4.39	0.80
2. Subjective Norm		-	.092	.387***	-.063	.398***	4.36	0.87
3. Perceived Behavioural Control			-	-.037	.487***	.083	4.08	0.95
4. Attitude				-	-.025	.483***	4.86	0.43
5. Past Behaviour					-	.169**	3.75	1.00
6. Inaction Regret						-	4.41	0.95

Note. * $p<0.05$, ** $p<0.01$, *** $p<0.001$

Appendix 3.7

Correlations for Behaviour and study variables – **"Drinking Too Much"** (N = 138).

Variables	INT	SN	PBC	ATT	PB	ACREG
1.Behaviour	-.571***	-.384***	-.267**	.651***	.519***	-.586***

Correlations for Behaviour and study variables – **"Spending too Much Money"** (N = 137).

Variables	INT	SN	PBC	ATT	PB	ACREG
1.Behaviour	-.281**	.099	-.223**	-.063	.550***	.056

Correlations for Behaviour and study variables – **"Making Impulsive Communications"** (N = 135).

Variables	INT	SN	PBC	ATT	PB	ACREG
1.Behaviour	-.316***	-.048	-.102	.010	.377***	-.189*

Correlations for Behaviour and study variables – **"Being Organised for Work"** (N = 135).

Variables	INT	SN	PBC	ATT	PB	INREG
1.Behaviour	.250**	-.004	1.87*	.013	.317***	.119

Note. * $p<0.05$, ** $p<0.01$, *** $p<0.001$

Correlations for Behaviour and study variables – **"Approaching Someone New"** (N = 134).

Variables	INT	SN	PBC	ATT	PB	INREG
1.Behaviour	.451***	.271**	-.084	.424***	.142	.249**

Correlations for Behaviour and study variables – **"Trying an Adventurous Activity"** (N = 136).

Variables	INT	SN	PBC	ATT	PB	INREG
1.Behaviour	.333***	.286**	.113	.258**	.227**	.232**

Correlations for Behaviour and study variables – **"Eating Healthily"** (N = 134).

Variables	INT	SN	PBC	ATT	PB	INREG
1.Behaviour	.455***	.151	.409***	.275**	.344	.157

Correlations for Behaviour and study variables – **"Exercising Regularly"** (N = 134).

Variables	INT	SN	PBC	ATT	PB	INREG
1.Behaviour	.442***	.151	.367***	.172	.445***	.328***

Correlations for Behaviour and study variables – **"Working Hard"** (N = 135).

Variables	INT	SN	PBC	ATT	PB	INREG
1.Behaviour	.289**	.173	.194*	.207*	.425***	.196*

Note. * $p<0.05$, ** $p<0.01$, *** $p<0.001$

APPENDIX 4.1

UNIVERSITIES AND DEPARTMENTS PARTICIPATING IN WEB STUDY 4

Bristol	Aerospace Engineering; Clinical Veterinary Science; Drama; Italian; Law; Maths; Music
Brunnel	Biological Sciences; Economics and Finance; Education; Electronic and Computer Engineering; English; Health and Social Care; Human Sciences; Information Systems and Computing; Law; Mathematical Sciences; Politics, American Studies and History; Systems Engineering
Cardiff	Architecture; Business; Centre for Language and Communication; Computer Science; English Literature; Journalism, Media and Cultural Studies; Pharmacy
Derby	All Departments
Nottingham	Biomedical Sciences
Southampton	Biochemistry; Economics; English; History; Medicine; Nutrition; Pharmacology; Physiology; Psychology; Social Statistics;
Sussex	Biology; Drama Studies; Engineering and Information Technology
York	Biology; English and Related Literature; Management Studies; Politics, Philosophy and Economics; Psychology; Physics.

APPENDIX 4.2

Feelings and Behaviour Research Study – Leeds University

READ THIS FIRST

Instructions for Completing the Questionnaire

This questionnaire relates to research being carried out as part of a PhD study into feelings and behaviour. Listed over the next few pages are several behaviours which students have indicated that they do (such as 'eating healthily'). For each behaviour there is an explanation which you will need to read first before completing the questions which follow. The questions require you to click on a radio point at an appropriate place on the scale between two words (the middle point means "neutral").

The questionnaire is totally PRIVATE and ANONYMOUS. However, I will ask you to complete a second (shorter!) questionnaire in 4 weeks time, and a final questionnaire to be completed in January 2003 at the beginning of the semester; because I need to match up participants from Time 1 to Time 2 and to Time 3, I would like you to fill in *your* date of birth and first three letters of your *mother's* first name below. I am interested in what you think, so please carefully read and answer each question, be honest and work on your own. I would be grateful for your support, so **please** participate in the study and **complete this questionnaire within the week of receipt.**

THERE IS A PRIZE DRAW OF £50 which you can enter by completing and submitting this questionnaire, with details of your e-mail address (so you can be contacted – the completed questionnaire remains anonymous); when you complete the final questionnaire in January 2003, you will also be entered into a **further £50 prize draw**. Please remember to use an e-mail address which you can be contacted on during this period.

If you have any queries or comments about this study, please do not hesitate to contact me on

tracys@psychology.leeds.ac.uk

TRACY SANDBERG, PhD Student

What is your age? (put one number in each box) ☐☐ (years)

Are you male or female? (tick one box) male ☐ female ☐

What is your date of birth? (e.g. 08/05/84) _____/_____/_____

What are the first three letters of you mother's first name? (put one letter in each box)

☐☐☐

Section A : DRINKING TOO MUCH ALCOHOL IN ONE SESSION DURING THE NEXT 4 WEEKS

The questions in this section relate to "binge drinking" (i.e. drinking too much alcohol within a single session) during the next 4 weeks.

Binge drinking may feel good at the time (e.g. joining in with everyone else, feeling more disinhibited) BUT it could result in you acting like a fool in front of your friends, and you may have a heavy hangover the next day which could affect your performance. So although binge drinking may seem like a good idea initially, the effects could be just not worth it.

Now *imagine* you're out with your friends and have far too much to drink; you act like a complete idiot, wake up the next day feeling absolutely wretched – and you have a load of work to do. You really regret the night before and wish you could turn the clock back. *Think about* how these things might make you feel.

Now answer the questions below.

1. For me, a binge drinking session during the next 4 weeks would be ..... (PUT A CROSS ON EACH LINE BELOW)

Good /____/____/____/____/____/ Bad

Unpleasant /____/____/____/____/____/ Pleasant

Foolish /____/____/____/____/____/ Wise

2. If I did have a binge drinking session during the next 4 weeks I would regret it

Strongly Agree /____/____/____/____/____/ Strongly Disagree

3. People who are important to me think that I should have a binge drinking session during the next 4 weeks

Strongly Agree /____/____/____/____/____/ Strongly Disagree

4. I am in control of **not** having a binge drinking session during the next 4 weeks

Strongly Agree /____/____/____/____/____/ Strongly Disagree

5. In the past, I have had binge drinking sessions

Frequently /____/____/____/____/____/ Never

6. If I wanted to, I could easily have a binge drinking session during the next 4 weeks

Strongly Agree /____/____/____/____/____/ Strongly Disagree

7. If I did **not** have a binge drinking session during the next 4 weeks I would regret it

Strongly Agree /____/____/____/____/____/ Strongly Disagree

8. I have mixed feelings about having a binge drinking session during the next 4 weeks

Strongly Agree /____/____/____/____/____/ Strongly Disagree

9. I intend to have a binge drinking session during the next 4 weeks

Strongly Agree /____/____/____/____/____/____/ Strongly Disagree

10. Have you ever regretted engaging in a binge drinking session in the past?

Frequently /____/____/____/____/____/____/ Never ❑ NOT APPLICABLE

11. Have you ever regretted **not** engaging in a binge drinking session in the past?

Frequently /____/____/____/____/____/____/ Never ❑ NOT APPLICABLE

12. If I do engage in a binge drinking session during the next 4 weeks, it will be because I really want to

Strongly Agree /____/____/____/____/____/____/ Strongly Disagree

13. If I do engage in a binge drinking session during the next 4 weeks it will be because I feel I really **should**

Strongly Agree /____/____/____/____/____/____/ Strongly Disagree

Section B : DOING REGULAR EXERCISE OVER THE NEXT 4 WEEKS

The following questions relate to doing regular exercise over the next 4 weeks. 'Regular' means at least five 20-minute sessions a week of an exercise such as swimming, aerobics, cycling, running.

Evidence shows that exercise is beneficial to an individual's health. In the long term, regular exercise has been shown to prevent coronary heart disease, which is caused by the build up of fatty deposits in artery walls; exercise decreases levels of cholesterol and fat in the bloodstream and lowers blood pressure, which in turn slows down the build up of those fatty deposits. In the short term, regular exercise is good both physically and psychologically. So, although doing exercise may seem hard work initially, if you make the time and effort, the rewards will be really worthwhile.

Now *imagine* you've not been exercising as much as you should, in fact you've been a bit of a couch potato – finding the time to go to the gym has been hard and you've managed to even get a car ride into university. But you feel really sluggish, everything is an effort, and your body could do with toning up. You really wish you had exercised more regularly and regret not making the effort. *Think about* how these things might make you feel.

Now answer the questions below.

1. For me, doing regular exercise during the next 4 weeks would be ..... (PUT A CROSS ON **EACH** LINE BELOW)

Good /____/____/____/____/____/____/ Bad

Unpleasant /____/____/____/____/____/____/ Pleasant

Foolish /____/____/____/____/____/____/ Wise

2. If I did not do regular exercise during the next 4 weeks I would regret it

Strongly Agree /____/____/____/____/____/ Strongly Disagree

3. People who are important to me think that I should do regular exercise during the next 4 weeks

Strongly Agree /____/____/____/____/____/ Strongly Disagree

4. I am in control of doing regular exercise during the next 4 weeks

Strongly Agree /____/____/____/____/____/ Strongly Disagree

5. In the past, I have done regular exercise

Frequently /____/____/____/____/____/ Never

6. If I wanted to, I could easily engage in regular exercise during the next 4 weeks

Strongly Agree /____/____/____/____/____/ Strongly Disagree

7. If I did regular exercise during the next 4 weeks I would regret it

Strongly Agree /____/____/____/____/____/ Strongly Disagree

8. I have mixed feelings about doing regular exercise during the next 4 weeks

Strongly Agree /____/____/____/____/____/ Strongly Disagree

9. I intend to do regular exercise during the next 4 weeks

Strongly Agree /____/____/____/____/____/ Strongly Disagree

10. Have you ever regretted engaging in regular exercise in the past?

Frequently /____/____/____/____/____/ Never ☐ NOT APPLICABLE

11. Have you ever regretted not engaging in regular exercise in the past?

Frequently /____/____/____/____/____/ Never ☐ NOT APPLICABLE

12. If I do engage in regular exercise during the next 4 weeks, it will be because I really want to

Strongly Agree /____/____/____/____/____/ Strongly Disagree

13. If I do engage in regular exercise during the next 4 weeks, it will be because I feel I really should

Strongly Agree /____/____/____/____/____/ Strongly Disagree

Section C : SPENDING TOO MUCH MONEY DURING THE NEXT 4 WEEKS

The questions in this section relate to spending too much money (e.g. spending just a little bit more than you budgeted for) during the next 4 weeks.

It can feel really good spending money because you may be able to get the things that you really *want* right away; however, spending more than your budget can afford could mean that you

can't afford other things which you really *need*. So, although spending too much may seem a good idea initially, it really may not be worth it in the long term.

Now *imagine* you are out shopping and see that expensive but "must have" item; in a very short space of time your month's budget is seriously dented. A few days later, you really regret having done that because your rent is due and you need to buy a book for your course; if only you had been more careful with your budget in the first place. *Think about* how these things might make you feel.

Now answer the questions below.

1. For me, spending too much money during the next 4 weeks would be ..... (PUT A CROSS ON EACH LINE BELOW)

Good /____/____/____/____/____/____/ Bad

Unpleasant /____/____/____/____/____/____/ Pleasant

Foolish /____/____/____/____/____/____/ Wise

2. If I spent too much money during the next 4 weeks I would regret it

Strongly Agree /____/____/____/____/____/____/ Strongly Disagree

3. People who are important to me think that I should spend too much money during the next 4 weeks

Strongly Agree /____/____/____/____/____/____/ Strongly Disagree

4. I am in control of **not** spending too much money during the next 4 weeks

Strongly Agree /____/____/____/____/____/____/ Strongly Disagree

5. In the past, I have spent too much money

Frequently /____/____/____/____/____/____/ Never

6. If I wanted to, I could easily spend too much money during the next 4 weeks

Strongly Agree /____/____/____/____/____/____/ Strongly Disagree

7. If I did **not** spend too much money during the next 4 weeks I would regret it

Strongly Agree /____/____/____/____/____/____/ Strongly Disagree

8. I have mixed feelings about spending too much money during the next 4 weeks

Strongly Agree /____/____/____/____/____/____/ Strongly Disagree

9. I intend to spend too much money during the next 4 weeks

Strongly Agree /____/____/____/____/____/____/ Strongly Disagree

10. Have you ever regretted spending too much money in the past?

Frequently /____/____/____/____/____/____/ Never ☐ NOT APPLICABLE

11. Have you every regretted **not** spending too money in the past?

Frequently /____/____/____/____/____/____/ Never ☐ NOT APPLICABLE

12. If I do spend too much money during the next 4 weeks, it will be because **I** really want to

Strongly Agree /____/____/____/____/____/____/ Strongly Disagree

13. If I do spend too much money during the next 4 weeks, it will be because I feel I really **should**

Strongly Agree /____/____/____/____/____/____/ Strongly Disagree

Section D : BEING ORGANISED FOR WORK DURING THE NEXT 4 WEEKS

The following questions relate to "being organised for work" during the next 4 weeks (e.g. writing essays a couple of weeks before they are even due, going to the library every day to source and read relevant or interesting material, being prepared to get the most out of lectures by reading several articles related to the topics being addressed in those lectures).

Developing sensible study habits is a good way of being time efficient. Although onerous at the time, in the long run it will work out easier for you and the effort will be worth it in terms of being able to perform to the best of your ability; for example, you won't be leaving writing essays until the last minute!

Now *imagine* you have been given an essay to do which counts for 20% of an exam mark. You're having a very good social life at the time and think there will be plenty of opportunities to go to the library and do the necessary research later. However, by the time you get to the library, most of the really good references are out on loan, and you have only got 2 days left before the hand-in date. You really regret not being more organised and promise yourself you will make up for it by revising well for the exam; but guess what – you leave that until the last minute too! *Think about* how these things might make you feel.

Now answer the questions below.

1. For me, being organised for work during the next 4 weeks would be ..... (PUT A CROSS ON EACH LINE BELOW)

Good /____/____/____/____/____/____/ Bad

Unpleasant /____/____/____/____/____/____/ Pleasant

Foolish /____/____/____/____/____/____/ Wise

2. If I were **not** organised for work during the next 4 weeks I would regret it

Strongly Agree /____/____/____/____/____/____/ Strongly Disagree

3. People who are important to me think that I should be organised for work during the next 4 weeks

Strongly Agree /____/____/____/____/____/____/ Strongly Disagree

4. I am in control of being organised for work during the next 4 weeks

Strongly Agree /____/____/____/____/____/____/ Strongly Disagree

5. In the past, I have been organised for work

Frequently /____/____/____/____/____/____/ Never

6. If I wanted to, I could easily be organised for work during the next 4 weeks

Strongly Agree /____/____/____/____/____/____/ Strongly Disagree

7. If I were organised for work during the next 4 weeks I would regret it

Strongly Agree /____/____/____/____/____/____/ Strongly Disagree

8. I have mixed feelings about being organised for work during the next 4 weeks

Strongly Agree /____/____/____/____/____/____/ Strongly Disagree

9. I intend to be organised for work during the next 4 weeks

Strongly Agree /____/____/____/____/____/____/ Strongly Disagree

10. Have you ever regretted being organised for work?

Frequently /____/____/____/____/____/____/ Never ❑ NOT APPLICABLE

11. Have you ever regretted **not** being organised for work?

Frequently /____/____/____/____/____/____/ Never ❑ NOT APPLICABLE

12. If I do get organised for work during the next 4 weeks, it will be because I really want to

Strongly Agree /____/____/____/____/____/____/ Strongly Disagree

13. If I do get organised for work during the next 4 weeks, it will be because I feel I really **should**

Strongly Agree /____/____/____/____/____/____/ Strongly Disagree

Section E : EATING HEALTHILY DURING THE NEXT 4 WEEKS

This section relates to healthy eating (i.e. a balanced diet low in fat, which means: avoiding eating nearly all fat-containing foods such as red meat, chips, pies, cakes, biscuits; eating at least 5 portions of fruit and vegetables every day; and eating fibre-containing foods like bran every day) during the next 4 weeks.

Eating healthily may seem like a chore, especially when faced with tempting junk food like fried chips and chocolate bars on a regular basis, but it makes sense in both the short and long term –

the effort will be worth it. In fact, a healthy diet has been shown to be good physically (e.g. decreased chance of developing heart disease, looking good) and psychologically (e.g. feeling confident about how you look).

Now *imagine* eating a large plate of fried chips followed by a 'wicked' dessert; you really enjoy it at the time – and why not! But this is becoming a regular pattern; eating junk food is particularly unhealthy unless you only do it very occasionally. You may be endangering your health; fatty deposits may be building up in the artery walls leading to problems with your heart. Just a few moments after you have finished the meal, you really regret it and wish you hadn't indulged so much. *Think about* how these things might make you feel.

Now answer the questions below.

1. For me, eating healthily during the next 4 weeks would be ..... (PUT A CROSS ON **EACH** LINE BELOW)

Good /_____/_____/_____/_____/_____/_____/ Bad

Unpleasant /_____/_____/_____/_____/_____/_____/ Pleasant

Foolish /_____/_____/_____/_____/_____/_____/ Wise

2. If I did **not** eat healthily during the next 4 weeks I would regret it

Strongly Agree /_____/_____/_____/_____/_____/_____/ Strongly Disagree

3. People who are important to me think that I should eat healthily during the next 4 weeks

Strongly Agree /_____/_____/_____/_____/_____/_____/ Strongly Disagree

4. I am in control of eating healthily during the next 4 weeks

Strongly Agree /_____/_____/_____/_____/_____/_____/ Strongly Disagree

5. In the past I ate healthily

Frequently /_____/_____/_____/_____/_____/_____/ Never

6. If I wanted to, I could easily eat healthily during the next 4 weeks

Strongly Agree /_____/_____/_____/_____/_____/_____/ Strongly Disagree

7. If I did eat healthily during the next 4 weeks I would regret it

Strongly Agree /_____/_____/_____/_____/_____/_____/ Strongly Disagree

8. I have mixed feelings about eating healthily during the next 4 weeks

Strongly Agree /_____/_____/_____/_____/_____/_____/ Strongly Disagree

9. I intend to eat healthily during the next 4 weeks

Strongly Agree /_____/_____/_____/_____/_____/_____/ Strongly Disagree

10. Have you ever regretted eating healthily in the past?

Frequently /____/____/____/____/____/ Never ❑ NOT APPLICABLE

11. Have you ever regretted **not** eating healthily in the past?

Frequently /____/____/____/____/____/ Never ❑ NOT APPLICABLE

12. If I do eat healthily during the next 4 weeks, it will be because **I** really want to

Strongly Agree /____/____/____/____/____/ Strongly Disagree

13. If I do eat healthily during the next 4 weeks, it will be because I feel I really **should**

Strongly Agree /____/____/____/____/____/ Strongly Disagree

Section F : MAKING IMPULSIVE COMMUNICATIONS DURING THE NEXT 4 WEEKS

Impulsive communications are those interactions we have with people whereby we communicate something which we can't later retract, e.g. saying something in a temper or sending a text message or e-mail in haste at the click of a button. The following section relates to impulsive communications such as these made during the next 4 weeks.

Impulsive communications may feel good at the time (e.g. you get those problems off your chest), BUT it could result in you falling out with someone or hurting their feelings. So although impulsive communications may seem like a good idea at the time, the results may be not be worth it.

Now *imagine* that you have had a difference of opinion with a good friend; in a fit of temper, you tell them something that you know will really hurt them. You see the look on their face and instantly regret it – but there's nothing you can do now, you've already said it; an apology will not take the words back. If only you had bit your tongue. *Think about* how these things might make you feel.

Now answer the questions below.

1. For me, making impulsive communications during the next 4 weeks would be..... (PUT A CROSS ON EACH LINE BELOW)

Good /____/____/____/____/____/ Bad

Unpleasant /____/____/____/____/____/ Pleasant

Foolish /____/____/____/____/____/ Wise

2. If I made impulsive communications during the next 4 weeks I would regret it

Strongly Agree /_____/_____/_____/_____/_____/ Strongly Disagree

3. People who are important to me think that I should make impulsive communications during the next 4 weeks

Strongly Agree /_____/_____/_____/_____/_____/ Strongly Disagree

4. I am in control of **not** making impulsive communications during the next 4 weeks

Strongly Agree /_____/_____/_____/_____/_____/ Strongly Disagree

5. In the past, I have made impulsive communications

Frequently /_____/_____/_____/_____/_____/ Never

6. If I wanted to, I could easily make impulsive communications during the next 4 weeks

Strongly Agree /_____/_____/_____/_____/_____/ Strongly Disagree

7. If I did **not** make impulsive communications during the next 4 weeks I would regret it

Strongly Agree /_____/_____/_____/_____/_____/ Strongly Disagree

8. I have mixed feelings about making impulsive communications during the next 4 weeks

Strongly Agree /_____/_____/_____/_____/_____/ Strongly Disagree

9. I intend to make impulsive communications during the next 4 weeks

Strongly Agree /_____/_____/_____/_____/_____/ Strongly Disagree

10. Have you ever regretted making impulsive communications in the past?

Frequently /_____/_____/_____/_____/_____/ Never ❑ NOT APPLICABLE

11. Have you ever regretted **not** making impulsive communications in the past?

Frequently /_____/_____/_____/_____/_____/ Never ❑ NOT APPLICABLE

12. If I do make impulsive communications during the next 4 weeks, it will be because **I** want to

Strongly Agree /_____/_____/_____/_____/_____/ Strongly Disagree

13. If I do make impulsive communications during the next 4 weeks, it will be because I feel I **should**

Strongly Agree /_____/_____/_____/_____/_____/ Strongly Disagree

THANK YOU FOR TAKING PART IN THIS RESEARCH. PLEASE ENTER YOUR EMAIL ADDRESS ON THE PAGE WHICH FOLLOWS AFTER YOU PRESS THE SUBMIT BUTTON. YOU WILL THEN BE ENTERED INTO THE PRIZE DRAW.

SUBMIT

APPENDIX 5.1

READ THIS FIRST

Instructions for Completing the Questionnaire

This questionnaire relates to research being carried out as part of a PhD study into exercise. The questions require you to put a cross at an appropriate point on the scale between two words (the middle point means "neutral"). There are 7 sections separated by slashes: please put your X in a section, NOT on a slash

e.g. strongly agree /____/____/____/____/ **X** /____/____/____/ strongly disagree

The questionnaire is totally PRIVATE and ANONYMOUS. However, I will ask you to complete a second questionnaire in 2 weeks time, and because I need to match up participants from Time 1 and Time 2 , I would like you to fill in *your* date of birth and first three letters of your *mother's* first name below. I am interested in what you think, so please carefully read and answer each question, be honest and work on your own. You are not obliged to fill in the entire questionnaire, or take part at all if you don't want to; however, I would be grateful for your support, so please participate in the study.

IF YOU COMPLETE THIS QUESTIONNAIRE YOU CAN ENTER INTO A £75 PRIZE DRAW; you will be asked to write your contact details on the last page and tear it off.

TRACY, PhD Student

What are you studying? Tick one box.

Engineering ☐ Maths/Stats/Computing ☐ Physics/Biology/Medicine ☐

History/Geography ☐ Sociology/Philosophy/Politics ☐ Psychology ☐

Languages ☐ Art/Design/Textiles ☐ Other (please detail) . . . . . .

What is your age? (put one number in each box) ☐☐ (years)

Are you male or female? (tick one box) male ☐ female ☐

What is your date of birth? (e.g. 08/05/84) _____/_____/_____

What are the first three letters of you mother's first name? (put one letter in each box)

☐☐☐

DOING REGULAR EXERCISE (AT LEAST 4 TIMES OVER THE NEXT 2 WEEKS)

This questionnaire is about exercising at least four times over the next two weeks. Exercise includes activities such as aerobics, badminton, jogging, rugby, etc, but not activities which form part of your daily life such as walking to the bus stop, dancing at discos etc.

Now answer the questions below.

1. If I did **not** exercise at least 4 times over the next 2 weeks I would feel regret.

   Definitely Yes /____/____/____/____/____/____/____/ Definitely No

2. I intend to exercise at least 4 times over the next 2 weeks.

   Strongly Agree /____/____/____/____/____/____/____/ Strongly Disagree

3. I will definitely exercise at least 4 times over the next 2 weeks.

   Strongly Agree /____/____/____/____/____/____/____/ Strongly Disagree

4. For me, exercising at least 4 times over the next 2 weeks would be ..... (PUT A CROSS ON **EACH** LINE BELOW)

   Good /____/____/____/____/____/____/____/ Bad

   Unpleasant /____/____/____/____/____/____/____/ Pleasant

   Enjoyable /____/____/____/____/____/____/____/ Not enjoyable

   Satisfying /____/____/____/____/____/____/____/ Unsatisfying

   Harmful /____/____/____/____/____/____/____/ Beneficial

   Positive /____/____/____/____/____/____/____/ Negative

5. Most people who are important to me think that I should exercise at least 4 times over the next 2 weeks.

   Strongly Agree /____/____/____/____/____/____/____/ Strongly Disagree

6. I am in control of exercising at least 4 times over the next 2 weeks.

   Strongly Agree /____/____/____/____/____/____/____/ Strongly Disagree

7. How likely is it that you will exercise at least 4 times over the next 2 weeks?

   Very Unlikely /____/____/____/____/____/____/____/ Very Likely

8. If I did **not** exercise at least 4 times over the next 2 weeks I would later wish I had.

   Strongly Agree /____/____/____/____/____/____/____/ Strongly Disagree

9. In the past, I have exercised at least 4 times over a 2 week period.

   Frequently /____/____/____/____/____/____/____/ Never

10. People who are important to me would . . .

Approve /____/____/____/____/____/____/____/____/ Disapprove

of me exercising at least 4 times over the next 2 weeks.

11. If I did exercise at least 4 times over the next 2 weeks I would later wish I had not.

Strongly Agree /____/____/____/____/____/____/____/____/ Strongly Disagree

12. How many days did you exercise in the last 2 weeks? (Please circle an appropriate number)

0 1 2 3 4 5 6 7 8+

13. If I exercised at least 4 times over the next 2 weeks my friends would approve.

Strongly Agree /____/____/____/____/____/____/____/____/ Strongly Disagree

14. If I wanted to, I could easily exercise at least 4 times over the next 2 weeks

Strongly Agree /____/____/____/____/____/____/____/____/ Strongly Disagree

15. If I did exercise at least 4 times over the next 2 weeks I would feel regret.

Definitely Yes /____/____/____/____/____/____/____/____/ Definitely No

16. How much control do you have over exercising at least 4 times over the next 2 weeks?

No control /____/____/____/____/____/____/____/____/ Complete control

17. In the past 6 months, I have exercised at least twice a week.

Frequently /____/____/____/____/____/____/____/____/ Never

18. If I did **not** exercise at least 4 times over the next 2 weeks I would feel upset.

Definitely Yes /____/____/____/____/____/____/____/____/ Definitely No

19. How strong is your intention to exercise at least 4 times over the next 2 weeks?

Very Strong /____/____/____/____/____/____/____/____/ Not at all Strong

20. Have you ever regretted engaging in regular exercise in the past?

Frequently /____/____/____/____/____/____/____/____/ Never ❑ NOT APPLICABLE

21. Have you ever regretted **not** engaging in regular exercise in the past?

Frequently /____/____/____/____/____/____/____/____/ Never ❑ NOT APPLICABLE

22. For me to exercise at least 4 times over the next 2 weeks would be .....

Very Easy /____/____/____/____/____/____/____/____/ Very Difficult

23. If I do exercise at least 4 times over the next 2 weeks, it will be because **I** really want to.

Strongly Agree /____/____/____/____/____/____/____/____/ Strongly Disagree

24. If I do exercise at least 4 times over the next 2 weeks, it will be because I feel I really **should.**

Strongly Agree /____/____/____/____/____/____/____/ Strongly Disagree

25. If I did exercise at least 4 times over the next 2 weeks I would feel upset.

Definitely Yes /____/____/____/____/____/____/____/ Definitely No

26. If I do exercise it would be ..... (please tick the appropriate box for you)

Mainly for health reasons ☐

Mainly to lose weight ☐

Mainly to maintain weight ☐

27. I have made a detailed plan regarding .....

a) when to exercise over the next 2 weeks

Not at all true /____/____/____/____/____/____/____/ Exactly true

b) where to exercise over the next 2 weeks

Not at all true /____/____/____/____/____/____/____/ Exactly true

c) how to exercise over the next 2 weeks

Not at all true /____/____/____/____/____/____/____/ Exactly true

d) how often to exercise over the next 2 weeks

Not at all true /____/____/____/____/____/____/____/ Exactly true

APPENDIX 5.2

UNIVERSITIES AND DEPARTMENTS PARTICIPATING IN WEB STUDY 6

Bath	Computer Science; Mathematical Sciences; School for Health; Social and Policy Sciences; Sport and Exercise Science
Bradford	Archaeology; Biomedical Sciences; Geography; Medical and Healthcare Technology; Pharmacy
Cambridge	Applied Economics; Applied Mathematics and Theoretical Physics; Architecture; Earth Sciences; Economics and Politics; Engineering; English; Experimental Psychology; History; History and Philosophy of Science; Law; Materials Science and Metallurgy; Paediatrics; Pharmacology; Physics and Chemistry; Plant Sciences
Durham	Chemistry; Computer Science; Economics and Finance; Engineering; Geography; History; Law; Mathematical Science; Philosophy; Physics; Politics; Psychology; Sociology and Social Policy
East Anglia	Computing; Economics; English and USA; Environmental Sciences; History; Nursing and Midwifery
Manchester	Applied Social Science; Computer Science; Dentistry; English and American Studies; Engineering; European Studies and Modern Languages; Geography; History; Law; Maths; Philosophy; Sociology
Queens, Belfast	Architecture; Chemical Engineering; Environmental Planning; Humanities; Language, Literature and Art; Legal, Social and Educational Sciences; Management and Economics; Philosophy; Politics and International Studies

APPENDIX 6.1

Exercise at the Sports Centre by Members - Questionnaire

DOING REGULAR EXERCISE AT THE UNIVERSITY CAMPUS SPORTS CENTRE (AT LEAST TWICE PER WEEK OVER THE NEXT 2 MONTHS)

This questionnaire is about going to the campus Sports Centre (**NOT** the Cromer Terrace Gym) and exercising at least twice per week over the next two months. Exercise includes activities available at the Sports Centre such as aerobics, badminton, table tennis, football, etc. It may be that you exercise in other places apart from the University Sports Centre, but this questionnaire is ONLY about exercise at the University Sports Centre.

Now please answer the questions below.

1. If I did **not** exercise at least twice per week over the next 2 months at the Sports Centre I would feel regret.

	1	2	3	4	5	6	7	
Definitely Yes	○	○	○	○	○	○	○	Definitely No

2. If I did **not** exercise at least twice per week over the next 2 months at the Sports Centre I would later wish I had.

	1	2	3	4	5	6	7	
Strongly Agree	○	○	○	○	○	○	○	Strongly Disagree

3. If I did **not** exercise at least twice per week over the next 2 months at the Sports Centre I would feel upset.

	1	2	3	4	5	6	7	
Definitely Yes	○	○	○	○	○	○	○	Definitely No

4. I intend to exercise at least twice per week over the next 2 months at the Sports Centre.

	1	2	3	4	5	6	7	
Strongly Agree	○	○	○	○	○	○	○	Strongly Disagree

5. I will definitely exercise at least twice per week over the next 2 months at the Sports Centre.

	1	2	3	4	5	6	7	
Strongly Agree	○	○	○	○	○	○	○	Strongly Disagree

6. For me, exercising at least twice per week over the next 2 months at the Sports Centre would be ..... (CLICK A POINT ON EACH LINE BELOW)

	1	2	3	4	5	6	7	
Good	○	○	○	○	○	○	○	Bad

Unpleasant	○	○	○	○	○	○	○	Pleasant
Enjoyable	○	○	○	○	○	○	○	Not enjoyable
Satisfying	○	○	○	○	○	○	○	Unsatisfying
Harmful	○	○	○	○	○	○	○	Beneficial
Positive	○	○	○	○	○	○	○	Negative
Worthwhile	○	○	○	○	○	○	○	Not worthwhile

7. Most people who are important to me think that I should exercise at least twice per week over the next 2 months at the Sports Centre.

	1	2	3	4	5	6	7	
Strongly Agree	○	○	○	○	○	○	○	Strongly Disagree

8. I am in control of exercising at least twice per week over the next 2 months at the Sports Centre.

	1	2	3	4	5	6	7	
Strongly Agree	○	○	○	○	○	○	○	Strongly Disagree

9. How likely is it that you will exercise at least twice per week over the next 2 months at the Sports Centre?

	1	2	3	4	5	6	7	
Very Unlikely	○	○	○	○	○	○	○	Very Likely

10. I am confident that I will exercise at least twice per week over the next 2 months at the Sports Centre.

	1	2	3	4	5	6	7	
Strongly Agree	○	○	○	○	○	○	○	Strongly Disagree

11. In the past, I have exercised at least twice per week at the Sports Centre.

	1	2	3	4	5	6	7	
Frequently	○	○	○	○	○	○	○	Never

12. Most people who are important to me would . . .

	1	2	3	4	5	6	7	
approve	○	○	○	○	○	○	○	disapprove

of me exercising at least twice per week over the next 2 months at the Sports Centre.

13. How many days did you exercise at the Sports Centre last week? (Please click on an appropriate number)

○ 0 ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6+

14. I am . . .

	1	2	3	4	5	6	7	
Very Confident	○	○	○	○	○	○	○	Not at all confident

that I will exercise at least twice per week over the next 2 months at the Sports Centre.

15. Most of my friends exercise at least twice per week.

	1	2	3	4	5	6	7	
Strongly Agree	○	○	○	○	○	○	○	Strongly Disagree

16. If I wanted to, I could easily exercise at least twice per week over the next 2 months at the Sports Centre.

	1	2	3	4	5	6	7	
Strongly Agree	○	○	○	○	○	○	○	Strongly Disagree

17. How much control do you have over exercising at least twice per week over the next 2 months at the Sports Centre?

	1	2	3	4	5	6	7	
No control	○	○	○	○	○	○	○	Complete control

18. In the past few weeks, I have exercised at least twice per week at the Sports Centre.

	1	2	3	4	5	6	7	
Frequently	○	○	○	○	○	○	○	Never

19. Most people who are important to me exercise at least twice per week.

	1	2	3	4	5	6	7	
Strongly Agree	○	○	○	○	○	○	○	Strongly Disagree

20. How strong is your intention to exercise at least twice per week over the next 2 months at the Sports Centre?

	1	2	3	4	5	6	7	
Very Strong	○	○	○	○	○	○	○	Not at all Strong

21. For me to exercise at least twice per week over the next 2 months at the Sports Centre would be . . .

	1	2	3	4	5	6	7	
Very Easy	○	○	○	○	○	○	○	Very Difficult

Continue

APPENDIX 6.2

Exercise at the Sports Centre by Members - 2nd Questionnaire

Again, this questionnaire is about going to the campus Sports Centre (NOT the Cromer Terrace Gym) and exercising during the last two weeks (i.e. **FROM 15 NOVEMBER TO 28 NOVEMBER INCLUSIVE**).
Exercise includes activities available at the Sports Centre such as aerobics, badminton, table tennis, football, etc.

1. I have exercised at least twice per week over the past two weeks at the Sports Centre.

	1	2	3	4	5	6	7	
Strongly Agree	○	○	○	○	○	○	○	Strongly Disagree

2. How many days did you exercise at the Sports Centre over the last two weeks? (Please click on an appropriate number)

○ 0 ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6+

3. And how many SESSIONS of exercise did you do at the Sports Centre over the last two weeks (for example, 1 session = an aerobics class). Please click on an appropriate number.

○ 0 ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6+

4. I intend to exercise at least twice per week over the next two months at the Sports Centre.

	1	2	3	4	5	6	7	
Strongly Agree	○	○	○	○	○	○	○	Strongly Disagree

5. I have experienced problems when using my student card to access the barrier in the Sports Centre over the past two weeks.

	1	2	3	4	5	6	7	
Strongly Agree	○	○	○	○	○	○	○	Strongly Disagree

6. How many times have you been to the Sports Centre to exercise over the past two weeks AND just been allowed through the barrier **without** using your card? (Please click on an appropriate number below)

○ 0 ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6+

7. Over the past two weeks I have exercised in places other than the sports centre (e.g. jogging with friends, playing tennis, doing a gym class elsewhere etc).

	1	2	3	4	5	6	7	
Strongly Agree	○	○	○	○	○	○	○	Strongly Disagree

8. Roughly estimate how many **other** sessions of exercise you have done over the past two weeks which have not been in the Sports Centre (Please click on an appropriate number below)

○ 0 ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6+

9. How often did you exercise at the Sports Centre over the last two weeks?

	1	2	3	4	5	6	7	
All the time	○	○	○	○	○	○	○	Not all the time

10. Over the past two **months** I usually exercised at least twice per week at the sports centre?

	1	2	3	4	5	6	7	
Strongly Agree	○	○	○	○	○	○	○	Strongly Disagree

11. I intend to exercise at least twice per week over the next two months EITHER at the sports centre OR elsewhere.

	1	2	3	4	5	6	7	
Strongly Agree	○	○	○	○	○	○	○	Strongly Disagree

12. What is/are the main reason(s) you exercise? (Please click as appropriate below)

- ☐ enjoyment
- ☐ to lose weight
- ☐ to maintain/control weight
- ☐ for health reasons
- ☐ other

THAT'S IT - JUST PRESS THE SUBMIT BUTTON BELOW!

Submit