Status Quo Change vs. Maintenance as a Moderator of the Influence of Perceived Opportunity on the Experience of Regret

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This dissertation titled

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ABSTRACT

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Status Quo Change vs. Maintenance as a Moderator of the Influence of Perceived Opportunity on the Experience of Regret

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Recent research in regret literature, examining the moderating role of perceived opportunity, has yielded conflicting results. Roese and Summerville (2005) argue that conditions that enhance perceptions of future opportunities should elicit the most intensely felt regrets, whereas Beike, Markman and Karadogan (2009) argue that it is the perception of lost opportunities (i.e., high past but low future) that elicit the most intensely felt regrets. Thus, the main purpose of the current project was to offer a resolution to these conflicting positions. With this goal in mind, three studies were conducted to demonstrate that the effect of perception of future opportunities change depending on the nature of decision type (i.e., changing the status quo vs. maintaining the status quo). Study 1 investigated the interactive effect of decision type and perceived opportunity on regret intensity by adopting a scenario paradigm. Results of Study 1 demonstrated that the amount of regret experienced intensified in situations where future opportunities to take corrective action were no longer available. Due to the possible limitations of a scenario paradigm, Study 2 was conducted by adopting a more involving paradigm in which participants were required to make actual regret-eliciting decisions. Consistent with the predictions, changing the status quo was regretted more than maintaining it under the conditions of low opportunity, whereas maintaining the status
quo was regretted more than changing it under the conditions of high opportunity. In addition to the attempt to replicate the previously obtained interaction effect, Study 3 sought evidence whether self-uncertainty about one’s judgmental abilities is responsible for the obtained interactive results. The study clearly replicated the previous findings which demonstrated that amount of regret experienced changed as a function of both decision type (i.e., maintaining status quo vs. changing it) and perceived future opportunity. Additional analyses suggest that the mechanism of self-uncertainty at present does not statistically mediate the interactive effects of decision type and perceived opportunity on experience of regret. Implications of the results obtained are discussed with a focus on possible directions for future research.

Approved: _____________________________________________________________

Keith Markman

Associate Professor of Psychology
I would like to dedicate this dissertation to

♦ The memory of my dearest grandfather, Mehmet Ozer, whom I truly wish were with me today to share my accomplishment.

♦ My loving husband, Ernur Karadogan, who has been proud and supportive of my work since the beginning.

♦ My mom, Mefaret Ozer and my dearest grandmom, Mediha Ozer, whose unconditional love and support always carried me through.

♦ Last but not least, my father, Tuncer Ozmen, who always believed in me.

I dearly love you all. I am glad that I finally have completed what I started a long time ago.
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OVERVIEW

Life is full of decisions, such as choosing what to do for a living, whom to marry, which movie to watch, or where to go for Spring Break, and the outcomes of these decisions sometimes turn out more negatively than one would hope. When individuals reflect on poor decisions and realize that if they had acted differently, or elected not to act at all, their outcomes might have been better, the unpleasant emotion that often follows is regret. Over the years, researchers have sought to understand the nature of this emotion: What do individuals regret most and, more generally, when and why do they experience regret? A significant amount of research has focused on the adaptive value of regret (e.g., Markman, Karadogan, Lindberg, & Zell, 2009; Roese, 1997; Zeelenberg & Pieters, 2007), and some of this work has examined the moderating role of perceived opportunity. Roese and Summerville (2005; Saffrey, Summerville, & Roese, 2008) argue that conditions that enhance perceptions of future opportunities should elicit the most intensely felt regrets in the service of initiating corrective action under similar conditions. Conversely, Beike, Markman, and Karadogan (2009) argue that perceptions of high past opportunity but low future opportunity (i.e., lost opportunities) should elicit the most intensely felt regrets, and that rather than catalyzing corrective action in a similar, circumscribed domain, regret serves a more general learning function.

The purpose of the present work is to reconcile these conflicting positions by positing that a critical moderator of the influence of future opportunity perceptions on regret is whether the most salient event aspect in a causal sequence is a regrettable action (i.e., changing the status quo) or a regrettable inaction (i.e., maintaining the status quo). Study 1 examined the impact of both perceived future opportunity and decision type [i.e.,
changing the status quo (action) versus maintaining the status quo (inaction)] on regret intensity. Study 1 provided partial support for Beike et al.’s (2009) lost opportunity principle by demonstrating that individuals experience regret about outcomes they believe they will not have an opportunity to correct as opposed to those they believe they will have an opportunity to correct.

Study 2 was designed to examine the interactive influence of future opportunity and decision type on regret in a situation involving actual behavior. Employing the “Monty Hall” paradigm developed by Gilovich, Medvec, and Chen (1995), Study 2 revealed a Decision Type X Future Opportunity interaction: changing the status quo was regretted more than maintaining it under conditions of low future opportunity, whereas maintaining the status quo was regretted more than changing it under conditions of high future opportunity.

The results of Study 2 supported the hypothesized interactive effect of future opportunity and decision type on regret intensity. The proposed Study 3 sought to examine the psychological processes that underlie the experience of regret under these conditions. Specifically, Study 3 explored the extent to which feelings of self-certainty mediate the interactive effects of decision type and future opportunity on regret. It was predicted that under conditions of low future opportunity, participants who made the wrong choice by changing the status quo would experience more uncertainty and thereby would feel more regret than participants who made the wrong choice by maintaining the status quo. Under conditions of high future opportunity, on the other hand, it was predicted that participants who made the wrong choice by maintaining the status quo
would experience more uncertainty and thereby would feel more regret than participants who made the wrong choice by changing the status quo.
“Many of us crucify ourselves between two thieves – regret for the past and fear of the future.”

Fulton Oursler

INTRODUCTION

Regret: Its Nature and Function

Until fairly recently, researchers had paid minimal attention to the role that emotions play in decision-making (e.g., Connolly & Zeelenberg, 2002; Lerner & Keltner, 2000; Loewenstein, Weber, Hsee, & Welch, 2001). One emotion that has received notable attention from decision-making researchers, however, is regret (e.g., Gilovich & Medvec, 1995; Kelsey & Schepanski, 1991; Zeelenberg, Beattie, van der Pligt, & de Vries, 1996). Initial studies focused primarily on defining regret and separating it from other related emotional states such as disappointment, guilt and sadness (Hampshire, 1960; Landman, 1987, 1993; Taylor, 1985; Van Dijk & Zeelenberg, 2002; Zeelenberg & Pieters, 1999, 2004a; Zeelenberg et al., 1998). However, this research has not necessarily yielded a consensus. Different researchers have used varying definitions for the term regret, ranging from very broad to quite narrow. For instance, according to Landman (1993),

Regret is a more or less painful cognitive and emotional state of feeling sorry for misfortunes, limitations, losses, transgressions, shortcomings, or mistakes. It is an experience of felt-reason or reasoned-emotion. The regretted matters may be sins of commission as well as sins of omission; they may range from the voluntary to the uncontrollable and accidental; they may be actually executed deeds or entirely
mental ones committed by oneself or by another person or group; they may be moral or legal transgressions or morally and legally neutral….(p. 36).

The definition offered by Landman is quite broad - one might feel regret at the loss of one’s car keys, for instance, in a manner that is indistinguishable from the experience of unhappiness in general. Zeelenberg and Pieters (2007), on the other hand, defined regret as a comparison-based emotion of self-blame experienced when people realize or imagine that their present situation would have been better had they decided differently in the past.

A more narrow definition of regret is offered by several economic choice theories (Bell, 1982; Loomes & Sugden, 1982; Savage, 1951). In order to account for violations of the axioms of rational choice, these economic models conceptualized regret as a comparison between what one received and what one rejected. Although such a definition is suitable for contexts in which one might sacrifice a monetary gain in order to avoid experiencing subsequent regret, it fails to account for why some rejected alternatives elicit more regret than do other rejected alternatives. Research on counterfactual thinking and Norm Theory (Kahneman & Miller, 1986) in particular, has broadened this definition of regret. Alternative routes taken to the same outcome often produce very different counterfactuals that, in turn, elicit differential levels of regret. According to this work (e.g., Markman, Gavanski, Sherman, & McMullen, 1993; Mellers, Schwartz, Ho, & Ritov, 1997; Roese, 1997), outcomes are not evaluated in isolation but, rather, are compared to alternatives that might have, could have, or should have been. By considering imagined outcomes, the study of regret is no longer limited to an examination of the rejected alternatives whose outcomes are known. Rather, in order to feel regret, it is
now recognized that the foregone alternative need only be *imagined* (Gilovich & Medvec, 1995).

Although specific definitions have varied, researchers seem to agree that, at the core, regret results from a judgment involving a comparison between factual reality and some imagined counterfactual standard (Gilovich & Medvec, 1995). In order to *feel* regret one has to *think* about one’s choices and the consequences of those choices, in addition to what might have been obtained by making a different choice (Zeelenberg & Pieters, 2007). Accordingly, the current research will adopt a general definition where regret is defined as a cognitively-based, unpleasant emotion resulting from a desire to undo the current situation.

How Does Regret Differ From Other Emotions?

Regret is different from related other emotions such as anger, disappointment, sadness, or general negative affect (Mellers, 2000; Roseman et al., 1994; Zeelenberg, van Dijk, Manstead, et al, 1998). Economic models suggest that whereas regret occurs when one’s outcome is worse than the outcome one would have experienced had one chosen differently (Loomes and Sugden, 1982), disappointment occurs when one’s outcome is worse than the outcome one would have obtained with a different state of the world (Bell, 1985; Loomes & Sugden, 1986). That is, disappointment is experienced when the obtained outcome is worse than expected or hoped, whereas regret is experienced when one’s decision leads to an outcome that is worse than what would or might have happened had one acted differently.

While both disappointment and regret arise from some type of a counterfactual comparison, regret also includes a component of responsibility or self-blame for the
obtained outcome. Zeelenberg and colleagues (1998; Zeelenberg, van der Plight, &
deVries, 1996) argue that different emotions have distinct characteristics (i.e., appraisals,
experiential content, behavioral consequences) and that felt responsibility for a negative
decision outcome is a critical element that differentiates regret from other negative
emotions. Disappointment is considered to be relatively free of self-blame because the
outcome of the situation is considered to be beyond one’s control (Van Dijk &
Zeelenberg, 2002a, 2002b). For regret, however, evaluations are focused on the quality of
one’s decisions. That is, because one could have chosen a different option, one feels a
sense of self-blame or responsibility for causing the poor outcome (Conolly and
Zeelenberg, 2002). Thus, for instance, although one cannot feel regret about experiencing
rainy weather (i.e., because the occurrence of rain is beyond one’s control), one can still
feel disappointment about the fact that it is raining.

Similarly, Sugden (1985) considers self-blame and responsibility to be integral
parts of regret – wishing one had done something differently in addition to feeling self-
blame. According to Sugden, regret intensity depends upon both self-blame and decision
justification. Gilovich and Medvec (1995) also consider personal responsibility to be
central to the experience of regret, as their findings reveal that very few participants
report feeling regret over things that are beyond their control (see also Girotto, Legrenzi,
& Rizzo, 1991; Markman, Gavanski, Sherman, & McMullen, 1995; N’Gbala &
Branscombe, 1995). Moreover, Zeelenberg et al. (1998) demonstrated how manipulations
of responsibility exacerbated the experience of regret, and found that the experience of
regret correlated positively with felt responsibility (i.e., a tendency to provide internal
attributions), whereas the experience of disappointment positively correlated with a tendency to provide external attributions.

Zeelenberg and Pieters (1999) investigated consumer dissatisfaction by focusing on the behavioral consequences of regret and disappointment. Their findings showed that whereas regretful consumers tend to switch providers and prefer not to share their experience with others, disappointed consumers who expected more from the service tend to complain and share their bad experience with others. Additionally, Zeelenberg et al claimed that, in contrast to disappointment, regret induces a desire to correct a mistake, undo the event, and take advantage of second chances (Zeelenberg et al, 1998a, 1998b).

Regret For Changing the Status Quo Versus Maintaining the Status Quo

Early work on regret focused on developing theories that identified regret-eliciting variables (e.g., Bell, 1982; Connolly, Ordoñez, & Coughlan, 1997; Gilovich, & Medvec, 1994; Kahneman, & Miller, 1986; Landman, 1987; Loomes & Sugden, 1982; Ritov & Baron, 1995; Thaler, 1980; Tversky & Kahneman, 1981; Zeelenberg, Van dijk, & Manstead, 1998) with special attention devoted to examining whether regret is more likely to follow from active intervention than passive waiting. For instance, Kahneman and Tversky (1982) asked students to assess the amount of regret experienced by two investors in response to two hypothetical scenarios. Both of the investors lost $1,200 as a result of their decision. However, one investor chose to sell his stock and buy another stock, only to end up losing $1,200 (i.e., the initially owned stock would have garnered him $1,200), whereas the other investor held on to his stock after considering switching to another stock, but also ended up losing $1,200 (i.e., the other stock would have garnered him $1,200). When asked to predict who would experience more regret, 92%
indicated that the individual who lost money after switching his stocks would experience more regret than the individual who lost the same amount of money after deciding to retain his stock. This phenomenon, deemed the *action effect*, has proven to be robust (e.g., Byrne & McElaney, 2000; Connolly et al., 1997; Gilovich et al., 1995; Gleicher et al., 1990; Landman, 1987; Zeelenberg et al., 2002).

One of the commonly offered explanations for this effect derives from Norm Theory (Kahneman & Miller, 1986). Norm Theory asserts that one’s emotional response to an event is amplified if its causes are deemed to be abnormal as individuals have a tendency to react more strongly to events for which a different outcome could be easily imagined. Thus, dying in a plane crash after switching flights at the last moment is judged to be more “tragic” (and abnormal) than is dying in a plane crash when the flight had been booked for some time because it is easier to imagine the individual in the former case surviving if he or she had not switched flights. By the same token, outcomes that follow exceptional (abnormal) actions will elicit stronger reactions than outcomes that follow routine (normal) actions. With regard to the investor problem, Kahneman and Miller argue that because it is usually easier to imagine oneself abstaining from actions that one has carried out (normal) than carrying out actions that were not in fact performed (abnormal), regret elicited by changing the status quo should be experienced more intensely than should regret elicited by maintaining the status quo (Baron & Ritov, 1994; Landman, 1987, 1993; Miller & Taylor, 1995; Spranca, Minsk, & Baron, 1991).

Alternative explanations for the action effect are numerous. For instance, maintaining the status quo may simply be less salient than changing the status quo because non-occurrences lack informational value relative to occurrences (Fazio,

Alternatively, Weiner’s (1980) attribution theory of emotion predicts that more intense emotions should follow from changing the status quo rather than maintaining the status quo because of the clearer causal connections between antecedents and consequences in the former case.

Although the majority of these studies revealed that regrets elicited by changing the status quo were experienced more intensely than were regrets elicited by maintaining the status quo, subsequent research has questioned the generality of the action effect (e.g., Connolly & Reb, 2003; Hattiangadi, Medvec & Gilovich, 1995; Prentice & Koehler, 2003). For instance, after interviewing the parents of infants who died from Sudden Infant Death Syndrome (SIDS), Davis, Lehman, Wortman, Silver, and Thompson (1995) found that 66% of the parents most regretted their failures to act. Also, when Gilovich and Medvec (1995) asked respondents to indicate their greatest life regrets, regrets stemming from inactions were listed more often than were regrets stemming from actions. Similarly, another study conducted by Gilovich and Medvec (1995) revealed that maintaining the status quo elicited greater regret than did changing the status quo. The authors provided the following scenario:

Dave and Jim do not know each other, but both are enrolled at the same elite East Coast University. Both are only moderately satisfied where they are, and both are considering transferring to another prestigious school. Each agonizes over the decision, going back and forth thinking that he is going to stay and he will leave. They ultimately make different decisions: Dave opts to stay where he is and Jim decides to transfer. Suppose their
decisions turn out badly for both of them: Dave still doesn’t like it where he is and wishes he had transferred, and Jim doesn’t like his new environment and wishes that he had stayed. Who do you think would regret the decision the most upon learning that it was a mistake? Who do you think would regret the decision the most in the long run?

Interestingly, whereas 76% of participants believed that Jim would experience more regret in the short run, 63% of participants believed that Dave would experience more regret in the long run.

Gilovich and Medvec’s (1995) explanation for this effect focuses on how the experience of regret follows a systematic time course — a temporal pattern of regret. That is, although individuals experience more regret from changing the status quo in the short run, in the long run it is the maintaining of the status quo that hurts them the most. Over time, a number of psychological processes work to decrease the intensity of regrets due to actions taken and increase the intensity of regrets due to actions not taken. Among a multitude of factors, Gilovich and Medvec highlight an asymmetry in the extent to which individuals can engage in ameliorative behaviors for poor outcomes that result from changing the status quo versus maintaining it. Specifically, they argue that individuals are more likely to take steps to correct their regrettable actions than their regrettable inactions. For instance, when someone regrets their decision to marry a particular individual, they can take corrective steps by getting a divorce. Conversely, however, when someone fails to take action and thereby misses an opportunity to begin a potentially rewarding long-term relationship, there is little they can do but ruminate upon the fact that the individual is no longer available. In addition, Gilovich and Medvec
suggest that an individual’s memory regarding the forces and conditions that initially inhibited them from acting (e.g., lack of confidence) tend to fade over time, making it difficult for individuals to understand upon reflection why they failed to do something that they now believe they so easily could have done. Thus, without having a satisfying explanation for their failure to act, regret over inactions is intensified.

Subsequent work on the temporal pattern of regret revealed that in the long run individuals consistently report more inaction regrets than action regrets (e.g., Gilovich & Medvec, 1994; Gilovich, Wang, Regan, & Hishina, 2003). There are at least two possible explanations for this recurrent long-term inaction effect. First, incidents of maintaining the status quo may be more available in memory (cf. Zeigarnik, 1935) than are instances of changing the status quo and this may associate inactions more with regret. An alternative explanation, however, might be that there is in fact no difference between the number of action and inaction regrets available in memory but, rather, that instances of having maintained the status quo might be more easily retrieved (i.e., more accessible) than instances of having changed the status quo. Rajagopal, Raju, and Unnava (2006) explored whether this existing difference in retrieval between changing the status quo and maintaining it is due to either differential availability or differential accessibility. When given sufficient time to name their greatest long-term life regrets, participants listed equal numbers of action regrets and inaction regrets, suggesting that both types of regrets are equally available in memory. However, when participants were given a limited amount of time in which to list their long-term regrets, participants listed relatively more regrettable inactions, suggesting that long-term regrettable inactions are more accessible in memory
than are long-term regrettable actions. Interestingly, however, no significant difference was observed in the accessibility of short-term regrettable actions and inactions.

Although studies of long-term regrets consistently point toward the regret-eliciting power of status quo maintenance, studies examining short-term regrets reveal mixed results. While some have found that failed actions are regretted more intensely than failed inactions (e.g., Kahneman & Tversky, 1982), others have found no difference between these decision types in the short term (e.g., Gilovich & Medvec, 1994). For instance, Gilovich and Medvec (1994, Study 5) asked a sample of adults to recall their single most regrettable action and inaction both from the past week and from their entire lives. Later, participants were asked to indicate, for each time period, whether they regretted more changing the status quo or maintaining it. No significant difference was found for short-term regrets as only 53% of the participants reported regretting their actions more when focused on the last week. However, when looking back over their entire lives, 84% of the participants reported greater regret for what they failed to do.

More recently, Zeelenberg et al. (2002) sought to demonstrate how differences in elicited short-term regrets between actions and inactions may depend critically upon prior context, and to do so they focused on measuring regret for a series of decisions rather than an isolated decision. Specifically, they employed a scenario in which a soccer coach and his team lost a game. According to the results, the amount of regret participants believed the coach would experience depended not only upon whether he made a strategy change or failed to make a strategy change during the game that resulted in the loss, but also on whether the team had lost their previous game because of a failure to make the same strategy change or not. If the team had previously lost because of a failure to take
proper action and the coach chose once again to not make any changes (i.e., thereby
making the same mistake twice), participants reported more regret for a subsequently lost
game than if he did make a strategy change but still lost the game. Therefore, the variable
that most affected perceived regret was not decision type per se, but rather decision
justification (i.e., was the (in)action justified or not; see also Connolly & Zeelenberg,
2002). Similarly, Seta, McElroy, and Seta (2001) showed that the amount of regret that is
experienced following failed actions as opposed to inactions depends on how consistent
is the decision to act or not act with the decision-maker’s chronic orientation (i.e., action
versus state orientation). From the perspective of an action-oriented decision maker, for
instance, inactions are inconsistent and undesirable, and thus inactions are especially
regretted. Implicating the role of personal and situational goals, Roese, Hur, and
Pennington (1999) demonstrated how different regulatory focus orientations (i.e.,
promotion versus prevention) help determine whether an individual is more likely to
focus on actions as opposed to inactions when reflecting upon a negative outcome. These
authors found that promotion failures elicited regrets of inaction, whereas prevention
failures elicited regrets of action (see also Higgins, 1998).

Opportunity

Regret is a common emotional consequence of counterfactual thinking (Roese,
2005). Early on, counterfactual thinking was often conceptualized as a bias that interferes
with optimal decision-making (e.g., Gavanski & Wells, 1989; Gleicher et al., 1990;
Kahneman, 1995; Kahneman & Tversky, 1982; Kahneman & Varey, 1990; Landman,
1987; Macrae, Milne, & Griffiths, 1993; Sherman & McConnell, 1995). Later work,
however, focused more on its preparative benefits (e.g., Epstude & Roese, 2008; King &
Hicks, 2007; Markman et al., 1993; Markman & McMullen, 2003; Markman, McMullen, & Elizaga, 2008; Sanna, 1996; Roese, 1994). Essentially, interest shifted toward demonstrating how regret in particular, and counterfactual thinking more generally, plays a critical role in encouraging personal growth, healthy living, and learning.

In this context, a question that has arisen is how future opportunity perceptions influence regret intensity. Roese and Summerville (2005) assert that opportunity represents “… an open rather than a closed door to further action in the service of correction, advancement, and betterment, defined in terms of the individual’s perception of situational features or personal talents that enable such pursuit” (p. 1273). They argue that regret intensity should be strongest when the chances for corrective reaction are clearest, but will be reduced when there is little or no future opportunity for correction. When the circumstances are unchangeable, regret will be minimized through emotion regulation or dissonance reduction efforts.

To support their argument, Roese and Summerville (2005) reported the results of three studies. First, they conducted a meta-analysis of existing surveys of life regrets. Education, career, and romance were the top three life domains into which individuals’ biggest regrets fell. According to these authors, life domains that individuals regret most frequently are those that offer the greatest potential for change. For instance, they argue, education is the number one regret domain among Americans because in contemporary society, education is open to continual modification throughout life. It is a domain in which individuals see high opportunities for future improvement, as student aid programs and community colleges make education accessible to many socioeconomic groups.
Second, Roese and Summerville (2005) provided college students with a list of these 12 life domains. Out of these 12, they then asked students to select and write about a personal event that occurred in a high opportunity life domain, and a personal event that occurred in a low opportunity life domain where, importantly, Roese and Summerville defined opportunity in terms of degree of constraint. As described to the participants, an event that occurred in a high opportunity domain should be one where they remembered feeling free to make choices, whereas an event that occurred in a low opportunity domain should be one where they remembered feeling constrained in their ability to make choices. After writing about each life event, participants were asked to rate the intensity of regret they felt when they were thinking about each event. Consistent with Roese and Summerville’s conceptualization, students rated regrets experienced in high opportunity domains as being significantly more intense than regrets experienced in low opportunity domains.

Third, Roese and Summerville (2005) manipulated the degree to which a given domain (e.g., romantic relationships) was perceived as high versus low in opportunity, and then asked participants to rate the intensity of their own life regrets in that domain. Although the opportunity manipulation was successful, the results revealed no significant differences in regret intensity ratings within given life domains. Thus, Roese and Summerville (2005) concluded that the opportunity principle operates at the time the outcome was experienced, rather than framing the experience as high or low in opportunity during recollection.

From this perspective, then, regret is a hot cognition that draws attention to future opportunities for improvement (see also Markman & McMullen, 2003). Whether the
experience of regret is a result of a failed action or inaction, so long as there remains an opportunity for correction, the experience of regret will motivate individuals to learn from their mistakes and act upon those opportunities. If regret follows from the realization that one could have acted differently, then the experience of regret should lead one to attempt to attribute cause for a poor outcome. In so doing, one will be less likely to repeat the same mistake in the future (Markman et al., 1993; Roese, 1994, 1997).

In contrast, however, Beike et al. (2009) recently hypothesized and provided evidence suggesting that outcomes that are associated with perceptions of high past opportunity but low future opportunity (i.e., “lost” opportunities) are, in fact, regretted more intensely than outcomes that are associated with perceptions of high future opportunity. They define a lost opportunity as “…an undesired outcome that could have been avoided or prevented at the time of its occurrence (high past opportunity), but can no longer be remedied at the present time (low future opportunity)” (Beike et al, 2009, p. 388). According to the lost opportunity principle, regret should be intensified when an individual perceives that there was opportunity in the past to improve upon or prevent an undesired outcome but little opportunity now remains to take corrective action.

To provide empirical support, Beike et al. (2009) conducted three studies that demonstrated how the most intensely experienced regrets are, in fact, more apt to be the product of lost opportunities. Their first study investigated whether the most frequently regretted domains are indeed high in perceived future opportunity, as the future opportunity principle (Roese & Summerville, 2005) predicts. Accordingly, these researchers asked participants to think about each of the same 12 life domains employed by Roese and Summerville and to rate the extent to which they believed that: a) they had
an opportunity in the past to make changes in that domain; b) they will have an opportunity in the future to make changes in that domain; c) they presently regret their decisions in that domain; and d) they are satisfied with their decisions in that domain. Consistent with the lost opportunity principle, the results revealed that the most commonly regretted life domains were actually perceived as offering the least future opportunity and, moreover, that the most commonly regretted life domains were considered to offer the greatest past opportunities.

In the second study, Beike et al. (2009) manipulated perceived future opportunity via outcome repeatability (Markman et al., 1993; Markman & Weary, 1996; Sanna, 1997). Participants were asked to describe a regretted life event that was perceived to be potentially repeatable in the future (high future opportunity) and a life event that was not perceived to be potentially repeatable in the future (low future opportunity). The intensity of regret experienced following recollection of each life event was measured as well as their current feelings of closure about the event. Consistent with the premise of the lost opportunity principle, participants reported experiencing more regret after recalling the low future opportunity life event than they did after recalling the high future opportunity life event. Furthermore, the low opportunity life event evoked a lower sense of closure (i.e., continuing to think about the event) than did the high opportunity life event.

Beike et al.’s (2009) third study employed a non-student sample. Participants described the greatest regret of their lives and then responded to measures of regret, perceived opportunity, and closure. The results revealed that while perceived past opportunity was a significant predictor of regret intensity, perceived future opportunity was not, and sense of closure was negatively associated with regret intensity.
In contrast to Roese and Summerville’s (2005) future opportunity principle, Beike et al. (2009) found that the most commonly regretted life domains (i.e., career, education, and romance) were perceived to be less modifiable than were domains that are regretted less commonly (e.g., health, friends, and spirituality), and that people’s greatest life regrets were perceived to offer little or no future opportunity for corrective action. Furthermore a scenario study that manipulated future opportunity via outcome repeatability found that the same event outcome elicited more regret when the outcome was perceived to be non-repeatable than when it was perceived to be repeatable (see also Liberman & Förster, 2006).

Given their discrepant findings, the Roese and Summerville (2005) and Beike et al. (2009) papers advocate somewhat conflicting positions regarding the functions of regret. From the perspective of the future opportunity principle, when regret is elicited via counterfactual comparisons to a better world that offers opportunities for improvement, the experience of regret may well be worth the emotional pain. Indeed, it is frequently suggested that the function of regret is to help individuals learn from their mistakes (e.g., Markman et al., 1993; Roese, 1997; Zeelenberg, 1999). According to this reasoning, regret should help individuals identify the causes of their misfortunes and provide them with strategies that will help them avoid making those same mistakes again (see also Smallman & Roese, 2009). Thus, according to the future opportunity principle, regret should persist precisely in those situations that offer future opportunities for correction or improvement. On the other hand, the function of regret may be somewhat different if, as suggested by the lost opportunity principle, it is true that regret is more likely to follow from negative outcomes that individuals could have prevented in the past.
but can no longer correct. Once individuals realize that they no longer have future opportunities to correct their mistakes, regretting lost opportunities may instead serve a more general learning function that leads to compensatory behavior. In the service of this general learning function, then, regret should be felt most intensely when there is no opportunity to correct or improve upon actions taken in the past that may have contributed to a specific negative outcome.

Current Research

In an effort to reconcile the conflicting findings in the regret literature regarding changing the status quo versus maintaining it, Gilovich, Medvec and Kahneman (1998) concluded that different emotional profiles are associated with failed actions in comparison to failed inactions. Specifically, they noted that regrets stemming from failed actions appear to evoke more hot emotions (e.g., anger), whereas regrets stemming from failed inactions appear to evoke more wistful emotions (e.g., nostalgia). Extending their assertions, it is proposed here that these two distinct emotional profiles may also yield differential behavioral responses.

Gilovich and Medvec (1995) suggested that individuals tend to take more ameliorative action to deal with their failed actions as compared to their failed inactions. For instance, upon realizing that the computer that one has just bought does not run smoothly, one will try to return it back to the store from which it was purchased. In kind, when a negative outcome is blamed on a failed action and thereby elicits hot regret, individuals should feel compelled to try to undo or correct the outcome. Accordingly, it is argued here that the amount of regret experienced should be intensified when opportunities to correct the failed action (status quo change) are unavailable. This
argument is consistent with Beike et al.’s (2009) lost opportunity principle: failed actions that cannot be readdressed because opportunities to rectify them have been foreclosed should evoke the most intensely felt regrets. Metaphorically, such regrets represent “open wounds” because the opportunity for achieving closure has been precluded. Thus, it would seem that changes from the status quo should elicit more regret than maintenance of the status quo when opportunities for corrective action are unavailable, as the necessity to act (Oettingen & Kappes, 2009) is felt more strongly in the former than in the latter case.

However, different behavioral responses are expected to follow failed inactions because of the nature of the emotional profiles associated with them (Gilovich et al., 1998). That is, when status quo maintenance is blamed for producing a negative outcome, individuals appear less compelled to take immediate action because regrettable inactions typically correspond to missed opportunities to act that are no longer available, or are only construed as missed opportunities after some reflection (Gilovich & Medvec, 1995). But, when opportunities for corrective action are perceived to be available, then it may be the case that maintaining the status quo will elicit more regret than changing the status quo. Essentially, maintaining the status quo might be problematic for individuals who perceive that they will have a future opportunity to improve upon a similar prior outcome. When individuals maintain a default course of action that later results in a poor outcome, it is difficult for them to learn a lesson from their failure that could be translated into future corrective action. Thus, it is proposed here that awareness of future opportunities to encounter the same situation lowers perceivers’ feelings of confidence.
and certainty regarding their decision-making abilities in that specific domain, and these feelings serve to intensify the amount of regret experienced.

Past studies of (short-term) regret employing scenarios (e.g., Zeelenberg et al., 1998) or gambling paradigms (e.g., Mellers et al., 1997) have typically examined reactions to one-time decisions where no future opportunity for correction is perceived (for exceptions, see Liberman & Förster, 2006, and Markman et al., 1993). Although status quo maintenance has been found to elicit more intense feelings of regret in the long-term than has status quo modification, it is possible that status quo maintenance will also evoke more regret in the short-term if an opportunity for corrective action is perceived to be available. As Roese and Summerville (2005) argued, the experience of regret should motivate individuals to act upon missed opportunities should they arise again in the future. By subjecting these hypotheses to empirical test, the present research would be the first to examine the interactive effects of decision type (changing versus maintaining the status quo) and perceived future opportunity on the experience of regret.
STUDY 1

Study 1 used a scenario paradigm to examine the interactive effects of decision type and perceived future opportunity on the experience of regret. Perceived future opportunity was operationalized as outcome repeatability (Beike et al., 2009; Markman et al., 1993). Participants imagined themselves either changing the status quo or maintaining it in a manner that produced an undesired outcome. For some, the event scenario was described as one that could arise again (i.e., high future opportunity), whereas for others the scenario was described as one that could not arise again (i.e., low future opportunity). Participants then rated the intensity of regret they thought they would feel after experiencing the outcome.

The lost opportunity principle (Beike et al., 2009) suggests that participants should experience greater regret if the negative outcome is low in perceived future opportunity, whereas the future opportunity principle (Roese & Summerville, 2005) suggests that participants should experience greater regret if the outcome is high in perceived future opportunity. Moreover, when the moderating influence of decision type is taken into account, it is predicted that whereas the typical action effect in regret should obtain for low opportunity outcomes (e.g., “I could so easily have stuck with my initial choice…I shouldn’t have switched my answer”; e.g., Kruger, Wirtz, & Miller, 2005; Landman, 1987; Miller & Taylor, 1995), high opportunity outcomes should actually elicit more regret when the status quo is maintained (“Next time, I’m going to take action, rather than sit idly by”; Zeelenberg & Pieters, 2007).
Method

Participants

A total of 78 (44 male and 34 female) introductory psychology students at Ohio University were recruited in exchange for partial course credit.

Materials

Participants were presented with a scenario, adopted from Zeelenberg et al (2002), in which they imagined that they were the coach of a soccer team that had an upcoming match. The match was described as being either the final match of the season (low opportunity condition) or the second-to-last match of the season (high opportunity condition). Furthermore, they imagined that they either changed (status quo change condition) or did not change (status quo maintenance condition) the line-up of the team for this match. All participants then imagined that they lost the match 3-0. Following the scenario, participants responded to questions about regret (i.e., “How much regret would you feel following this outcome?”), disappointment, responsibility, the degree to which they had an opportunity to prevent the outcome in the past, and the perceived degree of opportunity to change and improve upon the outcome in the future on 9-point scales (1 = “none at all,” 9 = “very much”).

Design

Participants were randomly assigned to conditions of a 2 (Future Opportunity: low vs. high) X 2 (Decision Type: status quo change vs. status quo maintenance) between-subjects factorial design.
**Procedure**

On arrival, participants received a booklet containing all of the instructions and tasks that were relevant for their participation. Participants read the soccer match scenario and then indicated the extent to which they would experience regret, disappointment, and responsibility following the outcome, as well as the perceived degree to which they had the opportunity to prevent the outcome in the past and could change and improve upon the outcome in the future. After completing these measures, participants were debriefed and thanked for their participation.

**Results and Discussion**

Responses to the regret measure were subjected to a 2 (Decision Type) X 2 (Future Opportunity) ANOVA. Consistent with previous literature (e.g., Gilovich & Medvec, 1995), more regret was elicited by the scenario that described changing the status quo ($M = 6.73$) than by the scenario that described maintaining the status quo ($M = 5.76$), $F (1, 74) = 8.79, p < .01$. In addition, participants imagined feeling more regret in the low opportunity condition ($M = 6.67$) than in the high opportunity condition ($M = 5.87$), $F (1, 74) = 6.32, p < .01$. However, the predicted interaction effect was not obtained, $F < 1$. Similarly, participants reported feeling more personal responsibility for a negative outcome that resulted from changing the status quo ($M = 7.0$) than from a negative outcome that resulted from maintaining the status quo ($M = 6.4$), $F (1, 74) = 7.00, p = .01$, and more personal responsibility was reported for low opportunity outcomes ($M = 7.1$) than for high opportunity outcomes ($M = 6.4$), $F (1, 74) = 8.5, p < .01$. Also of note, greater past opportunity was perceived for the scenario that described changing the status quo ($M = 6.05$) than for the scenario that described maintaining the
status quo ($M = 5.11$), $F (1, 74) = 8.67, p < .01$, and participants perceived greater past opportunity to prevent a low opportunity outcome ($M = 6.10$) than they did to prevent a high opportunity outcome ($M = 5.10$), $F (1, 74) = 9.54, p < .01$.

Although the predicted interaction effect did not obtain, the main effect of future opportunity provides additional support for Beike et al.’s (2009) lost opportunity principle. Participants believed that they would experience more regret in a situation where future opportunities to take corrective action were foreclosed than they would feel in a situation where future opportunities to take corrective action remained available.
STUDY 2

Study 1 failed to find support for the predicted interaction between decision type and future opportunity, but it is possible that a scenario paradigm that asked participants to make judgments about a hypothetical outcome failed to elicit sufficient levels of motivation to allow for a strong test of the hypotheses (see Markman et al., 1993, for a similar argument). Study 2, in contrast, employed a more involving paradigm where participants made actual regret-eliciting decisions. Specifically, the Monty Hall “three doors problem” was adopted from Gilovich et al. (1995). As before, it was predicted that changing the status quo would be regretted more than maintaining the status quo under conditions of low opportunity, whereas maintaining the status quo would be regretted more than changing it under conditions of high opportunity.

Method

Participants

71 (38 males and 33 females) introductory psychology students at Ohio University participated in exchange for partial course credit.

Design

Participants were randomly assigned to the conditions of a 2 (Future Opportunity: low vs. high) X 2 (Decision Type: status quo change vs. status quo maintenance) between-subjects factorial design.

Procedure

Upon arrival, individual participants were greeted by an experimenter and paired with a confederate posing as another student. The pair was informed that the study was examining group decision-making and that together they would be playing a game called
“Let’s Make a Deal.” To manipulate future opportunity, half of the participants were told that they would be given a chance to replay the game regardless of the outcome they obtained in the first game (high opportunity condition), whereas the other half were told that they would only be playing the game once (low opportunity condition). It should be noted that all participants in the Gilovich et al. (1995) study believed that they would be playing the game once.

The experimenter then explained that the pair would be making a decision regarding which one of three boxes they should choose. Each box contained cards that displayed the names of the prizes, and participants were told that two of the boxes contained the name of a “modest” prize whereas only one box contained the name of a “grand” prize. During this initial decision stage, the confederate behaved passively and allowed the participant to make the selection. Next, the confederate and the participant (with chosen box in hand to create a sense of ownership; see Gilovich et al., 1995) were escorted to another lab where they were instructed to enter some background information into a “main computer.” While the pair entered their information, another experimenter switched the boxes in the first lab to ensure the proper outcome. The pair was then led back to the first lab and seated around a large table.

Based on pilot testing, the modest prizes were described to participants as including items such as an Ohio University bumper sticker, an Ohio University mug, and an Ohio University lanyard, whereas the grand prizes were described as including items such as an Ohio University T-shirt, tickets to a local movie theater, and an Ohio University sweatshirt. After being seated at the table, the experimenter opened one of the unchosen boxes to reveal a modest prize: an Ohio University mug. The pair was then
asked to make a second decision — whether to keep the initially chosen box or to exchange it for the remaining unchosen box. The experimenter explained to the pair that they had to reach a consensus in their decision because, depending on the outcome of their choice, they would each receive the same modest or grand prize. In addition, the experimenter pointed to a tape recorder and noted that their discussion would be recorded. The experimenter then left the room, requesting to be notified as soon as the pair reached a consensus decision.

The confederate’s role was to ensure that the final decision aligned with each participant’s assigned condition: status quo maintenance or status quo change. Care was taken to guide the participant in such a way that they would feel responsible for the outcome of the choice. To accomplish this, confederates were trained to follow certain guidelines. Initially, confederates held back in order to gain a sense of the participant’s inclinations. If the participant’s preference appeared to be consistent with the assigned choice condition, then the confederate went along with the participant’s decision after coaxing the participant to articulate their reasoning. However, if the participant’s initial decision did not match the assigned condition, the confederate was trained to use the Socratic Method in order to guide the participant to the desired decision. In particular, the confederate asked questions designed to elicit arguments consistent with the assigned choice. Questions designed to elicit common intuitions encouraged participants to stay (e.g., “Isn’t it 50-50 either way?”), whereas questions designed to elicit the correct solution (see Gilovich et al., 1995 for a detailed explanation of why switching is the correct choice) encouraged participants to switch (e.g., “Didn’t we have a 1 in 3 chance of picking the grand prize initially?”).
Once the pair reached an agreement, the experimenter was notified and the final choice was reported. The participant was then directed to open and reveal the contents of the unchosen box, which always contained a grand prize: a card for an Ohio University sweatshirt. Directly thereafter, the participant opened the chosen box, which always contained a modest prize: a card for an Ohio University bumper sticker. After the contents of the boxes were revealed, participants completed a questionnaire designed to ensure that they had been paying attention. Specifically, they were asked to indicate whether they had stayed with or switched from their initial choice, to describe the prize they would have received if they had chosen the other box, and to indicate whether or not they were expecting to play the game again. Next, participants rated how much regret, surprise, disappointment, and responsibility they felt about their outcome along 7-point scales ranging from 1 = “none at all” to 7 = “very much.” Additionally, along the same 7-point scales participants indicated the extent to which they felt they had an opportunity to change or modify their outcome in the future, and the extent to which they believed that they could have prevented the outcome from happening. After completing these measures, participants were debriefed and thanked for their participation.

Results

As in Study 1, responses to the regret measure were subjected to a 2 (Decision Type) X 2 (Future Opportunity) ANOVA (see Table 1). Although neither the Decision Type nor the Future Opportunity main effects were significant, both F$s < 1$, the predicted Decision Type X Future Opportunity interaction was obtained, $F(1, 67) = 9.65, p < .01$. As depicted in Figure 1, whereas low opportunity outcomes elicited more regret when the status quo was changed than when it was maintained, $F(1, 67) = 4.72, p < .05$, high
opportunity outcomes elicited more regret when the status quo was maintained than when it was changed, $F(1, 67) = 5.09, p < .05$.

Additional analyses were conducted to ensure that there was no difference in the amount of regret experienced by participants whose initial inclination was to stay with their first choice as compared to participants who had to be convinced to stay. Only 5 participants in the stay condition had to be convinced to stay. The analyses with the assumption of unequal variances revealed no significant difference in the amount of regret experienced by participants whose initial inclination was to stay ($M = 4.2$) as compared to those who were convinced to stay ($M = 5.2$), $t(35) = 1.11, p = .28$. On the other hand, only 4 participants in the switch condition wanted to switch all along, whereas 22 participants were initially inclined to stay but were later convinced to switch. For these participants, analyses with the assumption of unequal variances also revealed no significant difference in the amount of regret experienced by participants whose initial inclination was to switch ($M = 5.75$) as compared to those who were convinced to switch ($M = 4.44$), $t(29) = 1.36, p = .19$.

Discussion

The results of Study 2 suggest that the influence of perceived future opportunity on regret intensity is moderated by whether the undesired outcome results from maintaining the status quo or changing it. These findings are important because they suggest a possible reconciliation between the future opportunity principle advocated by Roese and Summerville (2005) and the lost opportunity principle forwarded by Beike et al. (2009).
It is interesting to consider how changing the status quo under conditions of low future opportunity and maintaining the status quo under conditions of high future opportunity may intensify regret because both conditions elicit a sense of “unfinished business,” or, lack of psychological closure (e.g., Beike et al., 2009). With regard to the former, Gilovich and Medvec (1995) have theorized that individuals are more likely to take ameliorative action to deal with their failed actions as compared to their failed inactions. Therefore, when a negative outcome is blamed on a failed action, individuals may feel compelled to try to undo or correct the outcome. Thus, as previously argued, when opportunities to correct failed actions are unavailable, the amount of regret experienced should be intensified.

On the other hand, several research findings suggest that maintaining the status quo can also engender perceptions of “openness” or “unfinished business.” When describing the temporal course of regret, Gilovich and Medvec (1995) noted that failures to act call to mind a wider range of imagined consequences than do failed actions. In turn, research on the “fan effect” in memory (e.g., Anderson & Reder, 1999) suggests that maintaining the status quo may create more retrieval routes by which memory for the regrettable event can be activated. Supporting this notion, instances of maintaining the status quo that result in negative outcomes are in fact better remembered (Savitsky, Medvec, & Gilovich, 1997) and more accessible in memory (Rajagopal et al., 2006) than are changes from the status quo that produce negative outcomes, and recent work by Leach and Plaks (2009) has demonstrated that instances of maintaining the status quo are represented more abstractly in memory (i.e., due to their wider range of consequences) than are instances of changing it (i.e., which involve commitment to a single course of
action; see also Trope and Liberman, 2003). If changing the status quo does in fact lead individuals to construe tasks and outcomes as “unfinished” or “incomplete” (Förster, Liberman, & Higgins, 2005; Zeigarnik, 1935), then perceptions of future opportunities may heighten the functionality of regretted inactions because individuals feel compelled to engage in corrective action as soon as they can in order to obtain closure on the prior outcome. In other words, perceived future opportunity may intensify regret within a context of status quo maintenance because the possibility of repeating an outcome serves as a reminder of how one’s failure to act produced a prior regrettable outcome.
STUDY 3

The results of Study 2 provided support for the hypothesized interactive influence of perceived future opportunity and decision type on regret intensity. Study 3 is intended to investigate a mechanism that potentially underlies this effect: self-certainty.

Research and theory suggest that the self-concept is affected by evaluations of one’s judgments following undesired decision outcomes, particularly when the outcome domain is important to the self (e.g., Baumgardner, 1990; Beattie, Baron, Hershey, & Spranca, 2006; Cervone, Jiwani, & Wood, 1991; Josephs, Larrick, Steele, & Nisbett, 1992; Larrick, 1993; Tesser, 1988; Verplanken & Holland, 2002). Thus, it is reasonable to expect that upon experiencing an undesirable decision outcome, an individual may interpret the outcome as an indictment of their decision-making abilities, thereby diminishing confidence in their abilities. Consequently, it is proposed here that regret will be intensified following a poor decision outcome to the extent that one believes that they are now less capable of rendering correct decisions in the future.

Self-certainty, broadly defined, is one’s sense of confidence about their general competence and abilities (e.g., Bandura, 1997; Clarkson, Tormala, DeSensi, & Wheeler, 2009; Griffin & Tversky, 1992; Gross et al, 1995; Tormala & Rucker, 2007). One factor that may influence feelings of self-certainty is affect. Individuals experience negative emotions following undesirable outcomes that are perceived to be threatening, and such emotions have been found to lead individuals to distort judgments about themselves more than judgments about others (Forgas & Bower, 1987; Garber & Hollon, 1980). Moreover, sad individuals evaluate their own performances less favorably than they evaluate the performances of others (Forgas & Bower, 1987; Roth & Rehm, 1980). Similarly,
clinically depressed individuals are more critical of themselves than of others (Beck, 1967, 1976). Thus, temporary mood appears to be an important determinant of one’s feelings of self-efficacy (Kavanagh & Bower, 1981).

Prior work suggests that perceived self-efficacy and negative mood affect each other bi-directionally. According to the affective priming view (e.g., Bower, 1983), upon experiencing a negative outcome a subset of mood-congruent memories is activated through an associative network, and spreading activation from the emotion node enhances the salience of mood-congruent memories. Feelings of self-efficacy diminish vis-à-vis the selective recall of past failures. Alternatively, according to the cognitive priming view (Higgins & King, 1980; Higgins, Rholes, & Jones, 1977; Rholes & Pryor, 1982) experienced failure will evoke both an affective state and a set of relevant cognitions regarding past failures. Through a process of spreading activation such cognitions will prime or cue other items in long-term memory that are associated with them, thereby increasing their accessibility.

According to Bandura (1982), self-efficacy judgments determine how individuals respond to difficult situations. Those who assess themselves as being unable to cope with such situations dwell on their personal weaknesses and perceive upcoming challenges as more difficult than they really are (Bandura, 1988a, 1988b; Beck, 1976; Lazarus & Folkman, 1984; Lazarus & Launier, 1978; Sarason, 1975), whereas individuals who believe in their capabilities remain efficient in complex decision making situations and increase their efforts when they face failures or setbacks (Bandura & Wood, 1989; Locke & Latham, 1990; Wood & Bandura, 1989). Outcomes that are interpreted as successful enhance one’s perceived capabilities, whereas those interpreted as failure tend to lower
them (Bandura, 1986; Bandura, 1988c; Cutrona & Troutman, 1986; Holohan & Holohan, 1987).

Of particular relevance to the present research, Sanna (1997) examined the moderating role of self-efficacy perceptions on counterfactual thinking. Previously, Boninger et al. (1994; Strathman, Gleicher, Boninger, & Edwards, 1994) had shown that thinking about the future has an ameliorative effect on negative affect following counterfactual thinking. Sanna (1997) extended this work by suggesting that in order to have this ameliorative effect, one needs to feel that they are capable of attaining better outcomes in the future (i.e., high self-efficacy). In support, results indicated that participants with high self-efficacy experienced more positive affect after generating upward (i.e., “it could have been better”) counterfactuals when an anagram task was described as repeatable than when it was described as non-repeatable. Individuals with low self-efficacy, on the other hand, experienced negative affect following the generation of counterfactuals whether the task had been described as either repeatable or non-repeatable.

Overall, a poor decision outcome threatens one’s self-worth because it implies that one is a less than competent decision-maker. Introspection, recall of past experiences, predictions of future performance, and other self-generated cognitions can all affect feelings of certainty. In the present work, it is hypothesized that the more that negative decision outcomes lower feelings of self-certainty, the more intense will be subsequently experienced feelings of regret. More specifically, it is predicted that within a context where future opportunities are perceived to be available, failed decision outcomes stemming from a maintaining of the status quo will lower feelings of self-
certainty to a greater extent than will failed decision outcomes stemming from a change in the status quo. Conversely, within a context where future opportunities are perceived to be foreclosed, failed decision outcomes stemming from a change in the status quo will lower feelings of self-certainty to a greater extent than will failed decision outcomes stemming from maintenance of the status quo.

Hypotheses

_Hypothesis 1:_ Following a regrettable outcome, participants will experience more regret from changing the status quo than from maintaining it under conditions of low future opportunity. On the other hand, participants will experience more regret from maintaining the status quo than changing it under conditions of high future opportunity.

When regret is measured after learning that a better outcome could have been obtained had one acted differently, it is expected that the results will replicate the interaction pattern found in Study 2.

_Hypothesis 2:_ The underlying role of certainty in accounting for the interactive effect of decision type and future opportunity on regret intensity will be assessed. It is hypothesized that under conditions of low future opportunity, participants who change the status quo will feel relatively less certain, and as a consequence they will experience more regret. Conversely, under conditions of high future opportunity, participants who maintain the status quo will feel relatively less certain, and as a consequence they will experience more regret.
Although the correct solution to the Monty Hall problem is to switch boxes, individuals tend to intuit that they should stay with their originally chosen box. With only two remaining unopened boxes, individuals assume that there is a 50-50 chance of winning the grand prize. Thus, when there seems to be no good reason to change, individuals exhibit a tendency to maintain the status quo (e.g., Kahneman, Knetsch, & Thaler, 1991; Ritov & Baron, 1992; Samuelson, & Zeckhauser, 1988; Spranca, Mink, & Baron, 1991).

There are differences in the construal of the feedback individuals receive as a result of their decisions. Undesirable outcomes will have different implications for individuals who change the status quo as opposed to those who maintain it, depending on their decision strategy. When a decision turns out sub-optimally as a result of maintaining the status quo, the feedback received is ambiguous because status quo maintenance is less salient than is status quo modification. Accordingly, when participants receive a modest as opposed to a large prize after maintaining the status quo, the perceived efficacy of their judgment strategy is called into question. By sticking to their originally chosen box, participants probably think that they are choosing the safest option. However, despite the perceived normality of their decision to maintain the status quo, their decision outcome turns out worse than they would have liked.

Importantly, failed outcomes stemming from status quo maintenance are particularly problematic for individuals who perceive future opportunities (i.e., to play the game again). Such individuals will have difficulty understanding the link between their undesired outcome and their decision strategy – they may not feel that they have learned anything useful from their prior decision experience. The prospect of an
additional opportunity to play the game may be distressing because it is unclear what decision to make next time. Feelings of uncertainty should be most pronounced under high opportunity conditions because individuals are aware that they will encounter the same ambiguous situation in the future.

In contrast, when a decision turns out less than optimally for those who changed the status quo, the feedback received will be relatively informative (i.e., “do not repeat the same mistake twice”). In this case, feelings of uncertainty should be most pronounced when the outcome is non-repeatable. Changing the status quo is more salient than maintaining it, and so it is easier for individuals who change the status quo to understand the link between their decision strategy and the subsequent undesired decision outcome. Importantly, comprehending the link between their decision and the resulting undesired outcome should be particularly troubling when future opportunities are foreclosed, thereby heightening their sense of doubt about their capabilities as a decision maker. When an outcome is non-repeatable, one is denied the opportunity to enhance feelings of decision-making self-efficacy. To the extent that this set of circumstances lowers self-certainty, feelings of regret should intensify.

Method

Participants

Eighty (37 male, 45 female) introductory psychology students at Ohio University were recruited in exchange for partial course credit.
**Design**

Participants were randomly assigned to the conditions of a 2 (Future Opportunity: low vs. high) X 2 (Decision Type: status quo change vs. status quo maintenance) between-subjects factorial design.

**Materials**

*SC-IAT measure of uncertainty.* Because cognitions may not always be accessible to conscious introspection, numerous indirect techniques have been developed to measure individual differences in attitudes, self-esteem, and stereotyping (e.g., DeHouwer & Eelen, 1998; Greenwald & Farnham, 2000; Fazio, Jackson, Dunton, & Williams, 1995) and several of these association-based measures are frequently used (for a review, see Fazio & Olson, 2003). The Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998) was employed here because of its relative ease of administration.

Initially, the IAT was used to study implicit attitudes by assessing associations between target objects and attributes along a good-bad dimension (e.g., Fazio & Olson, 2003). Recently, associations between self (target concept) and behavioral attributes (i.e., “shy”-“non-shy”, “angry”-“self-controlled”) have also been investigated (Asendorpf, Banse, & Mucke, 2002; Egloff & Schmukle, 2002). The main assumption of IAT measures is that they provide unobtrusive access to associations between the self and the representation of such behaviors.

The traditional IAT is limited to measuring the relative strengths of pairs of associations rather than the absolute strength of such associations. Therefore, it requires the use of complementary pairs of categories such as positive-negative, self-other, male-female, young-old, black-white, and so forth (Greenwald & Farnham, 2000). However,
this feature becomes a limitation when one wants to measure evaluative associations within a single target concept. For instance, to measure self-esteem with a traditional IAT, researchers examine the positive/negative associations between “self” with respect to an unspecified “other” category (or sometimes “me” versus “not me”). In contrast, a recent approach to measuring self-esteem employing the Single Category IAT (SC-IAT) has measured evaluative associations with the self with no complimentary category (Karpinski, 2004). The SC-IAT becomes useful when there is no complimentary category or when one is interested in an absolute measure (cf. Blanton & Jaccard, 2006; Blanton, Jaccard, Gonzales, & Christie, 2006; De Houwer, 2002; Penke Eichstaedt, & Asendorpf, 2006). Thus, for instance, one can assess the category “Jewish” as positively versus negatively valenced without the use of a complimentary category (e.g., “Islamic”).

In the current study, the SC-IAT measure of uncertainty was administered on a computer running Inquisit 3, and described to participants as a sorting task (Karpinski & Steinman, 2006). Accordingly, participants were asked to categorize words as quickly and as accurately as possible by pressing one of two labeled keys (“D” and “K”). The certainty dimension was labeled as “Certainty” and “Uncertainty,” and the target category was labeled “Self.” Four (un)certainty words was used for each of the (un)certainty dimensions, loosely adopted from an uncertainty accessibility measure employed by Wichman, Brunner, and Weary (2008) (Uncertainty: “doubt,” “baffled,” “puzzled,” “confused”; Certainty: “sure,” “decided,” “confident,” “clear”). Self words consisted of four words related to self (“my,” “me,” “mine,” “myself”). All words were presented in lower case letters, and selected randomly with replacement. Regarding the effects of the number of exemplars used in the target and attribute categories, Greenwald and
colleagues (1998) indicated that high quality representation of a category is more important than the length of the exemplar list. Thus, stimulus sets of 25 items produce results equivalent to those produced by a set of 5 items. Furthermore, Nosek and colleagues (2005) showed that even when fewer than four stimulus items for each category are employed, task reliability was achieved. Additionally, empirical evidence indicates that the use of 20 trials in the first set of each combined pairing and 40 trials in the second set of each combined pairing yields good psychometric properties (Greenwald et al., 1998; Nosek, Grenwald, & Banaji, 2005), and no clear evidence exists to suggest that using more trials carries any additional benefits.

Following 24 trials where participants discriminated between certainty and uncertainty words (see Table 2), the uncertainty SC-IAT occurred in two stages, where the order of each stage was counterbalanced. Each stage consisted of 24 practice trials followed by 48 test trials. In the first stage (Certainty + self), certainty-related words and self-related words were categorized on the “D” key, and uncertainty-related words were categorized on the “K” key. In the second stage (Uncertainty + Self), uncertainty-related words and self-related words were categorized on the “D” key, and certainty-related words were categorized on the “K” key (see Table 2).

Each block of trials were preceded by a set of instructions regarding the dimensions of the categorization task and the correct key responses. Each stimulus word appeared in the center of the screen. Category reminder labels were positioned on the upper right and upper left corners of the screen. Each stimulus word remained on the screen until the participant responded. If the participant did not respond within 1,500ms, a reminder message appeared on the screen asking them to respond more quickly.
Following each response, feedback was provided regarding the accuracy of their responses. The computer recorded the elapsed time between the start of each stimulus presentation and the correct response.

Explicit measures of uncertainty. Participants next completed paper-and-pencil versions of the Judgmental Self-Doubt scale (Mirels, Greblo, & Dean, 2002), Causal Uncertainty Scale (Weary & Edwards, 1994), and the Self-doubt Scale (Oleson, Poehlmann, Yost, Lynch, & Arkin, 2000 (See Appendix). Nosek and colleagues (2005) systematically varied the presentation order of three implicit (IAT) and three explicit measures. Their results suggest that the order of implicit and explicit measures does not affect the relationship between the implicit and explicit measures. In the current study, however, participants completed the explicit measures only after they complete the uncertainty SC-IAT.

For the Judgmental Self-Doubt Scale (2001), participants were asked to complete a questionnaire consisting of 19 items. The items were rated on a seven point Likert type scale ranging from -3 (Strongly Disagree) to +3 (Strongly Agree). The Causal Uncertainty Scale (1994) consisted of 14 items where participants were instructed to indicate the degree to which they agreed with each item on a 6-point scale (1 = Strongly Disagree, 6 = Strongly Agree). Participants’ score were then calculated by summing across each of the individual items. Finally, participants responded to the Self-Doubt Scale (2000), where items were rated on a 6-point Likert-type scale ranging from 1 (Strongly Disagree) to 6 (Strongly Agree).
Procedure

The procedures closely mirrored those followed in Study 2. After completing the set of post-decisional affect measures, an implicit measure of uncertainty—the Single Category Implicit Association Test (SC-IAT) measure of uncertainty—was administered on a computer running Inquisit 3. Following administration of the implicit measure, explicit measures of doubt and uncertainty were administered. After completing these measures, participants were fully debriefed and thanked for their participation.

Results

Hypothesis 1: Interactive effect of perceived future opportunity and status quo maintenance on regret. This hypothesis was examined by performing a 2 (Decision Type) X 2 (Future Opportunity) ANOVA on the amount of regret experienced. Neither the Decision Type nor the Future Opportunity main effects were significant, both Fs < 1, whereas the predicted Decision Type X Future Opportunity interaction was significant, F (1, 82) = 7.53, p < .01 (See Table 3). The Decision Type X Future Opportunity interaction was further analyzed using a simple main effects analysis. Accordingly, low opportunity outcomes elicited more regret when the status quo was changed than it was maintained, F (1, 78) = 8.88, p < .01. Furthermore, when the status quo was maintained, high opportunity outcomes were regretted significantly more than the low opportunity outcomes, F (1, 78) = 3.54, p < .05 (see Figure 2).

Additional analysis was conducted to demonstrate that there was no significant difference in the amount regret experienced when comparing people who initially wanted to change their original choice (M = 7.12) to people who were convinced to change it (M = 7.00), F (1, 30) = .009, p=.92. There were only 7 participants in the switch condition.
who wanted to switch all long. On the other hand, among the people who stayed with their initial choice, no participant indicated that they originally wanted to switch from the initial decision. Therefore, no further analysis was conducted. Overall, the analysis revealed no significant difference in the amount of regret experienced by participants who acted along with their initial inclination ($M = 6.24$) as compared to those who were convinced to act in a certain way ($M = 7.12$), $F (1, 64) = 1.27, p = .27$.

**Hypothesis 2:** The underlying role of certainty in accounting for the interactive effect of decision type and future opportunity on regret intensity. **SC-IAT Data reduction and scoring.** Self certainty variable (D) was created by using the SCIAT responses. IAT scores were computed using the new D-score algorithm for IAT data (Greenwald, Nosek, & Banaji, 2003). $D$ was computed as the difference in average response latency between the IAT’s two combined tasks (i.e., Certainty + Self, Uncertainty + Self) divided by an “inclusive” standard deviation of participant response latencies in the two combined tasks. According to these suggested scoring procedures, trials greater than 10,000msec were deleted. Also, participants for whom more than 10% of the trials have latencies less than 300msec were deleted. Next, the “inclusive” standard deviation for all trials in the Combined Practice (Block 2) and the Reversed Combine Practice (Block 4) blocks were computed. Similarly, the same computation was performed for the Combined Test (Block 5) and Reversed Combine Test (Block 3) blocks. The mean latencies for each block (2, 3, 4, and 5) will be calculated such that two mean differences were computed ($\text{Mean}_{\text{Block 4}} - \text{Mean}_{\text{Block 2}}$) and ($\text{Mean}_{\text{Block 5}} - \text{Mean}_{\text{Block 3}}$). Next, each difference score was divided by its associated “inclusive” standard deviation. Finally, $D$ was computed as the equal
weight average of the two resulting ratios. Thus, higher SC-IAT \( D \) scores indicate more certainty than uncertainty associations with self.

A 2 X 2 between-subjects multivariate analysis of variance was performed on two dependent variables: D and regret. Independent variables were decision type (status quo maintenance and status quo change) and perceived future opportunity (opportunity and no opportunity). With the use of Wilk’s criterion, there was a statistically significant interaction effect on the combined dependent variables \( F(2, 71) = 6.36, p < .01 \). When the results for the dependent variables were considered separately, the interaction effect was significant with regards to the experience of regret, as mentioned above. Furthermore, with regards to the impact of decision type and perceived future opportunities on D, computed by using SCIAT scores, the results revealed a marginally significant interaction effect \( F(1, 76) = 3.64, p = .06 \), and a marginally significant main effect for perceived opportunity, \( F(1, 76) = 3.66, p = .06 \) (see Figure 3). Although the analysis did not reach statistical significance, the means were in the predicted direction. That is, as predicted, participants experienced lower self-certainty under repeatable status quo maintenance condition.

Present study sought to examine whether self certainty mediated the interactive effect of perceived future opportunity and decision type in experience of regret. Mediation requires a strong relationship between mediator and dependent variable (Baron & Kenny, 1986), but results revealed a marginally significant relationship between regret and the mediation variable D, only when the outcome is repeatable, \( r(34) = .33, p = .06 \). Thus, by the logic of the meditational analysis in Baron and Kenny, self-uncertainty
cannot mediate the interactive effect of decision type and perceive opportunity in experience of regret.

Relationship between Implicit and Explicit Measures of Self-Certainty. In these data, no evidence of a correlation was found between the self-uncertainty SCIAT and explicit measures of self-uncertainty (see Table 4). However, only when the status-quo is changed, there seems to be a significant negative relationship between Causal Uncertainty Scale and self-uncertainty SCIAT, $r_{(43)} = -.35, p = .02$.

Discussion

The current study sought to replicate and extend the findings of Study 2. Essentially, to further investigate the underlying mechanism by which decision type and perceived opportunity interactively affect the amount of regret experienced, Study 3 aimed to test the mediating role of feelings of self-uncertainty.

The major result of the current study was the successful replication of the previously reported interaction effect. That is, changing the status quo was regretted more than maintaining it under the conditions of low future opportunity. This important finding is consistent with the existing literature where the amount of regret experienced has been investigated following one-time decisions where no future opportunity for correction is perceived. Moreover, consistent with the findings of Study 2, participants who maintained status quo reported experiencing more regret under conditions of high future opportunity as compared to low future opportunity.

It was also hypothesized that self-uncertainty is the underlying factor responsible for the obtained interaction effect. Although the results did not reach statistical significance, SCIAT as an implicit measure of self-uncertainty provides some interesting
insight about how self uncertainty changed under the conditions where regret experienced the most. That is, with a marginal significance, the results suggest that participants experienced a decrease in their self confidence in those conditions where they experienced more regret (i.e., status quo maintenance under high perceived opportunity).

It is interesting to note that there was no evidence of correlation between SCIAT measure of uncertainty and the explicit measures of self-certainty. However, these somewhat surprising results might be due to the nature of the measures that were used. In other words, the explicit measures of self-uncertainty (i.e., judgmental self doubt, causal self-uncertainty, and self doubt scales) were significantly related to one another, because they are considered to be the dispositional measures of uncertainty, whereas SCIAT is a situational measure of uncertainty. In that regard, it should not be so surprising not to find relationship between these dispositional measures and the situational measure of self-uncertainty. It is important to distinguish the use of dispositional and situational measures of self-uncertainty in predicting relevant outcomes. Thus, further research is needed to shed light on this issue to be able to draw compelling conclusions regarding their role in the experience of regret.
GENERAL DISCUSSION

Recent research in regret literature, examining the moderating role of perceived opportunity, has yielded conflicting results. Roese and Summerville (2005) argue that conditions that enhance perceptions of future opportunities should elicit the most intensely felt regrets, whereas Beike et al. (2009) argue that it is the perception of lost opportunities (i.e., high past but low future) that elicit the most intensely felt regrets. Thus, the main purpose of the current project was to offer a resolution to these conflicting positions. With this goal in mind, three studies were conducted to demonstrate that the effect of perception of future opportunities change depending on the nature of decision type (i.e., changing the status quo vs. maintaining the status quo). After all, regret literature consist of numerous studies documenting how (psychologically) people react differently to negative outcomes resulting from maintaining the status quo vs. changing it. People not only place importance on the negative outcomes they obtained, but also place importance on how they obtained these negative outcomes. It was, therefore, hypothesized that perception of future opportunities will change depending on whether the negative outcome stems from changing or maintaining the status quo.

Study 1 investigated the interactive effect of decision type and perceived opportunity on regret intensity by adopting a scenario paradigm. Results of Study 1 demonstrated that the amount of regret experienced intensified in situations where future opportunities to take corrective action were no longer available. Thus, study 1 provided partial support for the lost opportunity principle.

Due to the possible limitations of a scenario paradigm, Study 2 was conducted by adopting a more involving paradigm in which participants were required to make actual
regret-eliciting decisions. Consistent with the predictions, changing the status quo was regretted more than maintaining it under the conditions of low opportunity, whereas maintaining the status quo was regretted more than changing it under the conditions of high opportunity.

To further investigate the underlying mechanism in the interactive effect of decision type and perceived opportunity on regret intensity, Study-3 was conducted. In addition to the attempt to replicate the previously obtained interaction effect, Study 3 sought evidence whether self-uncertainty about one’s judgmental abilities is responsible for the obtained interactive results. The study clearly replicated the previous findings which demonstrated that amount of regret experienced changed as a function of both decision type (i.e., maintaining status quo vs. changing it) and perceived future opportunity. Additional analyses suggest that the mechanism of self-uncertainty at present does not statistically mediate the interactive effects of decision type and perceived opportunity on experience of regret. However, it is possible that a more sensitive measure based on a well-defined construct might detect significant results.

Taken all together, the contribution of this project can be appraised by its unique methodological contribution as well as its goal to offer a resolution to the conflicting results in the literature. Typically, in regret research the vignette paradigms have been used where (uninvolved) participants make inferences about a protagonist after reading hypothetical scenarios. These past studies essentially examine experience of regret for one-time decisions, where no future opportunity for correction is perceived. However, for the current project a more involving paradigm has been adopted where participants were challenged with an actual decision making situation involving the self. By activating the
self-related motives, this paradigm allowed us to examine the experience of regret with regard to the perception of future opportunities. Although the Roese and Summerville (2005) and Beike et al. (2009) papers advocate somewhat conflicting positions regarding the function of regret, with this unique paradigm the current project was able to demonstrate the specific conditions under which Roese and Summerville (2005) and Beike et al. (2009) papers’ assertions might be correct.

In many ways the results of the current project are consistent with earlier research. The implication of the findings is that, at least psychologically, some failures are perceived to be more painful than others. Uniquely, current findings suggest that merely thinking about future opportunities do not necessarily have ameliorative effect on failures. In fact, the present research is first to demonstrate that thinking about future opportunities might have an adverse effect under certain conditions (i.e., maintaining status quo under high future opportunity). The key assumption in this account is that repeatability of an event (i.e., perceived future opportunity) induces the goal of improving upon one’s failures. This assumption is consistent with Roese and Summerville’s argument, which states that regret persists when there is future opportunity. However, taking Roese and Summerville’s claim a step further, the key argument in the current project is that having future opportunities is regretful only for those people who haven’t been able to learn from their past failures.

Past research points out an asymmetry in the outcome feedback one receives following status quo change vs. status quo maintenance (i.e., actions tend to be more salient than inactions, which might engender a bias in drawing a causal link between outcome and action taken). People’s causal judgments can be influenced by the salience
of their actions such that it might be easier to form contingency between the act of changing the status quo and a poor outcome. In view of that, when the poor outcome is due to status quo maintenance, the lesson to be learned may not be as clear as one would have received following status quo change. Because one hasn’t been able to learn from a past failure, as a consequence, the amount of regret experienced intensifies under those conditions where the person expects to encounter the same situation in the future. It is those people who were not able to identify the possible causes of their past failures, will regret more under the conditions of future opportunity, simply because they are not prepared for the next time (i.e., not knowing how things could have been avoided).

On the other hand, consistent with the arguments made by Beike et al., the typical action effect was observed under conditions of low future opportunity. It is believed that this result can also be traced back to drawing causal contingency between an action (i.e., changing the status quo) and a poor outcome by extrapolating on the work of past research suggesting that actions are more salient. The frustrating recriminations following a status quo change (e.g., I brought it to myself) might make the poor outcome linked to the decision of acting and hence form seemingly cause-effect relations between poor outcome and decision of changing the status quo. Consequently, following a poor outcome due to status quo change, the person sees the failure an error almost did not happen (i.e., initially holding the right choice) and thus the frustration associated with this conclusion might make the person draw the wrong causal connection between the decision (i.e., status quo change) and the poor outcome (e.g., “the gods are punishing me for my impulsiveness… If I didn’t change my lane in the grocery store, I would have been on my way home by now”). As a result, consistent with Beike et al.’s arguments, the
amount of regret experienced will be intensified under those conditions where the
person realizes his mistake but can no longer correct it (i.e., low future opportunity).

In a more general context, our results suggest that people experience regret
significantly more under these two conditions (i.e., status quo maintenance under high
opportunity and status quo change under low future opportunity) as these are the exact
conditions that people can not justify their decisions. This implication is congruent with
Connolly and Zeelenberg’s Decision Justification Theory (2002). Decision justification
theory (2002) suggests two components of regret, one of which refers to the feelings of
self-blame that follows from making a poor decision, whereas the second component is
associated with the comparative evaluation of the outcome. In view of that, not being able
to explain a past failure yet knowing that one will face the same situation in the future,
intensifies the amount of regret one experiences. By the same token, an unjustifiable
mistake that cannot be corrected in the future seems to be equally regretful for the person
who is reminiscing over the past.

Extending these assertions, at an intrapersonal level, Study 3 sought to understand
the psychological mechanisms that underlie the experience of regret under these two
conditions. As a result of the self-blame experienced, it is believed that, one will doubt
about one’s judgmental capabilities as a decision maker. This self-uncertainty will in turn
intensify the amount of regret one experiences under these two conditions (i.e., status quo
maintenance under high future opportunity and status quo change under low future
opportunity). Essentially, Study 3 aimed to test only the last prediction on this sequence.
That is, Study 3 adopted an intrapersonal level to test the predictions by focusing on the
degree of uncertainty one has regarding his judgmental capabilities. Thus, the results and
implications of Study 3 should be viewed with regards to these sequence-based predictions, and where self-uncertainty stands in that sequence. Because Study 3 adopted a more intrapersonal perspective, its results are only limited to whether self-certainty is the underlying mechanism or not. The reason why its results fell short of our predictions needs to be addressed with caution. Thus, there are a couple of important distinctions that needs to be made in order to draw valid conclusions.

First of all, the main predictions of the entire project regarding the underlying mechanism of regret needs to be differentiated from the more remote predictions of Study 3, which adopt a more intrapersonal level. Uncertainty about one’s judgmental capabilities as a decision maker is a remote prediction with respect to the overall project’s arguments. Therefore, future studies need to be conducted to test the main underlying mechanism of regret at a more external level (i.e., differential feedback received following status quo change versus maintenance). It is possible that people who did not learn from their past failures experience regret under repeatable conditions without reflecting on their judgmental capabilities.

Additionally, a follow-up study needs to be conducted to explain the non-significant results of Study 3 with regards to the mediation analysis that explored the role of self uncertainty in the experience of regret. Although at present, the results of Study 3 fell short in explaining the underlying mechanism of the obtained results, it still provides some initial evidence of how people might be internalizing a failure under repeatable conditions. That is, it turns out to be that under certain conditions (i.e., when people perceive future opportunities following status quo maintenance), people might in fact be experiencing less certainty about their capabilities. Thus, it is important to follow up on
this research to continue exploring the intrapersonal aspects of regret to have a better understanding of the interaction between decision type and perceptions of future opportunities.

Specifically, future research at the intrapersonal level can help us to identify whether it is the construct of self-uncertainty itself or the measure of self-uncertainty that was responsible for the obtained non-significant results. In that regard the results of Study 3 are at present inconclusive. Findings from SCIAT appear to be promising, but its construct validity needs to be established in order to be able to draw conclusions. Typically this is done by correlating IAT measures with some explicit measures. However, the literature has numerous examples where IAT does not correlate with the explicit measures. So, having no evidence of correlation in Study 3 may be due to the fact that the explicit measures of uncertainty might be tapping on a different aspect of self-uncertainty. But, still a future study is needed in which appropriately chosen self-uncertainty measures will be used in an attempt to validate SCIAT.

Finally, it is worth mentioning that this unique finding related to status quo maintenance might be limited to the nature of the decision-making task used in the current project—Monty Hall paradigm. Thus, in future research, it might be helpful to test the generalizability of the obtained interaction effects by adopting different decision making tasks than Monty Hall paradigm. Because in Monty Hall paradigm, to begin with, all the boxes looked identical so that participants had no reason to choose one box over others except their gut feelings. When presented with the option of staying with their originally chosen box or trading it with the unopened box, participants reported having a 50-50 chance of winning the grand prize and further indicating that they have no good
reason to change their initial decision. As a result, although the correct solution to the Monty Hall problem is to switch boxes, majority of the participants tended to stay with their originally chosen box. It is possible that the decision about the status quo (i.e., keeping vs. changing it) in the Monty Hall paradigm might actually be perceived by the participants as sticking to one’s *first instincts* vs. moving away from those instincts. Thus, they might have stayed with their initial choice simply because they did not want to deviate from their initial gut feelings.

Prior research demonstrates that people have a tendency to overestimate the effectiveness of sticking with a first instinct even in the face of subsequently received information that questions the prudence of that initial choice (see Kruger et al. (2005) for a detailed discussion). Thus, the reason for people to experience regret when they maintained the status quo under high opportunity conditions might be due to the fact that they are in fact experiencing the dilemma of sticking versus switching from first instincts rather than having a simple decision of keeping versus changing the status quo. This situation is problematic especially for those people under future opportunity condition, because they know that they will encounter a similar situation in the future. Furthermore, if the tendency to stick to the first instincts is as strong as it is claimed by past research, then the amount of regret experienced should be intensified. The lesson to be learned following a failed outcome due to sticking to one’s first instinct might not help the person to figure out how to avoid a similar failure for the next time. The fact that intuitions can sometimes fail us does not mean that we should not use them. People who do not know how to react next time around might not benefit the ameliorative effect of future
opportunities, because results of a previous failure stemming from sticking to gut feelings would not be informative enough to prepare the person for the next time.

In conclusion, the data for the current project provides intriguing results. It provides evidence for the interactive influence of future opportunity and decision type on regret intensity. Thus, it offers a resolution to seemingly conflicting results in regret literature. At present, current research is limited in its ability to make statements on the underlying mechanism explaining the obtained effects. The findings from current project are still in its infancy, and should be treated accordingly. Thus, it is imperative for future research to continue the work of this exciting step in the direction of a greater understanding of the underlying mechanisms of experience of regret.
REFERENCES


Table 1 *Interacting Effects of Error Type and Outcome Repeatability in Study 2*

<table>
<thead>
<tr>
<th></th>
<th>Actions</th>
<th>Regret Type</th>
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<td></td>
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<td>Non-repeatable</td>
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<td></td>
<td>M</td>
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<td>M</td>
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<td>3.94</td>
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<td>Responsibility</td>
<td>4.38</td>
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Table 2 Single Category IAT for uncertainty: Task sequence

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<tr>
<th>Block</th>
<th># of trials</th>
<th>Task</th>
<th>Response key Assignment</th>
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<tbody>
<tr>
<td>1</td>
<td>24</td>
<td>Certainty discrimination</td>
<td>Certainty</td>
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<tr>
<td>2</td>
<td>24</td>
<td>Initial combined task (practice)</td>
<td>Certainty + Self</td>
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<tr>
<td>3</td>
<td>48</td>
<td>Initial combined task (test)</td>
<td>Certainty + Self</td>
</tr>
<tr>
<td>4</td>
<td>24</td>
<td>Reversed combined task (practice)</td>
<td>Certainty</td>
</tr>
<tr>
<td>5</td>
<td>48</td>
<td>Reversed combined task (test)</td>
<td>Certainty</td>
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Table 3  *Interacting effects of decision type and outcome repeatability in Study 3*

<table>
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<tr>
<th>Decision Type</th>
<th>Status quo change</th>
<th>Status quo maintenance</th>
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<td></td>
<td>Repeable</td>
<td>Non-repeatable</td>
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<tr>
<td>Regret</td>
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<td>SD</td>
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<td>Disappointment</td>
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<td>Responsibility</td>
<td>6.50</td>
<td>2.88</td>
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Table 4 Correlations between implicit and explicit measures of Uncertainty in Study 3 (n=82)

<table>
<thead>
<tr>
<th>Uncertainty</th>
<th>JSD</th>
<th>CUS</th>
<th>SDS</th>
<th>D</th>
<th>Regret</th>
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<tr>
<td>JSD</td>
<td>0.39*</td>
<td>0.46*</td>
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<td>D</td>
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<td></td>
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<tr>
<td>Regret</td>
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<tr>
<td>Mean</td>
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<td>0.30</td>
<td>2.89</td>
</tr>
</tbody>
</table>

* Note. JSD = Judgmental Self-Doubt scale; CUS = Causal Uncertainty Scale; SDS = Self-doubt scale, D = SC-IAT.
* *P < .01.
Figure 1: Experienced of regret as a function of perceived future opportunity (Study 2)
Figure 2: Experienced of regret as a function of perceived future opportunity (Study 3)
Figure 3: Experience of self-certainty as a function of perceived future opportunity (Study 3)
APPENDIX

Judgmental Self-doubt Scale

1. I have difficulty making decisions.
2. I have a tendency to change my mind according to the last opinion I hear.
3. After deciding something, I tend to worry about whether my decision was wrong.
4. I frequently find myself afraid of not doing the right thing.
5. I often have the sense that others know better than I do.
6. Often I put off making difficult decisions.
7. I often don’t trust myself to make the right decision.
8. I often trust the judgment of others more than my own.
9. My judgments about situations often turn out to be mistaken.
10. I often worry about whether a decision I made will have bad consequences.
11. In making a decision, I often tire myself out by switching back and forth from one conclusion to another.
12. I am inclined to have trouble knowing where to stand on an issue.
13. When making a decision, I often feel confused because I have trouble keeping all relevant factors in mind.
14. In almost all situations I am confident of my ability to make the right choices.
15. I often don’t know what to feel or believe.
16. I wish I were more confident on my opinion.
17. Many times I don’t know what to do next.
18. I have a great deal of confidence in my opinions.
19. Frequently, I doubt my ability to make sound judgments.
Causal Uncertainty Scale

1. I do not know what it takes to get along well with others.
2. When I receive good grades, I usually do not understand why I did so well.
3. I do not understand what causes most of the problems that I have with others.
4. When I see something good happens to others, I often do not know why it happened.
5. When I received poor grades, I usually do not understand why I did so poorly.
6. When someone I know receives a poor grade, I often can not determine if he or she could have done anything to prevent it.
7. I do not understand what causes most of the good things that happen to me.
8. When things go right, I generally do not understand what to do to keep them that way.
9. When bad things happen, I generally do not know why.
10. When there is more than one possible reason for a person’s action it is difficult to determine which one is the actual reason.
11. I often feel like I don’t have enough information to come to a conclusion about why things happen to other people.
12. When I see something bad happen to others, I often do not know why it happened.
13. I often feel like I don’t have enough information to come to a conclusion about why things happen to me.
14. When I think about why someone does something, there are usually so many possible reasons for it that I cannot determine which one was the cause.
Self-doubt Scale

1. When engaged in an important task, most of my thoughts turn out to bad things that might happen (e.g., failing) than to good.

2. For me, avoiding failure has a greater emotional impact (e.g., sense of relief) than the emotional impact of achieving success (i.e., joy, pride).

3. More often than not I feel unsure of my abilities.

4. I sometimes find myself wondering if I have the ability to succeed at important activities.

5. I often wish that I felt more certain of my strength and weaknesses.

6. As I begin an important activity, I usually feel confident in my ability.

7. Sometimes I feel that I don’t know why I have succeeded at something.

8. As I begin an important activity, I usually feel confident in the likely outcome.