

## **INFORMATION TO USERS**

This manuscript has been reproduced from the microfilm master. UMI films the text directly from the original or copy submitted. Thus, some thesis and dissertation copies are in typewriter face, while others may be from any type of computer printer.

**The quality of this reproduction is dependent upon the quality of the copy submitted.** Broken or indistinct print, colored or poor quality illustrations and photographs, print bleedthrough, substandard margins, and improper alignment can adversely affect reproduction.

In the unlikely event that the author did not send UMI a complete manuscript and there are missing pages, these will be noted. Also, if unauthorized copyright material had to be removed, a note will indicate the deletion.

Oversize materials (e.g., maps, drawings, charts) are reproduced by sectioning the original, beginning at the upper left-hand corner and continuing from left to right in equal sections with small overlaps. Each original is also photographed in one exposure and is included in reduced form at the back of the book.

Photographs included in the original manuscript have been reproduced xerographically in this copy. Higher quality 6" x 9" black and white photographic prints are available for any photographs or illustrations appearing in this copy for an additional charge. Contact UMI directly to order.

**UMI<sup>®</sup>**

**Bell & Howell Information and Learning  
300 North Zeeb Road, Ann Arbor, MI 48106-1346 USA  
800-521-0600**



**Regretting Our Behaviour:  
Choice and Impulsiveness in a Temporal Perspective**

**Graeme Dyck**

**University of Manitoba**

**A dissertation submitted to the Faculty of Graduate Studies  
in partial fulfilment of requirements for the degree of**

**MASTER OF ARTS**

**Department of Psychology  
University of Manitoba  
Winnipeg, MB**

**©Copyright by Graeme Dyck, 1999**



**National Library  
of Canada**

**Acquisitions and  
Bibliographic Services**

**395 Wellington Street  
Ottawa ON K1A 0N4  
Canada**

**Bibliothèque nationale  
du Canada**

**Acquisitions et  
services bibliographiques**

**395, rue Wellington  
Ottawa ON K1A 0N4  
Canada**

*Your file Votre référence*

*Our file Notre référence*

**The author has granted a non-exclusive licence allowing the National Library of Canada to reproduce, loan, distribute or sell copies of this thesis in microform, paper or electronic formats.**

**The author retains ownership of the copyright in this thesis. Neither the thesis nor substantial extracts from it may be printed or otherwise reproduced without the author's permission.**

**L'auteur a accordé une licence non exclusive permettant à la Bibliothèque nationale du Canada de reproduire, prêter, distribuer ou vendre des copies de cette thèse sous la forme de microfiche/film, de reproduction sur papier ou sur format électronique.**

**L'auteur conserve la propriété du droit d'auteur qui protège cette thèse. Ni la thèse ni des extraits substantiels de celle-ci ne doivent être imprimés ou autrement reproduits sans son autorisation.**

**0-612-45149-6**

**Canada**

**THE UNIVERSITY OF MANITOBA**  
**FACULTY OF GRADUATE STUDIES**  
**\*\*\*\*\***  
**COPYRIGHT PERMISSION PAGE**

**Regretting Our Behaviour:**  
**Choice and Impulsiveness in a Temporal Perspective**

**by**

**Graeme Dyck**

**A Thesis/Practicum submitted to the Faculty of Graduate Studies of The University**  
**of Manitoba in partial fulfillment of the requirements of the degree**  
**of**  
**Master of Arts**

**Graeme Dyck © 1999**

**Permission has been granted to the Library of The University of Manitoba to lend or sell copies of this thesis/practicum, to the National Library of Canada to microfilm this thesis/practicum and to lend or sell copies of the film, and to Dissertations Abstracts International to publish an abstract of this thesis/practicum.**

**The author reserves other publication rights, and neither this thesis/practicum nor extensive extracts from it may be printed or otherwise reproduced without the author's written permission.**

## **ACKNOWLEDGEMENTS**

Though the words that follow have been typed with my own fingers, the thoughts that preceded them would not have bubbled to the surface without the encouragement and support that I have received from a lifetime of friends and family. To Pam: your wisdom, patience, and sacrifice have lit my path and guided my hand. I am blessed to have found my soul mate and life companion. Thank goodness someone was able to teach me about delay of gratification. To my son Jordan: you learned to roll over the day before my oral defense. In achieving this simple milestone you reminded me to focus on the moment in front of me and not the years behind me. You have brought out the best in me and reminded me about the value of persistence.

To my sister, Lesley, and friend, Stephen: how selfish of you to graduate before me. Even so, the hours you have both spent listening to me will never be forgotten. You are closest to my heart. To my friends, Kim, Chuck, Jacqueline, Jenn, Dana, Su & Randy: your friendship has brought a timely peace to my life when I have needed it most. To Dr. Jim Nickels, my academic advisor and mentor: thank you for your patience and thoughtfulness. Your encouragement throughout was meaningful and necessary. It is my aspiration that my professional life will reflect these qualities as I lead others the way you have led me. To Dr. Jim Forest and Dr. Riva Bartell, thank you for your investment in my learning process. You made my experience thoroughly enjoyable through your gentle words and confidence-inspiring approach.

Finally, to all the friends and family who I have not mentioned elsewhere, thank you for teaching me the value of humour and the importance of friendship. May each of you outlive your personal regrets.

# **TABLE OF CONTENTS**

Table of Contents .....	3
List of Tables .....	4
Abstract .....	8
Trends in Research on Regret .....	9
Choice and Dissonance .....	11
Action-Inaction Explanations .....	12
Gender, Ethnicity, and Socioeconomic Effects .....	14
Contributions of Counterfactual Thinking .....	14
Regret in the Temporal Perspective .....	15
Impulsiveness as an Individual Difference Variable .....	16
Impulsiveness and Its Consequences .....	16
Measures of Impulsiveness .....	17
Regret and Planning for the Future .....	19
Methodological Limitations in Regret Research .....	21
Measuring Participant Regret .....	21
Measuring Regret With Scales .....	22
Measuring Genuine Regret .....	23
Hypotheses .....	24
Method .....	24
Participants .....	24
Procedure .....	25
Instruments .....	27
Impulsiveness. ....	27
Regret and secondary variables. ....	27
Qualitative measure. ....	28
Design .....	28
Results .....	29
Choice .....	29
Term and Impulsiveness .....	29
Anger and Disappointment as Dependent Variables .....	32
Gender Effects .....	39

<b>Effect Sizes and Power</b> .....	<b>39</b>
<b>Discussion</b> .....	<b>46</b>
<b>The Role of Impulsiveness in the Prediction of Regret</b> .....	<b>46</b>
<b>The Role of Term in the Prediction of Regret</b> .....	<b>49</b>
<b>The Role of Choice in the Prediction of Regret</b> .....	<b>50</b>
<b>A Redefinition of Action and Inaction</b> .....	<b>53</b>
<b>The Importance of Anger and Disappointment</b> .....	<b>54</b>
<b>Gender Differences</b> .....	<b>55</b>
<b>Conclusions</b> .....	<b>59</b>
<b>Methodological Strengths and Limitations</b> .....	<b>61</b>
<b>Summary</b> .....	<b>63</b>
<b>References</b> .....	<b>64</b>
<b>Appendix A</b> .....	<b>69</b>
<b>Appendix B</b> .....	<b>70</b>
<b>Appendix C</b> .....	<b>71</b>
<b>Appendix D</b> .....	<b>74</b>
<b>Story One: The Final Exam</b> .....	<b>74</b>
<b>Story Two: The Inheritance</b> .....	<b>76</b>
<b>Story Three: The Late Movie</b> .....	<b>78</b>
<b>Story Four: The Trip of a Lifetime</b> .....	<b>80</b>
<b>Appendix E</b> .....	<b>83</b>
<b>Appendix F</b> .....	<b>84</b>



# **LIST OF TABLES**

Table 1

<b><u>Mixed ANOVA for Term, Choice, and Impulsiveness with Regret as Dependent</u></b>	
<b><u>Variable</u></b> .....	<b>30</b>

Table 2

<b><u>Means and Standard Deviations for Short Term and Long Term Regret for Each</u></b>	
<b><u>Story by Choice</u></b> .....	<b>31</b>

Table 3

<b><u>Means and Standard Deviations for Short Term and Long Term Regret for Each</u></b>	
<b><u>Story by Impulsiveness</u></b> .....	<b>33</b>

Table 4

<b><u>Test of Simple Main Effects for Term and Impulsiveness with Regret as</u></b>	
<b><u>Dependent Variable</u></b> .....	<b>34</b>

Table 5

<b><u>Mixed ANOVA with Anger and Disappointment as Dependent Variables</u></b> ....	<b>35</b>
---	-----------

Table 6

<u>Means and Standard Deviations for Short Term and Long Term Anger for Each Story by Impulsiveness</u> .....	36
---	----

Table 7

<u>Means and Standard Deviations for Short Term and Long Term Disappointment for Each Story by Impulsiveness</u> .....	37
--	----

Table 8

<u>Test of Simple Main Effects for Term and Impulsiveness with Anger and Disappointment as Dependent Variables</u> .....	38
--	----

Table 9

<u>Means and Standard Deviations for Short Term and Long Term Regret, Anger, and Disappointment by Gender</u> .....	40
---	----

Table 10

<u>Mixed ANOVA for Term, Gender, and Impulsiveness with Regret as Dependent Variable</u> .....	41
--	----

Table 11

<u>Mixed ANOVA for Term, Gender, and Impulsiveness with Anger and</u>	
<u>Disappointment as Dependent Variables</u> .....	42

Table 12

<u>Pearson Product-Moment Correlations for Impulsiveness and Short Term and</u>	
<u>Long Term Regret, Anger, and Disappointment by Gender</u> .....	43

Table 13

<u>One-Way ANOVA for Gender with Impulsiveness as Dependent Variable</u> ...	44
--	----

Table 14

<u>Means and Standard Deviations for Impulsiveness by Gender</u> .....	45
--	----

**Abstract**

This study researched several variables that help explain the experience of regret.

Participants (N=238) completed the I-7 Impulsiveness Questionnaire before assuming the role of the main character in four stories. Following the negative outcome in each story, participants completed quantitative and qualitative dependent measures. Data were analysed using Term (short, long), Choice (action, inaction), and Impulsiveness (low, high) as independent variables and regret as the principle dependent variable. Results showed that participants expressed (a) higher levels of regret in the short term than in the long term, (b) higher levels of regret under high impulsiveness only in the long term but lower levels of regret under low impulsiveness only in the short term, and (c) higher levels of regret for females than for males. These findings suggest that term and gender are two important variables for explaining intensity of regret.

## **Regretting Our Behaviour:**

### **Choice and Impulsiveness in a Temporal Perspective**

Why do some people have more intense regrets than others? Under what conditions do such regrets occur? These are the questions on which the following research is grounded. Researchers have already identified several contextual variables and individual differences that seem to predict certain levels of regret. However, some of these variables have not yet been thoroughly investigated. It is the purpose of this research to explicate several relationships between contextual variables, individual differences and regret, that have not yet been explained adequately in the literature.

### **Trends in Research on Regret**

As suggested by Landman (1987), the last 15 years have been more important to our scientific understanding of emotional regret than any other time in the history of psychology. Though Leon Festinger was the first psychological theorist to touch on its importance in 1957, no researchers had rigorously examined regret within the quantitative social sciences until formal economic decision theory added the regret term to its classical utility function (Loomes & Sugden, 1982). The trend towards understanding regret continued as Kahneman and Tversky (1982) addressed several empirical questions, leaving a firm foundation on which future researchers could build. Central to Kahneman and Tversky's study was the following question: Given the same unfortunate outcome, do people experience more regret for having attained the outcome via action rather than inaction? Over many studies, including Kahneman and Tversky's, this question has been answered with a resounding "yes" (Gilovich & Medvec, 1994;

Gilovich & Medvec, 1995; Gleicher et al., 1990; Granberg & Brown, 1995; Turley & Sanna, 1995; Kahneman & Miller, 1986; Kahneman & Tversky, 1982; Landman, 1987; Takemura, 1992).

In order to understand the meaning of action and inaction as independent variables in the above studies, these terms must be given a precise definition. Generally, the above studies have defined action to indicate any behaviour in which one engages that compels the status quo to change. Conversely, inaction has been defined as an instance in which the absence of behaviour has served to maintain the status quo. Though action/inaction are not the only variables used in psychological research, they appear to be the most common in the examination of regret. Other variables that have also been researched include switch/stay (Granberg & Brown, 1995) and commission/omission (Spranca, Minsk & Baron, 1991); however, the definition of these variables depend on how an experiment is structured. That is, based on its context, an action may or may not be a deviation from the status quo, and, depending on its context, may be either a decision to switch to something different or a decision to stay with what one has. Further, an action may also be a commission, (a decision to trade in what one has in return for something different), or an omission (a decision to keep whatever one has already). In sum, most research to date has suggested that the action/inaction variables directly associate an individual's decision to either maintain or abandon the status quo. In contrast, switch/stay and commission/omission may involve action or inaction depending on the context. That is, variables are chosen and defined depending upon the what a researcher wishes to define as the default condition.

Given the above definitions for action and inaction, it is clear that these definitions are largely behavioural. However, this emphasis is not to suggest that cognitive effort or emotional tension play a minor role in determining regret. It is the hope of this researcher that behavioural action will be merely viewed as one necessary approach towards understanding the experience regret. That is, the basis of regret theory has been founded on the assumption that one encounters regret through experiences that demand choices. In turn, these choices demand action or inaction through behaviour. However, there are many other dynamics in operation when it is demanded that one make a choice. What are these dynamics? Possible answers to this question will now be addressed.

#### Choice and Dissonance

According to Festinger (1957) and Aronson (1969), any decision with which an individual is faced unavoidably creates some dissonance between the awareness that an action has been taken or avoided, and those opinions that point to an alternative decision. Depending on an individual's evaluation of importance regarding the chosen alternative, dissonance will vary. Similar to the experience of post-decision dissonance, Aronson and Festinger suggest that before a decision is taken there is also unavoidable tension which occurs. In Aronson's words, "it is assumed that an individual will devote his energies to a careful, dispassionate, and sensible evaluation and judgment of the alternatives. He will gather all of the information, pro and con, about all of the alternatives in order to make a reasonable decision" (Aronson, p.12). Furthermore, depending on the importance of the possible alternatives, an individual will experience more or less tension prior to making a

decision. For the purposes of the following research, it will be assumed that a moderate level of tension will be experienced in each of the constructed scenarios, and that post-decision dissonance will be generally uniform across individuals. Although it is understood that people differ in their ability to tolerate dissonance (Festinger, 1957), and that the importance of a chosen alternative depends on an individual's opinion regarding an outcome's attractiveness, it is hoped that the outcome of each constructed scenario will be moderately important to all participants in the study. Thus, responses on the dependent measures should be an accurate representation of the general response of regret from scenarios resulting in moderately important and dissonant outcomes.

#### Action-Inaction Explanations

The finding that individuals experience more regret for having attained an outcome via action than those who have attained regret via inaction has been explained in many ways. One theory proposed by Kahneman and Miller (1986) suggests that the intensity of regret depends on an individual's expectations regarding what is normal and what is abnormal, as well as with the ease which alternative scenarios may be mentally constructed or undone. Because inaction is generally experienced as the default to action and is easier to imagine (because inaction will always occur unless one decides to act), a disappointing experience in which an alternative inaction is easy to imagine will usually be regretted with more intensity than in a situation in which an alternative action can occur. This explanation is the basis for research on counterfactual thinking and will be discussed with more detail in the next section.

There are also several other explanations for the finding that acts that result in



failure are usually more regrettable than failures to act. First, acts generally appear to be much more salient than non-acts and perform an important role in social cognition. For example, based on a self-perception paradigm, Fazio, Sherman and Herr (1982) discovered that people make greater use of their acts than their non-acts to infer their own attitudes. Moreover, because individuals are more often rewarded or punished because of their actions as opposed to their inactions (though there are several exceptions to this observation), such actions become much more important than inactions in terms of their informational value.

A second explanation for the action-regret association suggests that evolutionary success depends on one's ability to respond to events (that are generally brought forth by actions) rather than nonevents (that are generally the default to actions) (Newman, Wolff & Hearst, 1980). Therefore, individuals have a predisposition to make actions more salient than inactions in one's cognitive operations. By doing so, one may protect one's gene pool.

A third explanation, arising from attribution theory, suggests that the stronger the causal connection between an antecedent and its consequence, the stronger the affective impact will be. Thus, because actions create stronger causal connections with consequences than inactions, one would expect affect following action typically to be more intense than affect following inaction (Landman, 1987).

Two points can summarize the above explanations for the action-regret association. First, it is certainly evident that actions and inactions have separate functions in the experience of regret. Second, it appears that failed actions typically produce

greater regret than failures to act. However, are these findings generalizable to all situations, or are there instances in which these findings do not apply? This is a question that has recently promoted considerable interest and forms the basis for the following research.

#### Gender, Ethnicity, and Socioeconomic Effects

Though there is some evidence that males tend to report more intense regret due to unsuccessful life outcomes in action scenarios (Landman, 1987), no other studies that have been reviewed for this proposal have found significant differences between males and females. Similarly, no studies reviewed for this proposal have suggested regret or action-inaction effects due to ethnicity or socioeconomic status. Therefore, it is not expected that any particular effects due to demographics would be discovered after analysing such demographic variables.

#### Contributions of Counterfactual Thinking

According to Gilovich and Medvec (1994) most research on the subject of regret has dealt with the question of how the anticipation of future regret affects consumer behaviour rather than when and why regret is experienced outside of the tradition of formal economic decision theory. In most recent investigations researching when and why regret occurs, the term "counterfactual thinking" has received considerable attention (Boninger, Gleicher & Strathman, 1994; Gleicher, Kost, Baker, Strathman, Richman & Sherman, 1990; Turley, Sanna & Reiter, 1995). As previously suggested, a counterfactual can be defined as an imagined alternative to an actual event and is based on the heuristic of mental simulation. According to Gleicher et al. (1990), the generation

of counterfactuals is a key element in determining affective and behavioural responses to actual outcomes. That is, routes to inaction as a counterfactual alternative tend to be easier to generate than routes to action as a counterfactual alternative. For example, Boninger et al. (1994) describe a study in which participants judged a rape victim to be more responsible and blameworthy after imagining how she might have avoided the rape. Furthermore, a counterfactual that is judged to have a greater possibility of occurring will have a greater impact on the emotional response to the actual outcome. Thus, actions, unlike inactions, tend to operate through two routes: (a) ease of generation of the counterfactual and (b) increased perceived likelihood of its occurrence, both of which amplify emotional responses.

Though counterfactual thinking itself will not be a central idea guiding the following research, it is largely responsible for inspiring the idea that regret can be ameliorated or amplified over time. According to Boninger, Gleicher and Strathman (1994), there is evidence to suggest that one's perspective may shift over time, such that certain regrets may increase in intensity and others may diminish. Moreover, they make the suggestion that dispositional tendencies perform a large role in an individual's likelihood to be regretful over past failures. Therefore, the counterfactual thinking research lends two important concepts for research on regret theory. First, there may be a temporal perspective to the experience of regret. Second, there may be important dispositional tendencies which have an impact on such experiences.

### Regret in the Temporal Perspective

Research on the temporal perspective and regret suggests something

extraordinary. As powerful and intuitively appealing as it is that a failed action typically induces greater regret than a failure to act, these findings conflict with results reported by Gilovich and Medvec (1994). According to these researchers, when people look back over their lives it seems that it is their failures to act which provide more regret than their failed actions. That is, in the short term it is our failed actions that provide us with the most regret, whereas in the long term it is our inactions that plague us the most.

Furthermore, because Gilovich and Medvec conducted their research on the temporal perspective by means of surveys, interviews, and scenarios, the reliability of these results appear strong. However, until now, no other researchers have conducted studies or reported results on the relationship between the temporal perspective and regrets in the action/inaction framework. Therefore, this research endeavours to address the following question: are there any other variables that will significantly impact the relationship between regrets and action/inaction variables in the temporal perspective?

### **Impulsiveness as an Individual Difference Variable**

#### **Impulsiveness and Its Consequences**

According to Strathman, Gleicher, Boninger and Edwards (1994), individual differences may in fact have an important role in determining an individual's level of regret. They suggest that it is the additive effect of situational and dispositional factors that determines an individual's experience of regret. What dispositional factors may be responsible? Though Strathman et al. focussed their research on the effect of consideration of future consequences on regret experiences, their results suggest that other similar dispositional variables, such as impulsiveness, may have great importance

to the relationship between regret and failure outcomes.

As an individual difference, impulsiveness has been defined in the literature in a variety of ways. Some researchers have proposed that it involves up to 15 distinct components (Gerbing, Ahadi & Patton, 1987), while others have suggested that it involves only two general traits (Eysenck, Pearson, Easting & Allsopp, 1985). Generally, however, most researchers seem to agree that impulsiveness may be defined as an individual's tendency to respond quickly to a given stimulus, without deliberation, reflectivity, and evaluation of the consequences (Gerbing et al., 1987; Luengo, Carrillo-de-la-Pena & Otero, 1991). That is, impulsiveness seems to implicate both motor impulsiveness and a lack of cognitive foresight.

As a personality dimension, impulsiveness has been known to precipitate specific consequences such as adolescent pregnancy (Jones & Philliber, 1983), bulimia (Woznica, 1990), criminal behaviour (Eysenck & McGurk, 1980) and conduct problems (Olson & Hoza, 1993) to name but a few. The Diagnostic and Statistical Manual of the American Psychiatric Association (1983) has also implicated impulsiveness as a contributing component in certain disorders, including Attention Deficit Disorder, Substance Abuse Disorders, various types of Antisocial Behaviour, Pathological Gambling, Kleptomania, Pyromania, Borderline Personality Disorder, and Explosive Disorders.

#### Measures of Impulsiveness

Though researchers have been examining the dimension of impulsiveness since the 1960's, there is no single assessment tool which has been accepted as a pure measure of this construct. Rather, there are many disparate measures that span the self-report and

behavioural domains. Moreover, many reported impulsiveness measures are likely estimates of different constructs (Gerbing, Ahadi & Patton, 1987).

Of the several behavioural measures that have been used to assess impulsiveness, the most common are the Matching Familiar Figures Test (Kagan, 1966) and the Simple Reaction Time and Time Perception scales (Barratt & Patton, 1983). All of these tests aim to measure a construct known as cognitive tempo, which has been hypothesized to account for the contrasting conceptual styles of reflection and impulsiveness (Gerbing, Ahadi & Patton, 1987). Among the most commonly used self-report measures determining impulsiveness are several omnibus personality inventories, such as the 16 Personality Factors Questionnaire (16PF) Impulsiveness scale (Cattell, Eber & Tatsuoka, 1970), the Guilford-Zimmerman Temperament Survey Restraint scale (Guilford, Guilford & Zimmerman, 1978), the Personality Research Form (PRF) Impulsiveness scale (Jackson, 1974), and the impulsiveness scale from the EASI Temperament Survey, Version III (Buss & Plomin, 1975). However, specialized impulsiveness scales have also been developed and tend to be more commonly used than the omnibus personality inventories when impulsiveness is the only dimension of interest. The two most common specialized inventories include the I-7 (Eysenck, Pearson, Easting & Allsopp, 1985) and the Barratt Impulsiveness Scale, Version 10 (BIS-10) (Barratt, 1985). These last two inventories will be discussed in greater detail below.

Though the BIS-10 is defined by motor, cognitive and non-planning scales, the I-7 is composed of only two impulsiveness subscales, Impulsiveness and Venturesomeness. According to Barratt (1985), the BIS-10 and the Eysencks' earlier Impulsiveness

Questionnaire, the I-5, have many resembling characteristics. Barratt claims that his "motor impulsiveness" subtrait resembles the Eysencks' "narrow impulsiveness" factor, his "cognitive impulsiveness" is similar to the Eysencks' "liveliness" factor, and his "non-planning" subtrait resembles the Eysencks' "non-planning" factor. However, based on a factor analysis, Luengo, Carrillo-de-la-Pena & Otero (1991) reported that Barratt's "cognitive impulsiveness" failed to emerge as a dimension distinct from motor impulsiveness and lack of foresight on the Eysencks' recently revised I-7 Impulsiveness Questionnaire. Rather, the cognitive subscale tends to merge with the other two factors and must be redefined. Last, Luengo et al. also concluded that the I-7 is a psychometrically sounder instrument than the BIS-10 based on the consistency and reliability indices that were reported. Thus, it appears as if the I-7 is the scale that best defines impulsiveness for purposes of self-report methodologies.

#### Regret and Planning for the Future

It has been suggested thus far that impulsiveness is an important individual difference precipitating many forms of human behaviour, but what are the effects that this personality style could have on the function of regret? While one group of researchers evaluated the relationship between an individual's tendency to consider future consequences and subsequent experiences of regret (Boninger, Gleicher & Strathman, 1994), a factor that is not unlike the tendency to plan found in the Eysencks' I-7, there have been no reports in the literature in which regret has been studied in relation to self-reported motor impulsiveness. That is, what Boninger et al. termed their Consideration of Future Consequences (CFC) Scale (Strathman, Gleicher, Boninger & Edwards, 1994)

may be simply a contributing factor towards the accurate measurement of general impulsiveness.

According to Boninger et al. (1994), the CFC Scale "measures individual differences in the extent to which people weigh the immediate as opposed to distant implications of current behaviours and events" (p. 298). Specifically, the more one tends to prepare for the future, the higher one scores on the CFC Scale, the less one is likely to focus on "what might have been" (an instance of counterfactual thinking) and the more one is likely to focus on "what I might do next time." Furthermore, those individuals who have a future orientation on the CFC Scale tend to consider the future implications of their behaviours and endorse statements which suggest a willingness to delay gratification. In fact, Strathman et al. (1994) reported that Ray and Najman's Deferment of Gratification Scale (Ray & Najman, 1986) correlated .47 with their CFC Scale in one study. However, Boninger et al. do not suggest that an individual's tendency to delay of gratification performs the same role as an individual's tendency to prepare themselves for the future, even though they do not state how these two constructs actually differ. Nor do the researchers give credit to the general motor impulsiveness which, according to many sources, guides a great deal of human behaviour. Rather, Boninger et al. seem to have constructed a model which is purely cognitively driven.

In sum, Boninger et al.'s (1994) research has made a significant contribution to the understanding of regret in relation to individual differences, a necessary departure from earlier studies where scholarship has been confined to the examination of situational variables. However, there are several points which remain unclear. That is, by



neglecting the implications of short term versus long term regrets, and failed actions versus failures to act, the researchers appear to be generalizing across several important dimensions. Boninger et al. seem to presume that: (a) the more one is cognitively focussed on the future, the less regret one feels, regardless of whether the regret was due to a failed action or a failure to act; (b) the more one is cognitively focussed on the future, the less regret one feels, regardless of whether an undesirable outcome has occurred 10 minutes earlier or 10 years earlier; and (c) an individual's tendency to plan for the future will predict regret more accurately than it would with the addition of self-reported motor impulsiveness. Due to the fact that these presumptions appear to have been made, it is clear that the following study will also make an important contribution to the literature focussing on the relationships between regret, the action/inaction dimension, long term versus short term regret and the role of impulsiveness as an individual difference.

### **Methodological Limitations in Regret Research**

In order to fully understand why the following procedures and methods are proposed below, it is important to understand the limitations inherent to the above literature review. A summary of these limitations follows below.

#### **Measuring Participant Regret**

Gilovich and Medvec (1994) discuss one methodological limitation common to most studies researching regret. These researchers explain that experiments that use stories constructed by the researcher most often examine participants' intuitions about emotional states, not the emotional states themselves. Therefore, in response to this

criticism, researchers who construct stories for their experiment must adopt a methodology that enables participants to answer questions as if they are undergoing the regret experience themselves.

In consideration of this concern, the current researcher will encourage participants to assume that the scenarios are actually happening to them, and to believe they are the main character in the story. Therefore, the questionnaire sections will be directed towards the regret experience that the participant is experiencing, and the participant will not need to make intuitions about someone else's regret.

#### Measuring Regret With Scales

A second limitation often observed in regret methodologies is that researchers rarely use scales to determine regret intensity. Rather, participants are usually asked to compare two scenarios and to indicate in which scenario the main character might be feeling more regret. This forced-choice methodology is clearly effective if a researcher is interested in the primary detection of regret, rather than in determining its intensity. However, if it is the researcher's goal to detect the degree of regret, such a methodology would be ineffective.

In research that relies on forced-choice comparisons, a participant is usually asked to read a story in which one character generally experiences a failure outcome due to his or her inaction, and to compare that character's regret to another character who experiences a failure outcome due to his or her action. Given this type of methodology, it is not surprising that participants are quick to point out which context might provoke which character to feel the most regret. That is, when participants are given the

opportunity to make forced-choice comparisons, accuracy is less difficult when contextual cues are available and obvious. It is the hope of this researcher that if participants are presented with stories that do not supply them with simple contextual comparisons, assessing one's level of regret will require more effort than if simple comparisons were presented. Therefore, the researcher is proposing to measure a participant's level of regret on nine-point Likert scales. It is also possible that such reports will more accurately resemble true experiences of regret and will be less artificial than those that are accessed through methodologies that use cues towards contextual comparisons.

In sum, the following research will expect participants to determine their own intensity of regret based on a limited number of contextual cues, and without the benefit of comparisons between scenarios. The only contextual clues to be included will be the experience of a second character who has made the opposite decision as the main character, but who has achieved a positive outcome and experiences no regret. This comparison will be included to magnify the intensity of regret that the participant may experience, and to encourage the participant's use of counterfactuals.

### Measuring Genuine Regret

A third limitation common to regret methodologies is that participants are usually aware that regret is the primary dependent variable of interest. Consequently, researchers cannot always be sure that they are receiving "truthful" feedback from their subjects. It is this researcher's opinion that if regret is measured in conjunction with other emotions, a more authentic report of regret will likely be collected. That is, if other emotions are also

measured, it is reasonable to expect that participants' reports will more accurately represent true experiences of regret, not feelings exacerbated by subjects wishing to "help" the experimenter, or by overcompensating for feelings that they are also experiencing (e.g. disappointment and anger) but are not being measured. Furthermore, regret will not be the only emotion that one experiences after a loss. One may feel a host of emotions, varying from slight disappointment to outright anger. Therefore, if one's experience of regret is asked within the context of other emotions, a more genuine evaluation of regret may be reported.

### Hypotheses

Based on the above review, the following two interactions were proposed:

1. Action participants will express more regret in the short term than inaction participants, but inaction participants will express more regret in the long term than action participants.
2. High impulsiveness participants will express more regret in the short term than low impulsiveness participants, but low impulsiveness participants will express more regret in the long term than high impulsiveness participants.

### Method

#### Participants

Four experimental sessions were conducted by the experimenter, in which 240 students (between the ages of 17 and 43) participated. Participants had a mean age of 20, and 58% of them were female.

### Procedure

Participants entered a classroom in which a booklet was placed face down on each desk. They were asked to sit down wherever they liked. However, they were told not to open the booklet until instructed by the experimenter. Each booklet contained a list of written instructions (see Appendix A), a consent form (see Appendix B), Eysencks' I-7 Impulsiveness Questionnaire (Eysenck, Pearson, Easting & Allsopp, 1985) (see Appendix C), four stories (see Appendix D), quantitative measures (see Appendix E), and qualitative measures (see Appendix F). Participants were asked to complete the I-7 Impulsiveness Questionnaire prior to continuing with the rest of the experiment. After completing the questionnaire, participants were given instructions asking them to assume that each of the events taking place in each of the four stories was actually happening to the participant. That is, the participant was asked to assume the role of the main character, to experience what the main character was experiencing, and to feel what the main character was feeling. All stories were written in gender neutral language and were titled "The Final Exam," "The Inheritance," "The Late Movie," and "The Trip of a Lifetime."

Each story consisted of one scenario with an undesirable ending. In each of the four scenarios, the main character was given an opportunity to make a choice that affected the outcome of the story. The options that the main character could choose between were (a) to act or (b) not to act. The ending informed the participant as to what choice the main character decided to make: whether to act or not to act. Half of the participants received four stories in which the main character always made a decision to

act (action endings), and half of the participants received four stories in which the main character always made a decision not to act (inaction endings). The order of stories was counterbalanced to control for sequencing effects.

After reading a complete story, participants were asked to complete two short term and two long term measures. Following two of the stories, participants received the two short term measures before the two long term measures. Following the other two stories, participants received the two long term measures before the two short term measures. The order of short term/long term measures was counterbalanced such that each story was followed by short term measures before long term measures half of the time, and long term measures before short term measures half of the time.

The two short term measures consisted of the Discrete Affect Inventory Scale-I (DAIS-I) and one qualitative measure. In the short term version of the DAIS-I, participants were asked to “assume that only one hour has gone by since the outcome occurred” and to “circle the number that corresponds with how strongly [the participant is] feeling” regret, anger, and disappointment. Long term measures also consisted of the DAIS-I and one qualitative measure. In the Long term version of the DAIS-I, participants were asked to “assume that 10 years have gone by since the outcome occurred” and to “circle the number that corresponds with how strongly” the participant is feeling each of the above emotions. In both the short term and long term qualitative measures, participants were asked to explain the level of regret, anger, and disappointment that they were experiencing, depending on the time that had elapsed since the outcome. Participants were asked to respond on the qualitative measures each time

they completed a DAIS-I.

### **Instruments**

The experimenter gathered three types of information. Instruments gathered quantitative measurements of Impulsiveness and Regret (used as a dependent variable) and qualitative measurements to clarify the quantitative analyses. After completing all measures, participants were also asked (a) what they thought the researcher is hoping to discover by conducting the study, and (b) what they believed was the purpose of the experiment.

**Impulsiveness.** Before reading the first scenario, as discussed above, participants were asked to complete Eysenck's I-7 Impulsiveness Questionnaire (Eysenck, Pearson, Easting & Allsopp, 1985). (See Appendix C.) The I-7 is a forced-choice, 35 item questionnaire that determines a participant's level of impulsiveness. The measure consists of two sub-scales, Venturesomeness (16 items) and Impulsiveness (19 items). The I-7 has indicated test-retest reliabilities of greater than .75 (Eysenck et al., 1985; Luengo, Carillo-de-la-Pena & Otero, 1991) and Cronbach's alphas greater than .73 (Luengo et al., 1991). In terms of gender differences, males tend report slightly (though insignificantly) higher scores on the Impulsiveness sub-scale, and females tend to report slightly (though insignificantly) higher scores on the Venturesomeness sub-scale (Eysenck et al., 1985).

**Regret and secondary variables.** After reading the undesirable ending corresponding to a scenario, participants were asked to complete the Discrete Affect Inventory Scale-I (DAIS-I), a 3-item questionnaire created by the researcher (see Appendix E). It is scored on a 9-point Likert scale, ranging from 1 (*very little*) to 9 (*very*

much). Participants indicated how strongly they felt three distinct emotions: regret, anger, and disappointment, with regret the first emotion rated. This format ensures that regret is not contaminated by prior assessment of other affect, but also disguises the fact that Regret is the major dependent variable. Each participant's regret scores were summed across each of the four stories yielding one score based on the DAIS-I in the short term and one score based on the DAIS-I in the long term.

Qualitative measure. Each time participants completed a DAIS-I, participants were asked to explain the level of regret, anger, and disappointment that they were experiencing (see Appendix F). Such qualitative data helped to explain the quantitative data gathered by the DAIS-I and helped to clarify the cognitive experience of regret.

### Design

The data were analysed with a three-way Analysis of Variance (ANOVA) using Term (short, long), Choice (action, inaction), and Impulsiveness (low, high) as independent variables and Regret as the dependent variable. Comparable analyses were also run on the secondary variables of Anger and Disappointment. Choice and Impulsiveness functioned as between groups variables, whereas Term functioned as a within group variable. ANOVAs computed with the Impulsiveness variable used the I-7 35 item total score (hereafter called Impulsiveness scale). To establish high and low impulsiveness scores for all participants on the Impulsiveness scale, a median split was performed that equalled 18. In order to obtain a clearly high and a clearly low group, the 45 participants with scores one point above and one point below the true median of 18 were omitted from all but the correlational analyses and descriptive statistics. With this



calculation 98 participants were designated in the low impulsiveness category (those participants who scored between a minimum of 3 and a maximum of 16) and 95 participants were designated in the high impulsiveness category (those participants who scored between a minimum of 20 and a maximum of 32).

## Results

### Choice

No statistically significant main effects or interaction effects were indicated with this independent variable (see Table 1). Though unable to achieve statistical significance, mean levels of long term regret were higher for all four inaction stories (compared to action stories) and mean levels of short term regret were higher for three of four inaction stories (compared to action stories). (See Table 2.)

### Term and Impulsiveness

Two statistically significant results related to the Term and Impulsiveness variables are reported in Table 1. First, as suggested by the Term (short, long) main effect, participants expressed significantly more regret in the short term than in the long term,  $E(1, 189) = 270.35, p < .001$ . However, an Impulsiveness (low, high) x Term (short, long) interaction effect was also obtained,  $F(1, 189) = 4.93, p < .05$ . This finding is also evident in Table 11.

Because the statistical significance of the interaction effect between Term and Impulsiveness in Table 1 calls into question the Term main effect, four tests of simple main effects were conducted: (a) Impulsiveness at Term (short), (b) Impulsiveness at

Table 1

**Mixed ANOVA for Term, Choice, and Impulsiveness with Regret as Dependent Variable**

Source	Regret			
	MS	df	F	p
Choice	145.49	1	1.72	.191
Impulsiveness	.15	1	.00	.967
Choice x Impulsiveness	22.51	1	.27	.606
Within groups error	84.38	189		
Term	6533.36	1	270.35	<.001
Term x Choice	2.54	1	.11	.746
Term x Impulsiveness	119.21	1	4.93	.028
Term x Choice x Impulsiveness	.85	1	.04	.851
Term x Subjects within groups error	24.17	189		

Table 2

Means and Standard Deviations for Short Term and Long Term Regret for Each Story by Choice

Term	Story	Choice			
		Action		Inaction	
		M	SD	M	SD
Short	Across Stories	28.64	7.42	29.75	5.83
	The Final Exam	7.09	2.60	7.88	1.77
	The Inheritance	7.08	2.48	7.13	2.21
	The Late Movie	7.40	2.33	7.27	2.26
	The Trip of a Lifetime	7.06	2.41	7.45	2.04
Long	Across Stories	20.26	8.05	21.62	7.86
	The Final Exam	4.62	2.68	5.55	2.59
	The Inheritance	5.24	2.69	5.56	2.70
	The Late Movie	5.76	2.74	5.77	2.81
	The Trip of a Lifetime	4.63	2.74	4.81	2.78

Note. Regret was reported on 9-point Likert scales (1 = very little regret, 9 = very much regret).

Term (long), (c) Term at Impulsiveness (low), and (d) Term at Impulsiveness (high). As reported in Tables 3 and 4, participants who displayed high impulsiveness expressed more regret in the long term than those who displayed low impulsiveness, but participants who displayed low impulsiveness expressed more regret in the short term than those who displayed high impulsiveness. Most important, however, is the fact that these tests of simple main effects displayed that the influence of Term on Regret is not affected by level of Impulsiveness and that the main effect appears to be valid, as it does not depend on either Impulsiveness or Choice.

#### Anger and Disappointment as Dependent Variables

Two other mixed ANOVAs were conducted using the dependent variables of Anger and Disappointment to examine the relationship between Term, Choice, and Impulsiveness. The results of these ANOVAs (shown in Table 5) were conducted using Term (short, long) as a within-factors independent variable, Choice (action, inaction) as a between-subjects independent variable, and Impulsiveness (low, high) as a between-factors independent variable. Similar to the findings with regret, these analyses suggest that participants expressed significantly more anger and disappointment in the short term than in the long term. (See also Tables 6 and 7 for means and standard deviations by stories). A second important result, and similar to the results found with regret, is the finding of the tests of simple main effects (Tables 7 & 8) that high impulsiveness was associated with higher disappointment in the long term than was low impulsiveness, but low impulsiveness was associated with higher disappointment in the short term than was high impulsiveness.

Table 3

**Means and Standard Deviations for Short Term and Long Term Regret for Each Story by Impulsiveness**

Term	Story	Impulsiveness			
		Low		High	
		M	SD	M	SD
Short	Across Stories	29.66	6.17	28.48	7.04
	The Final Exam	7.40	2.21	7.56	2.31
	The Inheritance	7.30	2.24	6.90	2.44
	The Late Movie	7.48	2.28	7.18	2.30
	The Trip of a Lifetime	7.53	1.83	6.97	2.57
Long	Across Stories	20.47	7.56	22.06	8.40
	The Final Exam	4.79	2.69	5.37	2.62
	The Inheritance	5.26	2.65	5.54	2.74
	The Late Movie	5.77	2.58	5.76	2.96
	The Trip of a Lifetime	4.55	2.50	4.89	2.99

**Note.** Regret was reported on 9-point Likert scales (1 = very little regret, 9 = very much regret).

Table 4

Test of Simple Main Effects for Term and Impulsiveness with Regret as Dependent Variable

Source	Regret			
	MS	df	F	p
Impulsiveness at Term (Short)	195.00	1	3.59	>.05
Impulsiveness at Term (Long)	10.03	1	0.18	>.05
Pooled within groups error	54.27	189		
Term at Impulsiveness (Low)	4347.44	1	179.90	<.01
Term at Impulsiveness (High)	2381.78	1	98.56	<.01
Term x Subjects within groups error	24.16	189		

Table 5

Mixed ANOVA with Anger and Disappointment as Dependent Variables for Term, Choice, and Impulsiveness

Source	Anger				Disappointment			
	MS	df	F	p	MS	df	F	p
Choice	13.17	1	.16	.690	22.51	1	.30	.586
Impulsiveness	78.07	1	.94	.333	13.44	1	.18	.674
Choice x Impulsiveness	29.65	1	.36	.550	14.08	1	.19	.667
Within groups error	82.79	189			75.76	189		
Term	14119.21	1	689.04	<.001	9225.52	1	415.07	<.001
Term x Choice	3.58	1	.17	.677	7.55	1	.34	.561
Term x Impulsiveness	10.95	1	.53	.466	110.28	1	4.96	.027
Term x Choice x Impulsiveness	.13	1	.01	.936	8.86	1	.40	.529
Term x Subjects within groups error	20.42	189			22.23	189		

Table 6

**Means and Standard Deviations for Short Term and Long Term Anger for Each Story by Impulsiveness**

Term	Story	Impulsiveness			
		Low		High	
		M	SD	M	SD
Short	Across Stories	26.02	7.45	25.42	7.35
	The Final Exam	6.82	2.51	7.66	2.05
	The Inheritance	6.14	2.70	6.31	2.79
	The Late Movie	5.10	3.15	5.04	3.07
	The Trip of a Lifetime	7.03	2.17	7.40	2.25
Long	Across Stories	13.71	7.17	13.52	6.66
	The Final Exam	3.38	2.46	3.47	2.43
	The Inheritance	3.43	2.33	3.72	2.66
	The Late Movie	3.25	2.48	3.15	2.48
	The Trip of a Lifetime	3.25	2.42	3.57	2.72

Note. Anger was reported on 9-point Likert scales (1 = very little anger, 9 = very much anger).



Table 7

**Means and Standard Deviations for Short Term and Long Term Disappointment for Each Story by Impulsiveness**

Term	Story	Impulsiveness			
		Low		High	
		M	SD	M	SD
Short	Across Stories	24.92	7.96	26.65	6.91
	The Final Exam	7.64	2.13	8.22	1.40
	The Inheritance	7.30	1.97	6.82	2.42
	The Late Movie	7.04	2.47	6.46	2.58
	The Trip of a Lifetime	7.73	1.95	7.52	2.39
Long	Across Stories	12.92	6.66	15.15	7.12
	The Final Exam	4.54	2.65	5.11	2.71
	The Inheritance	5.00	2.67	5.42	2.58
	The Late Movie	4.96	2.72	4.89	2.96
	The Trip of a Lifetime	4.35	2.68	4.85	2.90

**Note.** Disappointment was reported on 9-point Likert scales (1 = very little disappointment, 9 = very much disappointment).

Table 8

Test of Simple Main Effects for Term and Impulsiveness with Anger and Disappointment as  
Dependent Variables

Source	Anger				Disappointment			
	MS	df	F	p	MS	df	F	p
Impulsiveness at Term (Short)	.87	1	.02	>.05	11.80	1	.24	>.05
Impulsiveness at Term (Long)	.41	1	.00	>.05	2.00	1	.04	>.05
Pooled within groups error	51.64	189			48.99	189		
Term at Impulsiveness (Low)	7287.88	1	355.70	<.01	6235.07	1	280.49	<.01
Term at Impulsiveness (High)	7448.72	1	363.50	<.01	3577.92	1	160.95	<.01
Term x Subjects within groups error	20.49	189			22.23	189		

### Gender Effects

Gender was not previously hypothesized to have an impact on the outcome of the study (especially given the unequal gender sample). Although gender was included to ensure that it did not seriously affect the hypothesized results, several interesting gender effects were found. Additional analyses with Regret, Anger, and Disappointment indicate statistical differences between male and female participants in terms of the relationships between independent and dependent variables. As exhibited in Tables 9, 10, and 11, males consistently had higher standard deviations and reported less affect on the measures of Regret, Anger, and Disappointment compared to females. Furthermore, Pearson Product-Moment Correlations between Impulsiveness and the dependent variables of Regret, Anger, and Disappointment (see Table 12) indicate statistically significant positive correlations for males between Impulsiveness and long term Regret, Anger, and Disappointment. Table 13 also suggests that males and females had different levels of impulsiveness. Based on Table 14, even without dropping the middle impulsiveness group, one can see that males indicate significantly higher mean levels of impulsiveness than females. See Discussion below for additional qualitative data and a summary of gender differences in regards to the present research.

### Effect Sizes and Power

Post-hoc power and effect size computations were completed for all statistical analyses. Based on conventions and computations established by Cohen (1988), the mixed factorial ANOVA main effect and interaction met the criteria for minimum power

Table 9

Means and Standard Deviations for Short Term and Long Term Regret, Anger, and Disappointment by Gender

Dependent Variable	Female (N=138)		Male (N=100)	
	M	SD	M	SD
Regret				
Short Term	31.05	5.24	26.61	6.89
Long Term	22.11	6.97	18.47	8.06
Anger				
Short Term	27.79	6.25	23.05	7.43
Long Term	14.60	6.47	11.73	6.72
Disappointment				
Short Term	30.79	5.14	27.58	6.65
Long Term	20.32	6.93	17.66	7.87

Note. Levels of regret, anger, and disappointment were reported on 9-point Likert scales

(1 = very little, 9 = very much).

Table 10

Mixed ANOVA for Term, Gender, and Impulsiveness with Regret as Dependent Variable

Source	Regret			
	MS	df	F	p
Gender	2152.19	1	29.34	<.001
Impulsiveness	82.63	1	1.13	.290
Gender x Impulsiveness	136.45	1	1.86	.174
Within groups error	73.35	189		
Term	73.35	1	254.04	<.01
Term x Gender	17.06	1	.71	.401
Term x Impulsiveness	96.38	1	4.00	.047
Term x Gender x Impulsiveness	.62	1	.03	.873
Term x Subjects within groups error	24.09	189		

Table 11

Mixed ANOVA for Term, Gender, and Impulsiveness with Anger and Disappointment as  
Dependent Variables

Source	Anger				Disappointment			
	MS	df	F	p	MS	df	F	p
Gender	1482.79	1	20.12	<.001	1112.67	1	15.94	<.001
Impulsiveness	309.69	1	4.20	.042	99.55	1	1.43	.230
Gender x Impulsiveness	324.09	1	4.40	.037	69.06	1	.99	.320
Within groups error	73.69	189			69.80	189		
Term	6120.23	1	654.90	<.001	8671.51	1	389.90	<.001
Term x Gender	134.07	1	6.86	.010	7.25	1	.33	.569
Term x Impulsiveness	38.31	1	1.96	.163	86.66	1	3.90	.050
Term x Gender x Impulsiveness	51.78	1	2.65	.105	6.33	1	.28	.594
Term x Subjects within groups error	19.56	189			22.24	189		

Table 12

Pearson Product-Moment Correlations for Impulsiveness and Short Term and Long Term  
Regret, Anger, and Disappointment by Gender

Dependent Variable	Impulsiveness					
	Male and Female		Male		Female	
	Impulsiveness		Impulsiveness		Impulsiveness	
	Score*		Score**		Score***	
	r	p	r	p	r	p
Regret						
Short Term	-0.07	0.26	0.12	0.21	-0.10	0.20
Long Term	0.07	0.27	0.21	0.03	0.06	0.44
Anger						
Short Term	0.11	0.08	0.42	<0.01	0.02	0.75
Long Term	0.07	0.28	0.28	<0.01	0.00	0.93
Disappointment						
Short Term	-0.05	0.38	0.10	0.28	-0.08	0.30
Long Term	0.09	0.13	0.22	0.02	0.07	0.35

Note. \* = (n=238), \*\* = (n=100), \*\*\* = (n=138)

Table 13

One-Way ANOVA for Gender with Impulsiveness as Dependent Variable

Source	Impulsiveness			
	MS	df	F	p
Gender	627.09	1	13.93	0.002
Within groups error	44.99	192		



Table 14

Means and Standard Deviations for Impulsiveness by Gender

Dependent Variable	Female (N=138)		Male (N=100)	
	M	SD	M	SD
Impulsiveness	16.26	6.14	19.24	6.02

Note. Levels of impulsiveness were reported on 35-point scale.

(80%). Thus, the researcher's probability of making a Type I or Type II error for mixed factorial analyses was less than 20%. Also, as expected, large effect sizes ( $>.40$ ) were computed for all within-factors analyses involving term.

### Discussion

The results support the prediction that individuals intuitively expect their level of regret to change between two time periods. However, the results do not support the hypotheses because Choice had no effect on Regret, high Impulsiveness was associated with long term rather than short term Regret, and the influence of Impulsiveness depended on the time period being considered (i.e., Term). It will be explained below why (a) higher levels of regret, anger, and disappointment were reported in the short term versus the long term; (b) Choice failed to influence Regret, (c) the influence of Impulsiveness on Regret depended on the time period being considered, and (d) gender differences had a strong influence on the experience of Regret. Finally, two questions that have guided the current research will be discussed. These questions are: (a) why do some people have more intense regrets than others and (b) under what conditions do such regrets occur?

#### The Role of Impulsiveness in the Prediction of Regret

Results were contrary to previous predictions regarding the relationship between impulsiveness and regret. First, though a mixed factorial ANOVA and an inspection of means suggests that low impulsiveness participants expressed more regret than high impulsiveness participants in the short term, and that this relationship is reversed in the long term, statistical tests suggest that these means are not dissimilar enough to be

meaningful regardless of the statistical significance. That is, though the mixed factorial ANOVA indicates an interaction, the simple effects statistics suggest that the interaction is weak, and the influence of Impulsiveness depended on the time period being considered. Second, the findings indicate that males who reported higher levels of impulsiveness were more likely to experience more intense regret in the short and long term compared to participants who reported lower levels of impulsiveness. However, similar findings were not evidenced by female participants. The fact that females and males expressed different levels of regret relative to the effect of impulsiveness indicates the possibility that gender differences could be partly responsible for the weak interactions exhibited between Impulsiveness and Term.

Statements from the entire participant sample that characterize the short term qualitative reports of high impulsiveness participants in the The Final Exam include: "The consequences of the mistake are too large," "The trip was important to me," "I should have listened to my friend," "I regret I failed the exam, but I shouldn't have answered the last question," "I am angry at myself for answering the question and I am angry at the layout of the exam," "Angry because my failure was controllable and regret rushing through it," "I am annoyed at still being in school," "I am angry at myself because all my planning was in vain" and "I was trying to be a hero by getting more points." Examples of long term qualitative reports of high impulsiveness participants include: "I would have had a better job and more experience," "I should have listened to my friend and am jealous," "I am not so much angry because I failed the exam, I am angry because the set-up of the exam was stupid... I should not lose 30%," "Because

looking back I could have gone on the trip and done all that fun stuff if I had listened to my friend,” “I had the exam passed, my goal was in my hands and I threw it away,” and “Things could have been different had I gone on the exchange.”

Such qualitative results suggest consistency in the increase of negative affect in the long term for people who express high impulsiveness. One interpretation for this finding is that participants who reported high impulsiveness may have had more difficulty engaging in psychological or behavioural repair work in the long term to ameliorate negative outcomes that have arisen from choice-point decisions. (See the discussion of choice-point decisions below). One might also speculate that individuals with high impulsiveness may have felt personally responsible for the negative outcomes in the long term, but were unable to feel such personal responsibility in the short term. That is, high impulsive individuals may feel more responsible for the negative outcome as they become more aware of the relationship between their impulsive natures and previous behaviour, something that can only occur over time. Furthermore, one might also speculate that participants with high impulsiveness may have greater dissonance due to the fact that their failure to make a successful choice-point decision was dissonant with the characteristic situation of having to make an impulsive decision that turns out well. Conversely, participants with low impulsiveness may have had less difficulty engaging in work that ameliorated negative affect in the aftermath of choice-point decisions. For when individuals with low impulsiveness are forced to make instantaneous choice-point decisions like those demanded in the stories in this study, they could attribute their failure outcome to the uncharacteristic situation of having had to make an impulsive

decision.

It also seems fair to suggest that individuals with high impulsiveness may have given full attention to the failure of the behavioural ramifications of their choice-point decisions in the short term, but in the long term they began to focus on the deeper meaning to their prior failure: their own high level of impulsiveness. Therefore, a second explanation for the above interaction also seems reasonable. If impulsiveness is considered a personality trait, when individuals with high impulsiveness made decisions that resulted in negative outcomes, such decisions may have been more difficult to rationalize in the long term than choice-point decisions made by an individual with low impulsiveness.

#### The Role of Term in the Prediction of Regret

Within-factors analyses computed for short and long term regret indicate that participants clearly expected long term regret to be weaker than short term regret across all scenarios. These analyses are supported by qualitative data. For example, in the story titled *The Late Movie*, statements from participants in the short term indicate that they experienced enormous immediate distress and despair from their role in the death of the man. Commonly made statements included: "The man shouldn't have died just because of my mistake," "A man died in my hands and I didn't do the right thing to save him," "I made a wrong decision that made a man die," "I could have saved his life," "I should have listened to my friend," and "I prevented the man's life from being saved." Conversely, statements from participants in the long term indicate that they had engaged in a great deal of psychological and behavioural repair work in the long term following

the negative outcome. Commonly made statements in the long term included: "Well I can't turn back time but it's just not fair that I had so much responsibility," "Well I'm only human and made a human mistake," "I should have been able to think better under the situation and possibly come up with a better solution, possibly saving the man's life," "I made the best choice that I thought at the time," "Maybe things would have turned out the same," "How was I to know which choice was better?" "I shouldn't have been so stubborn and impulsive," "I tried my best" and "It's time to move on." Whereas such participants expressed immediate responsibility for the man's death in the short term, they were able to ameliorate regret in the long term by displaying counterfactual thinking and dissonance reduction.

#### The Role of Choice in the Prediction of Regret

In the present research negative outcomes attained via Inaction resulted in higher (though not significantly higher) Regret means than those attained via Action for both long and short term reports. Though the relationship between action-inaction was not statistically significant, an inspection of means suggests a consistent finding across all four stories, a finding that can be explained by reexamining the definitions for action and inaction initially proposed for use in this research. Action was previously defined as "an instance of behaviour that compels the status quo to change" and inaction was defined as "an instance when the absence of behaviour serves to maintain the status quo." However, as discussed thoroughly below, the present results indicate that there may be a more appropriate definition for action and inaction.

In order to better understand the need for a redefinition of action and inaction, it

is essential that one clearly understand the procedure that was used in the current study.

In review, four stories were created for the present research, each consisting of one scenario and one undesirable ending. In each of the four scenarios, the main character was given an opportunity to make a choice that would affect the outcome of the story. After reaching a choice-point in the story (defined as a moment of decision) each participant was informed as to what choice the main character decided to make: whether to act or not to act. The outcome was then based on the main character's choice. The fact that there was a specific choice-point for each story is especially important to note as it is expected that the use of choice-points in each story significantly influenced the overall outcome of this research. Without the use of choice-points within the stories entirely different results may have been obtained.

As indicated above, quantitative results in the present study indicate that mean levels of regret attained via Inaction were higher (though not significantly higher) than those attained via Action for both long and short term reports. That is, across short and long term reports, a choice-point followed by inaction was associated with slightly more regret compared to a choice-point followed by action. However, this finding is not substantiated by the findings of previous researchers who have defined action and inaction without the use of choice-points and have suggested that individuals commonly experience more regret for having attained an outcome via action rather than inaction. Therefore, though results from the present study are inconclusive in terms of providing a better understanding regarding the relationship between regret and choice (especially in light of previous findings), the present research succeeds in highlighting the need to

provide greater specificity to the commonly accepted definition of action and inaction.

Given that previous researchers have not looked specifically at the characteristics of choice-point action and inaction, qualitative data from the present study are necessary to better understand the relationship between regret and choice in the context of an identifiable choice-point. For example, in the story titled *The Inheritance*, statements from participants who received action stories suggest that they were more likely to assign blame to the stock market and respond with externally-based justifications for making a wrong choice. Statements that were commonly made included: "I didn't have enough background on the rules of the stock market or not doing enough research," "I made a wrong choice, but I don't have control on how the market reacts," "I regret not talking to someone, making sure I was making the right stock decisions," "It was a choice I made based on a win or lose investment," "It's 'found' money. I didn't earn it to really be regretful," "I'm not a stock market wizard," and "It is unfortunate that I could not 'honour' my grandmother as she wished, but on the other hand, I did use her money trying to attain what she would have wanted." Conversely, Inaction participants were more likely to make statements that indicated internally-based despair and rumination about their personal failure and its implications. Commonly made statements by this group included: "I failed my grandmother," "I did not fulfill what my grandmother would have wanted me to do," "I feel like I disappointed people," "My brother was successful in his decision, and I wasn't," "I have nothing to show for the money and would have disappointed my grandma," and "I think I would always feel some regret for not being able to fulfill grandma's wish." In regards to such qualitative data, whereas



Action participants seemed to most often externalize responsibility and rationalize their actions in response to their negative outcomes, Inaction participants were more likely to internalize responsibility and personalize the impact of the negative outcome.

#### A Redefinition of Action and Inaction

Following a negative outcome, the decision-making process is evaluated with a great deal of information. Such information is commonly known to include psychological repair work (such as justification, rationalization, and counterfactual thinking) and behavioural repair work (such as compensatory behaviour in order to ameliorate regret). However, another piece of important information for evaluating negative outcomes may include the heuristic availability of an identifiable choice-point. Though many decisions can be evaluated with identifiable choice-points, many decisions also consist of choice-points that are unrecognizable. Examples of inactions that may not have choice points include such regrets as wishing to have traveled more, exercised more or worked harder at school. According to Gilovich and Medvec (1995) negative outcomes attributed to inactions most often result from decisions without recognizable choice-points. In such situations, regrets are the result of an accumulated, unfocussed pattern of inaction. However, the four stories created for the current research concentrated on regrets that could be associated with distinguishable choice-points.

Given the current findings, there is evidence that inaction must be redefined from the commonly accepted definition previously proposed in this research. It is the opinion of this researcher that Inaction must be divided into choice-point inaction and non-choice-point inaction. Under such a new definition, choice-point inaction could be

characterized by a memorable and identifiable instance in which a decision not to act is made by an individual. Conversely, non-choice-point inaction could be characterized by repeated and accumulated inactivity, identified by incremental junctures in time when inaction is an optional decision.

### The Importance of Anger and Disappointment

Though Regret is the primary variable of interest for the purposes of this research, emotions rarely operate in isolation of each other. That is, in order to gain a deeper understanding into the spectrum of negative emotions that may result from negative outcomes, other emotions should also be considered. As proposed above, data on two other emotions, disappointment and anger, were also collected. Together, regret, anger, and disappointment make up a triad of negative affect that will be discussed below. Therefore, when the term 'negative affect' is used, it will apply to the three emotions used as dependent variables in this research: Regret, Anger, and Disappointment.

Two points summarize the role of negative affect in the short and long term expressed by participants: (a) nearly all participants reported significantly less negative affect 10 years following each story's negative outcome compared to one hour following a story's outcome, regardless of whether choices resulted in action or inaction, or whether the participant displayed high or low impulsiveness and (b) significant Pearson product-moment correlations for males suggest that long term negative affect is positively correlated to impulsiveness, but, with the exception of anger, short term negative affect is not.

Based on these findings, the current research suggests that there may be at least two different ways for conceptualizing the impact of negative affect in the short and long term following a negative outcome. First, it can be suggested that other emotions may operate similarly to regret and that regret may have some similarities to other negative emotions. That is, psychological and behavioural repair work that has been discussed in the regret literature may also be generalized (in some instances) to include the experience of other negative emotions. Second, the current research suggests that one's intuitive expectations regarding the long term impact of negative emotions may also influence an individual's repair work process. For example, the recognition in the long term that one is at a different time may be sufficient to produce qualitatively different and more moderate negative emotional responses. Clearly there is opportunity for more research on the ameliorative functions of counterfactual thinking in relation to regret, anger, and disappointment as well in the area of gender differences.

#### Gender Differences

Despite the fact that previous researchers have not found gender to be an influential variable when researching regret as a dependent variable, and despite the fact that gender effects were not hypothesized, a number of interesting results were identified. The impact of gender on the relationships between Choice, Impulsiveness, and Regret can be summarized by the following points: (a) females had lower standard deviations and significantly higher levels of regret, anger, and disappointment compared to males (see Tables 9, 10, and 11); (b) though for males regret, anger, and disappointment were correlated positively with impulsiveness in the long term, similar correlations were not

found for females (see Table 12); and (c) males displayed higher levels of impulsiveness compared to females (see Tables 13 and 14). These results will be discussed below.

Though other research on regret disputes the present finding, it is intuitively unsurprising that females displayed higher mean levels of regret, anger, and disappointment and lower standard deviations compared to males. Present results add support to the common belief that females are generally more comfortable than males at identifying and expressing emotions. Interestingly, the data also indicate that females may be a more homogenous group with regards to emotional expression, as suggested by the higher standard deviations for males. Such data could be interpreted to mean that there is more variation between males in the area emotional expression than there is for females.

The qualitative data also uncovered other gender-related themes. These data suggest that (a) although males more often attributed negative outcomes to chance or luck, females more often attributed negative outcomes to their own personal failures; and (b) although males more often rationalized negative outcomes in the short term, females more often expressed personal dissatisfaction with the outcome. These themes can be found in *The Trip of a Lifetime* where females reported the following statements: "My friend and I are going on this trip together and should have agreed on one form of transportation," "Frustrated with my impulsive behaviour," "Paid a lot of money and made many sacrifices to go on the trip," "Regret not taking the chance and going on the bus," "My friend is on the plane so at least she gets to go," "Didn't leave soon enough in anticipation of unexpected traffic," "I shouldn't have taken the bus and I should have

listened to my friend because now I am out a lot of money and have to stay home instead," "If we had thought about traffic then maybe we would have thought to get an earlier cab," "If it wasn't for my decision my friend and I would have made the trip. I regret being stubborn and thinking that I'm always right," "I should have taken the bus like my friend suggested," "I am missing a great opportunity at a huge cost," "I was foolish and didn't get to go," "I regret not staying with my friend, not taking out cancellation insurance and not thinking about all possibilities." Conversely, males reported the following statements: "Not going on the trip is a real problem. To make it worse, my friend was right about the bus," "I would only regret not staying in the cab a short time because people make mistakes and I am no different," "I'm not really regretful to a large extent because I at least reacted to the situation in an aggressive way," "I've got horrible luck," "I am angry because my luck was poor in choosing to take the bus," "My friend had fun and I didn't," "It would have meant more to me than to my friend," "It was in chance's hands," "How could the cabbie have made that suggestion?" and "I made a mistake like flipping a coin and guessing wrong."

Another interesting gender effect concerns the role of negative affect in the long term. As suggested in Table 12, there was a positive correlation between long term negative affect and impulsiveness for males. It is important to note that (a) females did not have similar significant correlations, and (b) the highest correlations existed between Anger and Impulsiveness scores. These findings suggest two important implications. First, it appears that males who displayed high impulsiveness experienced anger more strongly than any other negative affect. Second, males are more likely to experience

negative affect in the long term than they are in the short term. Given such correlations, it would be interesting to study whether the anticipation of long term negative consequences from making choice-point decisions affect males and females differently in terms of the choice-point decisions they characteristically choose.

Finally, as indicated by Tables 13 and 14, males displayed significantly higher levels of impulsiveness compared to females. This finding contradicts previous research that has not reported statistically significant differences between males and females in terms of general impulsiveness (Barratt, 1985; Eysenck, Pearson, Easting & Allsopp, 1985; Luengo, Carrillo-de-la-Pena & Otero, 1991). Though these studies indicate that females tend to be less venturesome than males, there is no research to suggest that overall impulsiveness can be predicted by gender. That is, as the general conceptualization of impulsiveness is reported to be composed of more than venturesomeness sub-traits (such as cognitive impulsiveness), the impact of gender differences on the entire conceptualization of impulsiveness has been reported to be weak. Therefore, given the results of the current research, gender differences involving impulsiveness may be expected and interesting, suggesting possibilities for future research.

In particular, though the above experimenters in the area of impulsiveness research did not discuss the impact of participant age, cultural heritage, socio-economic status and education on their reported findings, such factors have been linked previously to research on delay of gratification, a construct closely associated with lower levels of impulsiveness. As discussed by Funder, Block and Block (1983), previous studies have

suggested that several environmental factors can be positively associated with delay of gratification, including childhood family environments that emphasize structure, order, conservative values and lack of family conflict. Therefore, given the impact of such values on delay of gratification, it is also likely that such values could significantly affect participant ratings on self-reported levels of impulsiveness, indicating a need to identify the cultural heritage, age, education and socio-economic status of participants. Without identifying such participant characteristics in the current study, a full understanding of the results in terms of gender differences is extremely difficult. Therefore, the results of the present study indicate a need for more research on gender differences and impulsiveness with a focus on participant characteristics, especially given the lack of research previously conducted in this area.

### Conclusions

Though many interesting findings resulted from the current research, the following findings are especially important: (a) levels of regret were not different in terms of statistical significance for participants who received action versus inaction scenarios; (b) levels of regret, anger, and disappointment were found to be significantly higher in the short term than the long term; (c) the influence of impulsiveness on regret depended on the time period being considered; and (d) females reported less impulsiveness and more intense experiences of regret, anger, and disappointment than males. The significance of these findings as they relate to previous research will be discussed consecutively.

Though unable to achieve statistical significance and indicating inconclusive

results, it must be noted that mean levels of short and long term regret were consistently higher for participants who received inaction scenarios compared to participants who received action scenarios. Inconclusive results challenge findings published by many researchers, including Gilovich and Medvec (1994), Gleicher et al. (1990), Kahneman and Miller (1986), and Landman (1987). Furthermore, the findings are contrary and in the opposite direction to previous predictions. There are two reasons that could explain such contradictory results. First, the current researcher did not give participants any opportunity to compare negative affect between action and inaction decisions. If the design functioned as planned, the results are a true representation of mental processes in choice-point situations: outcomes that result from inactions encourage more regret than outcomes that result from actions. A second explanation for the contradictory results is that Inaction stories in the present research used choice-point decisions for each story. Given the above findings, it is possible that the interpretation of action and inaction is arbitrary in forced-choice situations. That is, in choice-point situations, inaction may resemble action and vice versa. Therefore, there is also the possibility that participants did not express lower levels of regret for inaction stories because the stories had revealed characteristics of action stories due to the choice-point arrangement.

The finding that regret, anger, and disappointment were reported to decrease significantly in the long term supports the findings made by several researchers, including Gilovich and Medvec (1994, 1995). However, it is important to note once more that negative outcomes resulting from inaction decisions did not increase in the long term as might be expected. As suggested previously, such findings may have resulted from the



decision to use examples of choice-point Inaction in the research stories. Had non-choice-point examples been used, a different result may have been obtained and an interaction for Choice by Term may have resulted.

The finding that low impulsiveness participants expressed more regret in the short term than high impulsiveness participants, but high impulsiveness participants expressed more regret in the long term than low impulsiveness participants has not been proposed or discounted by any researchers. Nor have any researchers published information related to the present finding, a finding which indicates that the influence of impulsiveness on regret depends on the time period being considered. To date, no research has been conducted on the relationship between impulsiveness and regret, though Strathman, Gleicher, Boninger and Edwards (1994) have suggested that one's tendency to plan (a factor named Consideration of Future Consequences (CFC) that resembles Cognitive Impulsiveness on Eysencks' I-7 Impulsiveness Questionnaire) may be related to how much regret one experiences. However, their research did not distinguish between short term and long term effects of planning as associated with regret, nor did it allude to the interaction that action/inaction may have with impulsiveness.

It should be noted that Strathman et al. (1994) may have correctly identified the importance of Cognitive Impulsiveness in determining the long term experience of regret. As suggested by the current research, impulsiveness was a significant variable in determining long term regret, anger, and disappointment. However, Strathman et al. may have minimized the roles that motor impulsiveness and action/inaction variables perform in predicting the experience of regret. It is clear that more research on the interaction

between these variables is necessary in the future.

Finally, several gender differences were noted above. The finding that females displayed more intense experiences of regret, anger, and disappointment compared to males contradicts previous findings found by other researchers (Landman, 1987) and suggests that females are generally more expressive than males following a negative outcome. Non-hypothesized gender differences on levels of impulsiveness (with males indicating significantly greater impulsiveness) were also found by the current research, also contradicting the findings of previous researchers who have suggested insignificant gender differences on this variable (Eysenck, Pearson, Easting & Allsopp, 1985). Together, these findings indicate that gender differences are responsible for more findings than were anticipated in the present study, certainly implicating the importance of biology and personality in the overall experience and expression of regret. However, it should also be noted that gender did not interact with impulsiveness to significantly influence the experience of regret in this study.

#### Methodological Strengths and Limitations

The current research exhibits many methodological strengths. Some of these strengths have included (a) recording regret intensity with scales as opposed to forced-choice comparisons, (b) recording levels of affect for action and inaction decisions when all other factors are held constant, (c) measuring regret by including other measures of negative affect with the dependent measures, and (d) establishing the validity of each story through a pilot test. However, certain limitations are also associated with the current research: (a) inconclusive results on some of the variables may have been a

function of the within-factors design and (b) small effect sizes were found for some statistical analyses. However, as the strengths tend to outweigh the limitations, the current study is able to make an important contribution to literature already published in this area.

### Summary

The current research was guided by the following two questions: (a) why do some people have more intense regrets than others and (b) under what conditions do such regrets occur? These findings suggest that term and gender are two important variables for explaining intensity of regret. Overall, the results did not support the hypotheses for the current research because Choice had no effect on Regret, and the influence of Impulsiveness depended on the time period being considered (i.e., Term). However, the research indicates two distinctive areas for further research. First, the present study has suggested that choice-point inaction differs significantly from non-choice-point inaction, a definition that has received very little discussion in the published literature. Second, though not previously hypothesized, gender differences seem to be related to levels of impulsiveness and may be related to the experience of regret given the current research model. With more exploration of these definitions a different conceptualization may be established regarding the function of regret, especially as related to choice, gender and impulsiveness in the temporal perspective.

References

American Psychiatric Association, (1994). Diagnostic and statistical manual of mental disorders (4th ed.), Washington, D.C.: Author.

Aronson, E. (1969). The theory of cognitive dissonance: A current perspective. Advances in Experimental Social Psychology, 4, 1-34.

Barratt, E. (1985). Impulsiveness subtraits: Arousal and information processing. In J. T. Spence and C. Izard (Eds.), Motivation, emotion and personality. North Holland: Elsevier Science Publishers.

Barratt, E., & Patton, J. (1983). Impulsiveness: Cognitive behavioural and physiological correlates. In Marvin Zuckerman (Ed.), Biological bases of sensation seeking, impulsiveness, and anxiety (pp. 77-116). Hillsdale, NJ: Lawrence Erlbaum and Associates.

Boninger, D., Gleicher, F., & Strathman, A. (1994). Counterfactual thinking: From what might have been to what may be. Journal of Personality and Social Psychology, 67(2), 297-307.

Borenstein, M., & Cohen, J. (1988). Statistical analysis: a computer program. Hillsdale, New Jersey: Lawrence Erlbaum and Associates

Buss, A., & Plomin, R. (1975). A temperament theory of personality development. New York, NY: John Wiley & Sons.

Cattell, R., Eber, H., & Tatsuoka, M. (1970). Handbook for the sixteen factor questionnaire. Champaign, IL: IPAT.

Cohen, J. (1988). Statistical power analysis for the behavioural sciences.

Hillsdale, NJ: Erlbaum & Associates.

Emmons, R., & Diener, E. (1986). Influence of impulsiveness and sociability on subjective well-being. Journal of Personality and Social Psychology, 50(6), 1211-1215.

Eysenck, S., & McGurk, B. (1980). Impulsiveness and venturesomeness in a detention centre population. Psychological Reports, 47, 1299-1306.

Eysenck, S., Pearson, P., Easting, G., & Allsopp, J. (1985). Age norms for impulsiveness, venturesomeness and empathy in adults. Personality and Individual Differences, 6, 613--619.

Fazio, R., Sherman, S., Herr, P. (1982). The feature-positive effect in the self-perception process: Does not doing matter as much as doing? Journal of Personality and Social Psychology, 42, 404-411.

Festinger, L. (1957). A theory of cognitive dissonance. Evanston, IL: Row, Peterson.

Funder, D., Block, J., & Block, J. (1983). Delay of gratification: Some longitudinal personality correlates. Journal of Personality and Social Psychology, 44, 1198-1213.

Gerbing, D., Ahadi, S., & Patton, J. (1987). Toward a conceptualization of impulsiveness: Components across the behavioral and self-report domains. Multivariate Behavioral Research, 22, 357-379.

Gilovich, T., & Medvec, V. (1994). The temporal pattern to the experience of regret. Journal of Personality and Social Psychology, 67(3), 357-365.

Gilovich, T., & Medvec, V. (1995). The experience of regret: What, when, and why. Psychological Review, 102(2), 379-395.

Gleicher, F., Kost, K., Baker, S., Strathman, A., Richman, S., & Sherman, S. (1990). The role of counterfactual thinking in judgements of affect. Personality and Social Psychology Bulletin, 16(2), 284-295.

Granberg, D., & Brown, T. (1995). The Monty Hall dilemma. Personality and Social Psychology Bulletin, 21(7), 711-723.

Guilford, J., Guilford, J., & Zimmerman, W. (1978). The Guilford-Zimmerman Temperament Survey: Manual of Instructions and Interpretations. San Diego, CA: Edits Publishers.

Jackson (1974). Personality and research form manual. Goshen, NY: Research Psychologists Press.

Kagan, J. (1966). Reflection-impulsiveness: The generality and dynamics of conceptual tempo. Journal of Abnormal Psychology, 71, 17-24.

Kahneman, D., & Miller, D. (1986). Norm theory: Comparing reality to its alternatives. Psychological Review, 93, 136-153.

Kahneman, D., & Tversky, A. (1982). The psychology of preferences. Scientific American, 246, 160-173.

Landman, J. (1988). Regret and elation following action and inaction: Affective responses to positive versus negative outcomes. Personality and Social Psychology Bulletin, 13, 524-536.

Loomes, G., & Sugden, R. (1982). Regret theory: An alternative theory of rational choice under uncertainty. Economic Journal, 92, 805-824.

Luengo, M., Carrillo-de-la-Pena, M., & Otero, J. (1991). The components of impulsiveness: A comparison of the I.7 impulsiveness questionnaire and the Barrat Impulsiveness Scale. Personality and Individual Differences, 12(7), 657-667.

Newman, J., Wolff, W., & Hearst, E. (1980). The feature-positive effect in adult human subjects. Journal of Experimental Psychology, 6, 630-650.

Olson, S., & Hoza, B. (1993). Preschool developmental antecedents of conduct problems in children beginning school. Journal of Clinical Child Psychology, 22(1), 60-67.

Ray, J., & Najman, J. (1986). The generalizability of deferment of gratification. The Journal of Social Psychology, 126(1), 117-119.

Schweitzer, M. (1994). Disentangling status quo and omission effects: An experimental analysis. Organizational Behavior and Human Decision Processes, 58, 457-476.

Spranca, M., Minsk, E., & Baron, J. (1991). Omission and commission in judgment and choice. Journal of Experimental Social Psychology, 27, 76-105.

Strathman, A., Gleicher, F., Boninger, D., & Edwards, C. (1994). The consideration of future consequences: Weighing immediate and distant outcomes of behavior. Journal of Personality and Social Psychology, 66(4), 742-752.

Takemura, K. (1992). Effect of framing on postdecisional regret in interpersonal and noninterpersonal situations. Psychological Reports, 70, 1027-1030.

Turley, K., Sanna, L., & Reiter, R. (1995). Counterfactual thinking and perceptions of rape. Basic and Applied Social Psychology, 17(3), 285-303.

Woznica, J. (1990). Delay of gratification in bulimic and restricting anorexia nervosa patients. Journal of Clinical Psychology, 46(6), 708-713.



## Appendix A

### Instructions For Participants

The purpose of today's study is to investigate students' emotions and opinions in reaction to several possible life experiences. The experiment will take approximately one hour to complete. It is intended to be an enjoyable experience for all who participate and is not intended to cause any discomfort. Should you experience any discomfort, you may leave at any time and still receive credit for participation. Should you decide to participate, please read the stories and instructions carefully! Not doing so will mean that we have wasted your time and we will not be able to use your data. All data will be kept confidential and anonymous.

To begin, you are asked to complete the following Consent Form and 35 item questionnaire. After everyone has completed the Consent Form and questionnaire you will receive More Instructions.

### More Instructions

In the next hour you will be reading four stories. In each story you are asked to assume that *you* are the main character. You are also encouraged to imagine your friends, family, and sometimes complete strangers, as characters in the story. If you remember nothing else, remember this: **YOU** are the main character. Do your best to feel what the main character is feeling. Do your best to experience what the main character is experiencing. Following each story you will be asked to answer several questions. Some questions will ask you to circle the most appropriate answer, some will ask you to identify your feelings, and some will ask for your opinion. Regardless, there are no right or wrong answers to any questions.

## Appendix B

Student Consent

I give my consent to participate in the current experiment. I also understand that should I feel uncomfortable with any part of the experiment, I am free to leave the experiment at any time. If I feel that I must leave, I understand that I will still receive course credit. I also understand that should I prefer not to answer some questions, I will not be penalized for not answering them. For purposes of privacy, I understand that all of my answers to the research questions will be kept anonymous. Finally, I understand that this experiment is being conducted for educational purposes on behalf of the experimenter. After completing the experiment, I will receive a debriefing form from the experimenter that will explain the purposes and expected findings for this experiment. After data has been collected and considered, I understand that a copy of the results will be available to me in the Psychology Department. In signing my name, I promise to complete the experimental tasks to the best of my abilities.

Student Name (please print): \_\_\_\_\_

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

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

## Appendix C

**I-7 Impulsiveness Questionnaire**

**Instructions:** Please answer each question by putting a circle around the 'Y' (Yes) or 'N' (No) beside the questions. There are no right or wrong answers and no trick questions. Work quickly, and do not think too long about the exact meaning of the question.

- Y N 1. Would you enjoy water skiing?
- Y N 2. Usually do you prefer to stick to brands you know are reliable, to trying new ones on the chance of finding something better?
- Y N 3. Do you enjoy taking risks?
- Y N 4. Would you enjoy parachute jumping?
- Y N 5. Do you often buy things on impulse?
- Y N 6. Do you generally do and say things without stopping to think?
- Y N 7. Do you often get into a jam because you do things without thinking?
- Y N 8. Do you think hitch-hiking is too dangerous a way to travel?
- Y N 9. Do you like diving off the highboard?
- Y N 10. Are you an impulsive person?
- Y N 11. Do you welcome new and exciting experiences, sensations, even if they are a little frightening and unconventional?
- Y N 12. Do you usually think carefully before doing anything?
- Y N 13. Would you like to learn to fly an airplane?
- Y N 14. Do you often do things on the spur of the moment?

- Y N 15. Do you mostly speak without thinking things out?
- Y N 16. Do you often get involved in things you later wish you could get out of?
- Y N 17. Do you get so 'carried away' by new and exciting ideas, that you never think of possible snags?
- Y N 18. Do you find it hard to understand people who risk their necks climbing mountains?
- Y N 19. Do you sometimes like doing things that are a bit frightening?
- Y N 20. Do you need to use a lot of self-control to keep out of trouble?
- Y N 21. Would you agree that almost everything enjoyable is illegal or immoral?
- Y N 22. Generally do you prefer to enter cold water gradually, to diving or jumping straight in?
- Y N 23. Are you often surprised at people's reactions to what you do or say?
- Y N 24. Would you enjoy the sensation of skiing very fast down a high mountain slope?
- Y N 25. Do you think an evening out is more successful if it is unplanned or arranged at the last moment?
- Y N 26. Would you like to go scuba diving?
- Y N 27. Would you enjoy fast driving?
- Y N 28. Do you usually work quickly, without bothering to check?
- Y N 29. Do you often change your interests?
- Y N 30. Before making up your mind, do you consider all the advantages and disadvantages?

- Y N 31. Would you like to go cave hunting?**
- Y N 32. Would you be put off a job involving quite a bit of danger?**
- Y N 33. Do you prefer to 'sleep on it' before making decisions?**
- Y N 34. When people shout at you, do you shout back?**
- Y N 35. Do you usually make up your mind quickly?**

## Appendix D

Story One: The Final Exam

**Scenario.** It is the middle of April and you and your good friend are in the final year of your undergraduate program. You are each taking the same courses and a full course load, and have already written all of your other exams. However, your last exam together is extremely important and the two of you have been madly studying together for it, quizzing each other, and learning the same material. Both you and your friend must pass the exam in order to graduate. Failure on the exam means coming back next fall to finish the degree. Furthermore, you are both feeling even more pressure because you are both planning to go abroad for a five year work-exchange to a place you have always dreamed of going, and a requirement for going is that you must have graduated from your undergraduate program. You are still amazed that this opportunity presented itself, because the acceptance rate for the exchange program is only 5% of all who apply. To summarize, whoever doesn't pass this exam doesn't get to go on the exchange. Moreover, the program rules say that a student is only allowed to apply once, and the application must be made in the student's graduating year. Everything has worked out so far, but everything has come down to whether you pass this final exam.

Two hours into the three hour exam, passing the exam has come down to the last question, worth 30% of the exam. The way you calculate it, you have already earned somewhere between 35% and 65% of the 100% total. However, you can't be sure how the professor will mark it. Upon looking at the marking scheme on the last question, you see that the last question is structured in the following way: If you attempt to answer the

question, a correct response will give you 30%, however an incorrect response will make you lose 30%; not attempting the question at all means that you will neither lose nor gain any marks. No part marks will be given for a partly correct answer. Though you feel reasonably confident in being able to answer this last question, you don't want to blow the whole exam. So you pause for a moment to decide.

Ending One: Choice=Action. As you consider your alternatives, you look across the aisle at your friend who is frantically writing. Your friend also looks across the aisle at you. You point to the last question, indicating that you are not sure if you should answer it. Your friend gives a quick shake of the head, suggesting that you leave the last question alone. A moment later your friend gets up to leave. Despite your friend's advice to leave the last question alone, you decide to answer it.

Two weeks after the exam you get your exam results, along with a copy of your exam. You see that you failed the exam. You realize that you can't go on the work exchange and you must repeat the course. You flip to the back of your exam to see how you answered the last question, only to see that you wrote the wrong answer to the question. You also see that had you left the question blank, you would have passed. You then telephone your friend. Your friend passed the exam and had left the question blank. You should not have answered the last question!

Ending Two: Choice=Inaction. As you consider your alternatives, you look across the aisle at your friend who is frantically writing. Your friend also looks across the aisle at you. You point to the last question, indicating that you are not sure if you should answer it. Your friend gives a quick nod of the head, suggesting that you answer it.

Despite your friend's advice to answer the last question, you decide to leave the last question alone. As you leave you see that your friend has begun to answer the last question.

Two weeks after the exam you get your exam results, along with a copy of your exam. You see that you failed the exam. You realize that you can't go on the work exchange and must repeat the course. You flip to the back of your exam to see how you answered the last question, only to see that you left the question blank. You also see that if you had answered it as you had intended, you would have passed. You then telephone your friend. Your friend passed the exam and had answered the last question correctly. You should have answered the last question!

#### Story Two: The Inheritance

Scenario. You, your sibling and your grandmother were always close. Therefore, when she died last month, you and your sibling each received \$40,000 and suggestions on how she would want you to spend it. In addition, she suggests that both of you spend your money on something by which you will always remember her. Last, you were just informed that you have twenty four months from the time of her death to spend the money (due to a technicality in the terms of the will) or else it will be absorbed by her bank.

You and your sibling realize immediately what your grandmother would want you to spend the money on. However, the inheritance doesn't provide you with enough money to buy it (you need \$10,000 more), and you realize that you only have eight months to come up with the necessary money before your opportunity disappears. As you



don't want to borrow money from anyone or any bank, you decide to invest most of your Grandmother's money in a short term, medium risk mutual fund. Thinking that your idea was a good one, your sibling also invests in the same short term mutual fund.

After the first 6 months of the investment your broker informs you and your sibling that each of your investments have gone nowhere, but that you each have an option to switch stocks to a different company with a different investment portfolio. However, as your current investment company and the other company are sufficiently similar, your broker is unable to advise you as to which company is better; your stocks may skyrocket, but they may also plummet. Only you and your sibling can decide whether to switch companies or remain with what you have.

Ending One: Choice=Action. Though your sibling advises you to keep your investments in the original company, you decide otherwise: you decide to move your investment to the other company. Your sibling, on the other hand, decides to keep the investment in the original company.

It is now 23 months after your grandmother's death. You have just returned home for supper and retrieved your mail. You notice that one letter is from your stockbroker. Upon opening it, you read that you have lost most of your money on your investment due to several problems with your stock choices. You immediately call your sibling to find out how the other investment worked out, only to hear that by not switching companies your sibling was able to accumulate nearly all the necessary money. You realize that had you not switched stocks to the other company you would now have the money you needed to fulfill your grandmother's wish, instead of losing most of it and being unable to

spend it in memory of her. As you sit down, you realize that you made the wrong choice.

You should not have switched companies!

Ending Two: Choice=Inaction. Though your sibling advises you to switch your investments to the other company, you decide otherwise: you decide to keep your investments in the original company. Your sibling, on the other hand, decides to switch companies.

It is now 23 months after your grandmother's death. You have just returned home for supper and retrieved your mail. You notice that one letter is from your stockbroker. Upon opening it, you read that you have lost most of your money on your investment due to several problems with your stock choices. You immediately call your sibling to find out how the other investment worked out, only to hear that by switching companies your sibling was able to accumulate nearly all the necessary money. You realize that had you switched stocks to the other company you would now have the money you needed to fulfill your grandmother's wish, instead of losing most of it and being unable to spend it in memory of her. As you sit down, you realize that you made the wrong choice. You should have switched companies!

Story Three: The Late Movie

Scenario. You and your friend decide to see the late movie. Because you both like to watch the credits, you are the last people out of the theater. It is quiet out as you both walk to the car. However, as you near the parking lot, you hear groaning coming from a nearby doorway. As you glance in, you see a roughly dressed man sprawled awkwardly on the ground. He sees you at the same time and beckons to you for help. He tells you

that he's been stabbed. When you and your friend come closer, you see that he has been stabbed in the stomach. As the wound appears dangerously deep, you and your friend decide to help the man.

Ending One: Choice=Action. Your friend suggests that you should leave the bleeding alone and call an ambulance. However, you believe that you should stop the bleeding first and call an ambulance afterwards. After considering your alternatives, you instruct your friend to help you stop the bleeding in. However, you just can't seem to slow down the loss of blood. After 5 minutes of staying with him you decide to follow the advice your friend first gave and you run to a phone booth to call for an ambulance. When the ambulance arrives 10 minutes later, you and your friend stand back to let the ambulance attendants help the man. However, despite their best efforts, the man stops breathing shortly after their arrival and dies before being taken away by the ambulance. Just before leaving, the attendants come over to talk to you and your friend. They inform you that had they received the call 5 minutes earlier the man may have lived. The fact is, however, that the man is dead from losing too much blood. They thank you for trying to help and leave you to give a statement to the police. As the attendants leave, you realize that your friend's advice to call the ambulance first was the right thing to do. You should not have stopped the bleeding first!

Ending Two: Choice=Inaction. Your friend suggests that you should stop the bleeding first and call an ambulance afterwards. However, you believe that you should call an ambulance first and stop the bleeding later. After considering your alternatives, you instruct your friend to run down the street to look for a phone, and you run up the

street. When the ambulance arrives 10 minutes later, you and your friend stand back to let the ambulance attendants help the man. However, despite their best efforts, the man stops breathing shortly after their arrival and dies before being taken away by the ambulance. Just before leaving, the attendants come over to talk to you and your friend. They tell you that had you spent a few minutes slowing the flow of blood before calling for an ambulance, the man may have lived. The fact is, however, that the man is dead from losing too much blood. The attendants thank you for trying to help and leave you to give a statement to the police. As the attendants leave, you realize that your friend's advice to stop the blood first was the right thing to do. You should have stopped the bleeding first!

#### Story Four: The Trip of a Lifetime

Scenario. You have been waiting for many years to travel outside North America. Finally you have the opportunity. Because Spring Break is only a month away, you will have the time. Because you have a part-time job, credit cards and a line of credit, you will have the money. As you don't like traveling alone, your friend reluctantly agrees to travel with you.

So a month before Spring Break you buy the plane tickets and make reservations for the youth hostels and car rentals for a 10 day holiday. However, you decline to buy the cancellation insurance: you cannot even consider not going on this trip. The sacrifices you and your friend have made to go on this trip include maximizing your credit cards, maximizing your line of credit and quitting part-time jobs (your bosses wouldn't give you the time off). All in all, you and your friend have made large investments towards

this trip of a lifetime.

The day of your trip, a month after buying the travel package, you call a taxi to pick up you and your friend from your apartment well before the departure time of your flight. However, during your travel across Winnipeg you and your friend are caught in an unexpected traffic jam. On a good day in traffic it would take 15 minutes more to get to the airport from where you are stuck. Your plane leaves in 45 minutes. You begin to hope that your plane is delayed. The taxi driver tells you and your friend that if you take the airport bus at the next intersection (which is free from the traffic jam), though it travels on a roundabout route and drives a longer distance, you may make your flight on time. However the taxi driver adds that he can't be sure which option is better and says that he isn't in a position to suggest either option. Only *you* can make the decision. As you and your friend remain stuck in traffic, the two of you try to decide which alternative is best.

Ending One: Choice=Action. Though your friend wants to remain with the taxi, you would rather take your chances with the bus. So the two of you part ways: your friend remains in the taxi and you take the bus. Unfortunately for you, because of the roundabout route, you arrive at the airport 30 minutes after the scheduled departure of your flight. As you get off the bus you see that your taxi driver has already arrived and is in discussion with other cabbies. This leads you to believe that the taxi has been at the airport for some time. You also look around for your friend, but your friend is nowhere to be seen. You take your bags to the check-in counter, but are told that even though your flight was delayed, it left 5 minutes ago. Moreover, all the other flights to your

destination are full and it appears that you will be stuck in Winnipeg. You should not have taken the bus!

Ending Two: Choice=Inaction. Though your friend wants to take the bus, you would rather remain with the taxi. Unfortunately for you, as traffic remains heavy you arrive at the airport 30 minutes after the scheduled departure of your flight. As you get out of the taxi you see that the bus you could have taken has already arrived and is completely empty, leading you to believe that it has been at the airport for some time. Your friend is also nowhere to be seen. You take your bags to the check-in counter, but are told that though your flight was delayed, it left 5 minutes ago. Moreover, all the other flights to your destination are all full and it appears you will be stuck in Winnipeg. You should have taken the bus!

Appendix E

Quantitative Measures

Discrete Affect Inventory Scale-I. Instructions: [Please assume that 10 years have gone by since the outcome occurred/ Please assume that only one hour has gone by since the outcome occurred.] Based on the outcome of this story and the fact that you [should have/should not have] [answered the last question/switched companies/stopped the bleeding/taken the bus], please circle the number that corresponds with how strongly you are feeling each of the following emotions.

REGRET

Very little Very much

1      2      3      4      5      6      7      8      9

ANGER

Very little Very much

1      2      3      4      5      6      7      8      9

DISAPPOINTMENT

Very little Very much

1      2      3      4      5      6      7      8      9

**Instructions: Based on how you responded in part (N), please answer the following questions in a short paragraph with as many sentences as necessary. (Two or three would be fine. Point form is also fine). Please use the back of this paper if necessary.**

1. Why are you experiencing as much regret as you are?
2. Why are you experiencing as much anger as you are?
3. Why are you experiencing as much disappointment as you are?