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The Effects of Action, Normality, and Decision Carefulness on Anticipated Regret: Evidence for a Broad Mediating Role of Decision Justifiability

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Perceived Decision Justifiability and Anticipated Regret

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ABSTRACT

In three studies we examined the effects of action/inaction, social normality (i.e., how typical the decision is in one's social environment) and decision process carefulness on anticipated regret. Whereas past research has drawn on norm theory (Kahneman & Miller, 1986) to emphasize the role of mutability in (anticipated) regret, the present studies highlight the important role of perceptions of decision justifiability (Connolly & Zeelenberg, 2002). Study 1 replicated earlier findings showing greater anticipated regret when behavior was abnormal, but perceived justifiability mediated the effect. Study 2 showed that anticipated regret was higher for careless than for careful decisions; perceived decision justifiability again mediated the effect. Study 3 found that, when both carefulness and normality information was provided, only the former affected anticipated regret, again mediated by perceived justifiability. Decision justification theory thus appears to provide a better account of anticipated regret intensity in this context than does norm theory.

KEYWORDS: Anticipated Regret; Decision Making; Decision Process Carefulness; Justifiability; Normality; Regret Aversion

PERCEIVED DECISION JUSTIFIABILITY AND ANTICIPATED REGRET

Recent research attests to the important role of emotions in decision making (e.g., Finucane, Peters, & Slovic, 2003). One emotion that has received particular attention is (anticipated) regret. Numerous studies have shown that individuals make decisions so as to avoid anticipated future regret. Regret avoidance has been found in domains such as negotiation (Larrick & Boles, 1995), consumer behavior (Simonson, 1992), sexual behavior (Richard, van der Pligt, & de Vries, 1996), and health decisions (Chapman & Coups, 2006). While it seems clear that anticipated regret influences choices, it is much less clear what influences anticipated regret. Why is it that decision makers anticipate more intense regret for some ways of making a decision than for others? The present research investigates this question with a special emphasis on the role of decision makers' perceptions of what constitutes a justifiable decision.

Determinants of Anticipated Regret Intensity

Previous research has identified three major factors that appear to affect the intensity of anticipated regret: relative outcome severity, mutability, and justifiability.

Relative Outcome Severity

The intensity of anticipated regret is, first, thought to be influenced by *relative outcome severity*: The worse the expected outcome of a chosen option relative to a foregone option, the greater the anticipated regret (Bell, 1982; Loomes & Sugden, 1982; Mellers, Schwartz, & Ritov, 1999). Reference points other than foregone outcomes can also affect anticipated regret (e.g. Connolly, Ordóñez, & Coughlan, 1997). The idea makes intuitive sense: Consider your anticipated regret for losing \$10,000 versus \$100 from investing into the wrong stock. Clearly, we anticipate more intense regret for the former because of the higher relative outcome severity.

Mutability

The intensity of regret is also thought to be influenced by *mutability* (Kahneman & Miller, 1986). In a landmark paper, Kahneman and Tversky (1982) showed that regret intensity can depend on whether the option chosen involves action or inaction. Holding relative outcome severity constant, they found in a scenario study that people thought an investor who switched stocks (and lost money) would experience more regret than an investor who did not switch stocks (and lost the same amount of money), the so-called *action effect*. Kahneman and Tversky argued that it is easier to counterfactually imagine that one had not switched stocks than it is to imagine one had switched stocks. Further, they argued that the ease of availability of such upward counterfactual thoughts leads to more intense regret. (For an introduction to the counterfactual thinking literature see, e.g., Mandel, Hilton & Catellani, 2005; Roese, 1997).

Findings such as this led to the development of norm theory (Kahneman & Miller, 1986). In norm theory "... objects or events generate their own norms by retrieval of similar experiences stored in memory or construction of counterfactual alternatives. The normality of a stimulus is evaluated by comparing it to the norms it evokes after the fact" (Kahneman & Miller, 1986:136). Abnormal actions more easily activate counterfactual thoughts of what could have been, and are thus more "mutable" (i.e. subject to mental revision in thinking about alternatives to what actually happened). As a result, abnormal actions are predicted to lead to more regret about what could have been (and more generally, emotional amplification) than normal actions. The action effect is offered as a specific example of the process. According to Kahneman and Miller "consequences of actions evoke stronger emotional consequences than consequences of failures to act ... [because] ... it is usually easier to imagine oneself abstaining from actions that one has carried out than carrying out actions that were not in fact performed" (p. 145).

Consistent with the mutability account of regret intensity, regret has been found to be judged more intense after action, as compared to inaction (Landman, 1987), and after personally unusual behaviors, as compared to personally normal behaviors (Kahneman & Miller, 1986; Seta, McElroy, & Seta, 2001). However, some research showed results inconsistent with the mutability account. For example, N'gbala and Branscombe (1997) found an action effect only in a within-subjects design, not in a between-subjects design. They argued plausibly that norm theory would have predicted just the opposite: a stronger effect in the between-subjects design. In the within-subjects case, the argument that counterfactuals are more easily available following abnormal decisions is moot because both action (abnormal) and inaction (normal) alternatives are explicitly given to the participants as part of the experimental materials. Other research has found more intense regret following inaction rather than action (e.g., Connolly & Reb, 2003; Gilovich & Medvec, 1995).

Perceptions of Decision Justifiability

Findings such as these, together with theoretical arguments (e.g., Janis & Mann, 1977; Sugden, 1985), have led to the identification of a third potential influence on the intensity of anticipated regret: the *justifiability* of the decision (Connolly & Zeelenberg, 2002; Connolly & Reb, 2005). The notion of justifiability here is essentially the everyday meaning of the word: the perception by the decision maker that she has adequate reasons, evidence, logic or arguments to support the choice she has made or is about to make (see also Nozick, 1993). In older cognitive consistency formulations (see, for example, Aronson, 1969, on the “insufficient justification paradigm”), discomfort or dissonance was thought to be generated when an individual realized that she had engaged in some undesirable act (such as publicly lying) under a very small monetary incentive (such as a \$1 payment). Connolly and Zeelenberg’s (2002) decision

justification theory proposes that discomfort in the form of decision-related regret is experienced when one discovers that one's choice has led to an unfortunate outcome. They distinguish two major components of such regret, one associated with the outcome being (comparatively) poor, and another one associated with inadequacies in the decision itself, or in the process that led up to it. Self-blame is an essential ingredient of this second component of regret. The less justifiable a decision maker perceives a decision to be, the more likely she is to blame herself, and the more intense the process-related regret she will experience, if the outcome is bad. For example, to a mother, a child's sickness is regrettable in itself, but the regret is likely reduced by the reflection that her choice was justified at the time as it was based on a careful, thoughtful and well-informed decision.

Decision justification theory is concerned with how well-justified decision makers *themselves* perceive a decision to be, the justifications *they themselves* consider reasonable for the way it was made, and the *self*-blame and regret they experience when they do not see the decision as justifiable. A related, but not necessarily identical, notion of justifiability is central to research and theorizing on accountability (Tetlock, 1985, 2000; Lerner & Tetlock, 1999). Accountability is concerned with people's beliefs about what *others* will perceive as justifying a decision, and with efforts to behave in ways that meet these external standards. Internal and external standards may, of course, coincide, but there is no necessary reason they always will. A mother's decision not to vaccinate her child may have been guided by an intuition, a dream, or the advice of a fortune-teller, and the mother may feel entirely justified in relying on this guidance. However, she may also realize that such sources of guidance will be unpersuasive to a skeptical audience and will, therefore, make her public account of her decision on entirely different grounds.

Connolly and Zeelenberg (2002) have shown that differences in decision makers' justifiability perceptions can – post hoc – account for a variety of past findings (e.g., Zeelenberg, van den Bos, van Dijk, & Pieters, 2002; Crawford, McConnell, Lewis, & Sherman, 2002). For example, in a consumer preference study (Simonson, 1992), participants primed to think about regret chose the safer option (a SONY, a highly reputed, name-brand product) over the riskier option (a cheaper, no-name product) more often than did participants in a control condition. The SONY reputation, even if costly, appears to justify the choice and inoculate against self-blame, thus leading to lower anticipated regret.

In addition to providing post-hoc accounts of earlier findings, decision justification theory has also stimulated some new research on the determinants of anticipated and experienced regret. Inman and Zeelenberg (2002) investigated whether the intensity of regret depends on whether a choice is made for a good or a bad reason. Consistent with decision justification theory, participants thought that re-purchasing a product after a bad experience with it would lead to more regret than switching to a different product. Similarly, switching to a different product after a good experience with the first one was expected to lead to more regret than re-purchasing the initial product. Pieters and Zeelenberg (2005) found in a series of studies that intention-behavior inconsistency can increase experienced regret over a bad outcome. They also found that self-reported amount of thinking about the decision, an indicator of decision process carefulness, was negatively related to experienced regret.

In this paper we attempt to extend these initial demonstrations of the role of justifiability in anticipated regret. In Study 1 we revisit earlier findings on the relationship among normality, action and regret and show that a justifiability account provides a more parsimonious, and in some ways stronger, interpretation of the data than does norm theory, the interpretation in which

the relationships were originally cast. In Study 2 we examine the role of one rather broad and general justification, the care with which a decision was made, in ameliorating anticipated regret. Finally in Study 3 we examine the joint effect of normality and decision carefulness on anticipated regret. In all three studies, we find support for the mediating role of justifiability perceptions. The conclusion argues that decision justification theory attracts sufficient support in these data that it must be considered as a potential adjunct, if not a direct rival, to norm theory as an account of anticipated regret in decision making.

STUDY 1: ACTION, SOCIAL NORMALITY, PERCEIVED JUSTIFIABILITY, AND ANTICIPATED REGRET

Several studies have shown that the normality, or typicality, of a choice can affect anticipated regret. Abnormal choices, such as unusual actions and personally abnormal behaviors, lead to more intense anticipated regret than do normal ones (Kahneman & Miller, 1986; Kahneman & Tversky, 1982; Landman, 1987; Seta et al, 2001). As noted earlier the standard account, based on norm theory (Kahneman & Miller, 1986), argues that the effect is due to the easier mutability of abnormal choices, which leads to easier availability of counterfactuals and, thus, more intense regret, though N'gbala & Branscombe's (1997) results have been interpreted as challenging this account. An alternative that we are examining in this study, based on decision justification theory, proposes that normal choices lead to less anticipated regret because they are perceived as more justifiable than abnormal choices.

In the present research we used a decision context that has been the topic of extensive past research: a parent's decision whether or not to vaccinate her or his child (e.g., Connolly & Reb, 2003; Ritov & Baron, 1990). Anticipated regret rated for scenarios such as the one we used has been found to predict real choices. Wroe, Turner, and Salkovskis (2004) compared different

potential predictors of actual immunization decisions and found that “anticipated regret ... was the strongest predictor of likelihood of immunizing the child” (p. 38), predicting 57% of the variance (demographic variables, in contrast, predicted only 1% of the variance). They also reported that most parents decided to vaccinate their children.¹

We manipulated whether the protagonist in the scenario decides to vaccinate or not (action/inaction). Consistent with past research that found vaccinating to be preferred in the majority of our population (Connolly & Reb, 2003), we expected higher anticipated regret for inaction (not vaccinating) than action (vaccinating) – that is, an *inaction* effect.² More importantly, we expected that perceived decision justifiability would predict anticipated regret and that any effect of the action/inaction manipulation would be at least partially mediated by differences in the perceived justifiability of vaccinating and not vaccinating.

We also manipulated whether or not the protagonist in the scenario decides to do what her friends and family do. This manipulation of social normality was implemented both within- and between-subjects. A decision that conforms to what one’s friends and family do (“socially normal”) may not be seen as justifiable (and, therefore, as leading to reduced anticipated regret) when evaluated in isolation. However, when explicitly contrasted with a socially abnormal decision leading to the same outcome, decision makers may perceive the socially normal choice as more justifiable (and, therefore, less regrettable). We therefore expected to find an effect of social normality on anticipated regret for the within-subjects, but possibly not for the between-subjects design. More importantly, we expected that perceptions of the justifiability would at least partially mediate any effect (between- *and* within-subjects) of social normality on anticipated regret.³

*Method**Design and Procedure*

Participants read a scenario in which two mothers each face the decision whether or not to vaccinate their small child against a threatening flu. Both make the same choice: either both vaccinate, or both do not. For one protagonist the choice is described as consistent with what most of her family and friends did when faced with a similar decision (i.e. a “socially normal” choice). For the other protagonist, her choice is described as inconsistent with that of family and friends (i.e. a “socially abnormal” choice). In all conditions the choice results in the same poor outcome, a sick child. Thus, the experiment manipulated two factors each with two levels: action (vaccinate vs. don’t vaccinate) and social normality (socially normal decision vs. socially abnormal decision). Action was manipulated between-subjects only, whereas social normality was manipulated both between- and within-subjects, as described below.

The experimental materials were presented in a multi-page questionnaire. The basic decision situation faced by the two mothers was described on the first page. On the second page participants read about the decision of the first mother (whether she vaccinated or not, and whether this was, for her, socially normal or not), and the result (the child’s sickness). They then rated how much regret they thought the mother would feel over her decision. On the next page, participants read about the decision of the second mother, which differed from the first only in that the social normality of her choice was opposite that of the first mother. They then rated the intensity of the second mother’s regret, as before. Order of presentation was counterbalanced, so that for half the participants the first mother’s choice was socially normal, while for the other participants the first choice was socially abnormal. On the final page, respondents rated several statements concerning the normality and justifiability of the decisions.

Participants

Seventy-six undergraduate students at a large university in the southwest US participated for extra course credit. They took about ten minutes to complete the questionnaire.

Materials, Manipulations, and Measures

Scenario. The scenario was slightly adapted from Connolly and Reb (2003) and involved two mothers who each had to decide whether or not to vaccinate her child against a flu. The scenario explained that the risk of an unvaccinated child getting the flu was about equal to the risk of a vaccinated child getting vaccine side-effects, and that flu and vaccine side effects were equally serious: the child “was very sick and unhappy for almost three weeks”. The expected outcomes of the active and inactive options were thus essentially equal.⁴ The manipulations of action and social normality were implemented as follows (different conditions in parentheses):

[Protagonist] decides [not] to vaccinate her child, [like most of the people she knows / although most of the people she knows decide [not] to vaccinate their children].

Unfortunately, her child [gets a severe case of the flu / experiences the severe side effects of the vaccine] and is very sick and unhappy for almost three weeks.

Anticipated regret. After reading about one mother’s decision and its outcome, participants were asked to imagine themselves in the protagonist’s situation and to indicate how they would feel. Anticipated regret intensity was measured on an 11-point scale (0: “I wouldn’t experience this at all”; 10: “I would experience this a lot”). This measure was embedded in a list of several other emotions in order to avoid demand effects. Participants then read about the other mother’s decision and its consequences, and completed the same emotion ratings.

Perceived decision justifiability. After completing the emotion ratings for both scenarios, participants rated several items concerning the decisions of the two protagonists on 5-point

Likert-scales (anchored at “strongly agree” and “strongly disagree”, coded as +2 and -2, respectively). Decision ratings were on a separate page to reduce possible demand effects when indicating anticipated regret. Two pairs of items measured perceptions of decision justifiability for each protagonist: “[Protagonist] made a good choice”, and “[Protagonist] made a justifiable decision”. The items were averaged into justifiability indexes (average Cronbach’s $\alpha = .73$). In addition, as a manipulation check a pair of items asked about the social normality of the decision of each protagonist (“[Protagonist] chose the same alternative as most people she knows”).

Results

Manipulation Check

A between-subjects ANOVA on social normality ratings found the expected main effect of the manipulation (socially normal $M = 1.47$, socially abnormal $M = -1.23$, $F(1, 72) = 92.09$, $p < .001$). The same main effect was also revealed in a mixed-model ANOVA, $F(1, 73) = 139.70$, $p < .001$. No other effects (action, order, and interactions) were significant, all $ps > .1$.

Experimental Effects on Anticipated Regret

Action. We first analyzed only the responses to the first decision with a between-subjects ANOVA including action and social normality as between-subjects factors. This analysis revealed a significant main effect for action, $F(1, 72) = 5.24$, $p < .05$, $\eta_p^2 = .07$. As expected, a bad outcome resulting from vaccination was expected to be less regrettable ($M = 6.76$, $SD = 3.33$) than one resulting from non-vaccination ($M = 8.18$, $SD = 1.73$). This effect was replicated in a mixed-model ANOVA on the full data set (i.e. including responses to the decisions of both protagonists) with social normality as within-, and action and order as between-subjects factors, $F(1, 72) = 6.64$, $p < .05$, $\eta_p^2 = .08$ ($Ms = 6.58$ and 8.15). The order effect and all interactions were non-significant, all $ps > .1$.

Social normality. A between-subjects ANOVA considering only the first decisions showed that whether the decision was socially normal ($M = 7.50$, $SD = 2.30$) or socially abnormal ($M = 7.48$, $SD = 3.06$) had no significant effect on anticipated regret intensity for the between-subjects manipulation, $F(1, 72) = .00$, ns , $\eta_p^2 = .000$. However, the mixed-model ANOVA revealed a significant within-subjects effect of social normality, $F(1, 72) = 10.03$, $p < .01$, $\eta_p^2 = .12$. A socially normal choice was considered less regrettable ($M = 7.09$) than a socially abnormal choice ($M = 7.68$). Thus, the manipulation of social normality had a significant influence only when highlighted in a within-subjects design.

The Role of Perceived Decision Justifiability

We conducted several analyses to examine whether the justifiability account could explain the observed anticipated regret ratings. We first examined whether justifiability perceptions mediated the between-subjects effect of action on anticipated regret, following the Baron and Kenny (1986) procedure. First, consistent with the justifiability account, the more a decision was perceived as justifiable, the less regrettable it was anticipated to be in the event of a bad outcome, $\beta = -.37$, $t = 3.46$, $p < .01$. Second, action affected perceived justifiability as expected such that a decision to vaccinate was perceived as more justifiable ($M = .57$) than a decision not to vaccinate ($M = -.03$), $F(1, 72) = 5.37$, $p < .05$, $\eta_p^2 = .07$. Third, when regressing anticipated regret on both action and perceived justifiability, the effect of action became just significant ($\beta = .18$, $t = 1.67$, $p = .05$, one-tailed), and perceived justifiability remained a significant predictor ($\beta = -.33$, $t = 2.99$, $p < .01$). A Sobel (1982) test for mediation was significant ($z = 1.83$, $p < .05$, one-tailed). These analyses suggest that perceived justifiability partially mediated the effect of action on anticipated regret.

We next examined whether justifiability perceptions also mediated the within-subjects

effect of social normality on anticipated regret. First, we found in two linear regression analyses that a more justifiable decision was anticipated to be less regrettable in both the socially normal condition ($\beta = -.37, t = 3.50, p < .01$) and the socially abnormal condition ($\beta = -.42, t = 3.98, p < .001$). Second, a socially normal choice was perceived as more justifiable ($M = .40$) than a socially abnormal choice ($M = .16$), $F(1, 73) = 5.54, p < .05, \eta_p^2 = .07$.

Mediation of within-subjects effects cannot be tested using the popular Kenny and Baron (1986) procedure, which was developed for between-subjects designs. However, Judd, Kenny, and McClelland (2001) describe a way to test for mediation of within-subjects effects when both the dependent variable and the presumed mediator are measured twice (i.e., once for each within-subjects condition), as in the present case. As Judd et al have shown, significant mediation is demonstrated when the difference between the two measures of the mediator significantly predicts the difference between the two measures of the dependent variable. A regression with the difference in the two mediator measures as predictor of the difference in the dependent variable was significant ($\beta = .27, t = 2.44, p = .05$), thus showing that perceived justifiability mediated the effect of social normality on anticipated regret.⁵

Discussion

Study 1 examined the effect of action/inaction and social normality on anticipated regret, and, importantly, the role of perceived decision justifiability in mediating this effect. Using a scenario methodology, we described a mother who decides either to vaccinate her child or not (manipulated between-subjects), a decision described as either consistent or inconsistent with what most of the people she knows do (social normality, manipulated both between- and within-subjects). We measured both anticipated regret and perceived justifiability of the decision. We found that anticipated regret was affected by the between-subjects action manipulation, with

inaction leading to higher anticipated regret, and by the within-subjects social normality manipulation, with socially abnormal choices leading to more intense anticipated regret.

We also found evidence for an important role of justifiability perceptions in determining anticipated regret. First, perceived justifiability predicted anticipated regret. The more a decision was perceived as justifiable, the less regrettable it was anticipated to be in the event of a bad outcome. Second, action and social normality affected perceived decision justifiability and anticipated regret in a consistent direction (see Figure 1). Third, mediation analyses found that perceived justifiability mediated both the effect of action and that of social normality on anticipated regret.

[Figure 1 around here]

Further, the analyses revealed that highlighting the difference in social normality between the two protagonists through a within-subjects manipulation led to a significant effect on anticipated regret that was not obtained for the between-subjects manipulation. We interpret this as additional evidence consistent with a justifiability account of anticipated regret. In the within-subjects design, justifiability issues were made salient by direct comparison of normal and abnormal behavior. Without this additional salience the (between-subjects) normality manipulation may have been too weak to affect anticipated regret. As N'gbala & Branscombe (1997) argue, the mutability hypothesis of norm theory predicts a stronger effect of normality in the *between-subjects* design because it rests on the argument that abnormal behaviors evoke counterfactuals more easily. However, in a within-subjects design, even the counterfactual for normal behavior is essentially obvious because both decision alternatives (normal and abnormal) are described to the respondent. This would imply that the social normality effect would be found in the between-subjects rather than the within-subjects design, the reverse of our finding.

Justifiability appears to have “trumped” mutability in determining anticipated regret in this context. An additional regression analysis showed that social normality perceptions did not predict anticipated regret ($p = .63$), further weakening the case that normality, or typicality, as such determined anticipated regret as predicted by norm theory.

Study 1 examined the effects of factors associated with the normality of a decision (action/inaction, social normality). While in the past effects of normality, or typicality, have been explained through mutability (Kahneman & Miller, 1986) we predicted that differences in perceived decision justifiability could account for the effects of action and social normality. The results of Study 1 supported this interpretation. However, to further probe the role of justifiability perceptions in the anticipation of regret, it is important to identify new variables that affect perceived justifiability, and thus anticipated regret, in addition to reexamining previously studied variables such as the normality of a decision. Study 2 does this by investigating the effect of decision process carefulness on anticipated regret and perceived justifiability.

STUDY 2: DECISION PROCESS CAREFULNESS, PERCEIVED JUSTIFIABILITY, AND ANTICIPATED REGRET

Existing studies of justification and anticipated regret have examined justifications that are highly context-specific: previous experience with a particular product (Inman & Zeelenberg, 2002), the reputation enjoyed by a specific brand (Simonson, 1992), or an individual’s entrepreneurial personality (Seta et al., 2001). Study 1 examined the effect of another consideration, social normality, that might serve as a regret-reducing justification, though perhaps not a very compelling one, in a wider variety of situations. In the present experiment we examine a justification that is potentially powerful over a wide range of choices: the care and thoroughness of the decision process itself. Janis and Mann (1977) suggest that the anticipation

of regret can motivate what they call a “vigilant decision process”. Our question here is whether the use of such a process does, in fact, lead to reduced expectations of regret.⁶

Study 2A

Method

Design and Procedure

In Study 2a we manipulated action/inaction between-subjects. We also manipulated decision process carefulness between-subjects across three levels: participants read about a careful decision, a careless decision, or received no information on the decision process (control condition).

Participants

One hundred eighty undergraduate students enrolled in an introductory course in organizational behavior at a large university in the southwest US participated for extra-credit. They took about 10 minutes to complete the experimental materials.

Materials and Measures

We used the same vaccination scenario as in Study 1. Action was manipulated as in Study 1 and the same negative outcome for the child resulted in all conditions. Decision process carefulness was manipulated as follows. The careful decision process was described as:

[Protagonist] talked to several doctors, read medical journals, consulted with family and friends, and thought seriously about what to do.

The careless decision process was described as:

[Protagonist] did not collect any information, did not talk with friends or doctors before she made the decision, and didn't think very seriously about the decision.

No information on the decision process was provided in the control condition.

As in Study 1, anticipated regret was measured immediately after each scenario, using the same 11-point (0-10) scale as in Study 1. Perceived justifiability was measured through a rating of self-blame made on similar scale as anticipated regret, reverse-coded such that higher values indicated higher perceived justifiability.

Results

Experimental Effects on Anticipated Regret

We conducted an ANOVA on anticipated regret with decision process carefulness and action as between-subjects factors. This analysis revealed a significant main effect for decision process carefulness, $F(2, 174) = 11.30, p < .001, \eta_p^2 = .12$. As expected, anticipated regret intensity was lower in the case of a careful decision process ($M = 5.64, SD = 3.01$) than a careless process ($M = 7.67, SD = 2.57$), $p < .001$. Further pairwise comparisons showed that anticipated regret in the control condition ($M = 7.56, SD = 2.49$) was significantly different from (and higher than) the careful condition, $p = .001$, but not from the careless condition, $p = .81$.

Whether the decision was to vaccinate or not did not affect anticipated regret, $F(1, 174) = .47, ns, \eta_p^2 = .003$. Also, the interaction was not significant, $F(2, 174) = .81, ns, \eta_p^2 = .01$.

The Role of Perceived Decision Justifiability

We examined whether decision justifiability perceptions mediated the effect of decision process carefulness on anticipated regret following the same procedure as in Study 1. First, the higher perceived justifiability the lower anticipated regret, $\beta = -.66, t = 10.64, p < .001$. Second, a more careful process led to higher perceived justifiability, $\beta = .30, t = 3.84, p < .001$ (see also Figure 1). Third, a regression analysis with decision process carefulness ($\beta = .16, t = 2.45, p < .05$) and perceived justifiability ($\beta = -.61, t = 9.57, p < .001$) entered simultaneously showed that

both remained significant predictors of anticipated regret. A Sobel test for mediation was significant, $z = 3.56$, $p < .001$. Thus, these analyses suggest that perceived justifiability partially mediated the effect of decision process carefulness on anticipated regret.

Discussion

Study 2a was designed to examine the effect of decision process carefulness on anticipated regret. We argued that if a decision-specific justification for a decision, such as good past performance of a product (Inman & Zeelenberg, 2002), can lead to lower anticipated regret, a more general justification such as a careful decision process should achieve the same result as well or better. As predicted, we found that decision process carefulness affected anticipated regret intensity: a bad outcome following a careful decision process was expected to lead to less intense regret than an equally bad outcome following a careless decision process. Perceived decision justifiability predicted anticipated regret. Moreover, perceived justifiability partially mediated the effect of decision process carefulness on anticipated regret. These results are consistent with decision justification theory and provide further evidence for the important role of perceived decision justifiability in determining anticipated regret.

An analysis of the control group data, in which no information on decision process carefulness was given, showed that anticipated regret was significantly reduced by using a careful decision process, but not significantly increased by using a careless process, as compared to the no process information condition. One can informally compare the control condition mean to the means of the significant (within-subjects) manipulation of social normality in Study 1. Again, it appears that the control group ($M = 7.56$) was more similar to the less justifiable condition (here the socially abnormal choice, $M = 7.68$) than to the more justifiable condition (socially normal choice, $M = 7.09$). A speculative interpretation is that, perhaps, a good

justification is more effective at reducing regret over a bad outcome than a bad justification is at increasing already existing outcome regret.

In contrast to Study 1, whether the decision was to act or not did not affect anticipated regret. One possible explanation for this absence of an effect consistent with a justifiability account is that different justifications are not simply additive in their effects. In the presence of a strong justification, the influence of weaker justifications may be reduced or eliminated. As we argued earlier, the carefulness of the decision process is likely a strong justification of a choice. When a person makes a choice after collecting a lot of information and deliberating carefully, either choice (i.e., vaccinating and not vaccinating) may seem justified, and then the effect of action disappears. However, in the absence of this process information vaccinating might appear more justified as it reflects the majority choice. If this is correct then the effect of action should not have been crowded out in the control condition, in which no information on the decision process carefulness was given, just as in Study 1. The empirical results show that the difference in anticipated regret between action ($M = 6.93$, $SD = 2.87$) and inaction ($M = 8.12$, $SD = 2.03$) in the control condition was substantial (diff = 1.19) and much larger than in the careful process condition (diff = .04, action, $M = 5.62$, inaction, $M = 5.66$, $p = .96$, $\eta_p^2 = .000$) or the careless process condition (diff = .31, action, $M = 7.82$, inaction, $M = 7.51$, $p = .82$, $\eta_p^2 = .003$). While the effect failed to reach significance, $F(1, 30) = 1.86$, $p = .18$, possibly due to the small sample size, the effect size, $\eta_p^2 = .06$, is comparable to that of the action manipulation in Study 1, $\eta_p^2 = .07$.

The results suggest a contest between alternative justifications, in which a moderate preference for vaccination (see Connolly & Reb, 2003) is pitted against a general approval of careful decision processes. This implies that, in a more strongly pro-vaccination sample, the action/inaction effect should be apparent even in the presence of decision process carefulness

information. To test this idea, we conducted Study 2b using a sample from a population with strong pro-vaccination norms. A second purpose of this study was to replicate the effect of decision process carefulness, and its mediation through decision justifiability perceptions, in an independent sample from a different population to provide evidence for its generalizability.

Study 2b

Method

Design and Procedure

Study 2b used the same design and procedure as Study 2a except that decision process carefulness was only manipulated across two levels: the process was either careful or careless.

Participants

The study was conducted in Singapore. Singapore is a society with strong pro-vaccination norms and attitudes and vaccination rates even higher than in the US and in excess of 96% (World Health Organization, 2006). Participants in this study were 190 undergraduate students taking an introductory course in organizational behavior at a local university. They thus closely match the sample in Study 2a for age and interests, except for the country from where the sample was drawn.

Results

Experimental Effects on Anticipated Regret

ANOVA again revealed a significant main effect for decision process carefulness, $F(1, 186) = 6.10, p = .01, \eta_p^2 = .03$. Anticipated regret was lower when the bad outcome followed a careful decision process ($M = 7.03, SD = 2.72$) than when it followed a careless process ($M = 8.08, SD = 2.60$). In addition, we now found a significant effect of action, $F(1, 186) = 8.81, p < .01, \eta_p^2 = .05$. As expected, vaccinating ($M = 6.92, SD = 2.99$) was anticipated to lead to lower

regret than not vaccinating ($M = 8.15$, $SD = 2.24$). The interaction effect was not significant, $F(1, 186) = .54$, ns , $\eta_p^2 = .003$.

Comparison of Study 2a and Study 2b Samples

While the above results support our argument, they were obtained from independent analyses of the samples in Study 2a and Study 2b. For the following analyses, we combined the two data sets. If our argument is correct, we should find a significant interaction between sample (US vs. Singapore) and action, such that the effect of action is stronger in the Study 2b sample than the Study 2a sample. Consistent with this prediction, an ANOVA with sample (US vs. Singapore), action/inaction, and decision process carefulness (careful vs. careless) as factors revealed a significant interaction between sample and action, $F(1, 330) = 4.51$, $p < .05$, $\eta_p^2 = .01$. The interaction is such that inaction (non-vaccination) increased anticipated regret in the Singaporean sample, but not in the US sample.

In addition to the interaction, we found a significant main effect of sample, such that anticipated regret ratings were higher in the Singaporean sample ($M = 7.53$) than in the US sample ($M = 6.64$), $F(1, 330) = 9.41$, $p < .01$, $\eta_p^2 = .03$. Finally, we found a marginally significant interaction between sample and decision process carefulness, $F(1, 330) = 3.33$, $p = .07$, $\eta_p^2 = .01$, suggesting that the effect of decision process carefulness was somewhat stronger in the US sample than in the Singaporean sample.

The Role of Perceived Decision Justifiability

In Study 2b, once again, higher perceived justifiability was associated with lower anticipated regret, $\beta = -.79$, $t = 17.39$, $p < .001$. Further, perceived justifiability was predicted both by the action ($\beta = .25$, $t = 3.54$, $p < .001$) and the process carefulness manipulation ($\beta = .14$, $t = 1.94$, $p = .05$) (see also Figure 1). With respect to a potential mediation of the action/inaction

effect, when entered simultaneously only perceived justifiability ($\beta = -.78, t = 16.63, p < .001$), but not action ($\beta = .03, t = .72, ns$), remained a significant predictor of anticipated regret. A Sobel test for mediation was significant, $z = 3.46, p < .001$, suggesting that perceived justifiability fully mediated the effect of action on anticipated regret. With respect to a potential mediation of the process carefulness effect, when entered simultaneously both perceived justifiability ($\beta = -.77, t = 17.07, p < .001$) and process carefulness ($\beta = .09, t = 1.88, p < .05$, one-tailed) remained significant predictors of anticipated regret. A Sobel test for mediation was significant, $z = 1.93, p = .05$, suggesting that perceived justifiability partially mediated the effect of process carefulness on anticipated regret.

Discussion

The findings from Study 2 add further weight to the view that perceived decision justifiability is a key factor influencing anticipated regret. First, in two independent samples drawn from two substantially different populations (US and Singaporean students), perceived justifiability predicted anticipated regret and mediated experimental effects on anticipated regret. Second, in both US (moderately pro-vaccination) and Singaporean (strongly pro-vaccination) samples, participants who were told of a careful decision process anticipated less regret from a poor outcome than did those who were told of a careless process, or who received no information about the process. The data also suggest a possible process by which two justifications interact. When a strong justification (careful process) and a less strong justification (vaccination, for the US sample) combine, the second effect is suppressed, and the action/inaction effect disappears. When the same strong justification combines with a second strong justification (vaccination, for the Singapore sample), both effects remain.

STUDY 3: ACTION, SOCIAL NORMALITY, DECISION PROCESS CAREFULNESS, AND ANTICIPATED REGRET

The above discussion sets the stage for our final study. Study 1 showed that anticipated regret is reduced if the precipitating behavior is socially normal, though the effect appears to be mediated by perceptions of decision justifiability rather than by the mutability/amplification mechanism proposed by norm theory. Study 2 showed that decision carefulness serves a similar regret-reducing role, again mediated by justifiability. Further, the Study 2 data suggest a combining rule: Two strong justifications show additive effects, while a weak justification may be overwhelmed when it is combined with a strong one. What, then, is the effect on anticipated regret of combining decision process and decision normality information? Study 3 examines the joint effect of the variables of Studies 1 and 2 by manipulating decision process carefulness, social normality, and action/inaction within one experiment.

Method

Design and Procedure

Participants read about a protagonist who either vaccinated her child or not, a choice that either did or did not conform with the choice made by her social peers, and after engaging in either a careful or a careless decision process. Thus, we manipulated between-subjects three factors each with two levels: action/inaction, social normality, and decision process carefulness.

Participants

One hundred and sixty-six undergraduate students at a large southwestern university in the US participated for extra credit. They took about ten minutes to complete the questionnaire.

Materials and Measures

The materials and measures were identical to those for Study 1 except that the scenario

contained three manipulations. The relevant paragraph of the scenario in the careful/socially normal/action condition read as follows.

[Protagonist] gives the matter a lot of thought, consults several doctors and medical journals, and talks to her family and friends. Finally, she decides to vaccinate her child, like most of the people she knows. Unfortunately, her child experiences the severe side effects of the vaccine and is very sick and unhappy for almost three weeks.

In the careless/socially abnormal/inaction condition this paragraph read:

[Protagonist] doesn't give the matter much thought, nor does she discuss it with her doctor, her family or her friends. She just decides not to vaccinate her child, although most of the people she knows decide to vaccinate their children. Unfortunately, her child gets a severe case of the flu and is very sick and unhappy for almost three weeks.

Anticipated regret was measured as in the previous studies. Perceived decision justifiability was measured with the same two pairs of items as in Study 1. Manipulation checks asked about the carefulness of the decision process (“[Protagonist] followed a careful decision process”) and the social normality of the decision (“[Protagonist] chose the same alternative as most people she knows”) using the same 5-point Likert scale response format as in Study 1.

Results

Manipulation Checks

Perceptions of decision process carefulness showed the expected main effect for the decision process carefulness manipulation, $F(1, 158) = 254.41, p < .001$ (careful $M = 1.51$, careless $M = -1.33$); no other main effect or interaction was significant, all $p > .1$. Perceived social normality showed the expected main effect of the social normality manipulation, $F(1, 158) = 127.14, p < .001$ (socially normal $M = .99$, socially abnormal $M = -1.24$); no other main effect

or interaction was significant, all $p > .1$.

Experimental Effects on Anticipated Regret

ANOVA revealed that anticipated regret was lower when a careful decision process was used ($M = 6.49$, $SD = 3.36$) than when a careless process was used ($M = 7.52$, $SD = 2.81$), $F(1, 158) = 4.58$, $p < .05$, $\eta_p^2 = .03$. The effect for action was non-significant, $F(1, 158) = .97$, ns , $\eta_p^2 = .01$ (action $M = 6.78$, $SD = 3.08$, inaction $M = 7.25$, $SD = 3.15$). The effect for social normality was also non-significant, $F(1, 158) = 1.11$, ns , $\eta_p^2 = .01$ (socially normal $M = 7.29$, $SD = 3.07$, socially abnormal $M = 6.65$, $SD = 3.16$), as were all of the interaction terms, all $p > .1$.

The Role of Perceived Decision Justifiability

As in the other studies, the more justifiable a decision, the less regrettable a subsequent bad outcome was anticipated to be, $\beta = -.46$, $t = 6.55$, $p < .001$. Further, a more carefulness process was perceived as more justifiable ($\beta = .59$, $t = 9.39$, $p < .001$) (see also Figure 1). Finally, when entered simultaneously both perceived justifiability ($\beta = -.55$, $t = 6.64$, $p < .001$) and decision process carefulness ($\beta = .16$, $t = 1.88$, $p < .05$, one-tailed) remained significant predictors of anticipated regret. A Sobel test for mediation was significant, $z = 5.32$, $p < .001$, suggesting that perceived justifiability partially mediated the effect of decision process carefulness on anticipated regret.

Discussion

In Study 3 we manipulated decision process carefulness, action, and social normality. We found that a bad outcome following a careful, rather than careless, decision process was expected to be less regrettable even when information about action and social normality was present. Neither action nor social normality showed a significant effect on anticipated regret, suggesting that the decision process justification trumped the other two justifications. As in Study 2,

justifiability perceptions partially mediated the effect of process carefulness on anticipated regret.

GENERAL DISCUSSION

In three scenario studies, we examined the effects on participants' anticipated regret of three variables: action/inaction (i.e., whether the decision was to act or not); social normality (i.e., whether or not the decision conformed to the choices of one's family and friends); and decision process carefulness (i.e., whether or not the decision maker collected relevant information, consulted appropriate others and gave the decision careful thought.) The decision context was that of a mother deciding whether or not to vaccinate her small child against flu (cf. Connolly & Reb, 2003). Participants assessed their anticipated regret and perceived decision justifiability in the event of the child becoming sick (equally bad, either from the disease itself or from vaccination side-effects).

We were particularly interested in the role of perceived decision justifiability in explaining and mediating the effects of the experimental variables on anticipated regret. Our general prediction was that regret anticipated for a poor outcome would be reduced when the decision was made in a justifiable way (e.g. by using a careful decision process) (Connolly & Zeelenberg, 2002). The three studies reported yielded several results consistent with this prediction.

Past research and theorizing has suggested that the normality, or typicality, of a decision affects (anticipated) regret through the easier counterfactual mutability of abnormal choices (Kahneman & Tversky, 1982; Kahneman & Miller, 1986). Study 1 showed, however, that the effects of action and social normality on anticipated regret can be explained to a substantial degree through perceived decision justifiability. As in earlier studies in the vaccination context

(see Connolly & Reb, 2003) we did not replicate the so-called “action effect” (i.e., more intense regret following action: Kahneman & Tversky, 1982). Our results suggest instead that whether action or inaction leads to more regret depends on the participant’s assessment of the justifiability of the option chosen rather than on whether it was a choice of action or inaction per se (cf. Connolly & Reb, 2003). In the vaccination context “acting” (vaccination) is endorsed by the majority of the populations we sampled, and was expected to lead to lower regret (Study 1 & Study 2b). The effect was mediated through perceptions of decision justifiability. Similarly, we found an effect of social normality on anticipated regret (Study 1) but this, again, was mediated through perceived decision justifiability. (Interestingly, we found that social normality affected anticipated regret only when the manipulation was made salient in a within-subjects manipulation. Apparently, in a within-subjects design, the differential justifiability of normal and abnormal behavior became more salient, leading to a stronger effect on anticipated regret.)

Further, we found (Study 2) that a careful decision process is expected to protect decision makers to some extent from regret following a bad outcome. Mediation analyses showed the effect of decision process carefulness on anticipated regret to be significantly mediated through perceived justifiability. These results were duplicated both in a moderately pro-vaccination Western (US) sample and in a strongly pro-vaccination (Singapore) sample, suggesting that a careful decision process may be seen quite broadly as decision-justifying (and regret-reducing). Finally, the effect of decision process carefulness on anticipated regret was apparent even in Study 3, where social normality information was also given, and independently of whether the decision was to vaccinate or not to vaccinate. Once again, perceived justifiability appears to be the mediating variable.

Pieters and Zeelenberg (2005) have shown that the justifiability of a decision (as

indicated by the degree of intention-behavior consistency and amount of thinking before making a choice) can affect not only the anticipation but the actual experience of post-decisional regret. This consistency between anticipated and experienced regret is especially interesting given other research suggesting a decoupling of anticipated and experienced regret, resulting in mispredictions of regret (e.g. Gilbert, Morewedge, Risen, & Wilson, 2004). Our results, together with Pieters and Zeelenberg's findings, suggest that decision makers may be correct to predict that making a justifiable decision will protect them to some degree from post-decisional regret. Future research is needed to clarify the conditions under which anticipated and experienced regret correspond or diverge.

All three of the studies reported here showed an important role for decision justifiability in determining the intensity of anticipated regret. However, it should be noted that, even when anticipated regret was reduced by strong justifiability, the mean score remained around the mid-point of the scale. Consistent with decision justification theory's two-component model of (anticipated) regret, substantial outcome regret (over the child's sickness) remains even if the self-blame component of regret associated with lack of decision justification is eliminated.

The findings hint at the complexities of combining multiple sources of justification. In our moderately pro-vaccination US samples, we found no significant main effects on anticipated regret of either action or of social normality when decision process carefulness information was given (Study 2a, Study 3). These results suggest that the effects of a weaker justification, such as whether a decision is socially normal, may be driven out by a stronger justification, such as the carefulness of the decision process. Consistent with this idea, in a sample with strong pro-vaccination attitudes (Study 2b) the influence of action remained significant (vaccinating expected to lead to lower regret) even in the presence of decision process carefulness

information. Future research needs to examine in more detail the conditions under which different justifications crowd each other out or interact in other complex ways.

Limitations and Future Research

Several limitations of our studies point to directions for future research. First, Janis and Mann (1977) predicted that anticipation of regret leads to more “vigilant” decision making. Consistent with this prediction we have shown that people anticipate more regret when a poor outcome follows a careless decision process than a careful one. However, we did not demonstrate that decision makers will actually improve their decision processes to avoid this anticipated regret. Future research should examine whether regret aversion, either experimentally induced or measured as an individual difference variable, leads to more vigilant, careful decision making. Such a finding would have important implications for the debate about the functionality of regret (e.g., Zeelenberg, 1999) and would suggest that anticipated regret can have a beneficial effect on decision making.

It is, perhaps, worth reiterating that in none of these experiments did we directly manipulate perceived justifiability. We experimentally manipulated factors (social normality, decision carefulness, action/inaction) that we expected to affect both justifiability perceptions and anticipated regret. We then used statistical mediation analyses to provide evidence for the important role of perceived justifiability in the experimental effects. Such analyses can provide valuable information about the psychological processes through which experimental manipulations affect dependent variables (Baron & Kenny, 1986). However, these analyses are not without shortcomings (Spencer, Zanna, & Fong, 2005). In particular, one has to recognize that mediation analyses are correlational in nature and, as such, do not allow for strong causal inferences. However, we are somewhat encouraged by the repeated significant and consistent

results of our mediation analyses across the three studies and for different samples.

Two further limitations of our study were (a) the use of a hypothetical scenario methodology, and (b) the use of only one decision context. The first critique is somewhat blunted by the consideration that participants' anticipations of how they would feel in some imagined situation is the substantive variable of interest, not merely a pallid substitute for the real experience of that emotion. We are also encouraged by the findings of Wroe et al (2004), noted earlier, showing that anticipated regret does strongly predict actual vaccination choices. However, extension of the present studies to real decision makers and real decisions is an obvious priority.

A further direction for extension is to explore which justifications apply to which decision settings. In the context studied here (medical decisions for a child), a careful, comprehensive analytical decision process was seen as justifying the choice the parent made. Such a process might not be seen as appropriate for a choice in which intuition and spontaneity is called for, as in the choice of a spouse. Similarly, the seriousness of the stakes involved might change the kind of justification called for. A modest flutter at a gaming table might be justified by "I simply felt like it." A moderately expensive purchase of some new electronic gadget or a meal at a trendy restaurant might be adequately justified by noting that lots of other people were doing the same. Perhaps the "good decision process" justification used here is, in fact, seen as appropriate only for a subset of life's big decisions. We noted earlier the possible divergence between private justification, with which we were concerned in this research, and public accountability (Lerner & Tetlock, 1999). Further research might address how self- and other-justification diverge in general and also depending on the decision context.

A final direction for future research would be to examine individual differences in the

anticipation of regret. Such research could draw on work by Schwartz and colleagues (2002) on the difference between maximizers (who tend to experience more regret) and satisficers. For example, it could be that maximizers anticipate more regret for careless decisions than do satisficers and set higher standards for what is a justifiable decision.

Conclusion

This paper examined the effects of normality and decision process carefulness on anticipated regret, and the role of decision justifiability in these effects. We found support for the central prediction of decision justification theory (Connolly & Zeelenberg, 2002) that anticipated regret is reduced when a decision is perceived as justifiable. Overall, our results support the ability of decision justification theory to provide an account of decision makers' regret anticipations. We were able to replicate norm theory's prediction that abnormal actions are more regretted, but the effect (a) appears to be mediated by the perceived justifiability of normal actions, and (b) disappears when decision carefulness information is also provided. The suggestion is that the mechanism underlying the normality effect may be one of (weak) justification rather than the counterfactual/mutability account norm theory proposes.

The results also suggest a positive view of the role of regret in decision making. Earlier research on the so-called action effect suggested that anticipated regret might be a biasing factor, leading to a preference for inaction even when the active option was objectively superior. The current research suggests, instead, that anticipated regret can have a beneficial effect on decision making, by stimulating search for more justifiable decisions, and thus encouraging more careful decision processes.

FOOTNOTES

¹ The vaccination decision has also been the context of a number of studies examining a possible omission bias, a tendency to prefer inaction over action, in health-related decisions, a bias possibly resulting from increased anticipated regret for action (e.g., Ritov & Baron, 1990; Ritov & Baron, 1995). We are not concerned here with the debate about the existence of this bias (the interested reader can refer to the papers cited above as well as Connolly & Reb, 2003, and Baron & Ritov, 2004).

² Note that our prediction is the reverse of the original “action effect” (Kahneman & Tversky, 1982) -- the prediction that actions would lead to emotional amplification because they are more abnormal and mutable (Kahneman & Miller, 1986). However, norm theory does not rule out the possibility that inactions under certain rare circumstances are more abnormal than actions. As such, finding an “inaction” effect does not necessarily contradict norm theory.

³ We manipulated action only between-subjects because, based on previous findings showing a preference for, and general acceptance of, vaccination as the typical choice in the population (Connolly & Reb, 2003) we felt confident that the action/inaction manipulation would affect anticipated regret (and perceived justifiability) in a between-subjects design.

⁴ Connolly and Reb (2003) provide evidence that participants find this a comprehensible scenario and are able to construct plausible explanations of the decisions they would make. Interestingly, a preference for action or inaction per se is very rarely mentioned in these explanations.

⁵ Moderation exists when the sum of the repeated mediator measures predicts the difference of the repeated dependent variable measures. While we were not interested in a potential moderating role in the present context, Judd et al (2001) recommend including both

difference and sum predictors in order not to misspecify the model. We have followed their advice in our analysis and found no significant moderating role of perceived justifiability.

⁶ A reviewer reminds us of the important and on-going debate on the broad issue of decision quality, coherence, outcome bias, cardinality, etc. We intend no novel contribution to this discussion here. We suggest only that, in a wide range of decision settings, a process described as careful, thorough, drawing on a range of available information and so on will be perceived as better justified than one that has none of these features. Our participants seem to agree with this judgment.

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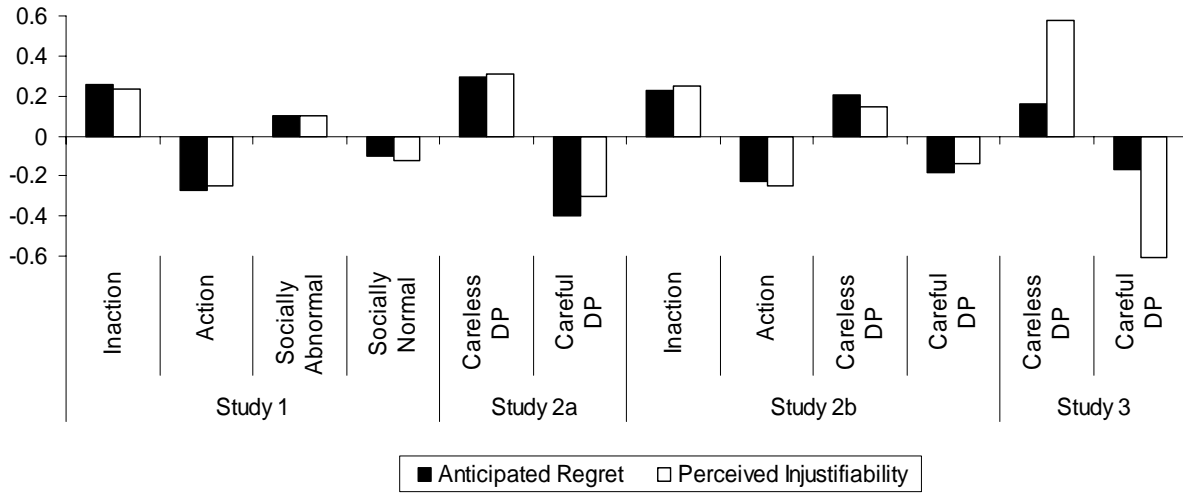
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Figure 1: Anticipated Regret and Perceived Decision Justifiability for All Significant Effects
(Standardized Scores)



Notes. DP = decision process