

# The Risk-as-feelings hypothesis in a Theory-of-planned-behaviour perspective

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## Abstract

The Theory of Planned Behaviour (TpB: Ajzen, 1985; 1991) is based on a utility framework, and the Risk-as-Feelings hypothesis (RaF: Loewenstein, Weber, Hsee, & Welch, 2001) is a feelings-based behavioural model. The TpB and RaF are first compared and contrasted. Two empirical studies investigated the predictive power of consequence-based vs. affect-based evaluative judgements for behavioural intentions: Study 1 ( $n = 94$ ) applied a regression model to examine the predictive value of a subset of shared variables, unique TpB variables, and unique RaF variables for intentions to have unsafe sex. Study 2 ( $n = 357$ ) experimentally examined whether intentions are driven by consequences or feelings, in two decision vignettes with opposite qualities: A positive hedonic experience with potential negative consequences (unsafe sex) vs. a negative hedonic experience with potential positive consequences (back surgery). The results supported the TpB by emphasising the role of outcome-expectations in the construction of intentions, and the RaF by showing the importance of affective subcomponents in attitudes.

Keywords: risk, feelings, affect, planned behaviour, decision, consequences, ambivalence.

## 1 Introduction

Humans sometimes act in order to reach an outcome, and other times out of enjoyment for the activity itself. This difference has been referred to as extrinsic vs. intrinsic motivation (Higgins & Bryant, 1982), incentives vs. motivation (De Grada, Kruglanski, Mannetti, & Pierro, 1999), and utilitarian vs. hedonically driven behaviour (Dhar, 2000), and represents a general dichotomy between action as goal and action as mean towards a goal.

There is often a conflict between the hedonic quality of the behaviour and its consequences. Although hedonic qualities could be seen as a particular kind of behavioural consequence, the experiential part of such a (dis)pleasure is, by definition, in the present, whereas other behavioural outputs lie in the future. Thus, one

suggested underlying mechanism for the tension between behaviour and consequences is the fundamental difference in time perspective associated with ongoing activities and their consequences. It has been suggested that the need for self-regulation exists in most individuals due to an inconsistency between short- and long-term consequences of an option (Soman et al., 2005). Intertemporal discounting exemplifies one such failure to balance the subjective value of immediate to more distant goals, and a systematic devaluation of future as opposed to immediate outcomes (Camerer, Loewenstein, & Weber, 1989). The present paper focuses on dilemmas where the value(s) associated with the performance of the behaviour and the value(s) of the consequences are in conflict, even when holding time-perspective constant.

Several theoretical accounts may shed light on the difference between actions as goals or as means. Meta-theories of human motivation, such as self-determination theory (Baard, Deci, & Ryan, 2004; Deci, Koestner, & Ryan, 1999; Ryan & Deci, 2000; Ryan, Huta, & Deci, 2008) centre on *motivational mechanisms*, claiming that a set of basic motivational needs drive behaviour. The need for competence, autonomy, and belongingness are proposed as general behavioural driving forces, fairly independently of time-perspectives. Thus, in addition to motivation towards mastery and independence, social norms direct our behaviour. The most socially accepted action is the default option, and complying with it may not be experienced as decision making.

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Other theories focus on *preventing factors*, such as cognitive limitations. To this end, several dual-process theories (Chaiken & Trope, 1999) demonstrate our ability and unique human predisposition to pay attention to potentially contradictory sources of information, e.g., affective/experiential vs. reason based/consequential. These authors (e.g., Chen & Chaiken, 1999; Epstein & Pacini, 1999) circumvent the issue of time perspective indirectly, by showing how the intuitive, basic, and effortless experiential/heuristic system for processing is faster than the intentional, reason-based, and effortful rational/analytical system. The rapid processing of affective and immediate information may result in behaviour which is more inclined to follow the affective rather than the analytical system.

There is ample evidence that intentions may be directed at activities just for the pleasure of it, with little consideration of the potential consequences, e.g., smoking, heavy drinking, unsafe sex, hazardous driving, and unhealthy eating. On the basis of this tension between consequences and feelings, the present study set out to compare and contrast two theoretical psychological frameworks, which identify key structures and processes of planned- and feelings-based behaviour; the Theory of planned behaviour (TpB: Ajzen, 1985; 1991; 2001) and the Risk-as-feelings hypothesis (RaF: Loewenstein et al., 2001). Furthermore, we aimed at an empirical investigation of core predictors for behavioural intentions in decision making under ambivalence. Decision ambivalence is here defined as perceived tension between the hedonic quality of the behaviour and its potential consequences in behavioural choices.

The present paper is organized as the following: The two theoretical frameworks are presented first, followed by a theoretical analysis which separates their basic components into shared and unique variables. Then, we present the outline and results of two empirical studies, investigating the predictive power of the models. Next, we discuss the findings in light of the theoretical frameworks and the reviewed literature. Finally, we present an example of a research model, meant to capture variables from several of the dominant research fields relevant to decision making under ambivalence.

## 1.1 The Theory of planned behaviour

The TpB is among the most widely used models for predicting specific human behaviour (Ajzen, 1985; 1991). It is based on a utility framework, and defined as consequentialist, according to the terminology of Loewenstein and colleagues (2001). The TpB has been applied for predicting specific behaviours, which may involve conflicts between short- and long term goals, affect and cognition, or hedonism and consequences, within various domains

such as e.g. exercise behaviour (Lowe, Eves, & Carroll, 2002), condom use (Richard, de Vries, & van der Pligt, 1998), and smoking cessation (Droomers, Schrijbers, & Mackenbach, 2004).

A core assumption of the TpB is the idea that planned behaviour is driven by behavioural intentions (Ajzen, 2001). The TpB specifically suggests which subcomponents determine intentions; i.e., the individual's attitudes towards the behaviour, subjective norms, and perceived behavioural control. Attitudes are defined as the individual's evaluation of whether performing the behaviour is either positive or negative, thus a valence-based subjective evaluation. Subjective norms represent perceived social pressure to perform the behaviour, indicating the appreciation of the given behaviour within a social context. Hence, this variable explicitly acknowledges our need to relate to others is shaping behaviour (Baard et al., 2004; Deci et al., 1999; Ryan & Deci, 2000; Ryan et al., 2008), and that preferences are socially context-dependent. Perceived behavioural control refers to the individual's perception of control over performing the behaviour. This reflects the idea that an ability to regulate or control one self is at the core of motivational processes in general, and is in line with several theoretical perspectives on self-regulation (Baumeister & Vohs, 2004).

Furthermore, the TpB specifies the antecedents of attitudes, norms, and perceived control. In the case of attitudes, these are a small set of specific salient behavioural beliefs. The behavioural beliefs are formed by the respective likelihood of anticipated outcomes of the behaviour, weighted by an evaluation of each of these outcome, thus a utility based construct. The expected outcomes may include the anticipation of positive and negative emotions, thus, anticipated emotions (prospects about feelings) are accounted for within this consequentialist model (Ajzen, 1991; Ajzen & Driver, 1991).

## 1.2 Risk as feelings

Few behavioural models explicitly outline the behavioural output resulting from ambivalence due to conflicting information from the two systems for information acquisition, but The RaF hypothesis (Loewenstein et al., 2001) is an exception. The RaF perspective has been used to feed into models that predict action selection in psychological risk-return models (Weber & Johnson, 2008; Weber & Milliman, 1997). Apart from showing the high potential for disagreement between feelings and cognitive evaluations, the RaF model suggests that, when such a tension arises, behaviour tends to be driven by anticipatory feelings, e.g., feelings experienced at the moment of decision making. By integrating outcome-related factors, such as anticipated outcomes, including anticipated emotions, the model incorporates several of the variables typ-

ically accounted for by the intentional/analytical system, and incorporates empirical evidence showing that the affective/intuitive system may overrule the cognitive evaluations when these are in conflict.

The RaF (Loewenstein et al., 2001) framework readily explains a range of behaviours which demonstrate divergence between cognitive evaluations and feelings, e.g., failure to act in accordance with one's values, to comply with one's intentions and goals, or seemingly irrational behaviour, such as specific phobias and various forms of affect-driven activities ranging from interpersonal relationships to appetitive/aversive motives in general. Loewenstein and colleagues (2001) argue that the RaF perspective is feelings-based, in opposition to virtually all other models aimed at describing and predicting human behaviour, as these are consequentialist in nature (see Figures 1–3 in Loewenstein et al., 2001).<sup>1</sup>

### 1.3 Consequentialist vs. feelings-based behavioural models

From the theoretical perspective, the tension between acting in order to reach a certain outcome, in contrast to just acting out of enjoyment of the activity, has been approached as a fundamental distinction between intentional behaviour and incidental- or feelings-based behaviour (Dhar, 2000). This distinction is in accordance with the distinction applied between consequence-based vs. feelings-based behaviour throughout the present paper. To reach a better understanding of such phenomena, by scrutinizing the feelings-based and the consequentialist perspective on human behaviour, we now turn to a more direct comparison of the TpB (Ajzen, 1985; 1991) and the RaF (Loewenstein et al., 2001).

The TpB (Ajzen, 1985; 1991) and the RaF (Loewenstein et al., 2001) are both aimed at identifying the structural antecedents of human behaviour, which may be used for predicting future behaviour. According to the TpB, the direct antecedents of behaviour are intentions, which in turn are determined by attitudes, social norms, and perceived behavioural control. More recently, Loewenstein and colleagues (2001) highlighted how feelings play a large role in determining behaviour. According to their model, both consequence-related factors, such as anticipated outcomes and subjective probabilities and feelings-based factors such as vividness of the consequences and background mood, give rise to cognitive evaluations and feelings. The RaF hypothesis focuses on how cognitive evaluations and emotional feelings may diverge, and claims that feelings frequently drive behaviour.

<sup>1</sup>Loewenstein and colleagues (2001) refer to the RaF approach as a hypothesis/perspective rather than a model, but present it graphically as a model.

The TpB treats lack of correspondence between intentions and behaviour as either a measurement problem, a question about the stability of an intention, or a behavioural-control issue (Ajzen, 1991). The measurement problem is best handled by eliciting behaviour-specific intentions, whereas the stability-of-intention problem will be lower the closer the time gap in-between the reported intention and the actual behavioural output (Ajzen, 1991; Isen, 2005). Behavioural dilemmas where there is cross-pressure between hedonic feelings and behavioural consequences exemplify one type of behavioural-control issue, which may lead to low correspondence between intentions and behaviour. Cross-pressure between social norms and attitudes is another type of dilemma challenging behavioural control within the TpB perspective. The RaF perspective depicts a slightly different tension, the one lying inherently in people's (implicit) judgements of perceived riskiness. The behavioural effects may nevertheless be similar, with low behavioural predictability as a result. We will devote our attention to such behavioural tensions in the empirical section of the present paper.

### 1.4 TpB and RaF: Shared variables

Despite the initial presentation of these models as contradictory, we argue that they have certain predictors and interrelations between predictors in common. Based on the explicit verbal and graphical presentations of subcomponents put forward in the TpB (Ajzen, 1985; 1991) and the RaF (Loewenstein et al., 2001) respectively, the variables have been divided into three categories (see Figure 1): The orange boxes indicate variables which are common for both models. The green boxes reflect the variables unique for the TpB, and the blue boxes are the unique RaF variables. We shall first focus on the shared variables (Figure 1, orange boxes).

The TpB and RaF share the general assumption that behaviour will be guided by an evaluation of the behaviour. The TpB has been validated extensively across a range of settings, and is specific about the formative indices of these global evaluations: The determinants of the global attitudinal evaluations are behavioural beliefs, along with their pertaining subjective probabilities and outcome evaluations. For the more recent RaF hypothesis, the factors anticipated outcomes, including anticipated emotions, are thought to jointly affect cognitive evaluations, and feelings, together with the respective subjective probabilities.

Despite the different degrees of specificity in determining the structural components of the attitudes, the TpB and RaF are based on the same general assumption, that evaluations of a specific behaviour will be guided by anticipated outcomes in combination with subjective prob-

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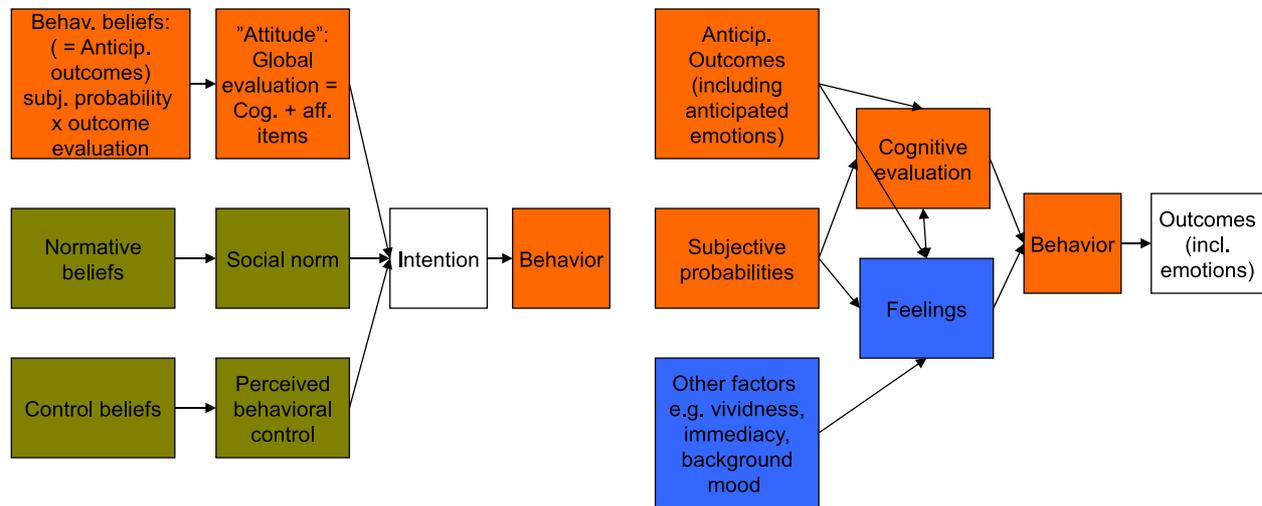


Figure 1: TpB and RaF variables. Colour codes: Orange = shared variables, Green = Unique TpB variables, Blue = Unique RaF variables.

abilities. The TpB determines the weighting function of the various components of the attitude, as the product of the subjective probability and outcome evaluation pertaining to the behaviour. The RaF hypothesis highlights the dynamic interplay of anticipated outcomes and subjective probabilities.

According to the RaF model, anticipated outcomes may influence cognitive evaluations and feelings separately. This is also the case for subjective probability. The dismantling of cognitive evaluations and feelings, and their unique inputs from anticipated outcomes and subjective probabilities, allows for more nuances than a mere valence-based global evaluation of the behaviour. Furthermore, the RaF depicts how cognitive evaluations and feelings are mutually influenced by each other, again emphasising a dynamic interplay. The TpB does not define the nature of outcome evaluations with respect to being more or less affective or cognitive in origin. However, Ajzen (1991) holds the TpB's behavioural beliefs to include outcome expectations of both predominantly cognitive and affective qualities (Ajzen, 1991; Ajzen & Driver, 1991).

### 1.4.1 TpB unique variables

There are also predictors unique to each model: Components specific to the TpB (Figure 1, green boxes) are subjective norms and perceived behavioural control. The subjective norms constitute the individual's perceived so-

cial pressure to perform a certain behaviour and are determined by a set of normative beliefs, i.e., the individual's beliefs about the perceived wishes of significant others, weighted by the individual's willingness to comply with these perceived expectations. Perceived control over the behaviour is in turn determined by a respondent's beliefs about a set of salient control factors, i.e., beliefs about the presence or absence of resources and obstacles which may facilitate or impede the performance of the behaviour, weighted by the respondent's perceived control over each of these factors. The greater the perceived social pressure and the greater the perceived control, the more likely will the individual perform the behaviour (Ajzen, 1985; 1991). The social aspects of behavioural control may relate to moral-based or feelings based evaluations pertaining to the behaviour. However, low behavioural control could also be related to the mere complexity of the behaviour at hand, given that certain behaviours are simply more *difficult* to carry out than others. Thus, lack of behavioural control in this model, could be emotional or non-emotional. This is in contrast to the more narrow focus of the RaF perspective, which centres on the particular interplay of feelings and cognitive evaluations, and the resulting behavioural ambivalence.

### 1.4.2 RaF unique variables

The components specific to the RaF (Figure 1, blue boxes) are feelings, specifically anticipatory feelings,

which are experienced at the moment of decision making. Another broad unique RaF component is labelled “other factors”. These include different types of contextual factors which will increase any feelings-based behavioural impact. Some of the examples provided by Loewenstein and colleagues (2001) are vividness, e.g., how vivid one may imagine the potential consequences of the behaviour, a factor found to correlate with affect and bodily arousal (Adolphs & Damasio, 2001), and risk judgements (Slovic, 1987). Furthermore, the immediacy of the behavioural consequences and background mood are specifically taken into account in the RaF. A final unique element of the RaF, contrary to the TpB, is the inclusion of the possibility that cognitive evaluations and anticipatory feelings have independent effects on behaviour, with the resulting potential for divergence in forces stemming from the cognitive evaluations and feelings, respectively. This divergence is much in accordance with the literature on self-regulation in general (Baumeister & Vohs, 2004), however, the particularly new notion of the RaF hypothesis, is the assumption that, when there is a conflict between cognitive evaluations and feelings, feelings will drive behaviour (Loewenstein et al., 2001). An in-depth understanding of the mechanisms underlying lack of behavioural control within individuals, and low behavioural predictability in general, may require further sub-divisions of types of behavioural control and a more explicit operationalisation.

## 2 Study 1: The predictive power of shared, unique TpB, and unique RaF variables

Following the theoretical analysis unpacking the shared and unique behavioural predictors from the TpB and RaF model, Study 1 compares the predictive power of subsets of shared and unique variables of the two models (Figure 1). A vignette about “unsafe sex” was the target behaviour, and formed the basis for elicitation of intentions, the TpB, and the RaF variables. There were several reasons for choosing unsafe sex as the target behaviour: First, sexual self-regulation is among the most basic areas for self-regulation (Baumeister & Vohs, 2004), and represents a situation with conflicting valence of hedonistic and consequential inputs. Moreover, this dilemma elicits decision processes which are affect-rich enough to be relevant for the RaF model. It is also likely to be based on normative beliefs, such as norm-pressure in a social-contextual setting. Unsafe sex is hardly the prototype of a planned behaviour,<sup>2</sup> but the TpB has been

<sup>2</sup>It is possible that under certain conditions unsafe sex is planned and intended.

applied to predict a range of behaviours which may be unplanned, e.g., condom use (Richard et al., 1998) and smoking (Droomers et al., 2004). The target behaviour, unsafe sex, is therefore in accordance with the traditional use of TpB.

Based on the idea that knowledge follows historical lines, and the argument that new models and perspectives need to be tested against existing paradigms, a stepwise approach was chosen in Study 1. The regression model investigates whether the unique TpB variables increase the predictability of behavioural intentions, above that accounted for by the shared variables, thus yielding support to the consequentialist perspective. If inclusion of the unique RaF variables, exceeds the predictability of the behavioural intentions beyond that provided by the TpB and the shared variables, this would support the feelings-based perspective. By entering the shared variables as a separate unit into the regression, the most parsimonious version in terms of number of predictors, of the model-overlap could be tested separately, and yield insight into whether the overlapping variables are the strongest predictors.

### 2.1 Method

#### 2.1.1 Sample and procedure

Data were collected on campus during a lecture break, by requesting the subjects to fill in a questionnaire about decision dilemmas from everyday life. In total 94 undergraduate students of psychology participated: 22 males and 72 females, with mean age of 20.6 years.

#### 2.1.2 Material

The questionnaire presented a vignette about unsafe sex: *“Imagine you are having a night out and you meet someone you have noticed before. You are happy when this person shows an interest in you, and you connect immediately. The rest of the evening the two of you stay together. You realise that you like this person really well. When the clubs and bars are closing, you do not want to split up, so you go home to your place. You start to get intimate, and you are aroused. You notice how good it feels. But, you do not have a condom. You are thinking about the day after, and how uncomfortable you will feel.”*

The vignette was followed by an elicitation of self-report measures of the variables extracted from the two theoretical models TpB and RaF. To prevent any order effect on the intention to have unsafe sex, the various independent variables were presented before and after the elicitation of the intention, in two different versions of the questionnaire. These were randomly distributed among the subjects.

### 2.1.3 Measures

The shared and unique components from the TpB and RaF models (Figure 1) were operationalised and adapted to the behaviour at hand; unsafe sex. The TpB variables were constructed according to the recommendations provided by Ajzen (2002a).

#### Shared variables

*Intention.* The dependent variable, the intention to have unsafe sex, was measured with two items: “Do you consider having unsafe sex with him/her?” 1<sub>certainly not</sub> to 7<sub>yes, definitely</sub> and “How probable is it that the two of you will have sex?” 1<sub>very improbable</sub> to 7<sub>highly probable</sub>. A sumscore yielded Cronbach’s Alpha = .84 ( $M = 2.67$ ,  $SD = 1.78$ ).

*Attitudes* were measured with 10 bipolar evaluations capturing both affectively and cognitively based evaluations pertaining to unsafe sex: “Having unsafe sex” is “boring/exciting, turn-off/turn-on, uncomfortable/comfortable, stressing/relaxing, dangerous/safe, unwise/wise, unnecessary/necessary, irresponsible/responsible, health damaging/health promoting, bad/good”. All the bipolar evaluations were anchored in 1 and 7.

The 10 items were submitted to a principal component analysis (varimax rotation), and yielded two factors, which explained altogether 56 % of the variance in attitudes. The first factor “Cognitive attitudes” (31 % explained variance) included the items “irresponsible/responsible, dangerous/safe, unwise/wise, stressing/relaxing, health damaging/health promoting, unnecessary/necessary”. Cronbach’s Alpha of the sumscore was .79 ( $M = 1.65$ ,  $SD = .77$ ). The second factor “Affective attitudes” (25 % explained variance) included the items “turn-off/turn-on, uncomfortable/comfortable, boring/exciting, and bad/good”, Cronbach’s Alpha of the sumscore was .79 ( $M = 2.86$ ,  $SD = 1.17$ ).

*Behavioral beliefs* were measured with two sets of 8 items. The 8 pairs of items were multiplied with each other (probability \* evaluation of consequences). We first elicited the *probability* associated with a set of 8 potential negative and positive consequences of having unsafe sex; “pregnancy, catch HIV, catch other sexually transmitted diseases, regretting, positive self image, feeling more attractive, getting a new boyfriend/girlfriend, feeling proud” from 1<sub>very improbable</sub> to 7<sub>highly probable</sub>. Then we measured the *evaluation of the same potential consequences* (how it would have been to experience each of them) from 1<sub>bad</sub> to 7<sub>good</sub>. A sumscore based on the multiplied items was entered into the regression analysis. Cronbach’s alpha of the sumscore was .62 ( $M = 8.56$ ,  $SD = 4.06$ ).

#### Unique TpB variables

*Perceived behavioural control* was measured with four items: “How difficult is it not to have sex in this situation?” rated from 1<sub>very easy</sub> to 7<sub>very difficult</sub>. “It is up to me if I have sex or not” was rated from 1<sub>I agree completely</sub> to 7<sub>I completely disagree</sub>. “If I wanted to refrain from having sex, I would be able to do so” was rated from 1<sub>I agree completely</sub> to 7<sub>I completely disagree</sub>. Finally “How much control would you have in this situation?” rated from 1<sub>no control</sub> to 7<sub>full control</sub> was reversed before added to the sumscore; Cronbach’s alpha = .67 ( $M = 2.49$ ,  $SD = 1.10$ ).

*Social norms (family and friends)* were measured with four items: “Do you believe that your family approves of you having sex in this situation?” followed by “Would you take their opinion into account?” and “Do you think your friends approve of you having sex in this situation?” followed by “Would you take their opinion into account?”. All items were indicated from 1<sub>yes, definitely</sub> to 7<sub>not at all</sub>. The two items measuring norms were multiplied separately for family and friends ( $M_{\text{Family}} = 4.52$ ,  $SD = 3.87$ ;  $M_{\text{Friends}} = 9.42$ ,  $SD = 6.91$ ).

#### Unique RaF variables

*Vividness* was measured with “How vividly can you imagine, after having had unsafe sex” each of the same 8 potential consequences as measured in behavioural beliefs; “pregnancy, catch HIV, catch other sexually transmitted diseases, regretting, positive self image, feeling more attractive, getting a new boyfriend/girlfriend, feeling proud” indicated on scales from 1<sub>very vividly</sub> to 7<sub>very diffuse</sub>. Cronbach’s Alpha reached .67 ( $M = 4.80$ ,  $SD = 1.03$ ).

*Anticipatory emotions* were measured with “Thinking about having unsafe sex makes/gives me:” with 7 items measuring “sweat, butterflies, cold, turned on, excited, dizzy, heartbeat” from 1<sub>high degree</sub> to 7<sub>low degree</sub>. Cronbach’s Alpha reached .82 ( $M = 5.72$ ,  $SD = 1.23$ ).

*Mood* was measured with one item: “How would you describe your general mood today?” from 1<sub>very positive</sub> to 7<sub>very negative</sub> ( $M = 2.65$ ,  $SD = 1.06$ ).

### 2.1.4 Design and statistics

A block-wise regression design was applied to partial out the separate contribution from (i) the shared variables, (ii) the unique TpB variables, and (iii) the unique RaF variables to predicting the intention to have unsafe sex.

## 2.2 Results

As shown in Table 1, first the (i) shared set of variables was entered in the step-wise multiple regression analysis. The results suggested that the variables “cognitive attitudes, affective attitudes, and behavioural beliefs” explained 57 % of the variance ( $p < .001$ ) of the intention

Table 1: Multiple regression analysis. Prediction of intention to have unsafe sex (n = 94) (\*\*\* p&lt;.001, \*\* p&lt;.01, \* p&lt;.05).

	B	SEB	B	R <sup>2</sup>	ΔR <sup>2</sup>
<b>Step 1. Shared variables</b>				.57***	
Cognitive attitudes/evaluations	.29	.22	.13		
Affective attitudes/evaluations	.95	.14	.63***		
Behavioral beliefs	.03	.04	.08		
<b>Step 2. Unique TpB variables</b>				.64***	.07**
Cognitive attitudes/evaluations	.11	.21	.05		
Affective attitudes/evaluations	.78	.14	.51***		
Behavioral beliefs	.03	.03	.06		
Subjective norms (family)	-.05	.03	-.11		
Subjective norms (friends)	.04	.02	.15*		
Perceived control	.42	.13	.26**		
<b>Step 3. Unique RaF variables</b>				.68***	.04*
Cognitive attitudes/evaluations	.10	.21	.04		
Affective attitudes/evaluations	.71	.14	.47***		
Behavioral beliefs	.06	.03	.13		
Subjective norms (family)	-.05	.03	-.10		
Subjective norms (friends)	.04	.02	.16*		
Perceived control	.44	.13	.27**		
Vividness	.36	.12	.20**		
Anticipatory emotions	.00	.10	.00		
Mood	-.07	.11	-.04		

to have unsafe sex. “Affective attitudes” was the only significant predictor;  $\beta = .63, p < .001$ . By entering (ii) the variables unique for the TpB “subjective norms (family)”, “subjective norms (friends)”, and “perceived control” there was a 7% increase ( $p < .05$ ) in explained variance, with altogether 64% ( $p < .001$ ) of the variance accounted for. “Affective attitudes”;  $\beta = .51, p < .001$ , “subjective norms (friends)”;  $\beta = .15, p < .05$ , and “perceived control”;  $\beta = .26, p < .05$  were the significant predictors. By then adding (iii) the variables unique for the RaF model “vividness”, “anticipatory emotions”, and “mood” into the model, the explained variance increased by 4% ( $p < .05$ ), and altogether 68% of the variance of the intention to have unsafe sex were explained ( $p < .001$ ). The significant predictors in the final regression model were “affective attitudes”;  $\beta = .47, p < .001$ , “social norms (friends)”;  $\beta = .16, p < .05$ , “perceived control”;  $\beta = .27, p < .01$ , and “vividness” of the consequences;  $\beta = .20, p < .01$ . Thus, the final predictors consisted of a mixed subset of shared and unique variables from both TpB and RaF.

The data were also analysed by entering the RaF vari-

ables before the TpB variables into the regression. This did not yield any significant changes in the results reported here in terms of significant predictors or explanatory power of the models.

### 2.3 Discussion

The unsafe-sex vignette described a behaviour typically carried out because the activity is pleasant in itself, and/or due to high intrinsic motivation. This is an affect-rich type of decision situation, where feelings and emotions would be expected to play a large part. Despite the limitation of vignette studies to elicit behavioural intentions, and the remaining variables from the TpB and RaF, ethical restrictions leave out real-behaviour experiments in the unsafe-sex domain.

The results of Study 1 are important for two reasons. First, we find support for the idea that both feelings-based and consequence-based reasoning is underlying decision pertaining to unsafe sex. The fact that the final predictors consisted of a mixed subset of variables from both TpB

and RaF is noteworthy because it may contribute to tone down a static and dualistic view of human reasoning and decision making as *either* fairly normative, rational and focussed on consequences *or* as very intuitive, heuristic, and affect-based. Rather than focussing on these forms of processing as two different phenomena, we argue that there is a continuous dynamic interplay between them.

At least in the type of decision dilemma used in Study 1, variables like global evaluations including affective qualities, social-cognitive aspects such as norms among peer groups, control-expectations e.g., ability to self-regulate efficiently in the dilemma situations, in addition to how vividly one is able to imagine each of the potential consequences, all play a significant part in shaping the behavioural intention. This means that even for unplanned behaviours, such as unsafe sex, variables from the consequentialist models interact with the feelings-based judgments.

The anticipatory feelings did not contribute significantly to the intention to have unsafe sex in our study. It is noteworthy that experiencing bodily emotional reactions such as “butterflies”, “turn-on”, “excited” or “heartbeat”, when thinking of having unsafe sex does not seem to play a significant role here. This finding can not be explained by lack of emotional reaction, as the mean level of reported anticipatory emotions was fairly high. Together with a level of control reported as fairly low, this shows that the dilemma was successful in creating ambivalence and need for self-regulation.

The second important issue derived from our results is the finding that a set of attitudinal evaluations which included both predominantly cognitive and affective evaluations could be separated into two distinct predictors, which differed according to being either proximal or distal to the behaviour of concern. The factor “cognitive attitudes” was characterised by more distal or even moral evaluations such as whether having unsafe sex is wise, necessary, and health promoting. The factor “affective attitudes” referred to more proximal or immediate aspects of the behaviour, such as whether having unsafe sex is pleasant, exiting, and arousing. The type of dichotomy derived from several dual-process models of social psychology (see Chaiken & Trope, 1999), and various decision theoretical models, fit these two types of attitudes. The cognitive attitudes are analogous to the analytical and consequentialist view, whereas the affective attitudes have more in common with the intuitive- and affect-based view. The affective attitudes were the significant predictors for the intention to have unsafe sex. Despite the limitation of having only one vignette, with behaviour which may be unplanned, we interpret this as partial support to the RaF model. However, the substantial contribution of factors derived from the TpB indicates a general support to the TpB and the consequentialist view.

## 3 Study 2

### 3.1 Feelings or consequences: Ambivalence in decision making

Study 2 was carried out to further examine the relationship between the hedonistic qualities of behaviour and the consequences, by contrasting two decision vignettes with opposite qualities, and where the TpB and RaF differed in their behavioural predictions. As noted, some activities are carried out because the activity is pleasurable in itself, in spite of the potential negative consequences. Other activities are carried out despite being painful, due to the prospect of positive consequences. Study 1 examined the former of these types of activities: Unsafe sex may be a positive hedonic experience, but a range of negative consequences could follow. In Study 2, we wanted to contrast this type of decision scenario with the opposite: A negative hedonic experience likely to be followed by positive consequences. The decision was made to use back surgery followed by the positive prospect of recovery from back pain: (4 variants of the back-surgery and unsafe-sex vignettes are presented in Appendix 1). The back-surgery vignette (ambivalent version) read as follows:

*“Imagine you are in the emergency unit at the hospital after having hurt your back in a fall. You are in moderate pain. The surgeon informs you that if an operation may be of help it must be carried out immediately. The operation will probably lead to severe pain for around 6 months, but in the long run, it may reduce the pain considerably. If you choose not to undergo surgery, the pain will be stabilising at the present level, probably for the rest of your life. You feel that the pain is pretty bad already, and fear how much worse it can get in the post-surgical period. You are thinking that you would function much better in daily-life activities, if you undergo surgery.”*

The two vignettes basically described the unsafe-sex situation from Study 1 and the back-surgery situation described above. There were four versions of each vignette (see Appendix). The *neutral* version simply described the basic facts needed to understand the situation. The *feelings* version highlighted the subjects’ anticipatory and anticipated feelings in the decision dilemma, such as feeling sexual arousal or pain. The *consequence* version highlighted the considerations around potential consequences of the decisions being made, e.g., suffering from regret or increasing one’s physical abilities. Finally, the *ambivalent* version outlined both the feelings and the consequences. This manipulation was done to examine whether intentions are driven by potential consequences of the behaviour (as described in the TpB) or rather by the feelings associated with it (as noted by the RaF).

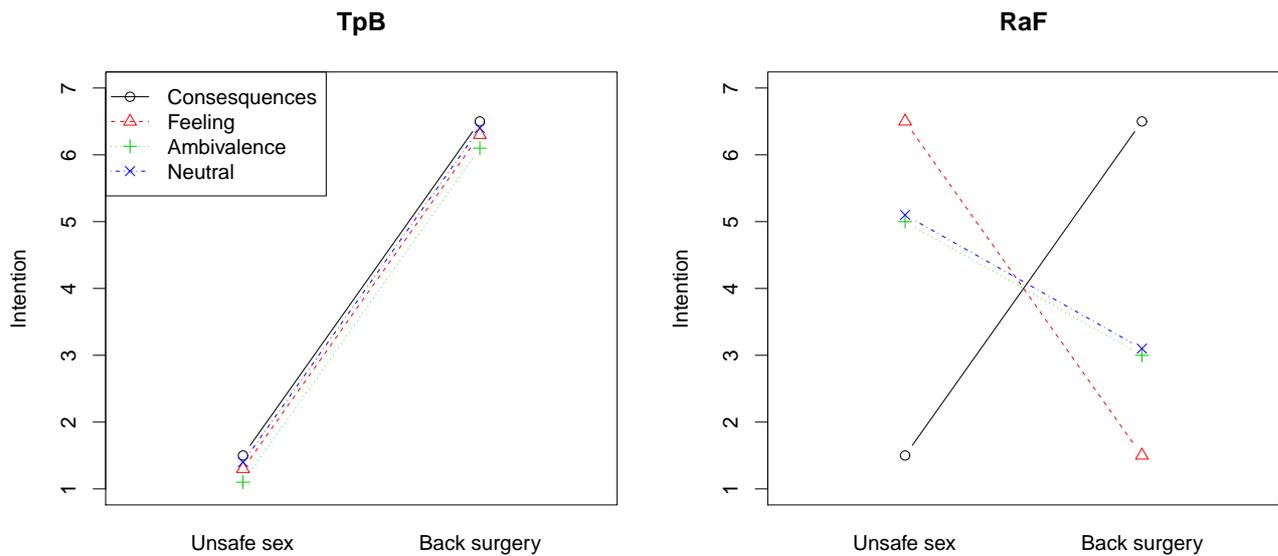


Figure 2: Hypotheses of TpB and RaF.

The four versions of the two vignettes yielded situations where the TpB and RaF differed in their assumptions. According to the TpB (Ajzen, 1991), intentions are driven by behavioural beliefs, normative beliefs, and control beliefs. The behavioural consequences and values (including social values) combined with the person’s (dis)ability to carry out the behaviour are supposed to guide behavioural intentions. Thus, experiencing a decision scenario as more or less affect rich, should not affect intentions. The RaF (Loewenstein et al., 2001) argues that there may be conflicts between cognitive evaluations and feelings, and that when such a conflict arises, behaviour tends to be based on feelings. Hence, a decision situation which highlights positive feelings, may lead to a feelings-based inclination to perform the behaviour, whereas one which involves negative feelings, may lead to a feelings-based reluctance to engage in the activity. However, a decision-situation that highlights the potential positive consequences of certain behaviours may foster the behaviour, and one highlighting the potential negative consequences of the behaviour, may impede the performance of the behaviour. In these latter situations, the predictions of whether a person will take part in a certain activity have the same directionality for both TpB and RaF.

A set of distinct predictions were derived from the TpB and the RaF (Figure 2): Based on the consequentialist TpB, we did not predict differential effects on intentions based on the presentation format (neutral, feelings, consequence, ambivalent). The TpB-based prediction were: *Low* behavioural intentions in the unsafe-sex scenario and *high* behavioural intentions in the back-surgery scenario, indicating a general adherence to whether the behaviour

mainly produces negative consequences (unsafe sex) or positive consequences (back surgery). Based on the RaF, in contrast, a general feelings-dominance was predicted: *High* behavioural intentions in the unsafe-sex situation with positive hedonic values, and *low* behavioural intentions in the back-surgery situation with negative hedonic values, a pattern showing opposite directionality than the one predicted by the TpB.

To further examine the dynamic interplay of cognitive evaluations and feelings, we explored whether it was possible to reverse the predicted feelings-based dominance by presenting the vignettes either more neutrally, by highlighting feelings or consequences, or by highlighting both feelings and consequences (to create different combinations of ambivalence). According to the RaF there will be effects of the presentation format, with high intentions among those reading unsafe-sex vignettes with feelings highlighted, and low intentions among those reading back-surgery vignettes with feelings highlighted. Such effects could not be accounted for by the TpB.

An additional goal was to replicate the findings from Study 1, that a mixed set of predictors from the consequentialist and feelings-based perspective are the most powerful behavioural predictors.

### 3.2 Method

#### 3.2.1 Sample

A total of 357 subjects were recruited from introductory courses of psychology, economics, and mathematics. There were 230 females, 120 males, and 7 who did not report gender. Mean age was 22 years.

### 3.2.2 Procedure

The experiments were carried out in the auditoriums during an extended lecture break. The subjects were randomly distributed to four experimental groups, without their awareness, by receiving different versions of a questionnaire.

#### Experimental groups

Group 1 received the *neutral* descriptions of an unsafe-sex vignette (positive experience, negative consequences) and a back-surgery vignette (negative experience, positive consequences). Group 2 read the vignettes which highlighted *feelings*. Group 3 read the ones which highlighted *consequences*. Group 4 read *ambivalent* vignettes with both feelings and consequences outlined (see Appendix).

### 3.2.3 Material

Each questionnaire first presented the unsafe-sex or the back-surgery vignette in one of four versions (neutral, feelings, consequences, or ambivalent), followed by the elicitation of self reports for the variables extracted from the TpB and the RaF. The presentation order of the two vignettes (unsafe sex, back surgery) was counterbalanced, as were the presentation order of the elicitation of the intention and the TpB and the RaF measures. Thus, some subjects reported their intention right after having read the vignette, and then gave self reports to the TpB and RaF variables, whereas others first gave self reports to the TpB and RaF variables, and then reported their intention for each type of behaviour (unsafe-sex intention and back-surgery intention).

### 3.2.4 Measures

The shared and unique components from the TpB and RaF models were operationalised and adapted to the behaviours at hand, as in Study 1. For the unsafe-sex vignette, the shared, unique TpB and unique RaF variables were elicited as reported in Study 1,<sup>3</sup> and will not be repeated here. The back-surgery variables were measured as reported below. These were the same for all four versions of the questionnaire (neutral, feelings, consequences, and ambivalence). Means, Cronbach's alphas and factor scores based on the unsafe-sex vignette are reported along with these measures based on the back-surgery vignette.

<sup>3</sup>The only change from the Study 1 version of the unsafe-sex vignette was the removal of the following sentences from the neutral condition: "You start to get intimate, and you are aroused. You notice how good it feels. You are thinking about the day after, and how uncomfortable you will feel." The removed sentences did appear in the feelings- and ambivalent versions of Study 2 (see Appendix).

#### Shared TpB and RaF variables

*Intention.* The dependent variable, the behavioural intention to undergo back surgery, was measured with two items: "Do you consider undergoing surgery?" 1<sub>certainly not</sub> to 7<sub>yes, definitely</sub>, and "how probable is it that you will undergo surgery?" 1<sub>very improbable</sub> to 7<sub>highly probable</sub>. The sumscores yielded Cronbach's alpha<sub>back surgery</sub> = .82 and alpha<sub>unsafe sex</sub> = .86 ( $M_{back\ surgery} = 6.30$ ,  $SD = .90$ ;  $M_{unsafe\ sex} = 3.32$ ,  $SD = 1.79$ ).

*Attitudes* were measured with 9 bipolar evaluations intended to capture both affectively and cognitively based evaluations pertaining to back surgery: "To undergo back surgery is: painful/pain free, unwise/wise, unnecessary/necessary, irresponsible/responsible, frightening/calming, uncomfortable/comfortable, health damaging/health promoting, bad/good, stressing/relaxing, dangerous/safe". All items were anchored in 1 and 7 respectively for the bipolar evaluations. The items were submitted to a principal component analysis (varimax rotation), and yielded two factors, which explained altogether 59 % of the variance in attitudes to back surgery. The first factor "Cognitive attitudes" (32 % explained variance) included the evaluations "irresponsible/responsible, unnecessary/necessary, bad/good, unwise/wise, dangerous/safe, and health damaging/health promoting"; Cronbach's Alpha = .79 ( $M = 6.17$ ,  $SD = .79$ ). The second factor "Affective attitudes" (25 % explained variance) included the evaluations "uncomfortable/comfortable, frightening/calming, painful/pain free, stressing/relaxing, and dangerous/safe"; Cronbach's Alpha = .79 ( $M = 3.33$ ,  $SD = 1.20$ ).

The attitude-item results concerning unsafe sex were a near perfect replication of the results from Study 1: A principal component analysis (varimax rotation) yielded two factors, which explained altogether 57 % of the variance of the intention to have unsafe sex. The factor "Cognitive attitudes" (32 % explained variance) included the items "irresponsible/responsible, unwise/wise, dangerous/safe, unnecessary/necessary, health damaging/health promoting, and stressing/relaxing"; Cronbach's alpha = .82 ( $M = 1.79$ ,  $SD = .79$ ). The factor "Affective attitudes" (25 % explained variance) included the items "turn-off/turn-on, uncomfortable/comfortable, boring/exciting, and bad/good"; Cronbach's alpha = .67 ( $M = 3.84$ ,  $SD = 1.43$ ).

*Behavioral beliefs* were measured with two sets of 8 items. The 8 pairs of items were multiplied with each other (probability \* evaluation of consequences). We first elicited the *probability* associated with a set of potential negative and positive consequences of back surgery (pain reduction, improved physical condition, improved sleep, long term sick leave, lack of recovery, feelings of regret due to lack of recovery, rejoicing over recovery, feelings of having tried everything), indicated on scales

from 1<sub>very improbable</sub> to 7<sub>highly probable</sub>. Then we measured the *evaluation of the same potential consequences* (how it would have been to experience each of them) on scales from 1<sub>bad</sub> to 7<sub>good</sub>. A sum score based on the multiplied items was used in the regression analyses ( $M_{\text{back surgery}} = 26.47$ ,  $SD = 4.36$ ,  $M_{\text{unsafe sex}} = 8.50$ ,  $SD = 4.02$ ).

#### Unique TpB variables

*Perceived behavioural control* was measured with four items: “How difficult is it to undergo back surgery?” was rated from 1<sub>very difficult</sub> to 7<sub>very easy</sub>. “It is up to me if I undergo surgery or not” was rated from 1<sub>I completely disagree</sub> to 7<sub>I agree completely</sub>. “If I wanted to undergo back surgery, I would be able to do so” was rated from 1<sub>I completely disagree</sub> to 7<sub>I agree completely</sub>. Finally “How much control would you have in this situation?” was rated from 1<sub>full control</sub> to 7<sub>no control</sub>, and reversed before added to the sumscore; Cronbach’s alpha = .55 ( $M = 5.32$ ,  $SD = .94$ ). For the unsafe sex scenario Cronbach’s alpha of the sumscore reached .64 ( $M = 5.21$ ,  $SD = 1.07$ ).

*Social norms (family and friends)* were measured with four items: “Do you believe that your family approves of you undergoing surgery in this situation?” followed by “Would you take their opinion into account?” and “Do you think your friends approve of you undergoing surgery in this situation?” followed by “Would you take their opinion into account?” The items were indicated on scales from 1<sub>not at all</sub> to 7<sub>yes, definitely</sub>. The two items measuring norms were multiplied separately for the family- and friends’ social domains (Back surgery:  $M_{\text{family}} = 35.04$ ,  $SD = 11.37$ ,  $M_{\text{friends}} = 29.32$ ,  $SD = 12.21$ , Unsafe sex:  $M_{\text{family}} = 3.42$ ,  $SD = 2.68$ ,  $M_{\text{friends}} = 9.04$ ,  $SD = 8.27$ ).

#### Unique RaF variables

*Vividness* was measured with “How vividly can you imagine, after having had back surgery” each of the same 8 potential consequences as measured in behavioural beliefs (pain reduction, improved physical condition, improved sleep, long-term sick leave, lack of recovery, feelings of regret due to lack of recovery, rejoicing over recovery, feelings of having tried everything) indicated on scales from 1<sub>very vividly</sub> to 7<sub>very diffuse</sub>. Cronbach’s alpha<sub>back surgery</sub> = .46 ( $M = 4.79$ ,  $SD = .95$ ), and Cronbach’s alpha<sub>unsafe sex</sub> = .71 ( $M = 2.93$ ,  $SD = 1.03$ ).

*Anticipatory emotions* were measured with “Thinking about having back surgery makes/gives me:” with 7 items measuring “sweat, nausea, cold, afraid, anxious, dizzy, increased heartbeat, feeling nervous, stressed” from 1<sub>high degree</sub> to 7<sub>low degree</sub>; Cronbach’s alpha = .94 ( $M = 3.74$ ,  $SD = 1.60$ ). For the unsafe sex scenario alpha was .86 ( $M = 2.25$ ,  $SD = 1.14$ ).

*Mood* was measured with the item: “How would you describe your general mood today?” from 1<sub>very positive</sub> to 7<sub>very negative</sub> ( $M_{\text{back surgery}} = 5.26$ ,  $SD = 1.12$ ,  $M_{\text{unsafe sex}} = 5.22$ ;  $SD = 1.14$ ).

### 3.2.5 Design and statistics

First, a repeated measures factorial ANOVA was carried out, to study the predicted effects on the behavioural intentions derived from the TpB and RaF (Figure 2). A mixed factorial design was applied: The experimental groups (neutral, feelings, consequences, ambivalent) were treated as a between-subjects factor, type of vignette (unsafe sex, back surgery) as a within-subjects factor (repeated measure), and the intentions to perform the behaviours (intentions to have unsafe sex, intention to have back surgery) were the dependent variables.

Then, the block-wise regression design from Study 1 was replicated, to partial out the separate contribution from (i) the shared variables, (ii) the unique TpB variables, and (iii) the unique RaF variables to predicting the intentions to (a) have unsafe sex and (b) back surgery.

## 3.3 Results

### 3.3.1 Manipulation check: Perceived decision ambivalence

The question “To what extent did you experience ambivalence when choosing whether to have unsafe sex/undergo back surgery? (1<sub>low degree</sub> to 7<sub>high degree</sub>)” measured perceived decision ambivalence. A repeated measures’ ANOVA, with the experimental group as the between subjects factor (neutral, feelings, consequences, ambivalent), type of vignette (unsafe sex, back surgery) as the within subjects (repeated) factor and decision ambivalence as the dependent variable, yielded a significant main effect of the experimental group,  $F(3, 257) = 3.05$ ,  $p < .05$  ( $\eta^2 = .04$ ). The effect was due to higher ( $p < .05$ ) levels of ambivalence in the feeling condition ( $M_{\text{Unsafe sex}} = 3.7$ ,  $SD = 1.8$ ,  $M_{\text{Back surgery}} = 3.6$ ,  $SD = 1.7$ ) than the ambivalence condition ( $M_{\text{Unsafe sex}} = 3.6$ ,  $SD = 2.0$ ,  $M_{\text{Back surgery}} = 2.6$ ,  $SD = 1.8$ ), and to higher levels of ambivalence ( $p < .05$ ) in the neutral ( $M_{\text{Unsafe sex}} = 4.0$ ,  $SD = 1.8$ ,  $M_{\text{Back surgery}} = 3.6$ ,  $SD = 2.0$ ) than the ambivalent condition. Thus, the most information-rich scenario, where both feelings and consequences were outlined, yielded the lowest perceived ambivalence, and the least information-rich yielded the highest perceived ambivalence. The versions highlighting either feelings or consequences yielded intermediate levels of perceived ambivalence.

There was also a significant main effect of type of vignette,  $F(1, 257) = 8.19$ ,  $p < .01$ ,  $\eta^2 = .03$ , due to generally higher levels of ambivalence in the unsafe-sex situation ( $M = 3.7$ ,  $SD = 1.8$ ), than in the back-surgery situation ( $M = 3.2$ ,  $SD = 1.9$ ). Despite a high degree of missing data for the back surgery ambivalence-item

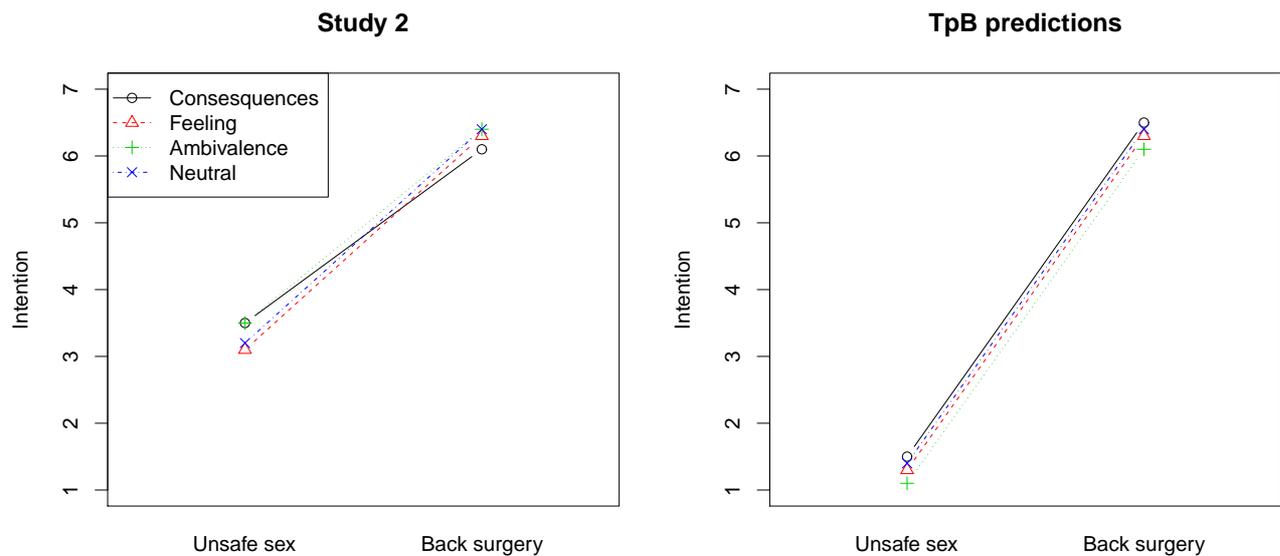


Figure 3: Results of Study 2.

(16 %) this suggests that the manipulation had successfully created systematic differences in decision ambivalence, depending on the vignettes and their presentation formats.

### 3.3.2 Effects on behavioural intentions based on the TpB and the RaF

The results (see Figure 3) from a repeated measures' factorial ANOVA, with type of vignette (unsafe sex, back surgery) as the within subject's (repeated measures) factor, and the experimental groups as the between subjects factor (neutral, feelings, consequences, ambivalent), and the behavioural intentions as dependent variables, yielded a strong and significant main effect of type of vignette,  $F(1, 311) = 691.00, p < .000$  ( $\eta^2 = .69$ ), due to lower ( $p < .001$ ) intentions in the unsafe-sex domain, as compared to the back-surgery domain ( $M_{\text{Unsafe sex}} = 3.31, SD = 1.8, M_{\text{Back surgery}} = 6.30, SD = .90$ ). This was in line with the predictions derived from the TpB, that behavioural intentions are guided by consequentialist concerns. The prediction derived from the RaF, that feelings are driving the behaviour, was not supported. The assumption that the presentation format of the vignettes (neutral, feelings, consequences, ambivalence) may reverse a potential feelings-based dominance did not receive support, due to a non-significant main effect of experimental group,  $F(3, 311) = .97, p < .41$ . The scenario by experimental group interaction was also non-significant,  $F(3, 311) = 1.40, p < .21, n.s.$  This indicates support to the consequentialist TpB.

### 3.3.3 The effects of shared, unique TpB, and unique RaF variables on behavioural intentions

Next, we carried out two step-wise regression models aimed at replicating the finding from Study 1, that a mixed subset of variables from both TpB and RaF most powerfully predicts behavioural intentions. First, we included the (i) shared variables "cognitive attitudes", "affective attitudes" and "behavioural beliefs". Then, (ii) the unique TpB variables "subjective norms (family)", "subjective norms (friends)" and "perceived control" were entered into the regression. Finally, (iii) the unique RaF variables "vividness", "anticipatory emotions" and "mood" were added. This was done separately for the two vignettes (see Table 2).

The regression analysis based on (a) the unsafe-sex vignette showed that (i) the shared variables accounted for 35 % of the variance of the intention to have unsafe sex,  $p < .001$ . The significant predictors were: "affective attitudes" ( $\beta = .46, p < .001$ ) and "behavioural beliefs" ( $\beta = .12, p < .001$ ). By then adding the (ii) unique TpB variables to the regression, there was a 17 % increase of explained variance,  $p < .001$ , hence altogether 52 % of the intention to have unsafe sex, were accounted for. This yielded the following significant predictors: "affective attitudes" ( $\beta = .31, p < .001$ ), "behavioural beliefs" ( $\beta = .11, p < .01$ ), "norms (family)" ( $\beta = -.09, p < .05$ ), "norms (friends)" ( $\beta = .13, p < .001$ ) and "perceived control" ( $\beta = -.40, p < .001$ ). Family norms relate negatively to not having unsafe sex, whereas friends' norms relate positively, illustrating the cross-pressure of a situation where social norms of different groups of reference are in conflict. Perceived control is negatively related to the intention to have unsafe sex. However, this construct

Table 2: Stepwise multiple regression analysis: Prediction of intention to have (a) unsafe sex and (b) back surgery (n = 357) (\*\*\*) p<.001, \*\* p<.01, \* p<.05).

	B	SEB	$\beta$	R <sup>2</sup>	$\Delta R^2$
<b>(a) Unsafe sex</b>					
<b>(i) Shared variables</b>				.35***	
Cognitive attitudes/evaluations	.08	.27	.08		
Affective attitudes/evaluations	.58	.07	.46***		
Behavioral beliefs	.08	.02	.19***		
<b>(ii) Unique TpB variables</b>				.52***	.17***
Cognitive attitudes/evaluations	.13	.10	.06		
Affective attitudes/evaluations	.39	.06	.31***		
Behavioral beliefs	.05	.02	.11**		
Subjective norms (family)	-.06	.03	-.09*		
Subjective norms (friends)	.03	.01	.13***		
Perceived control	-.67	.07	-.40***		
<b>(iii) Unique RaF variables</b>				.52***	.00
Cognitive attitudes/evaluations	.12	.10	.06		
Affective attitudes/evaluations	.38	.06	.30***		
Behavioral beliefs	.05	.02	.11*		
Subjective norms (family)	-.06	.03	-.10*		
Subjective norms (friends)	.03	.01	.13**		
Perceived control	-.66	.07	-.40***		
Vividness	-.01	.08	-.00		
Anticipatory emotions	.06	.07	.04		
Mood	.06	.06	.04		
<b>(b) Back surgery</b>					
<b>(i) Shared variables</b>				.24***	
Cognitive attitudes/evaluations	.42	.06	.37***		
Affective attitudes/evaluations	.06	.04	.09		
Behavioral beliefs	.04	.01	.19***		
<b>(ii) Unique TpB variables</b>				.34***	.10***
Cognitive attitudes/evaluations	.35	.06	.31***		
Affective attitudes/evaluations	-.01	.04	-.00		
Behavioral beliefs	.04	.01	.17***		
Subjective norms (family)	.01	.01	.14**		
Subjective norms (friends)	-.01	.01	-.10		
Perceived control	.32	.05	.33***		
<b>(iii) Unique RaF variables</b>				.35***	.01
Cognitive attitudes/evaluations	.36	.06	.32***		
Affective attitudes/evaluations	-.02	.04	-.03		
Behavioral beliefs	.04	.01	.18***		
Subjective norms (family)	.01	.01	.13**		
Subjective norms (friends)	-.01	.01	-.08		
Perceived control	.31	.05	.32***		
Vividness	-.08	.05	-.08		
Anticipatory emotions	-.07	.05	-.13		
Mood	.04	.04	.09		

was measured as a negation (how difficult is it *not* to have sex). This means that high control beliefs relate to low intentions to have unsafe sex. Adding (iii) the unique RaF variables into the regression failed to increase the explained variance significantly,  $\Delta R^2 = .00$ , n.s. The final model yielded the significant predictors: “affective attitudes” ( $\beta = .30$ ,  $p < .001$ ) “behavioural beliefs” ( $\beta = .11$ ,  $p < .05$ ), “norms (family)” ( $\beta = -.10$ ,  $p < .05$ ), “norms (friends)” ( $\beta = .13$ ,  $p < .01$ ), and “control beliefs” ( $\beta = -.40$ ,  $p < .001$ ). Thus, none of the unique RaF predictors reached significance in the regression model.

For the (b) back-surgery vignette, the regression analyses showed that (i) the shared variables, accounted for 24 % of the variance of the intention to undergo back surgery,  $p < .001$ . The significant predictors were: “cognitive attitudes” ( $\beta = .37$ ,  $p < .001$ ) and “behavioural beliefs” ( $\beta = .12$ ,  $p < .01$ ). When adding (ii) the unique TpB variables, there was a significant increase in explained variance of 10 %,  $p < .000$ , so altogether 34 % of the variance in the intention to undergo back surgery were accounted for,  $p < .000$ . The following predictors were significant: “cognitive attitudes” ( $\beta = .31$ ,  $p < .001$ ), “behavioural beliefs” ( $\beta = .17$ ,  $p < .001$ ), “norms (family)” ( $\beta = .14$ ,  $p < .01$ ) and “control beliefs” ( $\beta = .33$ ,  $p < .001$ ).

When (iii) the unique RaF variables were entered into the regression, there was no further increase in explained variance of significance,  $\Delta R^2 = .01$ , n.s. Thus, the final model explained 35 % of the explained variance of the intention to undergo back surgery,  $p < .001$ . The significant predictors of the final model were: “cognitive attitudes” ( $\beta = .32$ ,  $p < .001$ ), “behavioural beliefs” ( $\beta = .18$ ,  $p < .001$ ), “subjective norms (family)” ( $\beta = .13$ ,  $p < .01$ ) and “perceived control” ( $\beta = .32$ ,  $p < .001$ ). Thus, none of the unique RaF variables reached significance in predicting the intention to undergo back surgery.<sup>4</sup>

### 3.4 Discussion

Study 2 set out to further investigate the interplay of consequence-based and feelings-based processes in decision making under ambivalence. This was done to investigate how well a consequentialist and a feelings-based model would predict behavioural intentions, in two vignettes with tension between hedonism and consequences: An unsafe-sex dilemma with positive hedonic value and potential negative consequences, and a back-surgery dilemma with negative hedonic value and potential positive consequences. To prevent confounding effects from temporal discounting, the vignettes included both immediate and more distant behavioural conse-

quences. Four presentation formats of the vignettes were applied (neutral, feelings, consequences, and ambivalent). Increased behavioural intentions in the versions highlighting feelings would support the RaF (Loewenstein et al., 2001). A mere correspondence with the valence of the behavioural consequences would support the TpB (Ajzen, 1985; 1991).

The results centre around two issues. First, the test of the specific predictions of behavioural intentions, derived from the TpB (Ajzen, 1985; 1991) and RaF (Loewenstein et al., 2001), showed results which were clearly in line with the TpB: The behavioural intentions corresponded closely with the valence of the consequences, such that people in general did *not* intend to have unsafe sex, but *did* intend to undergo back surgery, an effect found across all four presentation formats of the vignettes. The second issue of Study 2 was the replication of the regression model from Study 1, which dismantled shared from unique factors.

In the unsafe-sex vignette, the unique TpB (Ajzen, 1985; 1991) variables *did* improve the explanatory power above that provided by the shared variables. The unique RaF (Loewenstein et al., 2001) did not increase the explanatory power, when entered as the last block in a regression analysis. The variables “affective attitudes”, “behavioural beliefs”, “subjective norms (family)”, “subjective norms (friends)”, and “perceived control” were the significant predictors of the final regression model. The variables “perceived control” and “affective attitudes” were the strongest predictors for intention to have unsafe sex. Perceived control was measured as finding it difficult to refrain from having sex in the scenario. The affective attitudes were based on feeling “turned-on”, finding unsafe sex “comfortable”, “exciting”, and “good”. Logically, the lower the perceived control, and the higher the affective attitudes, the higher was the intention to have unsafe sex.

This interplay between self-control and feeling attracted toward the behaviour regardless of the risk is at the core of self-regulatory processes in general (Baumeister & Vohs, 2004). It also demonstrates the dynamic processes between cognitive evaluations and (anticipatory) feelings which the RaF hypothesis describes (Loewenstein et al., 2001). “Affective attitudes” were among the shared variables, derived from both the TpB and the RaF. The TpB does not explicitly prescribe a splitting of affective and cognitive subcomponents of attitude measures (Ajzen, 1991; Ajzen & Driver, 1991), hence this way of operationalising reflects the interplay of cognitive evaluations and feelings outlined by the RaF. The differential predictive values of the two attitude components supports this notion from the RaF hypothesis.

In the back-surgery vignette, the unique TpB (Ajzen, 1985; 1991) variables *did* improve the explanatory power

<sup>4</sup>The data were also analysed by entering the RaF variables before the TpB variables into the regression, without showing any significant changes in terms of significant predictors or explanatory power of the models, as compared to the reported findings.

above that provided by the shared variables. The unique RaF variables (Loewenstein et al., 2001) did not utterly improve the explanatory power, when entered as the last block into the regression model. The significant predictors of the final model were “cognitive attitudes”, “behavioural beliefs”, “subjective norms (family)” and “perceived control”. The strongest single predictors in the back-surgery scenario were cognitive attitudes and perceived control. Cognitive attitudes were measured as judging back-surgery as “responsible, necessary, good, wise, safe, and health promoting”. Perceived control was measured as evaluating going through with back surgery as “easy”, “up to me”, feeling “able to” and feeling “in control”. Thus, the self-regulatory issue in this vignette is more inclined towards weighing the question about need for back surgery, against how easy one feels about going through with the operation.

In sum, the regression analyses for the two vignettes in Study 2 were consistent in suggesting that a mixed subset of variables from the shared and the unique TpB factors were most efficiently predicting behavioural intentions. The non-significant entering of the unique RaF variables in Study 2 may be due to methodological limitations of applying verbal measures exclusively, which may favour the TpB over the RaF. However, this cannot explain the difference between Study 1 and Study 2 in the predictive power of the RaF block in the regression. A reason for this may be the different samples. Study 1 involved students of psychology exclusively, whereas Study 2 involved students of psychology, mathematics, and economics. Being a student of psychology may be related to increased perceptiveness to emotions.

## 4 General discussion

The idea behind the present study was to investigate commonalities and differences between two prominent behavioural models. The TpB is a well established theoretical framework, which has been validated over several years, and which has proved successful in predicting behaviour from a variety of domains (Ajzen, 1991, 2001, 2002b). The newer RaF (Loewenstein et al., 2001) has received considerable attention (Kobbeltvedt, Brun, Johnsen, & Eid, 2005; Lerner, Gonzalez, Small, & Fischhoff, 2003; Slovic, Finucane, Peters, & MacGregor, 2004), and has inspired researchers to include affective measures in addition to the traditional variables pertaining to decision behaviour. The original version of the RaF perspective (Loewenstein et al., 2001) was formulated as a model at the level of (implicit) judgements of perceived riskiness, but now has been applied to feed into models that predict action selection and behaviour in psychological risk-return models (Weber & Johnson, 2008).

It could be questioned whether the original formulation of the RaF perspective, as a dynamic model of subjective risk judgements, is directly comparable to the TpB (Ajzen, 1985; 1991), as a theory of more explicit motivation and action. However, the close relatedness of (implicit) judgements, motivation, and behaviour in most real-life acts, along with the fact that the two models actually have certain core predictors in common, justify our attempt at taking the validation of the RaF perspective (Loewenstein et al., 2001) one step further by comparing it to a more explicit theory of motivation and action, such as the TpB (Ajzen, 1985; 1991, 2001).

The present study also follows up similar research by, e.g., Holtgrave and Weber (1993), showing that *both* consequentialist and emotional evaluations of risky financial, health- and safety choices contribute unique variance to people’s choices. Also Weber, Siebermorgen, and Weber (2005) found that in financial decisions, subjective and affect-based judgements of risk *did* predict choices that were unpredicted by finance-theory formulations of risk alone, such as, e.g., predicted volatility.

Going back to the theoretical foundations, the TpB (Ajzen, 1985; 1991) is a model aimed at predicting planned- and goal-directed behaviour, whereas the RaF hypothesis (Loewenstein et al., 2001) focuses on situations where risk is a crucial element, there are conflicts between cognitive evaluations and anticipatory feelings, and where behaviour cannot be understood from a pure consequentialist perspective. Thus, there are at least two processes by which behaviour may be shaped: the planned and goal-directed behaviour, which is predictable from our thoughts around the behaviour at hand; and social rules in peer groups. The primary moderator of this relationship is the perceived and actual control over the behaviour. This may be the prototypical TpB situational plot. Then, if perceived control is mis-predicted, the situation is like the one outlined by the RaF, with divergence between cognitive evaluations and anticipatory feelings.

There are various versions of such a disparity between the hedonic feelings and the consequences of behaviour. Basically, the hedonic quality may be positive, neutral, or negative, as may each of the potential consequences. The conflict between cognitive evaluations and feelings will be high when behaviours have positive hedonic qualities and negative consequences, or when behaviours have negative hedonic quality with positive consequences. When there is complete agreement in the valence of the hedonic quality and the behavioural consequences, it will be difficult to separate the driving forces as either consequence-based or feelings-based, and motivation will probably be very high due to the lack of emotional or consequential-based hindrance. The opposite is the case, when behaviours have neutral hedonic quality

and consequences, as during indifference. To the extent that neutrality is matched with either positive/negative consequences or hedonic qualities, the factor with valence will probably dominate behaviour motivation, be it feelings-based or consequence-based. To foster simplicity, the vignettes we constructed and applied in the present research were limited to conflicts between the hedonic quality of the behaviour and its consequences. However, a range of other constellations of conflicting forces could be applied in forthcoming research.

On the basis of the complexities involved in the potential divergences of cognitive evaluations and feelings, we argue that a broader scope is needed to capture the dynamic interplay between consequence-based (e.g. TpB) and a feelings-based behaviour (e.g., RaF). Having an impartial scope was the underlying aim of the present research. The primary question was to disentangle the shared from unique factors of the TpB and RaF, and to test their predictive power. We shall return to the TpB and RaF next, and subsequently to the concern of having an impartial scope, in the sense of being less tied to one specific theory.

#### 4.1 Shared and unique factors of the TpB and the RaF

By classifying and analysing the shared and unique factors of the TpB (Ajzen, 1985; 1991) and the RaF (Loewenstein et al., 2001), and by testing their predictive power, several points were raised. Our theoretical analysis revealed an equal amount of shared and unique factors of the TpB and RaF. When using the variables to predict behavioural intentions, the shared variables “attitudes/cognitive evaluations” were among the most powerful predictors. By factor-analysing “attitudes” into one cognitive and one affective principal component, the global attitude component “good-bad” loaded on different factors across the vignettes. In the unsafe-sex dilemma, good-bad loaded on *affective attitudes*, with variables like “turn-on”, “comfortable”, and “exciting”. In the back-surgery scenario, “good-bad” loaded on *cognitive attitudes*, with variables like “responsible”, “necessary”, “wise” and “safe”. This indicates that, in the unsafe-sex domain intentions are based on global good/bad-evaluations that are affect-based, whereas in the back-surgery domain global good/bad-evaluations are predominantly cognitive evaluations. In the unsafe-sex vignette, *affective attitudes* and behavioural beliefs were the significant predictors among the shared variables. In the back-surgery vignette, *cognitive attitudes* and behavioural beliefs were the significant behavioural predictors. Thus, the notion that the global evaluation of goodness/badness loads on different factors was mirrored in the significance of the predictors, hence having un-

safe sex appears more affect-based and undergoing back-surgery more cognitive-based.<sup>5</sup> This assumption that certain types of decision-situations call for affect-based evaluations, and others for more cognitively-oriented evaluations, challenges the need to develop and apply generalised models for predicting human behaviour across domains and specific situations.

The notion that some decisions are feelings-based and consequentialist may be understood by looking at the time-horizon. The “chickening-out” phenomenon (Gilbert, Lieberman, Morewedge, & Wilson, 2004; Trope & Fischbach, 2000) has been explained as undervaluation of anticipatory feelings (“the heat of the moment”) when making a decision about some future behaviour. This is in line with the lower correspondence between intentions and behaviour, typically found with increasing time-gap between the elicitation of the intention and behaviour (Ajzen, 1991). Thus, intentions could represent the decision process before the empathy gap (Loewenstein, 2005), whereas actual behaviour represents the real-time decision making at the opposite side of the gap. Although affective factors may be vulnerable to such a threshold-effect, factors like outcome expectations (behavioural beliefs including anticipated emotions) may be less affected by the temporal distance to the behaviour. Hence, some behavioural predictors appear more dynamic, and others more static. It is, for instance, likely that previous experience within a domain will influence our ability to accurately predict anticipatory feelings and perceived behavioural control pertaining to the behaviour. Having prior experience may then reduce the impact of the empathy-gap, and stabilize the most fluctuating behavioural predictors (e.g., anticipatory feelings, perceived behavioural control). Inclusion of such individual and contextual trends, may facilitate behavioural predictions, and contribute to explain why habits have such a large impact on behavioural decision making (Quellette & Wood, 1998).

Another possible interpretation of how the dynamics between affect and cognition in intentions, decisions, and behaviour may take place is via cultural and social rules for default decision options. In certain cultures undergoing back surgery may be seen as more acceptable than having unsafe sex, perceptions which may guide behaviour. The basic “need to belong” may lead to decisions not being perceived as a matter of choice at all (Baard, Deci, & Ryan, 2004; Deci, Koestner, & Ryan, 1999; Ryan & Deci, 2000; Ryan, Huta, & Deci, 2008). Also, the extent to which a decision is supposed to be a decision based on feelings or consequences may be

<sup>5</sup>Separating the principal components of attitudes in cognitive and affective factors is in line with the traditional dichotomising of affect and cognition, but the focus here is on the *dynamic interplay* between them.

rooted in social and cultural norms. This could be the case for intentions concerning marriage, partnership, career choices and treatment decisions, and illustrates the need for theoretical models broad enough to cover both consequence-based and feelings-based behaviour across diverse sets of domains.

In general, the present study lends support to the TpB (Ajzen, 1985; 1991), by emphasising the role of outcome-expectations in intention construction. However, the influence of affective subcomponents in attitudes gives indirect support to the RaF (Loewenstein et al., 2001) perspective. Several limitations of the present research need notification. First, the concept of intention in TpB does not correspond directly to the behaviour concept from RaF. Measuring intentions and not actual behaviour may favour the TpB over the RaF, as the stability of intentions may vary and lead to lower correspondence between intention and behaviour. There is ample evidence of good intentions failing to reflect into behaviours. This may particularly be likely for behaviours where there is a cross-pressure of feelings and cognitive evaluations, like the ones applied here.

Second, the sample was dominated by fairly young students. A large proportion of the student sample responded positively to having had experience with unsafe sex, but few had experience with back-surgery. This may have affected the results slightly, by making it easier for the subjects to relate to the questions about attitudes, anticipatory feelings and behavioural outcomes in one of the scenarios. A patient sample with prior experience from back-surgery might have responded differently to the back-surgery scenario. However, independently of domain-related experience, elicitation of mere intentions, and not behaviour, make such potential differences less crucial, as both versions elicited intentions before the empathy gap (Loewenstein, 2005). Also covariance analyses did not support the idea that prior experience played a role for intentions.

A related question is whether prior domain-specific experience would affect intentions or behaviour the most? In cases with clear expectations which match well with anticipatory feelings and thoughts during new decisions in the same domain, prior experience may be advantageous when carrying out the behaviour. However, when experience-based expectations do not match anticipatory feelings and thoughts in new situations following the same basic situational-plot, strong expectations may lead to functional fixedness (German & Defeyter, 2000) in situational awareness, and thereby be disadvantageous, leading to perseverance and repetitive actions which do not foster development and growth.

## 4.2 The dynamic interplay of consequence-based and feelings-based behaviour

Self regulation is at the core of the dynamic interplay of consequence-based and feelings-based behaviour in general, and is also central to the TpB (Ajzen, 1985; 1991), and RaF (Loewenstein et al., 2001) models, although other terms are used to describe these dynamics. There is a need to clarify which behaviour-predictor terms are being used in various theoretical models, as there is probably a large degree of overlap. The present research aims at contributing to a more explicit and empirically-based debate about highly overlapping concepts and postulates derived from models which are arguably different from each other, by being based on different human processes guiding behaviour. There is also a need to review and organize the range of findings and terminology pertaining to predictions of human behaviour. Traditional disciplinary borders need not be of hindrance, as long as the research models are less tied to one specific theory. To this end, Figure 4 attempts to exemplify a research model for the dynamic interplay of affect and cognition in behavioural decision making.

As Figure 4 shows, the characteristics of the alternatives, broadly defined, play an important role initially. It is widely documented that subjective judgements are as important if not more important than actual values and probabilities, e.g. are qualitative characteristics of hazards at the core of risk judgements (Slovic, 1987; Slovic, Finucane, Peters, & MacGregor, 2007; Slovic & Peters, 2006). Depending on the characteristics of each alternative, along with human limitations in information processing, an evaluative feeling will be based on affective *and* cognitive processes resulting from the interaction of alternatives, the individual and its context. Certain alternatives are more affect-provoking than others, and will likely result in affect-rich processing and emotional evaluative feelings. Other alternatives are less affect-provoking, and more inclined to elicit cognitively-based evaluative feelings (Clore & Gerrod Parrott, 1994), such as, e.g., feelings of rightness or of truth.

Two main moderating factors are included in Figure 4. The individual-based factors pertain to characteristics of the decision maker, including, e.g., personality factors, temporary- and permanent appraisal-tendencies, prior learning history, and past behaviour (Quellette & Wood, 1998). The context-based factors range from physical matters, e.g. time-pressure, location, temperature, access of information, to social-contextual variables such as group-pressure and norms. The factor time (Camerer, Loewenstein, & Weber, 1989) adds further complexity, and urges future research to focus on decision making as a dynamic process.

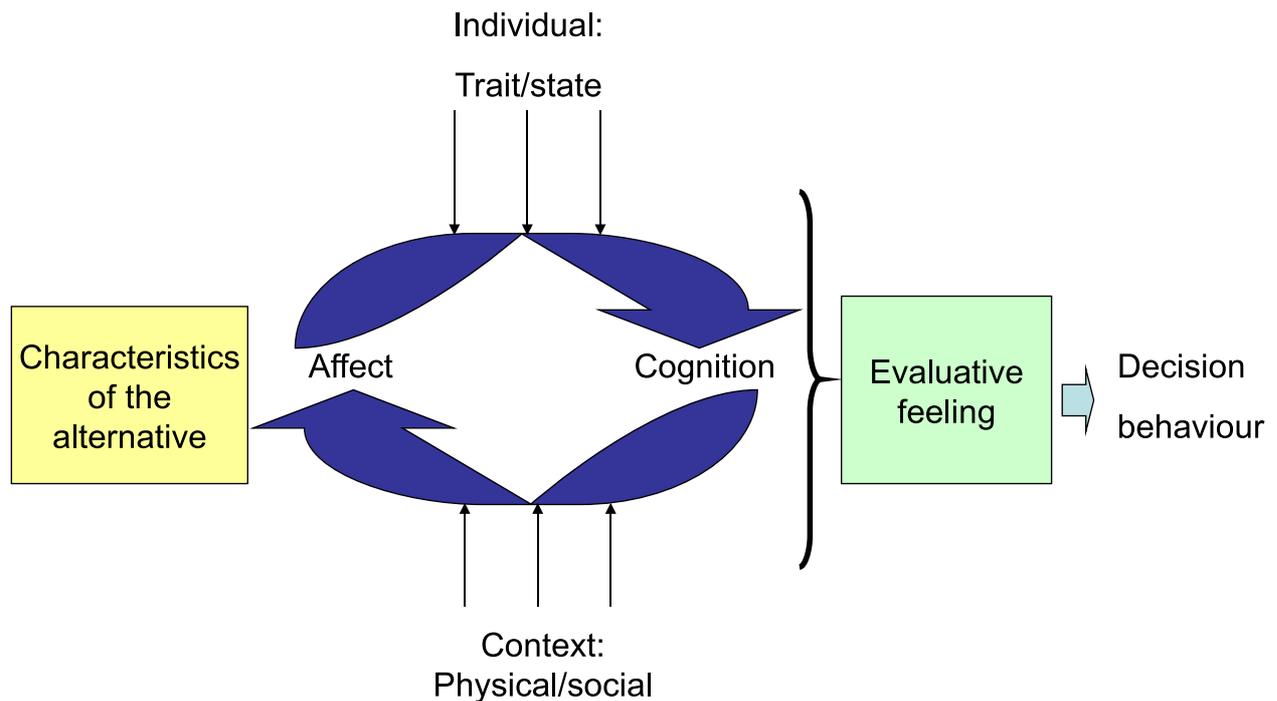


Figure 4: A research model for decision making under ambivalence

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## Appendix

The vignettes were presented as follows, with slightly different endings in the different conditions:

### **Unsafe-sex vignette (Study 1 and 2)**

Imagine you are having a night out and you meet someone you have noticed before. You are happy when this person shows an interest in you, and you connect immediately. The rest of the evening the two of you stay together. You realise that you like this person really well. When the clubs and bars are closing, you do not want to split up, so you go home to your place.

**Neutral condition:** But, you do not have a condom.

**Feelings condition:** You start to get intimate, and you are aroused. You notice how good this feels. But, you do not have a condom.

**Consequences condition:** You start to get intimate. But, you do not have a condom. You are thinking about the day after, and how uncomfortable you will feel.

**Ambivalence condition:** You start to get intimate, and you are aroused. You notice how good this feels. But, you do not have a condom. You are thinking about the day after, and how uncomfortable you will feel.

### **Back-surgery vignette (Study 2)**

Imagine you are in the emergency unit at the hospital after having hurt your back in a fall. You are in moderate pain. The surgeon informs you that if an operation may be of help it must be carried out immediately. The operation will probably lead to severe pain for around 6 months, but in the long run, it may reduce the pain considerably. If you choose not to undergo surgery, the pain will be stabilising at the present level, probably for the rest of your life.

**Neutral condition:** (The scenario was presented as described above).

**Feelings condition:** You feel that the pain is pretty bad already, and fear how much worse it can get in the post-surgical period.

**Consequence condition:** You are thinking that you would function much better in daily life activities, if you undergo surgery.

**Ambivalence condition:** You feel that the pain is pretty bad already, and fear how much worse it can get in the post-surgical period. You are thinking that you would function much better in daily life activities, if you undergo surgery.