

Regret Avoidance and Risk Tolerance

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This study investigates investment decision behavior. Specifically, the effects of a person's "experienced regret" and "anticipatory regret" are compared to the effects of an individual's risk tolerance on investment decision behavior. An individual's risk tolerance and "experienced regret" significantly influenced decisions. Anticipation of potential future regret did not predict subsequent investment decision behavior. The experience of regret with a particular type of investment did reduce one's tendency to make a similar investment. The individual's risk tolerance was predictive of participants' investment decision behavior regardless of regret condition. Practical implications of these findings for financial counseling are presented.

Keywords: *risk tolerance, regret avoidance, personal financial behavior*

Introduction and Background

"The revolutionary idea that defines the boundary between modern times and the past is the mastery of risk: the notion that the future is more than a whim of the gods and that men and women are not passive before nature" (Bernstein, 1998, p.1).

For thousands of years people have been making investment decisions. These decisions involve risk as some investments pay off and some do not. Only recently have people begun to effectively manage their exposure to risk. By the middle of the seventeenth century, there was growing trade and commerce such that wealth was no longer primarily "inherited from preceding generations; now it could be earned, discovered, accumulated, invested, and protected from loss" Bernstein (1998, p.89). Edward Lloyd (Lloyds of London) facilitated the growth of the insurance industry, and with it, the spreading of risk as a management-of-risk technique. Since that time, there has been a continued study of risk and decision-making under risk and uncertainty.

Daniel Kahneman and Amos Tversky have had a significant influence on understanding of decision-making under conditions of risk and uncertainty. They have developed Cumulative Prospect Theory (Tversky & Kahneman, 1992) which suggests that individuals faced with risky prospects do not make decisions consistent with expected utility theory. Their work has helped to foster a generation of researchers who are looking at behavioral influences on risky decisions. The research into behavioral influences attempts to account for individuals' limited cognitive capacity,

predispositions such as personality characteristics and emotions in decision-making under risk.

One such emotion to receive a great deal of interest is regret. Decision regret is the emotion felt as a consequence of a decision which, after the fact, appears to have been a wrong or poor decision (Bell, 1982). This includes the loss felt due to the recognition of missing out on the feeling of joy that comes when one has made a right or good decision. Many researchers have advanced the idea that regret avoidance may explain decision behavior that is inconsistent with expected utility theory better than Prospect Theory's explanations dealing with the value of additional gains being less than the lost value from a similar sized loss (Bell, 1982; Loomes & Sugden, 1982).

People make value judgments about their past choices and the consequences associated with them. In these moments of reflection, a person may think back on a certain decision and be content and happy with the outcome, or, after experiencing that outcome, the person may regret making that decision instead of an alternative choice. People often think about what might have been if only things had been slightly different (Mandel & Lehman, 1996; Kahneman & Miller, 1986). When a particular decision leads to an outcome that the person regrets or is unhappy with, they may ask themselves questions such as "what if I had not made that decision" or "if only I had chosen this instead of what I did." These thoughts are called counterfactuals because they are counter to what actually, or factually, occurred.

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This type of thinking is inherent and recognizable to nearly everyone. The concept of alternate realities itself has been debated by philosophers since at least the time of Plato, but counterfactual thought only became well-established in the realm of experimental research in the 1980's. This research predominantly focused on the basic cognitive mechanisms governing the generation of counterfactual thoughts (Roese, 1994). One of the early milestones was the publication of Daniel Kahneman and Dale Miller's influential norm theory in 1986. Following this publication, the research involving counterfactual thought expanded rapidly and extended into numerous theoretical and applied areas (Landman & Manis, 1992; Mandel & Lehman, 1996; Roese 1994; Tsiros, 1998; Zeelenberg et al., 1998).

Surprising or negative life events tend to increase the chance of counterfactual thoughts (Roese, 1994, Kahneman & Miller, 1986). These thoughts are typically conceptualized as conditional propositions, which have both an antecedent and a consequent. When people begin to think counterfactually, they remember an event, or a decision, and then alter or mutate some factual antecedent and assess the consequences of that alteration (Roese & Olson, 1995). In this way, counterfactual thoughts influence the emotional response an individual experiences as the result of a decision and the associated consequences. One main content area of this research entails the effect of counterfactual thinking on one's experience of regret and disappointment associated with prior decisions.

Purpose of Study

The purpose of this paper is to report the results of an experimental study in which the level of regret associated with either a risky investment --stock fund-- or a less risky investment-- certificate of deposit-- is manipulated.

Scenarios are created in which the levels of two forms of regret were manipulated. The first was "experienced regret." Participants were exposed to only one of three levels of "experienced regret."

- 1) they were given information about a previous investment in a stock fund they had made that had resulted in a loss (experienced regret investing in a stock fund)
- 2) they were given information about a previous investment in a savings account they had made that had resulted in less gain than would have been experienced in a stock fund (experienced regret investing in savings)
- 3) they were given no information about past choice behaviors – i.e., no experienced regret.

The second was "anticipated regret." Again, participants were exposed to only one of three levels of "anticipated regret."

- 1) "Think about how you would feel if you choose to put the money in a Stock Investment Plan and then two years from now it turns out that the Savings Plan is worth more because the Stock Plan you chose went down in value."
- 2) "Think about how you would feel if you choose to put the money in a Savings Investment Plan and then two years from now it turns out that the Stock Plan is worth a lot more because the Savings Plan you chose barely increased in value while the Stock Plan greatly increased."
- 3) Some did not receive any such directions.

All participants then made hypothetical choices about how to invest \$5000 they had just received from a relative.

Regret in Decision-Making

According to Kahneman and Miller's (1986) norm theory, it is expected that people would feel greater regret and responsibility for actions that deviate from the norm because it is easy to imagine doing the conventional thing. In most real-life decisions not all possible actions or associated consequences are known. However, decision-makers can imagine possible outcomes that might have occurred had things been different, thus generating counterfactuals. Reactions to the factual outcome are then based on the comparison of that outcome to the after-the-fact counterfactual alternatives generated (Zeelenberg et al., 1998). As stated above, decision outcomes often evoke emotional reactions. Counterfactuals are more frequently generated when a decision is associated with unfavorable outcomes. These counterfactuals, being more favorable than the actual outcomes, lead to the experience of regret and disappointment.

Zeelenberg et al. (1998) investigated the role of counterfactual thought in the experience of regret and disappointment. In three separate studies, the researchers were interested in finding whether those participants who experienced regret differed in their actions from those who experienced disappointment. The first study divided participants into two groups and then asked them to recall an event from their own lives in which they experienced intense regret or intense disappointment. After recalling a particular event, participants were asked to think of any way they may have been able to change the outcome. Consistent with the hypotheses, the regret participants predominantly mutated their own actions (things that were under their control) while the disappointment participants predominately changed aspects of the situation (things that were not under their control).

During second and third studies, participants were asked to read a scenario where a person experiences a negative event. Building upon the first study, participants were asked to undo the outcome of the event by either changing the person's actions (group A) or changing aspects of the situation (group B). All participants were then asked to report how much disappointment or regret they would have felt if they had been the person in the story. Consistent with the first study, the researchers found that participants who were instructed to undo the event by changing the person's actions reported more regret than disappointment, while participants who were instructed to undo the event by changing aspects of the situation reported more disappointment than regret. Their research suggests that regret is related to behavior focused counterfactual thought in which the decision-maker's own actions are changed, whereas disappointment is related to situation-focused counterfactual thought in which aspects of the situation are changed.

Most psychological research on regret has focused on the amount of regret associated with different types of decisions (Simonson, 1992). In the early 1980's, two regret theories were proposed. Bell (1982) proposed that people hope to avoid consequences in which they appear, after the fact, to have made the wrong decision. In an example, anticipated regret can cause people not to make large purchase decisions (e.g. home or property purchases) because they anticipate the possibility that their decision may not turn out the way they expect. In a second proposed regret theory, Loomes and Sugden (1982) assumed that the value of choosing an item is dependent on the items simultaneously rejected. Thus, on any given day, winning \$50 in a contest would seem like a good deal, unless the winner realizes that if only he had picked "door number two" instead, he would have won \$10,000 dollars. In a comparison of the outcomes for the different decisions, the \$50 does not seem to be as good a prize as \$10,000. If however, choosing "door number two" would have produced a prize of \$10, the \$50 does seem to be a good prize. Thus, the experience of regret associated with a decision outcome is dependent on an evaluation of the relative utility of the outcome in comparison to possible alternative outcomes.

Regret has been studied within the field of consumer research and consumer decision making. Building on previous research, Simonson (1992) attempted to find the influence of anticipating regret and responsibility on purchase decisions. He assumed that regret and responsibility were highly positively correlated, with a higher sense of responsibility leading to greater regret. He asked participants to anticipate the amount of regret

they thought they would feel if certain purchasing decision outcomes did not turn out the way the participant had pictured. By concentrating on anticipated regret, unlike experienced regret, Simonson hoped to open a window into its influence on pre-purchase decisions. Simonson was also interested in whether consumers may regret choosing a particular timing for a purchase rather than waiting for a later opportunity. Focusing on the role of anticipated regret and responsibility in choices between a default (normal or habitual) and a less conventional option, Simonson suggested that regret represents the sorrow over something done or not done, regardless of whether the decisions maker was responsible for the outcome. He states that the magnitude of regret is likely to depend on the difference between the actual and the alternative outcomes and on whether the selected option was the norm and was thus to be expected.

The present study seeks to expand upon counterfactual thinking research in the area of anticipated and experienced regret for personal financial decisions. Building upon both Zeelenberg et al. (1998) and Simonson (1992), the objective is to determine if there is a difference in choice behavior in an investment decision between those who have experienced regretful decisions associated with particular investments and those who have not, as well as those who anticipate a regretful decision consequence and those who do not. The main research interest was to investigate whether or not the investment choice behaviors of our participants would be consistent with avoidance of alternatives associated with experienced or anticipated regret. Likewise, we expect those with more risk tolerance to be more likely to invest in a stock fund plan than to invest in a savings plan.

Method

This was a $3 \times 3 \times 2$ between subjects experimental design. The first independent variable was experienced regret with three levels: experienced prior regret with a stock fund, experienced prior regret with a savings plan, no prior regret experienced. The second independent variable was anticipated regret with three levels: anticipated regret with an investment in a stock fund plan, anticipated regret with an investment in a savings plan, or no anticipatory regret. The third independent variable was risk tolerance with two levels: low, high.

The dependent variable was an investment choice between a stock investment plan and a savings plan. The savings plan was not explicitly defined and was intended to be interpreted as a savings account. In the scenario description, they were informed that the savings plan consisted of certificate of deposits at a bank and the investment stock plan consisted of a stock

fund portfolio of 350 different stocks. The choice alternatives were labeled as *Savings Plan*. "I would put the \$5,000 in the Savings Plan (should increase slightly in value)" and *Investment Stock Plan*: "I would put the \$5000 in the Investment Stock Plan (may increase a lot in value, may decrease in value)". Thus, risk is acknowledged as exposing the risk-taker to the potential for positive gain as well as potential loss. We also asked participants to rate their confidence in the choice they had just made. A participant's decision and his or her confidence in the decision were combined together as the dependent variable. Two hundred and twenty-five undergraduate college students volunteered to participate in this study.

The materials were developed to represent realistic situations for college students. For the experienced regret treatment levels, the scenarios portrayed information about having made a past investment of around \$5,000. For the experienced regret with a stock fund investment, the scenario informed the participant he/she had invested in a stock fund but that it had lost value. Furthermore, participants were informed that had they chosen the savings plan the interest would have made the current balance much higher. For the experienced regret with a savings plan, the scenario informed the participant that he/she had invested in a savings plan but that the stock fund had performed much better and if they had chosen the stock fund the current balance would be much higher. They received no prior investment information in the "experienced no prior investment regret" treatment level. For the anticipatory regret levels, the scenarios suggested how things might be two years from now if they invest in a savings plan or a stock fund. The "no anticipatory regret" treatment level did not have this information about the future. Finally, the risk tolerance variable was measured through self-reporting on a seven-item Likert scale with 1 = "I prefer low risk," 4 = "I prefer moderate risk," and 7 = "I prefer high risk." Self-assessed risk tolerance is generally similar to assessments based on other risk tolerance measures (Hallahan, Faff, & McKenzie, 2004). For this rating, the definition of "risk" was not explicitly defined.

Results

The effects of experienced regret, anticipated regret, and risk tolerance on type of investment choice were tested with a three-way ANOVA. The analysis revealed a statistically significant main effect for experienced regret, $F(2, 207) = 3.65$; $p < .05$, and a significant main effect for risk tolerance, $F(1, 207) = 128.25$, $p < .0001$. Table 1 presents the ANOVA results.

None of the two-way interactions reached statistical significance. The three-way interaction also did not reach statistical significance. There were no differences in risk tolerance by regret treatment conditions. Thus, it appears that both experienced regret and risk tolerance influence individual investment decision-making.

Discussion and Limitations

These data suggest that one's risk tolerance is a very strong predictor of choice behavior in an investment situation. This is particularly significant considering this was a self-report measure of one's preference for a level of risk. Many of the studies of risk attitudes employ experimental approaches to get a measurement of risk tolerance. Many have called into question the use of experimental approaches to infer risk tolerance (Davis & Holt, 1993; El-Sehity, Haumer, Helmenstein, Kirchler, & Maciejovsky, 2002; Roth, 1995; Krahn, Rieck, & Theissen, 1997). Furthermore, Hallahan, Faff, and McKenzie (2004) found that self-assessed risk tolerance is generally similar to assessments based on other risk tolerance measures. The self-report measure of risk attitude here was strongly associated with reported investment decision behavior.

It may be desirable to affirmatively differentiate between investment options to a greater degree. We found that people are less likely to invest in a manner in which they had experienced regret, i.e., the experience of regret with a particular type of investment. Thus, it may make sense to purposely differentiate current investment alternatives from those with which the person has experienced regret in the

Table 1.
Analysis of Variance for Experienced Regret, Anticipated Regret, and Risk Tolerance Effects
On Individual Investment Decisions

Source	SS	df	MS	F	Sig.
Experienced Regret (ER)	113.77	2	56.88	3.65	*
Anticipated Regret (AR)	25.34	2	12.67	0.81	
Risk Tolerance (RT)	1997.34	1	1997.34	128.25	****
ER × AR	50.93	4	12.73	0.52	
ER × RT	73.39	2	36.69	2.36	
AR × RT	69.02	2	34.51	2.22	
ER × AR × RT	31.33	4	7.83	0.50	
Error	3223.77	207	15.57		

* $p < .05$; **** $p < .0001$

past. It is good practice to know the various alternative investment vehicles available but to also know the financial counseling client's history with investments. If the client has experienced regret with a stock fund investment, the client will be less inclined to want to invest in a stock fund. However, the client's financial situation may be such that it would be advisable to invest in some type of stock fund. Given that experienced regret with a particular type of investment has the effect of significantly lowering a person's likelihood of making a similar investment, the counselor should find out more about the stock funds with which the client has had negative experiences. Then, the counselor can appropriately differentiate current alternatives compared with the past investment. The fund characteristics would provide the differentiation points. A client may lump all stock funds together and avoid all of them, having experienced regret with this in the past. The financial counselor can help the client see that there are many types of stock funds that differ from one another in level of risk exposure and other characteristics and that a component of the overall investments should include a stock fund, but a different one from that in which the client had experienced risk.

Future research could focus on normative portfolio analysis to investigate the effects of regret on rational choice behavior. In this way, researchers could identify the detrimental effects of poor decision choices that result from the experience of regret. In a broader sense, it would be interesting to see the effects of regret and risk tolerance on investment choice behavior over time. A particularly relevant context for this would be employee decision behavior in 401(k) plans.

There is a growing importance of individual investment behavior in retirement savings because of the increasing portion of retirement income that is based on defined contribution plans as compared with defined benefit plans (Holden & VanDerhei, 2001). As such, individuals have a great deal more control of the investment amount and type (allocation decisions) than in the past (Byrnes, 2004). These investment decisions are influenced by four broad categories of factors: plan characteristics, employee characteristics, social influences, and psychological influences (Bailey, Nofsinger, & O'Neill, 2003a). While social norms influence retirement investment decisions (Bailey, Nofsinger, & O'Neill, 2003b; Duflo & Saez, 2004), it is not clear how the experience of regret associated with behaving outside of the norms might influence retirement investment behavior. There is evidence that individuals' investment decisions in 401(k) are not as

good as those made by professional pension plan managers (Lauricella, 2004).

Regret may be an emotion that creates additional psychological bias leading to less than rational contribution and portfolio allocation decisions. Psychological biases investigated to date include framing effects (Benartzi & Thaler, 2002; Benartzi & Thaler, 2001), familiarity bias (Coval & Moskowitz, 1999; Huberman, 2001), status quo bias (Madrian & Shea, 2001), risk compensation (Bailey, 2004), representativeness bias (Shefren, 2000), and others (c.f., Mitchell & Utkus, 2004). Regret associated with past decisions could readily be studied in today's retirees and older workers. In this study, we did not find anticipatory regret significantly influencing the investment decision behavior. However, it is likely that anticipatory regret could have a positive effect on retirement savings behavior because of the greater importance of retirement as compared with the small cash gift investment decision used in the current study. Knowledge of the influence of anticipatory regret associated with low levels of retirement savings on current retirement contribution and allocation decisions could be beneficial in advising employees towards more appropriate levels of contributions and allocations.

There are several limitations of this study. First, the use of students as subjects limits the degree of generalizability. However, many experimentalists claim that the study of decision processes is valid using student participants although the context findings are less generalizable than findings from samples more reflective of the population. Thus, while we can quite confidently state that regret and risk tolerance influences one's investment decision behavior in predictable directions, we have less confidence in the specific effects on investing in stock funds compared with investing in a savings plan. Another weakness is the hypothetical nature of the decision task that served as the dependent variable. This also reduces the extent to which the results can be generalized to real decisions with real money involved. It is quite easy to be more risky in a hypothetical situation than when investing real money. However, the tasks were viewed by participants as realistic and the results suggest that the scenario information did influence the investment behavior.

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