

Errors in Affective Forecasting: Contrasting Anticipated and Experienced Regret after  
Group Failure versus Individual Failure

by

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## Abstract

This dissertation contributes to a growing literature on affective forecasting showing that people are often inaccurate when predicting their future emotions, particularly the emotion of regret (Wilson & Gilbert, 2003). In the current program of research I explored the differences in the anticipated and experienced regret of participants who worked (or imagined working) either alone or as part of a group. In Experiment One I demonstrated that participants anticipated more regret from failing a task when alone than from failing a task that when working as part of a group. I speculated that this occurs because working with a group allows one to blame others for a failure, thus reducing one's own regret. In Experiment Two I demonstrated that although participants anticipated more regret from an individual relative to a group failure, the regret they actually experienced is equivalent in these conditions. I hypothesised that this is because the psychological immune system (Gilbert, Pinel, Wilson, Blumberg, & Wheatley, 1998) works hard to reduce the regret of the participants who worked alone to levels matching that of the participants who worked in groups. I also demonstrated that this psychological immune system takes time to reduce regret differences in levels of regret were found between participants in the group and alone conditions when participants reported their regret immediately, but when regret was reported after a delay, these differences were no longer found. In Experiment Three I ruled out a potential confound by demonstrating that the differences between Experiments One and Two were not due to participants thinking of different time frames while reporting their regret. In Experiments Four and Five I extended my program of research by investigating whether the anticipated and experienced regret that is caused by failing a task varies depending on

whether one is working with in-group or out-group partners. I found that while participants anticipate more regret from failing a task with an in-group compared to an out-group partner, the regret they ultimately experience is not affected by the group status of their partner. Implications and future directions are discussed.

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# Table of Contents

Abstract .....	ii
Acknowledgements .....	iv
Table of Contents .....	v
Chapter 1 .....	1
Introduction .....	1
Defining Regret .....	2
Factors that Influence Anticipated Regret .....	3
<b>Counterfactual Thinking</b> .....	3
<b>Action versus inaction</b> .....	5
Mechanisms Explaining the Discrepancy Between Anticipated and Experienced Emotions .....	7
<b>Impact bias</b> .....	7
<b>Distinction bias</b> .....	8
<b>Focalism</b> .....	9
<b>Immune neglect</b> .....	11
Decision Justification Theory .....	15
Group Versus Individual Decision Making and Problem Solving .....	16
Present Studies .....	22
Overview .....	24
Chapter 2 .....	25
Experiment One .....	25
Methods .....	27
Anticipated Emotions .....	28
<b>1a) Anticipated regret:</b> .....	28
Preferences .....	29
<b>1b) Regret not salient:</b> .....	29
<b>1c) Regret salient:</b> .....	30
Results .....	30
Anticipated Regret .....	30

Preferences .....	31
Discussion.....	32
Chapter 3.....	33
Experiment Two .....	33
Methods.....	34
Results .....	38
Comparing Anticipated Regret (Experiment One) and Actual Regret (Experiment Two).....	38
Comparing Differences in Experienced Regret Between Groups and Individuals Who Reported Regret After a Delay or No Delay .....	39
Comparison of Feelings of Personal Responsibility .....	42
Group Size .....	44
Ranking of Factors That Influenced Performance .....	45
Open Ended Responses.....	46
Discussion.....	49
Chapter 4.....	52
Experiment Three .....	52
Methods.....	53
Results .....	54
Discussion.....	55
Chapter 5.....	57
Experiment Four.....	57
Methods.....	61
Anticipated Emotions .....	62
<b>4a) Anticipated regret questionnaire one:</b> .....	62
<b>4b) Anticipated regret questionnaire two:</b> .....	63
Preferences .....	64
<b>4c) Regret not salient:</b> .....	64
<b>4d) Regret salient:</b> .....	65
Results .....	66
Anticipated Regret (Questionnaire One) .....	66

Anticipated Regret (Questionnaire Two).....	66
Explanation of Choice .....	67
Preferences .....	67
Chapter 6.....	72
Methods.....	73
Results .....	74
Discussion.....	75
Chapter 7.....	77
General Discussion.....	77
Decision Justification Theory .....	81
Missing Success by a Wide or Narrow Margin .....	82
Limitations and Future Directions.....	83
<b>Between-subjects and within-subjects designs in studying regret</b> .....	83
<b>Travel adventure task</b> .....	85
<b>Potential mechanisms</b> .....	86
<b>Cognitive Resources</b> .....	87
<b>Unanimity of groups</b> .....	88
<b>Happiness</b> .....	89
<b>Individual differences</b> .....	90
<b>Status of group members</b> .....	91
Implications.....	92
Conclusion .....	93
References.....	95
Appendices.....	108

## List of Tables

Table 1	
<i>Mean anticipated and experienced regret of participants who imagined or actually worked alone or in groups. Standard deviations are presented in parentheses.....</i>	40
Table 2	
<i>Mean regret scores as a function of condition and delay, with standard deviations in parentheses.....</i>	41
Table 3	
<i>Mean personal responsibility scores with standard deviations in parentheses.....</i>	43
Table 4	
<i>Correlations between feelings of regret and personal responsibility.....</i>	44
Table 5	
<i>Coding of open-ended responses. Number of responses in each category (percentages in parentheses).....</i>	48
Table 6	
<i>Response categories, frequency of responses, and examples.....</i>	70
Table 7	
<i>Response categories, frequency of responses, and examples.....</i>	71

# Chapter 1

## Introduction

Imagine that you are an employee working on a challenging project for your boss, knowing that if you are able to successfully complete the project on time, you would likely receive a big bonus. How would you feel if you were unable to complete the project on time, and lost the big bonus? How much regret would you experience? Now imagine that you had been working on that project with three of your coworkers instead of by yourself, would you experience any more or less regret in that situation? In the current line of research I explored a novel research question by assessing whether or not the decision to work alone versus as part of a group could affect the regret that individuals both anticipate and actually experience. As discussed below, past research has shown that people are not always accurate at predicting what their future emotions will be, and this can sometimes lead them astray in decision making situations. In this thesis I explored the possible discrepancy between the regret people think they will experience when they fail a task when working alone or in a group, and the regret that they actually experience in those situations. In addition to comparing the anticipated and experienced regret of people working individually and in groups, I also investigated whether making one's potential future regret salient could affect one's preference for working on a task alone or as part of a group. As an extension, I also explored the effect that working with an in-group versus an out-group partner would have on both anticipated and experienced regret.

## **Defining Regret**

In the following studies, participants worked either as individuals or groups, and reported their anticipated or experienced regret over failing the task that they were working on. Regret is an uncomfortable emotional and cognitive state arising from a negative comparison of an actual outcome and some other, preferable outcome (Zeelenberg, 1999). Regret is often confused with related, but distinct emotions, such as guilt and disappointment. Zeelenberg, van Dijk, Manstead, and van der Pligt (1998) found that whereas disappointment occurs when outcomes have failed to live up to certain expectations, regret is experienced when one has had a direct hand in causing the unwanted outcome. They found that regret leads to feelings of wanting to correct one's mistake or get a second chance to undo the damage, whereas disappointment leads to wanting to do nothing, and turn away from the event. Berndsen, van der Pligt, Doosje, and Manstead (2004) as well as Zeelenberg and Breugelmans (2008) suggested that interpersonal and intrapersonal harm is important in distinguishing regret from guilt. Berndsen, van der Pligt, Doosje, and Manstead (2004) found that guilt was associated with causing harm or negative consequences to another person, whereas regret was associated with causing harm or negative consequences to oneself. Zeelenberg and Breugelmans (2008) also found that guilt was more likely in situations of interpersonal harm, however, they found that regret was associated with both interpersonal and intrapersonal harm. It seems that although the experience of guilt specifically follows after harming another, the experience of regret can follow after causing harm to the self or another.

Regret does not just have an impact on someone after a negative choice or experience. Predicting what amount of regret one might feel in the future can affect one's future decisions (Zeelenberg, 1999). When people must choose between two or more options, they often take into account how much regret each option may produce, should it turn out to be the incorrect choice. Unsurprisingly, people tend to choose the option that they believe will lead to the least regret. Anticipated regret has been shown to influence peoples' decision making in a variety of situations, including consumer purchases (Simonson, 1992), student course section selection (Connolly, Ordonez, & Coughlan, 1997), exercise behaviours (Abraham & Sheeran, 2003), and sexual behaviour (Richard, de Vries, & van der Pligt, 1996).

### **Factors that Influence Anticipated Regret**

#### **Counterfactual Thinking**

Despite this impact on decision making, researchers have shown that people are not always accurate in predicting their future levels of regret, leading to a discrepancy between their anticipated and experienced regret. One illustration of how people can be inaccurate about the regret they will actually feel comes from a field experiment done by Gilbert, Morewedge, Risen, and Wilson (2004) at a subway station. They asked people who had just gotten off a subway to guess how much regret they would feel if they were to miss their train by either several minutes or by just moments. Participants expected to feel more regret if they just barely missed their train than if they missed their train by quite a bit. The experimenters then found people in the subway station who had actually missed their trains by either a large or small amount of time and asked them how much

regret they were feeling. The results showed no difference in levels of regret between people who just barely missed their train and those who were quite late. This study illustrates that people expected to feel more regret in one scenario but no such differences were found when actual regret was measured.

The results of this study can also be interpreted in light of counterfactual thinking, or imagining alternative outcomes. Research has shown that emotional responses to events are amplified when it is easy to imagine the outcome of the event not occurring (Folger, Rosenfield, & Robinson, 1983; Kahneman & Miller, 1986; Tyler & Caine, 1981). In the Gilbert et al. (2004) train study, the alternative outcome, catching the train, was closer to reality for those who just barely missed their train than for those who missed it by quite a wide margin. When success is so close it is easy to compare the actual outcome with this just missed alternate outcome and imagine the negative outcome not occurring (e.g., “If only I had walked a bit faster, I would have caught the train”). However, when success is missed by a wide margin, the counterfactual thought of success seems less attainable and the negative outcome more fixed (e.g., “Even if I had walked quickly, I still would have missed the train by five minutes”). When counterfactual thoughts involve just missing success they can incur more regret than counterfactual thoughts of missing success by a wider margin. For example, bronze medal winners (whose counterfactual thoughts might include not winning any medal) look happier than do silver medal winners (whose counterfactual thoughts might be of how close they came to winning gold; Medvec, Madey, & Gilovich, 1995). This pattern seems contrary to what one would expect, which is that gold medal winners would be

happier than silver medal winners, who in turn would be happier than bronze medal winners.

### **Action versus inaction**

Imagine your life's biggest regret. Did you imagine something foolish you did in your youth? Perhaps it was something you failed to do but now wish you had. Does your regret involve an action or inaction? Much research has focused on whether regret is more likely to occur after action or inaction. Kahneman and Tversky (1982) provided participants with hypothetical scenarios where people suffered identical negative outcomes that arose either from action or inaction (e.g., losing an equal amount of money due to switching a stock or failing to switch a stock). Participants predicted that the "action" scenarios would lead to more regret than the "inaction" scenarios. Kahneman and Miller (1986) argued that actions are seen as relatively unusual compared to inaction. Therefore it is easier for people to create counterfactual thoughts that undo consequences caused by actions versus inaction. To mentally undo an action, all one has to do is imagine the default, inaction, but undoing an inaction requires coming up with an appropriate action, which is more difficult to imagine. Because it is so easy to imagine inaction, when an action causes a negative outcome and regret, it is easy to imagine how simply doing nothing would have avoided the negative outcome, and this leads to high levels of regret. On the other hand, when a negative outcome is caused by inaction, it is more difficult to imagine an appropriate action that could have prevented the negative outcome, and thus people tend to feel less regret. Indeed, much research supports this finding that people feel more regret after actions than inaction (Connolly, Ordóñez, & Coughlan, 1997; Gleicher, Kost, Baker, Strathman, 1990; Miller & Taylor, 1995; Ritov &

Baron, 1995. Gilovich and Medvec (1995) went so far as to say that “perhaps the clearest and most frequently replicated finding in the entire literature on counterfactual thinking, [is] that people experience more regret over negative outcomes that stem from actions taken than from equally negative outcomes that result from actions foregone” (p. 380).

Despite the large amount of research supporting this assertion, it seems to contradict many real world anecdotes. When people think back on their life’s regrets it is often the actions that they didn’t take that seem to linger on as regret. Gilovich and Medvec (1994) directly asked participants “when you look back on your experiences in life and think of those things that you regret, what would you say you regret more, those things that you did but wish you hadn't, or those things that you didn't do but wish you had?” (p. 358). Seventy-five percent of participants reported that they regret the things that they did not do but wished they had. The researchers also asked participants to think of their greatest regret of action and inaction and asked which they regretted more. Again, 70% of participants reported that they felt more regret over their inactions. Gilovich and Medvec (1994, 1995) proposed that actions cause more regret in the short term, but that inaction leads to more regret over the long term. Zeelenberg, van den Bos, van Dijk, Pieters (2002) felt that regret research failed to take into consideration that many decisions are made in the context of previous decisions and outcomes. They found that when previous outcomes were negative people felt more regret after inaction than action. They termed this finding the inaction effect. Although much research supports the hypothesis that actions lead to more regret than inaction, several circumstances have been found where the reverse is actually true.

As summarized above, it has been demonstrated that although people sometimes make decisions based on anticipated regret, they are often inaccurate at predicting how much regret they will feel in the future. There have been several mechanisms proposed explaining why this discrepancy between anticipated and experienced regret occurs, which will be summarized in the following section.

## **Mechanisms Explaining the Discrepancy Between Anticipated and Experienced Emotions**

### **Impact bias**

People often overestimate the intensity and duration of their future emotions, and this impact bias has been shown numerous times in the literature (e.g., Buehler & McFarland, 2001; Crawford, McConnell, Lewis, & Sherman, 2002; Gilbert, Pinel, Wilson, Blumberg, & Wheatley, 1998; Loewenstein & Schkade, 1999; Mellers & McGraw, 2001; Rachman, 1994; Robinson & Clore, 2001; Sieff, Dawes, & Loewenstein, 1999; Wilson & Gilbert, 2003; Wilson, Meyers, & Gilbert, 2001; Wilson, Wheatley, Meyers, Gilbert, & Axsom, 2000). People tend to overestimate the duration of their emotional states (Gilbert & Wilson, 2000), tending to think that how they feel in the present is going to stay consistent over time. This leads people to predict that they will feel quite strongly about things even over the passage of time. One interesting issue raised by this research is that if people repeatedly overestimate the duration of emotions, why don't we eventually learn from these errors and calibrate our predictions accordingly?

## **Distinction bias**

In many instances people look forward at potential future outcomes and evaluate these options in order to predict their future emotions, (e.g. “Should I purchase the sports car, the minivan, or the luxury sedan?”). Evaluating several options is quite different than simply thinking about one particular option, and these different situations can lead to different evaluation modes, which can affect predictions of future emotions (Hsee & Zhang, 2004). The authors suggested that when people make predictions about future events, they are often in joint evaluation mode where they are comparing several different options and scenarios. However, when they are actually in those situations they are usually in single evaluation or separate evaluation mode where there is only a single scenario. For example, imagine a woman who is planning to purchase a new car. She will most likely research several different models and compare the features of each. She may also imagine how she will feel about each vehicle. How much happiness will she experience driving with the top down in a new sports convertible that costs \$30,000? How much more or less happiness will she experience driving a car that costs \$3,000 less but is not a convertible? In contrast, after a purchase is made, the car shopper will only be thinking about how she feels about the car that she actually purchased. She will no longer be thinking about how happy she would be if she had purchased a different car. Because of these different evaluation modes people are in when making predictions about the future and when the future actually arrives, they tend to overpredict the experiential difference between different scenarios in single evaluation mode. So, our car shopper may think that saving \$3,000 will make her happy, but after the purchase is made she

may not be thinking about the money, only about how much she wished she had a convertible.

In an empirical demonstration of this effect, Hsee and Zhang (2004) had two options for participants in their study. Participants could either write about a personal failure, and receive a large chocolate bar, or they could write about a personal success, and receive a smaller chocolate bar. Some participants personally chose one of these options for themselves, others made the choice for another participant, and other participants had the choice made for them. Participants had to predict how happy the tasks and the chocolates would make them (or another participant). The predictors reasoned that a bigger chocolate bar will make them (or another participant) happier than a smaller chocolate bar, and so they were likely to choose the failure task and large chocolate bar option. However, the experiencers were not comparing the amount of chocolate they received with any particular standard and so were equally happy with either the large or small chocolate bars. Their happiness only varied according to whether they had to write about a failure or a success. This study showed that when making predictions, people often focus on factors that don't ultimately affect their future happiness. This can lead to a discrepancy between their predicted and experienced emotions.

### **Focalism**

Focalism is also concerned with focusing on factors that lead to inaccurate predictions of regret, but unlike the distinction bias, where irrelevant factors are the focus, in focalism people tend to focus only on the emotional event in question and underestimate all of the other factors that can affect their emotional states (Wilson,

Wheatley, Meyers, Gilbert, & Axsom, 2000)<sup>1</sup>. When one thinks about how they will feel after the breakup of a romantic relationship, all they focus on is that one event. They fail to take into consideration that in the weeks and months following the breakup several other factors will be influencing how they feel. For example, one may start a new romantic relationship, take a relaxing vacation, or even simply enjoy a delicious meal, all which can have an impact on one's emotional state. To experimentally test the impact of focalism on predictions of future emotions Wilson et al. (2000) had university students predict how happy they would be during the days following their school's big football game, as well as how much they would think about the game during that time. Before answering these questions, half of the participants were randomly assigned to a diary condition where they predicted how much time they would spend on a number of everyday activities. This was done to make participants aware of the many facets of their life, besides the football game, that would be impacting their life. As predicted, they found that participants in the diary condition expected to think about the football games less than participants in the control condition, and also expected their happiness to return to baseline quicker than participants in the control condition. Wilson et al. (2000) also had another group of participants rate their actual happiness in the days following the big football game. They found that even just one day after the game, the outcome of the game had little impact on participants' happiness. This suggests that the participants in the diary condition of the previous study were more accurate at predicting their future

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<sup>1</sup> Focalism may not be universal. Lam, Buehler, McFarland, Ross, and Cheung (2005) found that East Asians, who tend to think more holistically than North Americans (who have comprised the majority of participants in anticipated regret research), are not as susceptible to focalism. Because focalism is a cause of the impact bias, a tendency to overestimate the duration and intensity of future emotions, (Wilson et al., 2000), Asians are not as susceptible to the impact bias.

happiness because their predictions more closely matched the actual happiness levels of the participants in the “experiencers” condition. These results suggest that when people’s focus is not solely on one event, but rather all of the events and activities in their lives, they are more accurate at predicting their future emotions.

### **Immune neglect**

Just as people are often unaware of the other events and factors in their life that can affect their emotions, people also tend to be unaware of how well they are able to handle emotional threats. Much like we have a physical immune system that is activated when our body encounters a threat, such as a virus, it has been proposed that we also have a psychological immune system that is activated when we encounter a psychological threat, for example a regretful decision. And, just like people are generally unaware of the workings of our immune system, people also tend to be unaware of this psychological immune system. Gilbert, Pinel, Wilson, Blumberg, & Wheatley (1998) called this immune neglect. The psychological immune system acts to neutralize psychological threats and make them more benign. The psychological immune system is actually an umbrella term for a number of different processes that work to overcome the negative affective consequences of threatening events. When people encounter a negative or threatening event their minds quickly work to reduce the threat to the self by whatever means are available and convenient. For example, after failing an important test, a student might blame their poor performance on the fact that they are starting to catch a cold. The psychological immune system encompasses all the processes used to reduce the threatening and affectively negative consequences of a situation. Some of these processes include: “ego defense, rationalization, motivated reasoning, dissonance

reduction, positive illusions, self-serving attributions, self-deception, and self-enhancement, self-affirmation, and self-justification” (Gilbert et al., 1998, p. 619). None of these individual mechanisms are new ideas and each has been extensively examined in their respective literatures. The novel contribution that Gilbert and colleagues have made, by positing the construct they called immune neglect, is that even though people engage in these various processes countless times, they are often unaware that they are doing so, and fail to take into consideration how these processes will affect their future emotions. This can lead people to anticipate that negative emotions, such as regret, will be more intense and prolonged than they actually turn out to be.

In the case of making a regretful decision, one way the psychological immune system might work to make the decision seem less threatening is to deflect blame away from the self and reduce personal responsibility for the bad decision. Indeed, this phenomenon, called “diffusion of responsibility” (see Latané & Nida, 1981 for a review) has been studied extensively. Once the event has been made less threatening, the negative emotions associated with the event, such as regret, should also be reduced. Research on the diffusion of responsibility has been prevalent in two different domains. Darley and Latané (1968) have shown that people are less likely to assist a person in need when another bystander is present, and that each individual is less likely to help with each additional bystander. As the number of bystanders increases, the responsibility for the situation becomes diffused across all of them, with each individual feeling less and less personally responsible. Wallach, Kogan, and Bem (1964) and Kogan and Wallach (1967) proposed that diffusion of responsibility leads to risky shift, in which groups make riskier decisions than individuals. As with the bystander effect, the responsibility for the

decision is spread amongst all group members, leading to each individual feeling less personal responsibility for any potential failure, and thus more likely to support a risky decision. In an early empirical test of the diffusion of responsibility hypothesis, Mynatt and Sherman (1975) did indeed find that members of groups felt less personal responsibility for negative consequences than did individuals. Given this tendency for people to diffuse responsibility for negative events across all people involved, which in turn lowers each individual's sense of personal responsibility, it follows that other negative emotions associated with feelings of responsibility, such as regret, would also be lowered.

Similarly, people often use self-serving attributions to deflect blame away from themselves when a negative event occurs, and take personal credit for successes (Heider, 1983; Forsyth & Schlenker, 1977; Miller & Ross, 1975; Snyder, Stephan, & Rosenfield, 1978). Many people believed that these asymmetrical attributions were self-protective and helped to maintain one's self-esteem (Bradley, 1978; Hastorf, Schneider, & Polefka, 1970; Snyder, Stephan, & Rosenfield, 1978). Miller and Ross (1975) argued, however, that the results of earlier research could also be interpreted in an information processing context and that perhaps people (a) expect to succeed and take responsibility of expected outcomes, (b) are more likely to perceive covariation between their efforts and success rather than with constant failure, and (c) have misconceptions about contingency. There is evidence that individuals seem to make more self-serving attributions than group members. Zaccaro, Peterson, and Walker (1987) found that professional athletes made more self-serving attributions about their sports performances when they played individual sports, such as golf, relative to athletes who played team sports such as

basketball. In terms of the psychological immune system, it may be the case that the tendency to make self-serving attributions is another example of a mechanism that people often employ but are generally unaware of. This could again lead to people to not realize that these processes could lead to experiencing less regret after a failure than is anticipated. In the current study, participants could have made external attributions for their failure. As with diffusion of responsibility, once the failure is attributed to external (as opposed to internal) factors, emotions associated with the failure, such as regret, should also be decreased.

One might suspect that the psychological immune system could only be effective enough to dampen mild negative affect resulting from minor inconveniences such as missing a train. However, Gilbert and colleagues (1998) showed evidence of the psychological immune system at work after fairly distressing events. Participants were asked to predict how happy they would be following very negative events, for example ending a romantic relationship or being denied tenure. Then, participants who had actually experienced those negative events reported how happy they actually were several months after the event. Participants who just imagined the negative events assumed that they would be quite unhappy, even months after a negative life event. The researchers found however the participants who had actually been through those negative life events were not nearly as unhappy as would be anticipated. The participants in these studies greatly underestimated how well they would be able to cope with these negative events and so overestimated their negative reactions to them. The authors attributed this discrepancy between anticipated and experienced regret to immune neglect, claiming that people fail to realize that they have many psychological mechanisms at work to minimize

the impact of negative events, leaving them more benign than anticipated. Once an event has been rendered less threatening, the negative emotions associated with the event, such as regret, are also reduced. This study showed that the negative affect resulting from even fairly distressing events can be dampened to levels below what would be expected.

As attested to by the various mechanisms described above, there are a variety of processes that can operate to reduce the amount of regret that individuals experience. Despite these various mechanisms, however, it is clear that people do still experience regret. In the next section, I discuss research describing factors that affect the experience of regret.

### **Decision Justification Theory**

In terms of this regret that one actually experiences, Connolly and Zeelenberg (2002) proposed a decision justification theory that asserts that regret consists of two separate dimensions, a comparative evaluation of the outcome of the decision, and a feeling of self-blame for having made a poor choice. So, one can feel regret over a decision that turned out badly, yet feel no self-blame (e.g., when well laid plans lead to an unfortunate accident). One can also feel regret over a decision that leads to a lot of self-blame even when a negative outcome doesn't occur (e.g., when reckless behaviour narrowly avoids harming someone). In situations where each of these two components of regret is high, the psychological immune system should work differently to reduce regret. For example, in situations where the outcome cannot be reversed, it may be easier to dampen regret by minimizing personal blame which can be achieved by reducing personal responsibility and deflecting blame onto others. However, in situations where

there is no easy scapegoat, the outcome of the event may be perceived to be less negative in order to reduce the regret associated with an undesirable outcome.

In the following studies, participants worked either alone or in groups. I predicted that when one works on, and fails, a task as part of a group it is relatively easy to reduce the self-blame component of regret because there are other people involved in the failure, and responsibility can be shared among them. However, when one works alone, there is no one else to share the burden of responsibility, and so I predicted that self-blame, and therefore regret, would be higher for people who fail while working alone, relative to those working in a group. Alternatively, when the number of people involved in failing a task does not differ between groups, the self-blame component of regret should also stay consistent across those groups, leaving the comparative evaluation of the outcome component to vary. Therefore, if two people are both working with partners at a task, and fail, they should feel equal levels of self-blame because they both have someone else to share the responsibility with, but the one who perceives the outcome of the failure to be worse should experience more regret because the comparative evaluation of the outcome component of regret is greater.

### **Group Versus Individual Decision Making and Problem Solving<sup>2</sup>**

In the present studies participants worked (or imagined working) on a task either alone or as part of a group. I predicted that participants would expect to feel more regret if they worked on a task by themselves and failed than they would if they worked on the task as part of a group and failed. I further predicted that because they expected less

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<sup>2</sup> In the current line of research I have focused on the emotion of regret, and situations in which regret is likely to occur, (i.e., after a negative outcome such as a failure). As such, my review of the literature below has focused on individual and group failures rather than successes.

regret from working in a group they should prefer to work in a group rather than alone if their feelings of anticipated regret are made salient. As the previous section described, however, people tend to overestimate how much regret they will experience in the future. Accordingly, I hypothesized that although participants anticipated less regret from working in a group relative to working alone, the regret they actually experienced would be equivalent in these situations, due to mechanisms such as the psychological immune system. If this is true, and people will ultimately feel the same amount of regret regardless of whether they work alone or in a group, then one might assume that it makes no difference if someone chooses to work alone or in a group based on their anticipated regret. However, the potential costs of basing a decision of whether to work individually or in a group may not lie in the regret experienced, but in the fact that groups are often not as effective at decision making and problem solving as are individuals. If someone chooses to work in a group because they think that option will lead to less regret than working alone, but the group ends up making a worse decision than the individual would have on their own, then they have allowed their anticipated regret to lead them astray.

For example, if given the option, Steve may choose to work on a school project in a group rather than work independently because he thinks that if he does poorly on the project he will feel more regret having worked alone. This strategy has the potential to backfire, however, if working in a group is not the optimal choice. He may receive a lower grade working with a group than he would have if he worked alone (perhaps he chose less than studious partners). To make matters worse, if my hypotheses are correct, Steve will ultimately experience the same level of regret if he does poorly on the project

regardless of whether he worked with a group or by himself. Thus, he will have made a poor choice based on an emotion he will not experience.

There are many situations where people may have to choose to make a decision or solve a problem either alone or with others (e.g. school assignments, forming a committee or designating one person to head up a work project, etc.). In some instances it is obviously preferable to work with others. For example, it is usually wise to consult an expert when making a decision on a topic you know little about. However, in other situations it may not be as clear cut when it would be preferable to work alone or with others. In these situations, people may be influenced by the emotions, including regret, that they expect to feel if they make each choice. However, basing their decisions on these emotions may not lead them to the most effective choice.

There is a large literature that has explored the effectiveness of groups compared to individuals at decision making and problem solving. The results of these studies seem at times contradictory, but researchers have been working on answering not only who is more effective, groups or individuals, but also why, and under what circumstances do these differences in effectiveness arise.

In an early test of the effectiveness of groups versus individuals in decision making, Shaw (1932) had individuals and small groups work on various intelligence puzzles. In general, the groups outperformed the individuals. Shaw concluded that “groups seem assured of a much larger proportion of correct solutions than individuals do” (p. 504) and that “this seems to be due to the rejection of incorrect suggestions and the checking of errors in the group” (p. 504). The general finding that groups outperform individuals at problem solving and decision making (Hill, 1982; Laughlin, 1980;

Laughlin & Ellis, 1986), as well as information processing (Hinsz, Tindale, & Vollrath, 1997; Shaw, 1932; Vollrath, Sheppard, Hinsz, & Davis, 1984) has been replicated many times. However, it is not always the case that groups are better than individuals at these tasks. In the following sections I will review literature that suggests that working alone may, in some circumstances, be more effective than working with a group.

In their review of the literature on brainstorming, Lamm and Trommsdorff (1973) found that individuals actually generated significantly more ideas than did small groups (although it was unclear how the quality of the ideas compared between the individuals and groups). Interestingly, those working together in groups rated their performance as better than those working alone, perhaps because those working alone had no benchmark for comparison (Paulus, Dzindolet, Poletes, & Camacho, 1993).

Groupthink (Janis, 1972) appears to be another domain where group decision making processes lead to worse decisions than individuals. Janis (1972) defined groupthink as a “psychological drive for consensus at any cost that suppresses dissent and appraisal of alternatives in cohesive decision making groups” (p. 8). Groups may become more concerned with concurrence and consensus than with finding the best solution to a problem, which can ultimately lead to disaster. Janis (1972) proposed several antecedents to groupthink: a highly cohesive, homogeneous, and isolated group; decisive leadership; no systematic procedure for reviewing or revising decisions; and a stressful environment. The symptoms of groupthink include overestimating the group’s ability to solve the problem, close-mindedness, pressure to conform, an illusion of unanimity caused by “mindguards” who silence dissent and self-censorship of dissenting ideas. Because groupthink leads to such pressure to conform, alternative ideas are not

sufficiently explored and the risks of the group's plan are often ignored. The groupthink model has obvious real world application. Several large scale disasters seem to fit neatly into model, from the Bay of Pigs invasion, to the Walkerton water contamination scandal, to more recently, the devastating oil spill in the Gulf of Mexico. Janis' model sparked an interest in understanding the flaws in group decision making and led to a number of books and papers on the topic. Groupthink is just one example of a situation where groups may produce worse outcomes than individuals. Another example is the prisoner's dilemma game.

The prisoner's dilemma game involves two partners who can either choose to work cooperatively, or not during each round of the game. Mutual cooperation leads to greater gains for both partners in the long run compared to noncooperation. Individuals tend to be more cooperative and less competitive than groups (Insko, Schopler, Drigotas, & Graetz, 1993; McGlynn, Harding, & Cottle, 2009; Schopler, & Insko, 1992; Schopler, Insko, Wieselquist, Pemberton, Witcher, Kozar, Roddenberry, & Wildschut, 2001), a phenomenon termed the individual-group discontinuity effect (see Wildschut, Pinter, Vevea, Insko, & Schopler (2003) for a review). Schopler and Insko (1992) argued that this individual-group discontinuity effect arises because groups are both greedier and more fearful than individuals. In terms of the present research, if people are swayed by their anticipated regret to work on such a task with a group, rather than by themselves, they may end up in a worse situation if the competitiveness of the group leads to lesser gains than the cooperativeness of the individual would have garnered.

Many decision making situations do not involve competition like the prisoner's dilemma game, but rather require cooperation to solve a problem. One moderator that

may predict when groups will outperform individuals is the demonstrability of the solution to the problem (Laughlin & Ellis, 1986). Groups should excel at problems that have clearly demonstrable solutions, problems that when you discover the solution, it is clearly recognized as correct. Once a member of the group comes up with this solution it should be apparent to the other group members that it is the correct solution and they should adopt it as their final solution to the problem. Because groups have more people contributing than individuals, the likelihood that someone in the group will come up with the correct solution is greater than any one individual coming to the same solution, giving groups the edge. However, when problems do not have such demonstrable solutions, for example, making a hiring decision, it is not immediately apparent when someone comes up with the correct solution. In these situations groups tend to use a majority rules strategy (Tindale & Davis, 1985; Stasser, Kerr, & Davis, 1989). Because the correct answer is not obvious when it is suggested, groups lose their advantage over individuals in these situations.

Although in many situations groups are more effective than individuals, their overall efficiency is often lower (Kanekar, 1987). For example, even if a group can solve a problem twice as fast as an individual, if the group contains four members, they are actually only half as efficient as the individual. In real world situations, such as employment settings, efficiency is a major concern. Employers might be more willing to pay one employee to spend one hour to solve a problem rather than three employees who can solve the problem in half the time. In terms of the present research, this is another illustration of the potential negative consequences of allowing anticipated emotions to sway one's judgment. People may assume that working with a group will lead to less

regret, and so will choose this option over working alone. However, as demonstrated by the preceding research, groups are not always better decision makers or problem solvers than individuals. Thus, people may be choosing the least optimal option based on emotions that will not actually materialize in the future as intensely as predicted.

In sum, the literature reviewed above suggests that individuals sometimes make decisions based on the amount of regret they anticipate experiencing if the outcome of their decision is poor. Generally, however, people tend to overestimate the amount of regret that they will experience. There have been a number of mechanisms identified that can explain why people overestimate how much regret they will feel: In general, people are not aware that their “psychological immune systems” will work to minimize negative affect such as regret. In my thesis, I contributed to this body of research by assessing whether the decision to work alone versus in a group is affected by feelings of anticipated regret. I predicted that when potential future regret is made salient, it may push people towards working in a group rather than alone because they feel working in a group will lead to less regret. This may prove ineffective, however, if working in a group leads to a worse outcome than working alone.

### **Present Studies**

One area of the regret literature that has not been explored is whether people anticipate and/or experience different levels of regret when they make a poor decision while working alone versus when they are working as part of a group. In this line of research I investigated whether people anticipate and/or end up actually feeling more regret after failing a novel task that they worked on either by themselves or as part of a group. My prediction was that participants would anticipate less regret from a group

failure, relative to an individual failure. I expected this because when failure happens in a group, at least part of the blame can be attributed to the other group members and this diffusion of responsibility may lead to a reduction in feelings of personal responsibility, and in turn a reduction in the regret one anticipates.

Although people may anticipate more regret after an individual decision I predicted that because of the psychological immune system, the regret actually experienced may be equal between those who fail at a task alone and those who were working in groups. The psychological immune system may not have to work as hard to rationalize a group failure because the blame can be placed with other group members, but when a failure happens individually the psychological immune system may work harder to rationalize the failure, reduce the blame, and ultimately the amount of regret experienced. This will lead the experienced regret of those working alone and in groups to be comparable.

If there is a discrepancy between anticipated and experienced regret, it would be valuable to investigate this phenomenon because it suggests that people are making decisions based on regret they only think they will experience. People may be choosing to include others in their decision making in order to avoid or minimize their potential future regret. However, this strategy may backfire if the decision the group comes to is worse than the decision the individual would have made by him or herself. As reviewed above, under many conditions, the decisions made by groups are less optimal, and less efficient, than decisions made by individuals. People may thus end up with an inferior outcome and no less regret than if they had made the decision on their own.

## Overview

This line of research consisted of five experiments examining the anticipated and experienced regret of people making decisions alone and as part of a group<sup>3</sup>. The first hypothesis of Experiment One was that participants would anticipate more regret from a failure brought about while working alone versus while working in a group. A second hypothesis of Experiment One was that when given a choice to make a decision alone or as part of a group, the salience of potential regret would influence the choices that people make. Specifically, when potential regret is made salient, a greater proportion of participants should prefer to make the decision as part of a group, compared to when regret is not made salient. Experiment Two examined the experienced regret of participants who fail at a task alone or as part of a group, and Experiment Three replicated Experiment One with the inclusion of a time manipulation to rule out the possibility that participants in Experiments One and Two were thinking of different time frames while reporting their regret. Experiment Four investigated the differences in anticipated regret of participants who fail a task when working with an in-group or out-group partner and Experiment Five examined the experienced regret that occurs after working with members of an in-group versus members of an out-group.

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<sup>3</sup> The failure that participants imagined / experienced in the following studies was relatively trivial and did not involve significant risks or consequences; therefore, the regret reported by participants was lower than would be expected for a failure involving higher stakes.

## Chapter 2

### Experiment One

In Experiment One I investigated whether people anticipate feeling more regret after failing at a task independently or as part of a group. The main prediction was that participants would anticipate less regret from a group failure because when a group fails, at least part of the blame can be attributed to the other group members and this may lead to a reduction in the regret one anticipates. In contrast, when someone fails at a task they have worked on alone, there is no one else to take the blame and this can lead to increased feelings of personal responsibility and ultimately, regret.

A secondary prediction dealt with preferences for making decisions alone or in groups. Kocher, Strauß, and Sutter (2006) had participants state their preference for playing and making decisions in a beauty-contest game alone or as part of three-person groups. They found that 37% of participants reported a preference for working alone, whereas 63% preferred to work as a group. The results of this study suggest that people may have a preference for making decisions as a group, however these results may not generalize to all decision making situations. A preference to make decisions alone versus as part of a group most likely depends on a number of factors. For example, when one is making a decision on which they are uninformed, one may choose to include those with relevant expertise in the decision making process. People may also feel more comfortable with making decisions with people they know and trust as opposed to strangers. As well, people may be more inclined to work with a group if they feel that the group is more likely to be successful than they would be on their own. In the following

studies, however, participants in the group conditions worked with other undergraduate students on a novel task and should have had no reason to assume that their group members were experts at the task.

Because several variables play into preferences for making decisions alone or in groups I did not have specific predictions regarding participants' preferences concerning the experimental task. Therefore, when participants were asked to rate their preference for working on the task alone or as a group I made no specific prediction and assumed equal preference for group and individual decision making. However, a second group of participants were first asked to think about the regret they would experience if they failed the task alone as well as in a group before stating their preference. I predicted that making participants' future regret salient would lead to a shift in preferences, so that in this condition a greater proportion of participants would prefer to make the decision as part of a group, relative to those for whom future regret is not made salient.

When anticipated regret was made salient, I predicted that participants would show a greater preference for working on the task as part of a group because it would be more apparent that they would be able to attribute at least part of the blame to other group members and this should reduce their regret. When the possibility of experiencing regret is highlighted, people might look for easy ways to avoid that regret and an obvious way is to reduce personal responsibility for the decision by blaming others.

In sum, this study addressed two questions. First, would participants anticipate more regret from failing at a novel task when working alone compared to when working as part of a group? A number of participants in Experiment One read a description of a novel task and reported the amount of regret they anticipated if they failed the task while

working alone as well as while working as part of a group. The second question addressed in Experiment One was, would participants prefer to work on a novel task alone or as part of a group, and would making potential future regret salient affect these preferences? Here, participants read a description of a novel task and reported their preference for working on that task either alone or as part of a group. The potential future regret of half of these participants was made salient before reporting their preferences.

### **Methods**

Because this study was so short, it was run in conjunction with other, unrelated studies and the materials were given to participants at the end of the experimental sessions, or as a filler task. Participants were students enrolled in the introductory psychology course at Queen's University and were recruited via phone and e-mail. Two hundred and twenty-three participants (123 women, 23 men, and 77 unreported (several questionnaires that were missing the gender question were inadvertently passed out to participants); mean age: 18.11 years) read a passage, below, about a decision task called the Travel Adventure Task, in which a traveler needs to make their way home from a vacation on a tight budget.

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#### Travel Adventure Task

Please imagine you have been asked to complete the following travel adventure task. You don't actually have to complete the task, just imagine that you will have to complete it.

Imagine that you are on your last day of a backpacking trip through New Zealand when you realize that you have lost your plane ticket home. You start to feel panicked

when you realize you have only \$1000 left and the airline tells you that there are no more flights to Canada available. Your only option is to take several connecting flights from Auckland New Zealand back to Kingston, Ontario. You need to find a way home to Kingston using only the \$1000 you have with you. In order to do this you will need to take several flights. Below are listed the possible flights and how much each costs. You will have 10 minutes to figure out your way home. If you are successful you will be entered into a draw for \$100.

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To increase the likelihood that they would anticipate regret over making the wrong decisions, participants were asked to imagine that the task involved the chance to win \$100. If there are no negative consequences associated with a poor decision then it becomes less likely that anyone would anticipate regretting the wrong choice. I chose a draw for \$100 because the amount seemed substantial enough to evoke feelings of regret, and yet also a plausible prize for a study. An alternative would have been a guaranteed monetary prize for each successful participant. However, a smaller prize may not have been sufficient to evoke regret, and a large prize for each participant might have seemed unrealistic and could have raised suspicion in participants, (i.e., if the task were truly solvable, it would be very unlikely that each participant who completed the task would win \$100).

## **Anticipated Emotions**

### **1a) Anticipated regret:**

After reading about the Travel Adventure Task, participants in this condition were asked “Imagine that you are making this decision alone. How much regret would you



Strong preference for making decision as part of a group	Moderate preference for making decision as part of a group	Mild preference for making decision as part of a group	No preference	Mild preference for making decision alone	Moderate preference for making decision alone	Strong preference for making decision alone
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**1c) Regret salient:**

After reading about the Travel Adventure Task, participants in this condition were asked: “If you were to really complete this task and make the decision of how to get back to Canada, would you prefer to make this decision as a group or on your own? Before deciding, please think about the regret you might feel if you were to make the wrong decision, weren’t able to successfully make it back to Canada, and didn’t win the \$100”.

Participants responded using the following scale:

Please circle your preference:

Strong preference for making decision as part of a group	Moderate preference for making decision as part of a group	Mild preference for making decision as part of a group	No preference	Mild preference for making decision alone	Moderate preference for making decision alone	Strong preference for making decision alone
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**Results<sup>4</sup>**

**Anticipated Regret**

The main prediction of Experiment One was that participants would anticipate more regret from failing the Travel Adventure Task alone compared to as part of a group.

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<sup>4</sup> Throughout this dissertation, I have used the term statistically significant to mean having a corresponding p value of less than .05, and marginally significant as having a corresponding p value between .05 and .10.

This hypothesis was supported. A paired sample t-test revealed that participants expected to feel significantly more regret after making a poor decision independently ( $M = 5.17$ ,  $SD = 1.66$ ), as opposed to as when part of a group ( $M = 4.62$ ,  $SD = 1.66$ ),  $t(1, 81) = 2.90$ ,  $p = .005$ .<sup>5</sup>

## Preferences

A second hypothesis was that when possible regret was made salient, participants would show a greater preference for working on the Travel Adventure Task as part of a group than when regret is not made salient. I predicted that making their anticipated regret salient would prompt participants to prefer group decision making so they could reduce personal responsibility for poor decisions. In turn, I expected that feeling less personal responsibility for a poor decision would lead participants to anticipate less regret. This hypothesis was not supported. There was no difference in the preference to work on the task alone or in a group between participants whose possible regret was made salient ( $M = 4.00$ ,  $SD = 2.16$ ) and participants whose possible regret was not made salient ( $M = 3.58$ ,  $SD = 1.96$ ),  $t(72) = .868$ ,  $p = .388$ .

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<sup>5</sup> The order of questions was counterbalanced so that half of the participants were asked about working alone first while the other half were asked about working in a group first. I conducted a mixed 2 (group first / alone first, between) by (group / alone, within) ANOVA. There was a main effect of order such that participants who were asked about working alone first ( $M = 4.78$ ,  $SD = 1.76$ ) reported significantly less regret from working alone than participants who were asked about working in a group first ( $M = 5.58$ ,  $SD = 1.46$ ),  $t(80) = 2.20$ ,  $p = .031$ . Participants in the alone first condition ( $M = 4.14$ ,  $SD = 1.70$ ) also reported significantly less regret from working with a group than participants in the group first condition ( $M = 5.12$ ,  $SD = 1.49$ ),  $t(80) = 2.77$ ,  $p = .007$ . However, there was no interaction between order and group / alone,  $F(1,80) = .26$ ,  $p = .614$ , so the data were collapsed across order.

## Discussion

The main hypothesis of Experiment One was supported. Participants did anticipate more regret from individual as opposed to group failures. I propose that this difference occurs because when participants imagine failing at a task while working as part of a group, at least part of the blame for the failure can easily be placed with their group members. This reduces feelings of personal responsibility for the failure which in turn leads to lower feelings of regret. When participants imagined working alone, there was no one else to blame for the failure so feelings of personal responsibility, and therefore regret, remained high.

The second hypothesis, that making future regret salient would lead to a greater preference for working in a group, was not supported. In retrospect, perhaps the regret salient condition did not make future possible regret salient enough to lead to a greater preference for working in groups in this condition. Participants in the regret salient condition were asked to imagine the regret they would anticipate in both group and individual decision making situations, however, perhaps participants did not take the time to really contemplate their possible regret and simply answered the question.

## Chapter 3

### Experiment Two

I designed Experiment One to show differential anticipation of regret between people failing at a novel task alone or as part of a group. Experiment Two was designed to show that this pattern of differing levels of anticipated regret does not translate into a similar pattern of experienced regret.

Participants in Experiment Two actually completed the Travel Adventure Task the participants imagined in Experiment One, either independently or in small groups, and reported their experienced regret. I predicted that although people anticipated feeling more regret after failing at a task alone rather than in a group, the regret they actually experience would be equivalent. When a failure happens as part of a group, one can reduce some of the feelings of personal responsibility by putting at least some of the blame on the other members of the group. Once the responsibility for the failure is diffused amongst all group members, the regret experienced by each group member may also be reduced. It should be quite easy to blame fellow group members for a failure, so reducing regret this way should occur quite quickly. I hypothesized that the regret experienced by people working in groups would be equivalent regardless of whether they reported their regret immediately following a failure, or after a delay. In both cases, their regret should have been reduced by passing at least part of the blame for the failure onto their group members. In contrast, when someone fails a task alone there is no one else to share the responsibility with, so one might expect the regret experienced to be higher in this situation. However, I predicted that in this situation the psychological immune

system would try to neutralize the threat by rationalizing the failure, leading to a reduction in regret. Because rationalization presumably is not instantaneous, I further predicted that the psychological immune system takes time to reduce regret when a failure occurs when working alone. Therefore, I hypothesized that the regret experienced by people who failed alone, and who reported their regret after a delay, would be no greater than the regret experienced by those who failed at the task as part of a group. In contrast, I predicted that those participants who worked independently but who reported their regret immediately after failing the task, would report higher levels of regret than the other participants because their psychological immune systems would not have had time to process their regret.

To summarize, participants worked on the Travel Adventure Task either alone or in small groups. Participants then reported their regret either immediately or after a delay.

I predicted that there would be an interaction between condition (working alone versus in a group) and delay (delay versus no delay) such that participants in the alone no delay condition would report significantly more regret than the participants in the other three conditions.

## **Methods**

Participants were students in the introductory psychology course at Queen's University and were recruited either via phone or e-mail to participate in a study concerning decision making skills.

Participants were 253 undergraduates (203 women and 50 males; mean age: 18.29 years). They were randomly assigned to participate either alone or in groups. When

participants arrived at the lab, either alone, or in small groups of 2 to 5 people, the experimenter explained the details of the study and handed out the Letter of Information and Consent. The experimenter explained that the study was about decision making skills and that they would be working on a decision making task and filling out some questionnaires. After completing the Letter of Information and Consent Form (see Appendix A), participants were told about the Travel Adventure Task. The experimenter explained that although the task was tricky, most participants were able to successfully complete the task within the time limit. This was meant to increase the regret that participants experienced by reducing the blame that could be attributed to the task itself. The experimenter also told participants that if they were successful at the task, their name would be entered into a draw for \$100. For participants in the group condition, it was made clear that each participant could win \$100 individually, and not split the money amongst all group members. The experimenter added “so you could each win \$100”. Offering a possible reward was meant to keep the participants engaged in the task and heighten the regret they would experience.

After hearing about the task, participants were given a list of several flights to and from various destinations around the world at varying prices (see Appendix B). They tried to find a route that would lead them home while staying on budget. In order for all participants to experience regret the task was rigged to be impossible – there was no way to get from their starting destination home while staying on budget. Having a very long list of flights to choose from and putting a time constraint on the task made it less likely that participants would figure out the task was impossible. Participants in the group condition worked on the task with the other participants in their group, whereas the

participants in the alone condition worked on the task alone. After participants had been working on the Travel Adventure Task for ten minutes, the experimenter explained that time was up and unfortunately the participants had failed the task, and would not be entered into the draw for \$100. The experimenter then told participants that for the second half of the study they would be completing some questionnaires. Participants in the group condition were placed at separate tables to ensure privacy.

Half of the participants in both the alone and group conditions were randomly assigned to report their regret immediately after completing the Travel Adventure Task. The other half of the participants completed filler tasks (see Appendix C) for approximately 10 minutes before reporting their regret. The reason for this was to allow time for the psychological immune system to reduce the threat associated with the poor decision they just made, and thus the regret they were experiencing. Questionnaires were chosen as filler tasks so that participants would still have enough cognitive ability for the psychological immune system to function.

To maintain the perception that the task was possible, the questionnaires about their regret were phrased in a way that implied that the outcome of the task was not rigged and asked both about success and failure. Participants were also asked about their feelings of personal responsibility for the outcome of the task. Participants were given the following questions:

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Were you / Was your group successful at the task? Y \_\_\_\_\_ N \_\_\_\_\_

If you / your group was not successful at the task and lost your chance to win the \$100, please indicate how much regret you feel.



- \_\_\_\_\_ Your other group members (only in group condition)
- \_\_\_\_\_ The experimenter
- \_\_\_\_\_ The task
- \_\_\_\_\_ Other (please specify) \_\_\_\_\_

Please reflect on the Travel Adventure Task you just completed and which factors played a role in your success or failure. Please elaborate on how these factors contributed to your success or failure. Discuss how one or two of these factors played a role in the task. If you were to complete the task again, what would you do the same, and what would you do differently?

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After completing the measures, participants were debriefed, thanked, compensated, and given the Feedback Letter (see Appendix D).

## **Results**

### **Comparing Anticipated Regret (Experiment One) and Actual Regret (Experiment Two)<sup>6</sup>**

Recall that in Experiment One, participants were asked to report how much regret they anticipated from failing the Travel Adventure Task when working alone as well as when working as part of a group. Participants in the current study actually worked on the Travel Adventure Task alone or in groups and reported the regret they were experiencing in those situations. Table 1 shows the anticipated regret of participants in Experiment One and the experienced regret of participants in Experiment Two.

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<sup>6</sup> When interpreting these results, the reader should bear in mind that I am comparing across two studies, and while random assignment occurred within each study, participants were not randomly assigned to be either anticipators (Experiment One) or experiencers (Experiment Two).

Table 1

*Mean anticipated and experienced regret of participants who imagined or actually worked alone or in groups. Standard deviations are presented in parentheses.*

	Anticipated	Experienced
Alone	5.17 (1.66)	2.93 (1.73)
Group	4.62 (1.67)	2.60 (1.51)

I conducted a 2 (alone / group) x 2 (Experiment One / Experiment Two) factorial design. Among the participants of both Experiments One and Two, there was a main effect of alone versus group condition, such that participants reported higher levels of anticipated and experienced regret for an individual failure ( $M = 3.77$ ,  $SD = 2.02$ ) compared to a group failure ( $M = 3.44$ ,  $SD = 1.86$ ),  $F(1, 413) = 7.13$ ,  $p = .008$ . There was also a main effect of experiment such that participants in Experiment One reported higher levels of anticipated regret ( $M = 4.90$ ,  $SD = 1.68$ ) compared to experienced regret ( $M = 2.78$ ,  $SD = 1.64$ ),  $F(1, 413) = 165.63$ ,  $p < .001$ . It is not surprising that the anticipators in Experiment One reported higher levels of regret than the experiencers in Experiment Two, as past studies have shown that people are not accurate at predicting, and often overestimate, their future regret (Gilbert et al., 2004). There was no significant interaction between condition and study on levels of regret,  $F(1, 413) = 0.418$ ,  $p = .518$ .

### **Comparing Differences in Experienced Regret Between Groups and Individuals Who Reported Regret After a Delay or No Delay**

I conducted a 2 (alone / group) x 2 (Experiment One / Experiment Two) by 2 (male / female) factorial design. There was a main effect of gender such that women ( $M = 2.89$ ,  $SD$

= 1.67) reported significantly more regret than men ( $M = 2.35$ ,  $SD = 1.49$ ),  $F(1, 247) = 4.18$ ,  $p = .042$ . Among the male participants, there was no main effect of condition (alone/group),  $F(1, 45) = 0.26$ ,  $p = .611$  or delay (delay/no delay),  $F(1, 45) = 0.367$ ,  $p = .548$ , and no interaction between the two,  $F(1, 45) = 0.106$ ,  $p = .746$ . Because there was no significant interaction with gender, for the rest of the analyses, I collapsed across gender.

Among all participants, there was a marginal difference between the regret experienced by participants who completed the Travel Adventure Task independently ( $M = 2.93$ ,  $SD = 1.75$ ) and those who completed the task in groups ( $M = 2.60$ ,  $SD = 1.51$ ),  $F(1, 247) = 3.20$ ,  $p = .075$ . At first glance, this result seems inconsistent with my prediction that the psychological immune system would work to equalize the regret experienced by participants in both the individual and group conditions. However, this difference in regret between participants in the group and individual conditions seems to be driven by the critical (individual no delay) condition, as discussed below.

Table 2

*Mean regret scores as a function of condition and delay, with standard deviations in parentheses.*

	Group	Alone	Total
Delay	2.56 (1.58)	2.49 (1.63)	2.52 (1.60)
No Delay	2.64 (1.45)	3.40 (1.73)	3.05 (1.64)
Total	2.60 (1.51)	2.93 (1.75)	

There was a main effect of delay,  $F(1, 247) = 6.05$ ,  $p = .015$ . Participants who reported their regret immediately after completing the Travel Adventure Task ( $M = 3.05$ ,

$SD = 1.64$ ) differed significantly in their levels of regret from participants who reported their regret after a delay ( $M = 2.52, SD = 1.60$ ).

Most relevant to my hypotheses, the was the interaction between condition (group / individual) and delay (delay / no delay),  $F(1, 247) = 3.81, p = .052$ . My prediction was that initially participants in the individual condition would experience more regret than participants in the group condition due to increased feelings of personal responsibility. However, I also predicted that the psychological immune system would work harder in the individual condition to reduce the regret to be equal to the regret experienced by the participants in the group condition, and that this process would take time. Therefore, when participants in the individual condition reported their regret immediately after completing the task, they should have experienced more regret than the participants in the group condition because the psychological immune system would not have had time to reduce their regret. This prediction was supported. For participants in the individual condition, those who reported their regret immediately ( $M = 3.40, SD = 1.73$ ) felt significantly more regret than those who reported their regret after a delay ( $M = 2.49, SD = 1.63$ ),  $t(136) = 3.18, p = .002$ . In contrast, for the participants in the group condition, those who reported their regret immediately ( $M = 2.64, SD = 1.45$ ) reported equal levels of regret compared to those who reported their regret after a delay ( $M = 2.56, SD = 1.58$ ),  $t(113) = 0.27, p = .787$ .

Looking at the data in a different way, for participants who reported their regret immediately, those in the individual condition reported significantly more regret than those in the group condition,  $t(123) = 2.66, p = .009$ . For participants who reported their

regret after a delay, those in the individual condition did not differ in their levels of regret compared to those in the group condition,  $t(126) = 0.24, p = .811$ .

### **Comparison of Feelings of Personal Responsibility**

In addition to reporting their regret, participants were also asked to report how much personal responsibility they felt for their or their group's failure at the Travel Adventure Task. As expected, a 2 (alone / group) x 2 (delay / no delay) analysis revealed a main effect of condition on feelings of personal responsibility. Participants who worked alone ( $M = 5.34, SD = 1.52$ ) reported significantly higher levels of personal responsibility compared to those who worked in groups ( $M = 3.63, SD = 1.31$ ),  $F(1, 225) = 80.53, p < .001$ . There was a marginal main effect of delay and the participants who reported their regret immediately after the task ( $M = 4.35, SD = 1.66$ ) reported marginally less personal responsibility than participants who reported their regret after a delay ( $M = 4.73, SD = 1.65$ ),  $F(1, 225) = 2.84, p = .093$ . The interaction between condition and delay was not significant,  $F(1, 225) = 0.79, p = .780$ . Table 3 shows the mean levels of feelings of personal responsibility in each condition.

Table 3

*Mean personal responsibility scores with standard deviations in parentheses.*

	Group	Alone	Total
Delay	3.81 (1.29)	5.46 (1.54)	4.73 (1.65)
No Delay	3.44 (1.32)	5.20 (1.51)	4.35 (1.66)
Total	3.63 (1.31)	5.34 (1.52)	

In comparing the regret and personal responsibility felt by participants in each condition, it might be noted that the condition with the highest level of regret (alone / no delay) was different than the condition with the highest level of personal responsibility

(alone / delay), however the responsibility of the participants in the alone / no delay condition did not differ from the participants in the alone / delay condition ( $t(121) = .964$ ,  $p = .337$ ). Table 4 shows that there was a small but significant correlation between regret and personal responsibility for participants in the alone condition, however, regret and responsibility were not significantly related for the participants in the group condition. The only correlations that differed significantly were the alone / no delay ( $r(56) = .356$ ,  $p = .007$ ) and the group / no delay conditions ( $r(67) = -.019$ ,  $p = .899$ ),  $z = 2.11$ ,  $p = .0349$ . It is not surprising that there was a significant correlation between regret and responsibility in the alone / no delay condition because those participants had not yet had the opportunity to reduce their regret, and both regret and responsibility were quite high. However, in the other conditions, participants had already reduced their regret. For participants in the group conditions, it could be the case that reducing their feelings of personal responsibility did not lead to an equivalent decrease in regret, which might account for the low correspondence between regret and responsibility in those conditions. These correlations will need to be replicated before strong conclusions can be drawn.

Table 4

Correlations between feelings of regret and personal responsibility.

Condition	Correlation between regret and responsibility
Alone No Delay	$r = .356$ $p = .007$ $n = 56$
Alone Delay	$r = .221$ $p = .073$ $n = 67$
Group No Delay	$r = -.019$ $p = .899$ $n = 52$
Group Delay	$r = .214$ $p = .121$ $n = 54$
Alone	$r = .253$ $p = .005$ $n = 123$
Group	$r = .091$ $p = .352$ $n = 106$
Delay	$r = .240$ $p = .012$ $n = 108$
No Delay	$r = .178$ $p = .051$ $n = 121$

### Group Size

Participants in the group condition were run in groups of 2 to 5 members with the mean group size being 2.67 members ( $SD = 0.75$ ). Research on diffusion of responsibility shows that this phenomenon increases with the size of the group (e.g., Darley & Latané, 1968; Freeman, Walker, Borden, & Latané, 1975), so it is possible that group size had an effect on the regret or personal responsibility felt by participants in the current study. Group size was not strongly correlated with either regret ( $r(113) = .053, p$

=.574,) or responsibility ( $r(106) = -.157, p = .108$ ). A regression analysis including group size, delay, and the interaction between group size and delay as predictors and regret as the dependent variable shows that neither group size ( $\beta = .187, p = .146$ ), delay ( $\beta = .486, p = .175$ ), nor their interaction ( $\beta = -.570, p = .134$ ) predicted regret. A regression analysis with the same predictors and personal responsibility as the dependent variable shows that group size ( $\beta = -.227, p = .088$ ) marginally predicted feelings of personal responsibility but delay ( $\beta = -.041, p = .909$ ) did not. The interaction between group size and delay ( $\beta = .222, p = .557$ ) also did not predict personal responsibility. Group size seemed to have a marginal effect on feelings of personal responsibility, but not regret. For the purpose of my thesis, it is important to note that there was no interaction between group size and delay on either personal responsibility or regret.

### **Ranking of Factors That Influenced Performance**

Participants were given a list of factors that might have influenced their performance on the task (self, group (in group condition only), experimenter, the task, and “other”) and ranked them in order of influence. I predicted that participants in the alone conditions would more frequently rank themselves as having the biggest influence on their failure in relation to the participants in the group conditions. This prediction was supported. Participants in the alone condition ranked “self” as the most influential factor 57.8 % of the time, while participants in the group condition ranked “self” as the most influential factor significantly less with only 16.0 percent of the time ( $\chi^2(1, N = 253) = 36.10, p < .001$ ). I further predicted that participants in the group condition would rank their group members as most influential quite frequently. Participants ranked their group members as being most influential 8.5 % of the time. Obviously, comparisons cannot be

made on this factor between participants in the group and alone conditions because only participants in the group condition had group members to rank.

The task itself was also ranked first quite frequently. Participants in the alone condition ranked the task first 25.9% of the time which was significantly less frequently than participants in the group condition 46.8% ( $\chi^2(1, N = 253) = 8.27, p = .004$ ). The experimenter was ranked first by only 1.7% of participants in the alone condition and 4.3% of participants in the group condition. “Other” was ranked as most influential by 13.8% of participants in the alone condition and 24.5% of participants in the group condition.

Overall, participants seemed to view themselves and the task as the most important factors in their failure. As predicted, the participants in the alone condition were more likely to rank themselves as playing the biggest role in their failure, whereas participants in the group condition seemed to feel that the task itself played the biggest role.

### **Open Ended Responses**

In addition to ranking the factors that influenced their performance, participants were also asked to briefly elaborate on those factors and to discuss what they would do the same and differently if they were to complete the task again in the future. These statements were coded into 12 categories by two independent raters (kappa = .80). Disagreements were settled by discussion. The results of the coding can be found in Table 5. By far the most frequent response in all conditions was comments on specific strategies used. Almost all participants discussed the strategies they used or the strategies they would adopt if they were to complete the task again. Participants in the group

condition had a higher proportion of statements in this category than did participants in the alone condition ( $\chi^2(1, N = 274) = 8.48, p = .004$ ). Participants also mentioned the task and the time limit quite frequently. Many participants suggested that they (or their group) would have been successful if they had just been given a bit more time.

Participants in the alone and group conditions did not differ in the proportion of responses in this category ( $\chi^2(1, N = 274) = 1.08, p = .298$ ). Participants also commented that the task was very challenging and wished that the flights had been organized in some sort of logical order. Participants in the alone condition did not give a greater proportion of responses in this category than participants in the group condition ( $\chi^2(1, N = 274) = 0.83, p = .363$ ). Participants also made several negative comments about themselves, suggesting that they contributed to their (or their group's) failure. The proportion of responses in this category did not differ by condition ( $\chi^2(1, N = 274) = .04, p = .845$ ).

Participants made very few positive comments about themselves, such as suggesting that they failed despite their hard work or skills. Participants in the group condition made both negative and positive comments about their group and its individual members. Few participants mentioned anxiety, stress, pressure, or feeling overwhelmed as reasons for failing the task. Three of the participants in the individual condition commented that the experimenter played a role in their failure, mostly suggesting that when the experimenter mentioned that many other people completed the task, it made them feel a need to succeed. One participant in the group condition mentioned that they would have preferred to work on the task alone, rather than in a group. There were a few comments that mentioned factors that contributed to the failure but which could not be coded into

Table 5

Coding of open-ended responses. Number of responses in each category (percentages in parentheses).

Category	Individual No Delay	Individual Delay	Group No Delay	Group Delay	Example
Strategy	29 (54.7)	30 (60.0)	39 (42.9)	28 (35.0)	"If I were to complete the task again, I would write down all the flights leaving Auckland and all the flights arriving in Kingston, and map out different options between them."
Task	3 (5.7)	6 (12.0)	12 (13.2)	9 (11.2)	"The task wasn't the easiest thing in the world."
Time	5 (9.4)	3 (6.0)	11 (12.1)	9 (11.2)	"The time constraint was the only factor that I feel hindered my group. We would have been able to complete the task given (sic) we had five more minutes or so."
Self (neg.)	8 (15.1)	3 (6.0)	7 (7.7)	10 (12.5)	"I felt like I let them down a bit."
Self (pos.)	0 (0)	2 (4.0)	0 (0)	3 (3.8)	"If I did it again, I'm pretty sure I could get it right ☺"
Group (neg.)	n/a	n/a	9 (9.9)	8 (10.0)	"No clear leadership."
Group (pos.)	n/a	n/a	5 (5.5)	5 (5.0)	"My partner and I worked really well together so that didn't have any affect on the outcome of the task."
Anxiety/stress	3 (5.7)	2 (4.0)	1 (1.1)	1 (1.2)	"Felt stressed and jumped into it."
Experimenter	1 (1.9)	2 (4.0)	0 (0)	0 (0)	"The experimenter led me to believe that many others had completed this task and therefore I was expected and motivated to try at least."
Want to work alone	n/a	n/a	1 (1.1)	0 (0)	"Would have rather done the study on my own."
Other	0 (0)	2 (4.0)	6 (6.6)	3 (3.8)	"I did not know there were flights listed on the back side of the page."
N/A	4 (9.4)	0 (0)	0 (0)	4 (5.0)	"Don't know what I would do differently."
Total	53	50	91	80	

any of the previous categories. They are listed as “Other” in Table 5. Most of these comments related to participants not realizing that the list of flights was printed on both sides of the paper. The last category, “N/A” contained comments that did not discuss a factor that contributed to the failure or were neutral about what would be done differently or the same if the task was repeated. There were too few responses in the following categories to compute a chi square: self (pos), anxiety/stress, experimenter, want to work alone, other, and N/A.

In the open-ended responses participants most frequently discussed the specific strategies they used or would use again during the task. They also made several comments on how they themselves had contributed to their failure, although unlike the rankings discussed above, the frequency of the negative comments on the self did not differ by condition. So, even though participants in the alone condition ranked themselves as being the biggest factor in their failure more frequently than participants in the group condition, they did not seem to write about this fact to any greater extent than the participants in the group condition.

## **Discussion**

In Experiment Two I showed that although people may anticipate more regret from working on a task alone compared to working as part of a group, the regret that they actually end up experiencing is equivalent in those situations. This finding is qualified by the fact that the psychological immune system takes time to reduce levels of regret and so the elimination of the differential levels of regret was only found when participants reported their regret after a delay. When regret was reported immediately, there was not

sufficient time for the psychological immune system to work, and so regret levels remained higher in the alone condition compared to the group condition.

The results of the ranking measure also supported the prediction that participants in the alone conditions felt more personal responsibility than participants in the group conditions. Participants in the alone conditions ranked “self” as being the most influential factor far more often than did participants in the group conditions. Again, this suggests that because participants in the group condition have group members with whom the blame can be shared, they feel less personal responsibility for the failure. I further predicted that participants in the group conditions would rank “group” as being most influential quite frequently. Because they have others who can help share the blame, I predicted this would have been reflected in the rankings. Although there is no basis for comparison, the ranking of “group” was quite low among the participants in the group conditions. The most frequent response among participants in the group conditions was “task”.

In addition to ranking the factors that influenced their failure, participants also briefly discussed these factors as well as what they would do differently if they were to attempt the task again in the future. I predicted that participants in the alone condition would mention more frequently, compared to participants in the group condition, factors related to themselves that contributed to their failure. As with the rankings discussed above, I predicted that participants in the alone condition would feel greater personal responsibility for the failure and so would see themselves as more influential in contributing to the failure. This hypothesis was not supported in the open-ended

responses. Participants in the alone and group conditions mentioned negative comments about themselves equally frequently. It seems that although the direct measure of feelings of personal responsibility indicate that participants in the alone condition experienced significantly more personal responsibility than those in the group condition, participants were not more likely to describe these feelings in their open-ended responses. Only ten percent of participants in the group condition mentioned negative comments about their group or individual group members. Because participants in the alone condition obviously did not have group members to discuss, it is impossible to make comparisons between conditions. However, as with the ranking data, I was surprised that participants in the group condition did not make more disparaging remarks about their groups. I predicted that participants in the group condition would have passed at least part of the blame for the failure onto their group members in order to reduce feelings of personal responsibility, and ultimately regret. After participants place the blame for the failure onto their group members, it seems logical that when discussing factors that contributed to the failure, the group members would be mentioned frequently by participants in the group condition. This however, was not the case. It is possible that even if participants were thinking that their fellow group members were to blame for the failure, politeness or social desirability, a tendency to portray oneself favourably (Holden, 2001), may have prevented them from writing these feelings down. Participants may not have wanted to seem petty or mean in the eyes of the experimenter and so did not express any negative sentiments toward their fellow group members.

## **Chapter 4**

### **Experiment Three**

Experiments One and Two showed that although participants anticipated more regret from an individual as opposed to a group failure, the regret they experienced in these situations was equal, given enough time for the psychological immune system to work. One potential limitation of Experiments One and Two is that while participants in Experiment Two reported their regret after two time intervals (either immediately after failing the task, or after a 10 minute delay), participants in Experiment One were not given such time frames when reporting their anticipated regret, and so I cannot know exactly what time frame they were imagining. It could be argued that if participants in Experiment One were asked to estimate what their regret would be 10 minutes after the failure, they might have responded differently than they would have if they estimated their regret immediately after the failure. If it turned out that participants anticipate different levels of regret when imagining how they would feel immediately after the failure, but that participants show no differences in regret when estimating it after a 10 minute delay, then the conclusions drawn from Experiments One and Two can be called into question. In order to determine if participants' estimates of regret differ when they imagine their regret immediately after a failure or after a delay, Experiment One was replicated and participants were asked to imagine how much regret they would be experiencing either 30 seconds or 10 minutes after failing the task.

## Methods

Because this study was so short, it was run in conjunction with other, unrelated studies and the materials were given to participants at the end of the experimental sessions, or as a filler task. Sixty female participants<sup>7</sup> (mean age: 18.67) read the same description of the Travel Adventure Task that participants in Experiment One read. Participants were randomly assigned to one of two between-subjects conditions; estimating how much regret they would feel either 30 seconds after failing the Travel Adventure Task or 10 minutes after failing the task. Within each of these conditions participants were asked to imagine failing that task while working both alone and as part of a group. Participants then reported how much regret they would feel in each of those situations (alone or in a group) using the same 7-point scale used in Experiment One. Participants were given the following questions, counterbalanced for order:

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Imagine that you are making this decision **alone**. How much regret would you anticipate feeling 10 minutes (30 seconds) after you found out you were unsuccessful in finding your way back to Canada, and you didn't win the \$100.

1	2	3	4	5	6	7
No regret						Extreme regret

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<sup>7</sup> This study was run in conjunction with other, unrelated studies, which happened to run only female participants.



in the 10 minute condition (alone:  $M = 5.1$ ,  $SD = 1.94$ ; group:  $M = 4.33$ ,  $SD = 1.56$ ),  $F(1, 58) = 0.60$ ,  $p = .441$ . There was no interaction between condition and time manipulation,  $F(1, 58) = 0.60$ ,  $p = .441$ .<sup>8</sup>

## Discussion

In Experiment One, participants were not given a precise time frame when asked to imagine their levels of future regret, and so it cannot be determined how far into the future they were actually imagining. This posed a problem when trying to compare the results of Experiment One and Experiment Two. It is possible that participants in Experiment One were imagining how they would feel immediately after failing the Travel Adventure Task, when they anticipated more regret from an individual as compared to group failure. However, it is possible that if participants in Experiment One were asked to estimate how much regret they would feel after a delay equivalent to the length of delay used in Experiment Two (approximately 10 minutes), they would report a different pattern of regret. If it turned out that participants anticipated different levels of regret from individual and group failures when imagining their immediate response, but anticipated equivalent levels of regret when imagining their emotions after a delay, then

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<sup>8</sup> The order of questions was counterbalanced so that half of the participants were asked about working alone first while the other half were asked about working in a group first. I conducted a mixed 2 (group first / alone first, between) by (group / alone, within) ANOVA. There was no main effect of order. Participants who were asked about working alone first (alone:  $M = 4.90$ ,  $SD = 1.94$ ; group:  $M = 4.29$ ,  $SD = 1.72$ ) reported regret equivalent to that of participants who were asked about working in a group first (alone:  $M = 5.10$ ,  $SD = 1.72$ ; group:  $M = 4.55$ ,  $SD = 1.48$ ),  $F(1,58) = 0.38$ ,  $p = .543$ . There was a main effect of alone/group such that regardless of which order participants reported their anticipated regret, participants expected more regret from working alone ( $M = 5.00$ ,  $SD = 1.82$ ) than from working in a group ( $M = 4.42$ ,  $SD = 1.60$ ),  $F(1,58) = 6.00$ ,  $p = .017$ . However there was no interaction between alone/group and order,  $F(1,58) = 0.02$ ,  $p = .898$ , so the data were collapsed across order

Experiments One and Two would show only that participants end up feeling precisely what they anticipate.

In order to show that participants do in fact incorrectly predict their future regret, I replicated Experiment One and asked participants to predict what their future regret would be either immediately after failing the task or ten minutes after the failure. No effect of time manipulation was found, suggesting that participants anticipated more regret from an individual as compared to group failure regardless of whether they imagined how they will feel 30 seconds or 10 minutes after the failure. These results indicate that any differences found between Experiments One and Two are not due to participants in these experiments imagining (or experiencing) different timelines.

## **Chapter 5**

### **Experiment Four**

The first three studies showed that although participants anticipated more regret from an individual failure as compared to a group failure, the regret they actually experienced in these two situations is equal. The following studies examined the differences in anticipated and experienced regret in participants who failed at a task when working with either an in-group or out-group partner. Similar to my predictions in Experiments One and Two, the prediction of the following studies was that participants would anticipate different levels of regret in the in-group and out-group conditions, but the regret actually experienced in these two conditions would be equal. I hypothesized that participants would anticipate more regret when a failure happened while working with an in-group partner as compared to when partnered with an out-group member. My reasoning was that participants would feel worse about a negative outcome for an in-group partner (i.e. their partner missing out on the \$100 draw) compared to an out-group partner. There have been a number of studies that support my prediction.

Past research has shown that we tend to like those who are similar to ourselves (Newcomb, 1961) and we tend to perceive ourselves as more similar to in-groups than out-groups. According to social identity theory (Tajfel & Turner, 1979) we favour in-groups over out-groups in order to maintain and enhance our self-esteem. When someone experiences a failure, this could be a blow to their self-esteem, which might motivate them to show greater in-group favouritism in order to boost their deflated self-

esteem. If the failure occurs when working with an in-group or out-group partner, one might feel a greater sense of closeness to in-group partners and a desire to distance themselves from out-group partners. These enhanced feelings of closeness and distance could then lead one to feel worse about the negative outcome happening to a close in-group member, and feeling less bad about the negative outcome happening to a distant out-group member. This reasoning suggests that participants would feel less regret when a failure happens while working with an out-group as compared to an in-group partner.

A second line of research that supports my hypothesis comes from Connolly and Zeelenberg's (2002) decision justification theory which argues that regret has two components: self-blame and evaluation of the outcome. In Experiment Two participants in the alone conditions felt more regret than those in the group condition because they had no one to blame for the failure other than themselves. This led to greater feelings of self-blame for participants in the alone condition. In the following studies however, all participants worked with a partner and so they were all able to pass some responsibility for the failure to their partners. This should have left the self-blame component of regret equivalent across the in and out-group conditions. This leaves the evaluation of outcome component of regret to vary across conditions. I predicted that participants in the in-group partner condition would anticipate more regret than participants in the out-group partner condition because the outcome would be viewed as worse when something negative happens to an in-group as opposed to out-group member. The amount of regret felt should correspond to how negative the outcome was, and participants should have

perceived the outcome as more negative when a member of their own group also experienced the failure.

As well, when an out-group member experiences a loss or failure, people might feel a bit of Schadenfreude, and this may lead them to feel less negatively about the outcome, and in turn, anticipate less regret. Schadenfreude is feeling pleasure over someone else's misfortune or suffering. Schadenfreude is higher when someone is responsible for their own setback (van Dijk, Ouwerkerk, Goslinga, & Nieweg, 2005). The ultimate attribution error (Pettigrew, 1979) might predict that participants would view their partner as being more personally responsible for losing out on the \$100 prize when their partner is an out-group as opposed to an in-group member. This increased perceived responsibility might then in turn lead them to feel greater Schadenfreude when paired with an out-group partner compared to an in-group partner. Schadenfreude occurs more when a setback happens to someone we envy (Smith, Turner, Garonzik, Leach, Urch-Druskat, & Weston, 1996), someone we dislike (Hareli & Weiner, 2002), or someone we resent (Feather & Sherman, 2002), and also when the setback is in a self-relevant domain (Leach, Spears, Branscombe, & Doosje, 2003). In the present studies it is unlikely that participants felt any particular envy, dislike, or resentment toward their partners, even if those partners were out-group members. (In the current studies, I defined an in-group partner as someone who lived in the participant's own residence building on campus, and an out-group member as someone who lived in a different residence building on campus). Students may bond more closely with other students who live in their particular residence building, but don't generally feel antagonistic toward those in

other residences. In other situations, however, Schadenfreude may play a greater role. For example, if in-groups and out-groups are comprised of groups more associated with one's social identity (e.g., fans of rival sports teams) or values (e.g., Liberals vs. Conservatives), Schadenfreude might contribute to greater anticipated regret when participants are partnered with in-group as opposed to out-group members.

In Experiment Four, participants read the same description of the Travel Adventure Task used in Experiment One. Half of the participants reported which scenario they anticipated would lead to more regret, working with an in-group or an out-group member. The other half reported their preference for working on the task with either an in-group or out-group partner, and their regret was either made salient or was not mentioned. I predicted that participants would anticipate more regret from a failure that occurred when working with an in-group as compared to an out-group partner. I further predicted that participants would show a greater preference for working with an out-group partner when their potential regret was made salient. As in Experiment One, I predicted that when regret was made salient participants would show a greater preference for the least regretful choice, which I hypothesized would be working with an out-group partner. When participants are thinking about the regret they will feel if they fail the task, they should want to avoid this negative emotion and choose the option that will lead to the least amount of regret.

For the following two studies I defined an in-group partner as someone who lived in the participant's own residence building on campus, and an out-group member as someone who lived in a different residence building on campus. I chose to define my

conditions in this way because residency lends itself to an easily operationalized and identified variable. Most first year students at Queen's (who make up the majority of my participant population) live in on-campus residences. During Orientation Week students are grouped together based on their residence building and participate in activities and get-to-know-you events with the other first year students in their residence building. This helps to build a sense of community among students in a particular residence and can foster a sense that the students in their building being an in-group. Research has also shown that in-groups and out-groups can be established with minimal distinction between groups. Tajfel (1970) showed that something as inconsequential as whether someone over or under-estimates the number of dots shown during a study is enough to create a sense of in-group and out-group. These minimal groups were also powerful enough to produce ingroup favouritism, the tendency to discriminate in favour of the in-group over the out-group (Tajfel, 1970).

## **Methods**

Because this study is so short, it was run in conjunction with other, unrelated studies and the materials were given to participants at the end of the experimental sessions, or as a filler task. In this study all participants lived in one of several on-campus residence buildings at Queen's University. Participants were asked on the questionnaire which residence building they lived in. If they reported that they did not live in a residence building their data was not included in any analyses. In-group members were defined as a partner who lived in the same residence building as the

participant, and out-group members were defined as a partner who lived in a different residence building as the participant.

One hundred and sixty-seven participants who were enrolled in the introductory psychology course at Queen's University were recruited via phone and e-mail. The reader should bear in mind when interpreting the results, that because this study was run in conjunction with other, unrelated studies, data on gender and age are unavailable for these particular participants. However, because these participants were recruited from the same general population of students as the participants in the other studies in this line of research, there is no reason to expect that they differ markedly from the other samples. Participants read the same description of the Travel Adventure Task that participants in Experiment One read. Participants were randomly assigned to one of three conditions.

### **Anticipated Emotions**

#### **4a) Anticipated regret questionnaire one:**

In the first condition participants were given the following instructions after reading about the Travel Adventure Task:

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Imagine that in one scenario you are working with a partner who lives in your residence, in another scenario you are working with a partner who lives in a different residence. Try to visualize each of these scenarios.

Now imagine that in each of these two scenarios the wrong decision is made, you and your partner were unsuccessful in finding your way back to Canada, and you didn't win the \$100. Try to visualize this scenario happening with both a partner from your residence and a partner from a different residence, and think about the regret you would feel in each situation.

In which scenario would you feel more regret, if you worked with a partner who lived in your residence, or a partner who lived in a different residence? Please circle your choice.

Much more regret if my partner lived in my residence	Moderately more regret if my partner lived in my residence	Slightly more regret if my partner lived in my residence	Equal amounts of regret	Slightly more regret if my partner lived in a different residence	Moderately more regret if my partner lived in a different residence	Much more regret if my partner lived in a different residence
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Participants were then asked to briefly explain their choice.

**4b) Anticipated regret questionnaire two:**

In order to determine the robustness of the effect, I measured anticipated regret using a second method. Participants randomly assigned to this condition read the same instructions as the participants in the previous condition, but indicated their level of anticipated regret by placing a tick along a line.

In this second condition participants were given the following instructions after reading about the Travel Adventure Task:

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Imagine that in one scenario you are working with a partner who lives in your residence, in another scenario you are working with a partner who lives in a different residence. Try to visualize each of these scenarios.

Now imagine that in each of these two scenarios the wrong decision is made, you and your partner were unsuccessful in finding your way back to Canada, and you didn't win the \$100. Try to visualize this scenario happening with both a partner from your residence and a partner from a different residence, and think about the regret you would feel in each situation.

In which scenario would you feel more regret, if you worked with a partner who lived in your residence, or a partner who lived in a different residence? Please indicate your response by placing a tick along the line.

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Participants then indicated their response by placing a tick along a line 151 mm long anchored by “much more regret if my partner lived in my own residence” at one end and “much more regret if my partner lived in a different residence” at the other end.

Participants were then asked to briefly explain their choice.

## **Preferences**

### **4c) Regret not salient:**

Participants in this condition also read the description of the Travel Adventure Task. They were then given the following instruction

“If you were to really complete this task with a partner, and make the decision of how to get back to Canada, would you prefer to work with a partner who lives in the **same** residence as you, or would you prefer to work with a partner who lives in a **different** residence?”

Participants then reported their preference using the following scale:

Strong preference for working with a partner from your own residence	Moderate preference for working with a partner from your own residence	Mild preference for working with a partner from your own residence	No preference	Mild preference for working with a partner from another residence	Moderate preference for working with a partner from another residence	Strong preference for working with a partner from another residence
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Participants were then asked to briefly explain their choice.

**4d) Regret salient:**

Participants in the regret salient condition were given the following additional instructions. Because my regret salience manipulation was unsuccessful in Experiment One, I wanted to try to ensure that participants really paid attention to the instructions regarding imagining their future regret. Therefore, for Experiment Four, the regret salient instructions were bolded and placed in a separate paragraph:

**“Please take a moment to focus on all the regret you would feel if you and your partner were to make the wrong decision, you weren’t able to successfully make it back to Canada, and you didn’t win the \$100.”**

All participants then reported their preference using the same scale as above.

Participants were then asked to briefly explain their choice.

## Results

### Anticipated Regret (Questionnaire One)

I conducted a one sample t-test to determine whether participants anticipated more regret from failing the Travel Adventure Task when working with an in-group or out-group partner. I compared participants' mean score on the scale to a score of 4, the midpoint on the scale, representing equal amounts of regret from working with a partner from the same or a different residence. Participants reported their responses on a rating scale ranging from 1 (much more regret if my partner lived in my residence) to 7 (much more regret if my partner lived in a different residence). As predicted, participants anticipated significantly more regret when working with a partner from their own residence as opposed to a working with a partner from a different residence ( $M = 3.33$ ,  $SD = 1.49$ ,  $t(23) = 2.19$ ,  $p = .039$ ).

### Anticipated Regret (Questionnaire Two)

In order to show the robustness of the effect, I measured anticipated regret using a second scale. Participants reported their response by placing a tick along a 151 mm long line. Responses less than the midpoint of 75.5 mm indicated anticipating more regret from working with an in-group+ partner, while responses greater than the midpoint of 75.5 mm indicated anticipating more regret from working with an out-group partner. I conducted a one sample t-test to determine whether participants anticipated more regret from failing the Travel Adventure Task when working with an in-group or out-group partner. I compared participants' mean score on the scale to a score of 75.5, the midpoint

of the scale, representing equal amounts of regret from working with a partner from the same or a different residence. Just as with the previous questionnaire, in this condition participants also anticipated significantly more regret from working with an in-group as opposed to an out-group partner,  $M = 58.11$ ,  $SD = 7.48$ ,  $t(22) = 2.33$ ,  $p = .030$ .

### **Explanation of Choice**

After reporting their regret, participants in both of the anticipated regret conditions were asked to briefly explain their choice. Responses were coded into seven categories by two independent raters ( $\kappa = .78$ ) (see Table 6). Disagreements were resolved through discussion. The most common response category was that a partner's residence had no impact on feelings of anticipated regret. The second most common response was that working with an in-group partner would cause more regret because the participant would have to see that person frequently and be continually reminded of the failure.

### **Preferences**

I conducted an independent sample t-test to determine whether, as I predicted, making possible future regret salient would increase participants' preference for making a less regretful decision, (i.e., working with an out-group partner). Participants in the regret not salient condition ( $M = 3.41$ ,  $SD = 1.37$ ) did not differ in their preference for working with an in-group versus out-group partner compared to participants in the regret salient condition ( $M = 2.86$ ,  $SD = 1.64$ ),  $t(42) = 1.20$ ,  $p = .238$ . Contrary to my

prediction, making possible future regret salient did not lead to a greater preference for working with an out-group member.

Like the participants in the regret conditions, participants who reported their preference for working with an in-group or out-group partner were also asked to briefly explain their choice. Their responses were coded into six categories by two independent raters ( $\kappa = .79$ ) (see Table 6). The most common response category was that partner residence had no impact on preference for in or out-group partner. The second most common response category was that participants knew the people from their own residences better and / or felt a greater similarity to them compared to people from different residences.

Table 6

*Response categories, frequency of responses, and examples.*

Response Category	Frequency of Response	Example Response
Partner residence did not impact regret	19	“I don't think it matters what residence the person is from. It would be disappointing either way”
Would be reminded of failure / regret	12	“Seeing my partner on a more daily basis would be a reminder of regret”
Feel more trust or a closer relationship with in-group	5	“Because we are in the same res we are sort of like a team and have a stronger connection. We should have been able to figure it out together”
Have higher expectations of in-group	3	“I'd feel more regret because we <i>*should*</i> have got along better and been able to be entered into the draw.”
Feel worse about negative outcome for in-group	3	“I would feel worse if a friend and I didn't win \$100 as opposed to a stranger”
Feel worse about negative outcome for out-group	3	“I don't know the person in another res that well so I would feel bad that they had to put all their trust in me without knowing me and then I failed”
Derogate out-group	1	“A different residence person I am less likely to know. I assume that people that live in bigger "party residences" (i.e. Vic, Waldon) than my own are more likely to be judgemental because I imagine them to be more immature. Why I feel this way, I am not sure.”

Table 7

*Response categories, frequency of responses, and examples*

Response Category	Frequency of Response	Example Response
Partner residence did not impact preference	20	“I don't think residence buildings somehow affect a person's capacities for reasoning and cooperation, since it was randomly assigned by the school”
Know in-group better / more similarities	13	“I would chose someone from my residence because I would know them, and in a situation where I have to work fast and as a team I would want someone that could relate to me and my choices”
In-group possesses desirable qualities	4	“I have come to trust the people living around me very much, they are also quite smart.”
Would be reminded of failure	2	“I would probably feel pretty silly if we were unable to find our way home, and would prefer not to see this person all the time (as I would if they lived in the same res) because it would remind me of the incident”
Where friends live	2	“Because it is where my friends live”
Unclassified comments	3	“We both want to go back to the same place, therefore all our attention would be focused on one goal”

### Discussion

The main hypothesis of Experiment Four was supported. Participants did anticipate more regret from failing the Travel Adventure Task when they imagined working with an in-group as opposed to an out-group partner. When participants imagined failing at the task they may have perceived the outcome as being worse when their partner is an in-group member than when their partner is an out-group member. Participants may have felt worse when imagining an in-group partner losing out on the \$100 prize because that person is more likely to be a similar and close other, unlike an

out-group member who is more likely to be viewed as dissimilar and more distant from the self.

The second hypothesis, that making future regret salient would lead to a greater preference for working with an out-group partner, was not supported. Despite trying to make the potential future regret in the regret salient condition even more salient than in Experiment One, by using a bold font for the instructions regarding imagining the regret, and placing these instructions in a separate paragraph, the manipulation did not have the expected effect on preferences. There were no differences in the preferences for working with in-group or out-group members between the participants in the regret salient and the regret not salient conditions. All participants showed a preference for working with an in-group partner. Although these results were not predicted, in hindsight, they may not be too surprising. Of course, when someone is making a decision, anticipated regret is not the only factor that comes into play. It may be that people would prefer to be around an in-group as opposed to an out-group member during times of failure, regardless of how much regret they may feel. The comfort of having someone familiar with you may outweigh any negative affect. Also, I only looked at one particular scenario, failing at a novel task. It is possible that anticipated regret has a bigger impact on partner preference under different situations. For example, the risks were quite low in this study. If participants failed the task, they missed out on winning the \$100 prize, but there were no other negative consequences. Perhaps if the stakes were higher and participants had more to lose, the potential future regret may have been increased which might have led participants to weigh it more heavily in their decision making.

## **Chapter 6**

### **Experiment Five**

Experiment Four showed that participants anticipated more regret from failing a novel task when they worked on that task with an in-group as compared to an out-group partner. Experiment Five was designed to investigate whether this pattern of anticipated regret is mirrored in the regret participants actually feel when they fail a task while working with in and out-group partners.

Participants in Experiment Five completed the Travel Adventure Task that participants in Experiment Four read about. Participants were partnered up with either someone who lives in the same residence building as themselves, or someone who lives in a different residence building. I predicted that although participants in Experiment Four anticipated more regret when working with an in-group partner, because of the psychological immune system, the regret that participants actually feel would be equivalent across conditions. In Experiment Two, participants differed in how much personal responsibility they felt for the failure, with participants who worked alone feeling more responsibility than those who worked in groups, and this in turn meant differences in the regret they felt. However, in the following study all participants were partnered with one other person and so feelings of personal responsibility were expected to be equal across conditions.

## Methods

Participants were recruited either via phone or e-mail and were invited to participate in a study concerning decision making skills.

Participants were 100 students enrolled in the introductory psychology course at Queen's University (72 women, 28 men; mean age: 18.21 years). Participants were not matched on gender. As in Experiment Four, all participants in Experiment Five lived in one of several residence buildings on campus at Queen's University. Their residency was determined during an initial recruitment phone call. They were randomly assigned to participate either with a partner who lived in their own residence building (in-group) or in a different residence building (out-group).

The procedures for Experiment Five were identical to those of Experiment Two with the following exception. In the current study, before the experimenter explained the Travel Adventure Task, he or she explained to the participants that another lab member was conducting a separate study on residence life at Queen's University and requested that the researchers in the lab keep track of which residence building their participants live in. The experimenter then asked each participant which residence building they lived in. Each participant reported their residence building out loud in front of their partner so that their partner could hear their response. The experimenter pretended to mark down their responses on a survey to add legitimacy to the cover story. In actuality, the participants were asked to report their residence building so that they would both be aware of whether or not their partner was an in-group or out-group member. After reporting their residences, the study procedure was identical to that of Experiment Two.

All participants reported their regret after an approximately 10 minute delay in which participants filled out filler questionnaires (see Appendix C). After the delay, participants reported the amount of regret they were experiencing on a 7-point rating scale ranging from 1 (no regret) to 7 (extreme regret). They also reported their feelings of personal responsibility using the same 7-point scale (1 (no personal responsibility) to 7 (personal responsibility)).

I also included a manipulation check to ensure that participants were aware of whether or not their partner was an in-group or out-group member, (i.e. if their partner lived in their residence building or a different building). At the end of the study, participants were asked if their partner lived in their residence building, and circled yes or no. All participants answered this question correctly, indicating that participants were aware of whether or not their partner lived in the same building as they did during the study. After completing all measures, participants were debriefed and compensated (see Appendix F).

## **Results**

The data were analyzed in a 2 (in-group / out-group) x 2 (male / female) factorial analysis. As predicted, there was no main effect of gender so gender was not included in the following analyses. There was no effect of condition (in-group / out-group) on feelings of regret. Participants who worked with an in-group partner ( $M = 2.96$ ,  $SD =$

1.71) reported the same level of regret as participants who worked with an out-group partner ( $M = 2.72$ ,  $SD = 1.53$ ),  $t(98) = 0.740$ ,  $p = .461$ .<sup>910</sup>

In addition to reporting their feelings of regret, participants also reported how much personal responsibility they felt for the failure. As predicted, participants in the out-group ( $M = 3.70$ ,  $SD = 1.36$ ) condition did not differ in their feelings of personal responsibility compared to participants in the in-group condition ( $M = 3.58$ ,  $SD = 1.68$ ),  $t(98) = 0.39$ ,  $p = .695$ .

## Discussion

Although participants in Experiment Four anticipated more regret from an in-group compared to an out-group failure, when participants in Experiment Five actually experienced these failures, they showed equivalent levels of experienced regret, regardless of whether their partner was an in-group or out-group member. I propose that, as in Experiment Two, the psychological immune systems of participants in Experiment Five were able to work to reduce the regret experienced by participants in the in-group condition, equalizing it with the regret experienced by participants in the out-group

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<sup>9</sup> Because different scales were used to measure anticipated and experienced regret, direct comparisons of the results of Experiments Four and Five are not possible. This was an unfortunate oversight on my part. I wished to measure anticipated regret using more than one scale, however, the scale measuring the experienced regret was not changed as well. In the future, it would be informative to replicate these studies using identical measures of regret in order to make more direct comparisons.

<sup>10</sup> A null result was predicted and obtained, which may raise issues about conclusions that can be drawn from these analyses. In Experiment Four I found a significant result using a much smaller sample size, so differences in power cannot account for the null result. Indeed power calculations revealed that a sample size of more than 1400 participants would be required to find a significant difference between conditions, so I am confident that there is no difference between these two conditions.

condition. Participants anticipated more regret than they would actually end up feeling after failing the travel adventure task.

Unlike in Experiment Two, there were no differences in feelings of personal responsibility between conditions in Experiment Five. In Experiment Two, half of the participants had group members who could share in the blame for the failure, resulting in less personal responsibility than the participants who worked alone. However, in the current study, all participants worked with a partner, so all participants had equal opportunity to place at least part of the blame for the failure on their partners.

## Chapter 7

### General Discussion

My dissertation contributes to the body of research assessing errors in affective forecasting. I found evidence that individuals overestimate (a) the regret they will experience if they fail at a task while working alone, compared to working in a group, and (b) the regret that they will experience after failing with an in-group versus an out-group member. In both of these cases, forecasters predicted a difference in affective intensity (e.g., more regret after failing alone, more regret after failing with an in-group member), yet the levels of regret that were actually experienced in those situations were equivalent. In these studies, I suggested that the psychological immune system was able to reduce the levels of regret experienced by participants in the alone and in-group partner conditions until they reached the levels of regret experienced by participants in the group and out-group conditions respectively.

These studies make a contribution to the anticipated regret literature by identifying two novel situations where there is a discrepancy between the regret that is anticipated and the regret that is ultimately experienced. Indeed, these studies are among the first<sup>11</sup> to examine both the anticipated and experienced regret of participants working

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<sup>11</sup> Komiya, A., Kusumi, T., & Watabe, M. (2007) published a paper entitled *Regret in individual and group decision making*. The authors say in the abstract that participants were randomly assigned to work either alone or in groups on a decision making task, and after failing the task, participants reported their regret. Participants in the alone condition reported more regret than participants in the group condition. Because the article itself is in Japanese (and only the abstract is in English) I, unfortunately, am not able to evaluate the methods, results, or conclusions drawn in this paper.

alone and in groups. So far the anticipated regret literature has focused almost exclusively on individuals working independently. The current studies are the first to examine how working in a group can affect the predictions of one's future emotions, and also the first to evaluate the discrepancy between anticipated and experienced regret of individuals working in groups. The current line of research is also first to examine the differences in anticipated and experienced regret between participants who work with in-group and out-group partners. The results of Experiment Four suggest that the person one works with on a task can affect one's predictions of their future emotions, even though the outcome of the task remains constant (i.e., failure on the task).

Another contribution this research has added to the anticipated regret literature is providing additional evidence that the psychological immune system takes time to reduce levels of regret (Gilbert, Pinel, Wilson, Blumberg, & Wheatley (1998), which has not received much attention. In Experiment Two, the participants in the alone condition initially felt significantly more regret than the participants in the group condition. It wasn't until they had been given a delay of about ten minutes that the regret of the two groups was equalized. This suggests that the psychological immune system is not instantaneous, at least not in this particular situation. It seems probable that the length of time required by the psychological immune system to reduce feelings of regret to some particular level will be a function of how high the initial level of regret is and how easy it is to reduce the regret. For example, if in Experiment Two, I had been able to assess participants' regret even sooner than I did in the no delay condition (i.e., immediately after learning they had failed the task, before the experimenter could give further

instructions or hand out the measures) it is possible that regret in both the alone and group conditions would have been even higher than what was reported. It is possible that the two groups could have been experiencing equally high levels of regret, but because it was so easy for participants in the group condition to blame their other group members for the failure, their high levels of regret may have been too fleeting to capture them with my self-report measure. For the participants in the alone condition on the other hand, it might not have been so simple to reduce their regret and so it took much longer for the psychological immune system to reduce it.

In addition to contributing to the anticipated regret literature, the current studies also add to the body of work on group decision making by exploring regret anticipated and experienced by groups versus individuals as well as groups of in-group and out-group members. So many decisions, from where to have supper with friends, to which employee to hire, to which house to move your family into, are often decided as groups, rather than individuals. Much research has focused on how individuals and groups differ in their effectiveness as problem solvers and decision makers, but research has not focused on the role their regret plays in these situations.

In addition to predicting that participants would anticipate different levels of regret when imagining working alone or in groups (or with an in-group or out-group partner), but would feel equal amounts of regret in those situations, in this line of research, I also predicted that making regret salient would increase participants' preferences for making the least regretful choice, relative to regret not being salient. In Experiment One I predicted that participants whose potential future regret was made

salient would report a greater preference for working in a group compared to participants whose regret was not made salient. This prediction was not supported and the salience of regret had no impact on participants' preferences; neither condition showed a preference either way for working alone or in a group. In Experiment Four, I made a similar prediction, that participants whose potential future regret was made salient would report a greater preference for working with an out-group over an in-group partner compared to participants whose regret was not made salient. Again, this prediction was not supported. Regret did not affect participants' preferences, and participants in both conditions reported a preference for working with an in-group partner, regardless of regret salience.

To some extent it was surprising that the regret salience manipulation had no effect on the choices that participants made in our paradigm. It seems entirely logical that people would prefer the option that would lead to the least amount of regret, and research has shown that anticipated regret can affect decision-making (Zeelenberg, 1999). It is unclear exactly why the manipulation failed. One possibility is that the stakes were simply not high enough. In the current studies participants were facing no real risk. They simply imagined a scenario where they might win \$100, they knew that they would not actually have a chance to win (or lose out on winning) that money, so perhaps they were just not invested enough for any potential future emotion to sway their preference. The Travel Adventure Task scenario may have been real enough to affect participants' anticipated regret, but not to have an impact on their preferences. For example, students who are given the option to complete an assignment alone or to work in groups may be invested enough to take their potential future regret into greater consideration when

choosing to work alone or in a group. Another possible explanation for the failure of the regret salience manipulation is that other emotions were simply more important than regret. For example, in Experiment Four, the small increase in regret that participants might experience if they work with an in-group member might be minimal compared to the comfort they will anticipate from working with a similar and familiar other, rather than a stranger. Regret may simply not have been strong enough compared to other emotions to influence preferences. A third possible explanation is that participants simply did not read the instructions carefully or did not really consider their future regret adequately before making their decision. Although I tried to eliminate this possibility in Experiment Five by using bold font for the instructions and placing them in a separate paragraph, it is still possible that participants gave only a fleeting thought to their regret before responding. In future studies, the regret salient condition would have to be even more salient. Perhaps participants could write a short paragraph or think out loud about their regret in each scenario, ensuring that they process the instructions and thoroughly think about their regret. A future study would also have to ensure that the consequences of failing or making an incorrect decision are large enough to induce sufficient regret as to impact preferences.

### **Decision Justification Theory**

The results of the current studies fit nicely into the framework of Connolly and Zeelenberg' (2002) decision justification theory. They proposed that regret is composed of two components, a comparative evaluation of the outcome of the decision, and a feeling of self-blame for having made a poor choice. In Experiments One and Two, the

participants in the alone condition may have felt a greater sense of personal responsibility than the participants in the group condition because they did not have anyone else to share the blame with. This might have led them to experience more regret, at least until the psychological immune system was able to reduce some of the regret. In Experiments Four and Five, the personal responsibility was equivalent across participants in the in-group and out-group conditions because in all conditions participants were working with a partner. In this case because the self-blame component of regret was equal, the difference in levels of regret between participants in the in-group and out-group conditions must be attributable to the second component of regret, the evaluation of the outcome. I argued that participants in the in-group condition would feel worse about the outcome of the failure than participants in the out-group condition because they would be more upset about a familiar, similar other losing out on the prize than an “outsider” losing out. The results of the current studies seem to suggest that the psychological immune system will work to reduce whichever component of regret is easier to change.

### **Missing Success by a Wide or Narrow Margin**

Recall the study by Gilbert and colleagues (2004); participants anticipated more regret from missing a train by a narrow relative to a wide margin, but this factor did not affect the regret participants actually experienced. In the current studies, participants failed a novel task, and although it was rigged to be impossible, participants believed there was a correct solution. Anecdotal evidence suggests that some participants believed they were very close to solving the problem, whereas others felt that they were hopelessly far from finding the solution. When told that the time limit was up, several participants

asked for a couple additional minutes to work on the task because they were “so close” or “almost there”, while other participants confessed that they didn’t feel much closer to the solution than when they started. Although I did not measure how close participants felt they were to finding a solution, it would be interesting to know how this might affect their regret. If Gilbert et al. (2004) were correct, then this factor should not affect the regret that participants in the study felt, but may affect the regret participants would anticipate if this factor was manipulated in a study of anticipated regret.

### **Limitations and Future Directions**

In the following section I will summarize the potential limitations and future directions of this program of research.

#### **Between-subjects and within-subjects designs in studying regret**

One important factor to consider when conducting research on anticipated regret is whether to employ a within-subjects or between-subjects design. In the current studies the anticipated regret in Experiments One and Four were analysed in a within-subject design, but the experienced regret in Experiments Two and Five were analysed in a between-subjects design. The “anticipators” imagined both possible future scenarios (working alone and in a group or working with an in-group and out-group partner), whereas “experiencers” only ever experienced one of those scenarios. Within the affective forecasting and anticipated regret literatures, researchers have employed both within-subjects designs (e.g., Dunn, Wilson, & Gilbert, 2003; Dunn, Biesanz, Human, & Finn, 2007) as well as between subjects-designs (Gilbert et al., 2004; Kermer, Driver-

Linn, Wilson, & Gilbert, 2006) in their “anticipators” conditions. The experiencers, however, usually only ever experience one outcome, and so are analysed in a between-subjects analysis.

In their research on predicting the regret that others feel, Zhang, Walsh, and Bonnefon (2005) argue that regret scales are unable to capture differences in perceived regret in between-subjects designs because they lack a well-defined reference point. Participants in a within subjects design are exposed to both options and can therefore use each as a reference point for comparing the other, whereas participants in between-subjects designs have no such reference point. Indeed it is quite possible that in many instances, using within-subjects design may amplify differences in perceived regret. For example, asking one group of participants to rate how much regret they would feel if they were to lose a watch worth \$50 and how much regret they would feel if they lost a watch worth \$5000 may lead to greater differences in anticipated regret than comparing the anticipated regret of participants who only imagined losing the \$50 watch and those who only imagined losing the \$5000 watch, because the contrast between the value of the two watches is more salient in the within-subjects design. However, if participants truly believe that they would feel no differences in regret between two different situations (e.g., regret over losing a \$50 watch versus regret over losing a \$60 watch) then that lack of difference may also be amplified in a within-subjects design. When faced with an explicit comparison participants might make a conscious effort to report exactly equal amounts of regret for such factors they feel would have no influence on their future regret. In this way, a within-subjects design might amplify anticipated differences in

regret, but if people really do believe that there would be no difference between the two conditions being compared, a within-subjects design might actually be a more conservative test than a between-subjects design.

Using a within-subjects design for comparisons of anticipated regret and between-subjects comparisons for experienced regret also mirrors real life. When one is making decisions, such as whether to work alone or in a group, one is evaluating all available options and considering the potential regret of each. However, after a decision is made and one is experiencing regret, that person is no longer in such an evaluative state and is only faced with their current situation (Hsee & Zhang, 2004). For these reasons I chose a within-subjects design for the studies on anticipated regret and a between-subjects design for the studies on experienced regret. In future studies, however, it would be beneficial to explicitly test whether the differences in anticipated regret after failure working alone or a group replicate using a between-subjects design.

### **Travel adventure task**

One potential limitation of the current line of research is that it involved only one decision making task, the novel Travel Adventure Task. It would be informative to test my hypotheses using a variety of tasks and decisions. It would be especially useful to more closely simulate real world decisions since the Travel Adventure Task is a rather artificial scenario. That being said, the Travel Adventure Task did have its benefits. The task was quite engaging for participants, and although it may not have high ecological validity, it was quite real for the participants and many seemed genuinely disappointed when they were told they had failed the task. The fact that I was able to induce feelings

of anticipated and experienced regret at all using such a manufactured task suggests that the effect may be even stronger for real world situations with more at stake where people must choose to work alone or in groups. I was also able to find differences in anticipated regret using two different measures of regret, suggesting the results were not merely due to method effect.

### **Potential mechanisms**

In future studies I think it would also be informative to investigate more thoroughly the mechanism underlying the reduction in regret in each condition. For example, in Experiment Five I argue that participants in the in-group condition anticipated and initially felt more regret than participants in the out-group condition because they felt worse about a negative outcome happening to an in-group partner. This hypothesis was only partially tested in the current studies by having participants explain their preference for working with an in-group or out-group partner. It would be helpful to test this hypothesis more directly, perhaps by asking participants how badly they would feel about someone from their residence not winning the \$100 versus someone from a different residence not winning the money. Also, in Experiment Two, I argued that participants in the group condition anticipated and initially felt less regret than participants in the alone condition because they had other group members to blame for the failure. Again, this hypothesis was partially tested, participants in the group condition felt significantly less personal responsibility, but it would be informative to directly assess whether or not they used passing the blame onto other group members as a means of minimizing regret.

## **Cognitive Resources**

In the current line of research I have provided evidence that the psychological immune system can vary in the length of time required to reduce regret. In Experiment Two, the regret of the participants in the group condition was unaffected by the delay manipulation, but the regret of the participants in the alone condition was reduced only after a delay. If the psychological immune system requires different amounts of time to reduce regret in different situations, it is plausible that these increases in time correspond with increases in amounts of cognitive resources needed. A future study could test this hypothesis by replicating Experiment Two with the addition of a cognitive load manipulation. Participants could again work on the task either alone or in groups, and could report their regret either immediately or after a delay. Half of the participants in each of the delay conditions could do nothing between the failure and the reporting of their regret (e.g., be left alone in a room to sit quietly), while the other half of participants could be given a cognitively taxing task to perform before reporting their regret. There are at least two potential hypotheses. The first is that under cognitive load, there will not be enough cognitive resources available for the psychological immune system to reduce regret. This would lead to high levels of regret in the alone / delay / cognitive load condition because if it takes more time to reduce the regret in the alone conditions, it should also take more cognitive resources, which are not available under cognitive load. The regret in the group conditions should be unaffected by the cognitive load manipulation, however, and remain low in all conditions because reducing regret in the group conditions should use little cognitive resources. A second hypothesis is that the

cognitive load manipulation will act as a distraction from the failure and may eliminate the regret. This would lead to no, or very low levels of regret in both the group and alone conditions under the cognitive load manipulation. This distraction hypothesis seems plausible for mild regret over minor failures, but when a major failure occurs and intense regret is experienced it may be impossible to be distracted from such an experience, or if one is successfully distracted, the intense regret may return once the distraction has ended and one is once again reminded of the failure.

### **Unanimity of groups**

Another avenue for future research is whether the unanimity of a group decision affects anticipated and / or experienced regret. I predict that people will anticipate more regret after a decision that is made by an initially divided, rather than unanimous group. When a group is initially unanimous but ends up making the wrong decision it might be easy to reduce blame and regret by thinking, "Since we all agreed, there was no way to know that this would be a bad decision." However, when some group members initially oppose the group's ultimate decision people might think, "If only we had listened, we could have avoided this poor decision", which could lead to increased regret. Again I predict that the psychological immune system may work to equalize the experienced regret in these two scenarios, even if people would anticipate feeling more regret after a divided group decision. This research idea can be carried further by exploring the different roles within the groups. For example, if a group is initially divided and one group member persuades the others to follow his decision, which turns out to be incorrect, I predict that that group member will anticipate more regret than the others

because he or she will presumably be feeling more personal responsibility for the group's failure. However, as with the other studies, I predict that the levels of regret that the group members ultimately experience will be equal, again due to the psychological immune system.

### **Happiness**

In this dissertation, I have focused on the feeling of regret and how people can mispredict this emotion in certain circumstances. Although regret has been an area of particular interest in the literature, it is certainly not the only emotion that people mispredict. There is also a body of work evaluating the misprediction of a wide range of emotions, most notably, happiness. In this literature, as with anticipated regret, it is often the case that people overestimate what their future happiness will be (Wilson, Wheatley, Meyers, Gilbert, & Axsom, 2000; Dunn, Wilson & Gilbert, 2003). People overestimate their future happiness over both minor (e.g., school's sports team winning, Gilbert, Wheatley, Meyers, Gilbert, & Axsom, 2000) and major events (e.g., starting a new romantic relationship, Tomlinson, Carmichael, Reis, & Aron, 2010). It is quite possible that anticipated happiness, like anticipated regret, may also vary when people think about how they will feel after failing a task they have worked on alone and failing the task when working as part of a group. Although not a part of this dissertation, I have collected data on participants' anticipated happiness following successfully completing the Travel Adventure Task alone and as part of a group<sup>12</sup>. Participants anticipated feeling

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<sup>12</sup> For a summary of this research, see Appendix H.

marginally more happiness from working on the task alone than from working on the task as part of a group. When participants' potential future happiness over successfully completing the task was made salient, participants did not show a preference either way for working alone or in a group. No data have been collected on the experienced happiness of those who successfully complete the Travel Adventure Task, but investigating the differences between the anticipated and experienced happiness of people working alone and in groups would be informative. If people expect both more happiness and more regret from working alone, then these two oppositely valenced emotions may both compel and discourage someone from choosing either option. Further research on which of these two emotions plays a greater role in choosing to work either alone or in groups, and under what circumstances each has an effect would be worthwhile.

### **Individual differences**

I am also interested in investigating the role that individual difference variables might play in the discrepancy between anticipated and experienced regret of different groups. Schwartz, Ward, Monterosso, Lyubomirsky, White, and Lehman (2002) created a regret and maximization scale. They found that maximizers, those who try to maximize their choices and make not just a good, but the best choice, are more sensitive to regret compared to satisficers who, when making decisions try to simply choose an option that surpasses some minimum threshold. Maximizers were also found to make more social comparisons, but be more negatively affected by upward social comparisons than satisficers. It would be interesting to see if maximizers and satisficers prefer to work in

groups or individually, and how making potential future regret salient would affect those preferences. Given that maximizers are apt to make social comparisons, they may prefer working in groups, but once regret is made salient, they may choose to work alone to avoid having to make painful upward social comparisons. Satisficers, on the other hand, may not show a strong preference for working in groups or alone as long as the outcome will be up to a minimum standard.

Another individual difference variable that could help deepen our collective understanding of group regret is Hill's (1987) motivation for affiliation scale. Hill (1987) found that people differ in their motivation for social contact and found four distinct areas of motivation, social comparison, emotional support, positive stimulation, and attention. I predict that people high on this need to affiliate will show a greater preference for working as part of a group, compared to those who score low on the scale. I further predict that when regret is made salient, those who score high on the emotional support subscale will be particularly affected and will show an even greater preference for working in a group than will those who score low on this subscale. Because making a poor decision, failing, and feeling regret are aversive, I think that those who seek out others for emotional support will be even more likely to do so when such negative events and feelings are made salient.

### **Status of group members**

A final possible future direction for this line of research is looking at the status of the group members. I predict that higher status group members (for example, upper year students) would anticipate more regret from a group failure compared to lower status

members (for example, first year students). I predict that higher status participants may feel more personal responsibility for the failure since they may consider themselves older and wiser than students just out of high school. This increased personal responsibility should lead to greater anticipated regret, as in Experiment One. However, as in Experiment Two, the regret actually experienced by high and low status participants is predicted to be the same, again due to the psychological immune system.

### **Implications**

The current program of research has the potential for implications in the realm of decisions making. Although the regret salience manipulation failed to have the predicted effect on preferences for working alone versus in a group, I feel that it is possible that in other situations this effect may be found. Previous research has shown that people tend to choose options they believe will lead to the least amount of regret (Zeelenberg, 1999), and the current research has shown that participants believe working with a group will lead to less regret than working alone, so it is logical that people would show a greater preference for working in a group when their regret is made salient. As discussed above, there are several circumstances which might make this more likely. If, in the real world, it is the case that anticipated regret pushes people toward working with a group over working by themselves, then this can have both positive and negative consequences.

As discussed in the introduction, there is a large body of evidence suggesting that groups are often more effective at decision making and problem solving than individuals. In many instances, then, it may be beneficial for one's anticipated regret to impel them towards working in a group rather than alone, as it may lead to a superior outcome. For

example, Laughlin and Ellis (1986) showed that for problems that have clear, demonstrable solutions, groups have an advantage over individuals. The Travel Adventure Task is such a task (if it were not rigged to be impossible, of course). If the task were actually possible, as soon as participants found the solution it would be immediately apparent if it were correct or not. So, for participants in the current studies who had to state their preference for working alone or in a group on the task, it might actually have been to their advantage to choose to work as a team rather than alone if they were to actually attempt the task. In this instance, choosing the option that one feels will lead to the least regret would have been a wise decision. However, as mentioned earlier, there is also a growing literature outlining situations where groups actually make worse decisions than individuals (e.g., brainstorming (Lamm and Trommsdorff (1973); groupthink (Janis, 1972); the prisoner's dilemma game (Schopler & Insko, 1992); and problems with solutions of low demonstrability (Laughlin & Ellis, 1986)). This is where being influenced by anticipated regret carries a cost. If people are choosing to work in groups rather than work alone thinking that they will experience less regret in a group, this strategy can backfire. Not only will they not end up experiencing any less regret from working in a group instead of alone (as shown in Experiment Two), but their decision to work in a group may lead to a worse outcome than working alone.

## **Conclusion**

In closing, with this program of research I have furthered the work on affective forecasting, and anticipated regret in particular. I have identified two specific instances where one's anticipated regret does not match the regret one ultimately experiences: The

decision to work in a group versus alone, and the decision to work with an in-group or out-group member. I have also suggested several ideas for future research that could potentially further understanding of the discrepancies between the emotions that individuals anticipate and the emotions that they eventually feel.

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## Appendices

### Appendix A

#### Letter of Information and Consent – Experiment Two Individual Condition

#### Letter of Information

I would like to inform you about the purpose and procedures of this research. I would also like to take this opportunity to inform you about your rights and alleviate any concerns you might have with respect to your participation in this study.

This study is being conducted by Pamela Stager and Dr. Tara MacDonald, Department of Psychology at Queen's University.

This study will involve working on a decision making task and then reporting your reactions to your decision.

There are no known risks to your participation in this study. Participation is completely voluntary and you are free to withdraw from the study at any time with no effect on your standing at school, in which case you may have any information about you removed. You are not obligated to answer any questions that you find objectionable or which make you feel uncomfortable. Your name will not be associated with the information you provide, and only the principal researchers of this project will have access to your responses. The results of this study will only be published in summary form and in standard academic outlets. This study will take approximately 30 minutes of your time, and in exchange for your help, you will receive 0.5 subject pool credits or \$5.00.

Should you have any questions, concerns, complaints, or require further information in regard to this study, please feel free to contact Dr. Tara MacDonald ([tmacdon@post.queensu.ca](mailto:tmacdon@post.queensu.ca) or at 533-2873), the head of the Department of Psychology, Dr. V. Quinsey (533-2483) or Dr. Joan Stevenson of the General Research Ethics Board, c/o the Office of Research Services (533-6081).

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#### Consent Form

I, \_\_\_\_\_, have read the Letter of Information and have had all questions answered to my satisfaction.

I understand that I will be participating in a study on decision making and that my involvement consists of reading a passage, imagining a decision making situation, and reporting your reactions to the decision.

I am aware of the people who I can contact if I have any questions, concerns, or complaints. I understand that my participation is completely voluntary and that I am free to withdraw at any time. I understand this study takes approximately 5 minutes. I have

been assured that my responses to the questionnaires will be confidential and will not be made public in any way that I could be identified. I understand that this consent form allows the researchers to use the data collected from my questionnaires for research purposes only.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

## **Letter of Information and Consent – Experiment Two Group Condition Letter of Information**

I would like to inform you about the purpose and procedures of this research. I would also like to take this opportunity to inform you about your rights and alleviate any concerns you might have with respect to your participation in this study.

This study is being conducted by Pamela Stager and Dr. Tara MacDonald, Department of Psychology at Queen's University.

This study will involve you working as part of team to solve a decision making task and then you will individually report your reactions to your group's decision.

There are no known risks to your participation in this study. Participation is completely voluntary and you are free to withdraw from the study at any time with no effect on your standing at school, in which case you may have any information about you removed. You are not obligated to answer any questions that you find objectionable or which make you feel uncomfortable. Your name will not be associated with the information you provide, and only the principal researchers of this project will have access to your responses. The results of this study will only be published in summary form and in standard academic outlets. This study will take approximately 30 minutes of your time, and in exchange for your help, you will receive 0.5 subject pool credits or \$5.00.

Should you have any questions, concerns, complaints, or require further information in regard to this study, please feel free to contact Dr. Tara MacDonald ([tmacdon@post.queensu.ca](mailto:tmacdon@post.queensu.ca) or at 533-2873), the head of the Department of Psychology, Dr. V. Quinsey (533-2483) or Dr. Joan Stevenson of the General Research Ethics Board, c/o the Office of Research Services (533-6081).

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### **Consent Form**

I, \_\_\_\_\_, have read the Letter of Information and have had all questions answered to my satisfaction.

I understand that I will be participating in a study on decision making and that my involvement consists of reading a passage, imagining a decision making situation, and reporting your reactions to the decision.

I am aware of the people who I can contact if I have any questions, concerns, or complaints. I understand that my participation is completely voluntary and that I am free to withdraw at any time. I understand this study takes approximately 5 minutes. I have been assured that my responses to the questionnaires will be confidential and will not be made public in any way that I could be identified. I understand that this consent form allows the researchers to use the data collected from my questionnaires for research purposes only.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

## **Appendix B**

### **Travel Adventure Task Materials**

#### **Travel Adventure Task**

Imagine that you are on your last day of a backpacking trip through New Zealand when you realize that you have lost your plane ticket home. You start to feel panicked when you realize you have only \$1000 left and the airline tells you that there are no more flights to Canada available. Your only option is to take several connecting flights from Auckland New Zealand back to Kingston, Ontario. You need to find a way home to Kingston using only the \$1000 you have with you. In order to do this you will need to take several flights. Below are listed the possible flights and how much each costs. You will have 10 minutes to figure out your way home. If you are successful you will be entered into a draw for \$100.

<b>FROM</b>	<b>TO</b>	<b>COST (\$)</b>
Tirane, Albania	Minsk, Belarus	741
New Delhi, India	Seattle, USA	778
Madrid, Spain	Kingston, Canada	590
Kathmandu, Nepal	Bridgetown, Barbados	973
Stockholm, Sweden	Kingston, Canada	639
Buenos Aires, Argentina	Beijing, China	661
Moscow, Russia	Nairobi, Kenya	743
Ankara, Turkey	Buenos Aires, Argentina	700
Stockholm, Sweden	Tripoli, Libya	775
Kingston, Canada	Tripoli, Libya	568
Tirane, Albania	Kigali, Rwanda	555
Sanaa, Yemen	Stockholm, Sweden	168
Kingston, Canada	Beijing, China	267
Tirane, Albania	Bridgetown, Barbados	487
Cairo, Egypt	New Delhi, India	510
Havana, Cuba	Kabul, Afghanistan	752
Auckland, New Zealand	Kathmandu, Nepal	334
Reykjavik, Iceland	Kigali, Rwanda	151
Cairo, Egypt	Helsinki, Finland	813
Lisbon, Portugal	Sanaa, Yemen	836
Kathmandu, Nepal	Tirane, Albania	411
Port-au-Prince, Haiti	Guatemala City, Guatemala	303
Havana, Cuba	Beijing, China	396
Auckland, New Zealand	Minsk, Belarus	454
Lisbon, Portugal	Kingston, Canada	161
Sanaa, Yemen	Islamabad, Pakistan	289
Havana, Cuba	Nairobi, Kenya	378
Port-au-Prince, Haiti	Buenos Aires, Argentina	436

Beirut, Lebanon	Beijing, China	253
Lisbon, Portugal	Madrid, Spain	657
Ottawa, Canada	Buenos Aires, Argentina	506
Kigali, Rwanda	Minsk, Belarus	814
Ankara, Turkey	Port-au-Prince, Haiti	386
Moscow, Russia	Havana, Cuba	260
Beijing, China	Cairo, Egypt	283
Havana, Cuba	Manila, Philippines	369
Tripoli, Libya	Islamabad, Pakistan	880
Havana, Cuba	Kuala Lumpur, Malaysia	886
Nassau, The Bahamas	Caracas, Venezuela	308
Madrid, Spain	Lisbon, Portugal	922
Manila, Philippines	Cairo, Egypt	409
Warsaw, Poland	Seattle, USA	801
Helsinki, Finland	Nassau, The Bahamas	419
Kingston, Canada	Islamabad, Pakistan	303
Tokyo, Japan	Kuala Lumpur, Malaysia	464
Kingston, Canada	Stockholm, Sweden	197
Guatemala City, Guatemala	Beijing, China	340
Helsinki, Finland	Beirut, Lebanon	444
Minsk, Belarus	Kathmandu, Nepal	424
Port-au-Prince, Haiti	Auckland, New Zealand	558
Tripoli, Libya	Kingston, Canada	281
Moscow, Russia	Auckland, New Zealand	655
Tripoli, Libya	Sanaa, Yemen	539
Cape Town, South Africa	Nairobi, Kenya	589
Minsk, Belarus	Tirane, Albania	853
Kathmandu, Nepal	Dublin, Ireland	789
Dublin, Ireland	Minsk, Belarus	653
Cape Town, South Africa	Tokyo, Japan	583
Sanaa, Yemen	Lisbon, Portugal	334

Kigali, Rwanda	Reykjavik, Iceland	486
Dublin, Ireland	Kathmandu, Nepal	795
Ankara, Turkey	Beijing, China	358
Reykjavik, Iceland	Tirane, Albania	982
Kathmandu, Nepal	Kigali, Rwanda	960
Auckland, New Zealand	Dublin, Ireland	860
Havana, Cuba	Nassau, The Bahamas	208
Beirut, Lebanon	Nassau, The Bahamas	201
Kingston, Canada	Lisbon, Portugal	254
Stockholm, Sweden	Lisbon, Portugal	811
Kigali, Rwanda	Dublin, Ireland	417
Havana, Cuba	Beirut, Lebanon	847
Sanaa, Yemen	Tripoli, Libya	765
Nairobi, Kenya	Cape Town, South Africa	706
Kingston, Canada	Madrid, Spain	501
Beirut, Lebanon	New Delhi, India	210
Kigali, Rwanda	Bridgetown, Barbados	874
Tripoli, Libya	Lisbon, Portugal	990
Ottawa, Canada	Nassau, The Bahamas	357
Dublin, Ireland	Tirane, Albania	164
Havana, Cuba	Port-au-Prince, Haiti	292
Nassau, The Bahamas	Cape Town, South Africa	712
New Delhi, India	Buenos Aires, Argentina	282
Auckland, New Zealand	Bridgetown, Barbados	725
Stockholm, Sweden	Islamabad, Pakistan	162
Tokyo, Japan	Helsinki, Finland	508
Cape Town, South Africa	Port-au-Prince, Haiti	686
Reykjavik, Iceland	Dublin, Ireland	716
Bridgetown, Barbados	Dublin, Ireland	180
Lisbon, Portugal	Tripoli, Libya	970
Sanaa, Yemen	Madrid, Spain	242

Kuala Lumpur, Malaysia	Buenos Aires, Argentina	628
Bridgetown, Barbados	Reykjavik, Iceland	703
Stockholm, Sweden	Madrid, Spain	587
Bridgetown, Barbados	Minsk, Belarus	649
Cape Town, South Africa	Auckland, New Zealand	529
Minsk, Belarus	Dublin, Ireland	251
Auckland, New Zealand	Kigali, Rwanda	741
Cape Town, South Africa	Guatemala City, Guatemala	655
Helsinki, Finland	Beijing, China	599
Reykjavik, Iceland	Bridgetown, Barbados	545
Lisbon, Portugal	Stockholm, Sweden	378
Manila, Philippines	Guatemala City, Guatemala	680
Ottawa, Canada	Manila, Philippines	476
Tokyo, Japan	Moscow, Russia	451
Beirut, Lebanon	Caracas, Venezuela	599
Port-au-Prince, Haiti	Ankara, Turkey	874
Auckland, New Zealand	Reykjavik, Iceland	363
Madrid, Spain	Tripoli, Libya	551
Islamabad, Pakistan	Tripoli, Libya	858
Havana, Cuba	Cape Town, South Africa	358
Manila, Philippines	Auckland, New Zealand	735
Islamabad, Pakistan	Sanaa, Yemen	622
Bridgetown, Barbados	Kigali, Rwanda	724
Lisbon, Portugal	Islamabad, Pakistan	967
Caracas, Venezuela	Kabul, Afghanistan	881
Kabul, Afghanistan	Beirut, Lebanon	346
Cairo, Egypt	Beirut, Lebanon	617
Manila, Philippines	Seattle, USA	564
Madrid, Spain	Islamabad, Pakistan	569
Manila, Philippines	Buenos Aires, Argentina	638
Caracas, Venezuela	Ankara, Turkey	555

Tirane, Albania	Kathmandu, Nepal	845
Minsk, Belarus	Bridgetown, Barbados	198
Minsk, Belarus	Reykjavik, Iceland	421
Tirane, Albania	Reykjavik, Iceland	281
Dublin, Ireland	Reykjavik, Iceland	818
Minsk, Belarus	Kigali, Rwanda	544
Havana, Cuba	Buenos Aires, Argentina	744
Islamabad, Pakistan	Stockholm, Sweden	661
Islamabad, Pakistan	Kingston, Canada	154
Islamabad, Pakistan	Lisbon, Portugal	879
Kathmandu, Nepal	Reykjavik, Iceland	747
Beijing, China	Kuala Lumpur, Malaysia	288
Madrid, Spain	Stockholm, Sweden	378
Kathmandu, Nepal	Minsk, Belarus	738
Kingston, Canada	Helsinki, Finland	395
Guatemala City, Guatemala	Seattle, USA	855
Manila, Philippines	Moscow, Russia	744
Tripoli, Libya	Stockholm, Sweden	645
Dublin, Ireland	Kigali, Rwanda	687
Ankara, Turkey	Beirut, Lebanon	649
Bridgetown, Barbados	Tirane, Albania	190
Kigali, Rwanda	Tirane, Albania	738
Ottawa, Canada	Cape Town, South Africa	769
Islamabad, Pakistan	Madrid, Spain	674
Moscow, Russia	New Delhi, India	346
Moscow, Russia	Nassau, The Bahamas	860
Dublin, Ireland	Bridgetown, Barbados	671
Kabul, Afghanistan	Caracas, Venezuela	625
Stockholm, Sweden	Sanaa, Yemen	178
Reykjavik, Iceland	Minsk, Belarus	223
Auckland, New Zealand	Tirane, Albania	287

Tripoli, Libya	Madrid, Spain	323
Bridgetown, Barbados	Kathmandu, Nepal	673
New York City, United States of America	Warsaw, Poland	474
Buenos Aires, Argentina	Tokyo, Japan	884
Budapest, Hungary	Seattle, USA	425
Cairo, Egypt	Seattle, USA	291
Mexico City, Mexico	Paris, France	671
Kingston, Canada	Ankara, Turkey	879
Reykjavik, Iceland	Kathmandu, Nepal	810
Kabul, Afghanistan	Moscow, Russia	849
Sanaa, Yemen	Kingston, Canada	856
Madrid, Spain	Sanaa, Yemen	370
Kigali, Rwanda	Kathmandu, Nepal	242
Kingston, Canada	Sanaa, Yemen	264
Tirane, Albania	Dublin, Ireland	608
Guatemala City, Guatemala	New Delhi, India	424
Helsinki, Finland	Buenos Aires, Argentina	607
Kuala Lumpur, Malaysia	Nairobi, Kenya	696
Havana, Cuba	Moscow, Russia	729
Kingston, Canada	Buenos Aires, Argentina	622
Calgary, Canada	Seattle, USA	375

## Appendix C

### Filler Tasks – Experiments Two and Five

#### Colour-Ranking Scale

On this page are 14 colours. Your task is to rank all of the colours in terms of which ones you like most and which ones you like least.

Study the list carefully and pick out the one value that you like the most. Place a “1” beside that colour. Then pick out the colour that is next most important to you and place a “2” beside that colour. Continue in this manner until all 14 colours have been ranked.

- \_\_\_\_\_ BLACK
- \_\_\_\_\_ BLUE
- \_\_\_\_\_ BROWN
- \_\_\_\_\_ GOLD
- \_\_\_\_\_ GREEN
- \_\_\_\_\_ GREY
- \_\_\_\_\_ ORANGE
- \_\_\_\_\_ PINK
- \_\_\_\_\_ PURPLE
- \_\_\_\_\_ RED
- \_\_\_\_\_ SILVER
- \_\_\_\_\_ TURQUOISE
- \_\_\_\_\_ WHITE
- \_\_\_\_\_ YELLOW

Please indicate your responses using the following scale;

1 – several times a day

2 – a few times a day

3 – a few times a week

4 – a few times a month

5 – a few times a year

6 – virtually never

1. How often do you notice whether you are more or less <b>attractive</b> than other people?	1	2	3	4	5	6
2. How often do you notice whether you are more or less <b>intelligent</b> than other people?	1	2	3	4	5	6
3. How often do you notice whether you are more or less <b>wealthy</b> than other people?	1	2	3	4	5	6
4. How often do you notice whether you are more or less <b>physically fit</b> than other people?	1	2	3	4	5	6
5. How often do you notice whether you have a better or worse <b>personality</b> than other people?	1	2	3	4	5	6

Please indicate your responses using the following scale;

- 1 – strongly agree
- 2 – agree
- 3 – neither agree nor disagree
- 4 – disagree
- 5 – strongly disagree

1. I like school work that I'll learn from, even if I make a lot of mistakes.	1	2	3	4	5
2. An important reason why I do my school work is because I like to learn new things.	1	2	3	4	5
3. I like school work best when it really makes me think.	1	2	3	4	5
4. An important reason why I do my work in school is because I want to get better at it.	1	2	3	4	5
5. I do my school work because I'm interested in it.	1	2	3	4	5
6. An important reason I do my school work is because I enjoy it.	1	2	3	4	5
7. I would feel really good if I were the only one who could answer the teachers' questions in class.	1	2	3	4	5
8. It's important to me that the other students in my classes think that I am good at my work.	1	2	3	4	5
9. I want to do better than other students in my classes.	1	2	3	4	5
10. I would feel successful in school if I did better than most of the other students.	1	2	3	4	5
11. I'd like to show my teachers that I'm smarter than the other students in my classes.	1	2	3	4	5
12. Doing better than other students in school is important to me.	1	2	3	4	5
13. It's very important to me that I don't look stupid in my classes.	1	2	3	4	5
14. An important reason I do my school work is so that I don't embarrass myself.	1	2	3	4	5
15. The reason I do my work is so others won't think I'm dumb.	1	2	3	4	5
16. One reason I would not participate in class is to avoid looking stupid.	1	2	3	4	5
17. One of my main goals is to avoid looking like I can't do my work.	1	2	3	4	5

Please indicate your responses using the following scale;

- 1 – strongly agree
- 2 – agree
- 3 – neither agree nor disagree
- 4 – disagree
- 5 – strongly disagree

1. On the whole, I am satisfied with myself.	1	2	3	4	5
2. At times, I think I am no good at all.	1	2	3	4	5
3. I feel that I have a number of good qualities.	1	2	3	4	5
4. I am able to do things as well as most other people.	1	2	3	4	5
5. I feel I do not have much to be proud of.	1	2	3	4	5
6. I certainly feel useless at times.	1	2	3	4	5
7. I feel that I'm a person of worth, at least on an equal plane with others.	1	2	3	4	5
8. I wish I could have more respect for myself.	1	2	3	4	5
9. All in all, I am inclined to feel that I am a failure.	1	2	3	4	5
10. I take a positive attitude toward myself.	1	2	3	4	5

## Appendix D

### Feedback Letter – Experiment Two

Thank you very much for your participation.

This study is designed to investigate whether people anticipate feeling different levels of regret after making an unsuccessful decision as part of a group or individually.

Participants in this study were asked to imagine making a decision – half of the participants in this study imagined making the decision individually and half imagined making the decision as part of a group. Participants were then asked to report the regret they would feel if they (or the group) made an unsuccessful decision.

The prediction of this study is that participants who imagine making the decision as part of a group will anticipate feeling less regret than participants who imagine making the decision alone. We hypothesize that when people make a decision alone they have no one else to share the blame with and this can lead to anticipating a lot of regret after a poor decision. On the other hand, when someone makes a decision as part of a group, at least part of the blame for any poor decision can be attributed to the other group members. We predict that this will lead people to anticipate less regret over poor decisions when they are made as a group.

Your responses will be absolutely confidential. Your name will be converted to a code number, and no person not associated with this research will see your name or your responses. We hope that you will honour our confidentiality - - please do not tell anyone about the details of the study before the end of the term. If other students know about the purpose of this study before they participate it could affect how they would naturally respond to the task and this would make their data useless.

If you are interested in this area of research, you may wish to read the following reference:

Gilbert, D. T., Pinel, E. C., Wilson, T. D., Blumberg, S. J., & Wheatley, T. P. (1998). Immune neglect: A source of durability bias in affective forecasting. *Journal of Personality and Social Psychology*, 75, 617 – 638.

If you are interested in learning the results of this study you may contact Pamela Stager (4ps3@qmlink.queensu.ca).

If you have any complaints, concerns, or questions about this research, please feel free to contact Dr. Tara MacDonald (x32873, tmacdon@post.queensu.ca), the Head of the Department of Psychology, Dr. V. Quinsey (533-2843), or Chair of the General Research Ethics Board, c/o the Office of Research Services at Queen's University, 533-6081.

## Appendix E

### Letter of Information and Consent Form – Experiment Five

#### Letter of Information

I would like to inform you about the purpose and procedures of this research. I would also like to take this opportunity to inform you about your rights and alleviate any concerns you might have with respect to your participation in this study.

This study is being conducted by Pamela Stager and Dr. Tara MacDonald, Department of Psychology at Queen's University. This study was granted clearance by the General Research Ethics Board for compliance with the TCPS: Ethical Conduct of Research Involving Humans, and Queen's policies.

This study will involve working with a partner on a decision making task. You will also fill out some questionnaires.

There are no known risks to your participation in this study. Participation is completely voluntary and you are free to withdraw from the study at any time with no effect on your standing at school, in which case you may have any information about you removed. You are not obligated to answer any questions that you find objectionable or which make you feel uncomfortable. Your name will not be associated with the information you provide, and only the principal investigators of this project or researchers authorized by the principal investigators will have access to your responses. The results of this study will only be published in summary form and in standard academic outlets. This study will take approximately 30 minutes of your time and you will receive either 0.5 experimental PSYC 100 credits or \$5 for your participation.

Any questions about study participation can be directed to Dr. Tara MacDonald ([tmacdon@queensu.ca](mailto:tmacdon@queensu.ca) or at 533-2873). Any ethical concerns about the study may be directed to the Chair of the General Research Ethics Board at 613-533-6081, or [Chair.GREB@queensu.ca](mailto:Chair.GREB@queensu.ca).

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#### Consent Form

I, \_\_\_\_\_, have read the Letter of Information and have had all questions answered to my satisfaction.

I understand that I will be participating in a study on decision making and that my involvement consists of completing a decision making task with a partner and filling out questionnaires.

I am aware of the people who I can contact if I have any questions, concerns, or complaints. I understand that my participation is completely voluntary and that I am free to withdraw at any time. I understand this study takes approximately 30 minutes. I have been assured that my responses to all questionnaires will be confidential and will not be made public in any way that I could be identified. I understand that this consent form allows the researchers to use the data collected from my questionnaires for research purposes only.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**Appendix F**  
**Feedback Letter – Experiment Five**

**Debriefing Form**

Thank you very much for your participation.

This study is designed to investigate whether people experience different levels of regret after failing at a task with an in-group or an out-group member.

In-group partners were either people from your own residence or your own friends. Out-group members were either people from a different residence or strangers. We wanted people to feel that their partner was either part of their group or not.

You and your partner then attempted a “travel adventure task”, which was rigged to be impossible. This was done so that all participants would fail at the task and hopefully experience some level of regret.

We are interested in whether or not people experience different levels of regret depending on whether they worked with someone who was part of their in-group or part of an out-group, based on their classification as an over or under-estimator.

This study is part of a larger body of research examining the differences between the regret that people anticipate and the regret they actually experience. People often anticipate more regret than they actually experience. People often fail to realize that they have what is known as a “psychological immune system” that kicks in when a psychological threat is detected, much like how the physical immune system leaps into action when a harmful virus is detected in the body. The greater the threat, the harder the psychological immune system works to protect the self. In the case of a failure, such as in this study, it is easy for someone to reduce their regret by placing the blame for the failure on their partner and not themselves. We predict that people may place more blame out out-group as compared to in-group members because people feel a connection to in-group but not out-group members. This will lead people to anticipate less regret from a failure that happened with an out-group as compared to in-group partner. However, we predict that the psychological immune system will work to reduce the regret experienced in this situation, making it equal to the regret felt by the participants with out-group partners.

We were not completely honest with you at the start of this study about the true purpose of the study. If you feel concerned or uncomfortable about the fact that you were intentionally deceived, you may tell us to withdraw your data from the sample. Remember that your results are confidential to me and my supervisor, and that all results are published anonymously as group data. If participating in this experiment has caused sufficient distress you that you wish to speak to a counselor, please contact the following:

**Queen’s Student Counseling Service - 545 2893**

**TALK Distress and Information Line – 544 1771**

**Canadian Mental Health Association - (416) 484-7750**

Your responses will be absolutely confidential. Your name will be converted to a code number, and no person not associated with this research will see your name or your responses. We hope that you will honour our confidentiality. **Please do not tell anyone about the details of the study before the end of the term.** If other

students know about the purpose of this study before they participate it could affect how they would naturally respond to the task and this would make their data useless.

If you are interested in this area of research, you may wish to read the following reference:

Gilbert, D. T., Pinel, E. C., Wilson, T. D., Blumberg, S. J., & Wheatley, T. P. (1998). Immune neglect: A source of durability bias in affective forecasting. *Journal of Personality and Social Psychology*, *75*, 617 – 638.

If you are interested in learning the results of this study you may contact Pamela Stager ([4ps3@qmlink.queensu.ca](mailto:4ps3@qmlink.queensu.ca)).

Any questions about study participation can be directed to Dr. Tara MacDonald ([tmacdon@queensu.ca](mailto:tmacdon@queensu.ca) or at 533-2873). Any ethical concerns about the study may be directed to the Chair of the General Research Ethics Board at 613-533-6081, or [Chair.GREB@queensu.ca](mailto:Chair.GREB@queensu.ca).

## **Appendix G**

### **Happiness Data**

In a line of research parallel to the regret research presented in this dissertation I have collected preliminary data on the happiness anticipated from succeeding at a novel task that was completed independently or while working in a group, as well as the happiness anticipated from succeeding at a task while working with an in-group as well as out-group partner. Participants' preferences for working alone or in a group (or with an in-group or out-group partner) were also measured.

#### **Study One**

This study was run to investigate the effect that working alone or in a group would have an anticipated happiness, as well as to determine if making potential future happiness salient can affect preferences for working alone or in a group.

##### **1a) Anticipated Happiness:**

The twenty-nine participants in this condition read the same description of the Travel Adventure Task as participants in Study One of this dissertation. They were then given the following instructions: "Imagine that in one scenario you are working alone and have to complete this task by yourself, in another scenario you are working in a group and have to complete the task together. Try to visualize each of these scenarios. Now imagine that in each of these two scenarios the correct decision is made, you (first scenario), or your group (second scenario) were successful in finding your way back to Canada, and you won the \$100. Try to visualize each of these scenarios and think about the happiness you would feel in each."

Participants then responded by placing a tick along a 151 mm line anchored at each end with "much more happiness if I made the decision alone" and "much more happiness the decision was made in a group".

**1b) Happiness Salient:**

Twenty-nine participants have been run in this condition so far. After reading the same description of the Travel Adventure Task used in the previous condition, participants were given the following instructions:

Imagine that you were to make this decision **independently**, without assistance or guidance from anyone else. Please think about the happiness you would feel if you were to make the correct decision all by yourself, you were able to successfully make it back to Canada, and you won the \$100.

Now imagine that you were to make this decision as part of a **group** of other people and you had to decide, as a group, how to get home. Please think about the happiness you would feel if your group were to make the correct decision, you were able to successfully make it back to Canada, and you won the \$100.

Participants then reported their preferences using the following scale:

If you were to really complete this task and make the decision of how to get back to Canada, would you prefer to make this decision as a group or on your own?

Please circle your preference:

Strong preference for making decision as part of a group	Moderate preference for making decision as part of a group	Mild preference for making decision as part of a group	No preference	Mild preference for making decision alone	Moderate preference for making decision alone	Strong preference for making decision alone
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**Results**

**Anticipated Happiness:**

Participants in this condition reported whether they expected more happiness to occur after successfully completing the task alone or as part of a group. Participants

expected marginally more happiness from an individual as compared to a group success ( $M = 61.09$ ,  $SD = 41.31$ ),  $t(28) = 1.88$ ,  $p = .071$ .

**Preference:**

Participants in this condition did not show a preference for working either alone or in a group. Their mean preference ( $M = 3.86$ ,  $SD = 2.05$ ) did not differ from the midpoint of the scale representing no preference,  $t(28) = 0.363$ ,  $p = .720$ .

Because these happiness data are preliminary, I do not have a control condition, in which happiness was not made salient, for comparison, so conclusions cannot be made at this point.

## Study Two

This study was run to investigate the effect that working with an in-group or out-group partner would have on anticipated happiness, as well as to determine if making potential future happiness salient can affect preferences for working with in-group or out-group partners.

**Anticipated Happiness:**

The twenty-six participants in this condition anticipated their future happiness. Participants read the same description of the Travel Adventure Task as participants in the previous study and were given the following instructions:

Imagine that in one scenario you are working with a partner who lives in your residence, in another scenario you are working with a partner who lives in a different residence. Try to visualize each of these scenarios.

Now imagine that in each of these two scenarios the right decision is made, you and your partner were successful in finding your way back to Canada, and you won the \$100. Try to visualize this scenario happening with both a partner from your residence and a partner from a different residence, and think about the happiness you would feel in each situation.

In which scenario would you feel more happiness, if you worked with a partner who lived in your residence, or a partner who lived in a different residence?

Participants then reported their anticipated happiness by placing a tick along a line 151 mm long, anchored at each end with “Much more happiness if my partner lived in my residence” and “Much more happiness if my partner lived in a different residence”.

**Happiness Salient:**

Twenty-Four participants were randomly assigned to a happiness salient condition where they reported their preference for working with an in-group or out-group partner while their potential future happiness over being successful at the Travel Adventure Task was made salient. Participants in this condition read the same description of the Travel Adventure Task as the above condition. They were then given the following instructions:

**Please take a moment to focus on all the happiness you would feel if you and your partner were successful at the task, you were able to successfully make it back to Canada, and you won the \$100.**

If you were to really complete this task with a partner, and make the decision of how to get back to Canada, would you prefer to work with a partner who lives in the **same** residence as you, or would you prefer to work with a partner who lives in a **different** residence?

Participants then reported their preference using the same scale as above:

Strong preference for working with a	Moderate preference for working with a	Mild preference for working	No preference	Mild preference for working	Moderate preference for working	Strong preference for working with a
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partner from your own residence	partner from your own residence	with a partner from your own residence		with a partner from another residence	with a partner from another residence	partner from another residence
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**Anticipated Happiness:**

Participants reported if they expected more happiness from working with an in-group or out-group partner. Participants expected equal happiness working with an in-group and out-group partner ( $M = 68.58, SD = 37.47$ ),  $t(23) = 0.90, p = .379$ .

**Preference:**

Some participants reported their preference after their potential future happiness over success was made salient. The mean preference of participants in this condition ( $M = 3.62, SD = 1.33$ ) did not differ from the midpoint of the scale, representing no preference for working with either an in-group or out-group partner,  $t(25) = 1.48, p = .153$ .

As in Study One, because these data are preliminary and there is no control condition, in which happiness was not made salient, for comparison, conclusions cannot be drawn at this point.