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## Working Paper

# The effect of anticipated and experienced regret and pride on investors' future selling decisions

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**CFS WORKING PAPER**

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No. 2012/17

**The Effect of Anticipated and Experienced  
Regret and Pride on Investors'  
Future Selling Decisions**

Carmen Lee, Roman Kräussl,  
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# The Effect of Anticipated and Experienced Regret and Pride on Investors' Future Selling Decisions<sup>\*</sup>

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and Leo Paas<sup>1</sup>

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## Abstract

This paper investigates the effect of anticipated/experienced regret and pride on individual investors' decisions to hold or sell a winning or losing investment, in the form of the disposition effect. As expected the results suggest that in the loss domain, low anticipated regret predicts a greater probability of selling a losing investment. While in the gain domain, high anticipated pride indicates a greater probability of selling a winning investment. The effects of high experienced regret/pride on the selling probability are found as well. An unexpected finding is that regret (pride) seems to be not only relevant for the loss (gain) domain, but also for the gain (loss) domain. In addition, this paper presents evidence of interconnectedness between anticipated and experienced emotions. The authors discuss the implications of these findings and possible avenues for further research.

## JEL Classifications:

**Keywords:** Regret, Pride, Disposition Effect, Risky Decision

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Individual investors' decisions to hold or sell an investment may depend on their emotions. For example, regret and pride may explain the occurrence of the disposition effect, by which people tend to hold losing investments (losers) too long and sell winning investments (winners) too early (Shefrin & Statman, 1985). The disposition effect has been confirmed in laboratory settings (Weber & Camerer, 1998), online (Lee, Park, Lee, & Wyer, 2008), in individual investors' trading behavior (Odean, 1998), and among professional investors (Garvey & Murphy, 2004). It often leads to inappropriate financial decision making, resulting in losses for both individual investors and firms (Dhar & Zhu, 2006).

To explain the disposition effect, Dhar and Zhu (2006) assess the effects of individual differences, and Muermann and Volkman (2007) developed a theoretical portfolio choice model that incorporates anticipated regret and pride. Their model reflects Shefrin and Statman's (1985) proposal that investors may take pride in their ability to make profits through their investments, which implies they would be likely to sell winners. However, when selling a loser, their ex-post knowledge suggests that a forgone alternative decision would have resulted in more desirable outcomes, so to avoid this form of regret, investors hold on to their losers (Shefrin & Statman, 1985). Although the roles of *anticipated* regret and pride were proposed, the roles of *experienced* regret and pride are neglected.

Empirical evidence shows responsibility is a prerequisite for the disposition effect. Summers and Duxbury (2012) find that investors must feel responsible for their buying or selling decisions, in order for the disposition effect to occur. They argue that due to the sense of responsibility, investors feel regret or pride over their decisions, which ultimately leads to the disposition effect. However the roles of regret and pride were theoretically asserted instead of

directly tested (Summers & Duxbury, 2012). Furthermore, although previous investment decisions and thoughts of counterfactual alternatives influence people's subsequently experienced satisfaction/regret, there is a missing link between experienced emotions and future investment decisions (O'Curry Fogel & Berry, 2006).

Despite the recent research efforts, three issues thus remain unaddressed. First, the effects of anticipated regret and pride on investors' hold/sell decisions have not been tested directly. Second, though Shefrin and Statman (1985) propose the disposition effect results from anticipated regret and pride, the investment process actually consists of a chain of decisions. In addition to anticipating emotions that they expect to feel after future decisions, investors may experience emotional feedback from previous decisions. We therefore address, for the first time, the relevance of emotional feedback for the disposition effect. This investigation complements previous studies of other consumer consequences, such as switching behaviors, complaints, repurchase intentions, loyalty, word-of-mouth, and customer satisfaction, which show that emotions experienced as a result of previous decisions affect subsequent attitudes and behaviors (Chitturi, Raghunathan, & Mahajan, 2008; Hennig-Thurau, Groth, Paul, & Gremler, 2006; Zeelenberg & Pieters, 2004). Most importantly, previous studies only focused on testing either the effect of anticipated emotions or experienced emotions on consumers' decisions; we contribute to the literature by providing the first test of how both anticipated and experienced emotions simultaneously affect subsequent decisions in a dynamic setting.

The reason for focusing our investigation on two specific emotions: regret and pride, is that they share one important element: *Sense of responsibility*. One can only experience regret if one feels responsible for a bad decision that cannot be justified (Pieters & Zeelenberg, 2007). Other negative emotions, such as anger and disappointment, can be experienced without the

feeling of responsibility, but regret cannot. Pride arises from achievements that can be attributed to one's abilities or efforts (Williams & DeSteno, 2008). Thus, pride differs from other positive emotions, such as joy, in that pride is also linked to a sense of responsibility for the outcome. Summers and Duxbury (2012) find that the mere experience of gains or losses, without being responsible for the outcome, was not sufficient to generate the disposition effect. In financial modeling, Muermann and Volkman (2007) include preferences of anticipated regret and pride in their choice model to predict the disposition effect. It appears that the sense of responsibility is a prerequisite to predict individuals' subsequent decisions. Thus, in order to predict holding or selling decisions in a dynamic setting, we identify regret and pride to be important candidates of emotions to investigate, due to their associations with responsibility and agency.

Nevertheless, consumers may experience other emotions apart from pride and regret following financial gains or losses, for example, anger or sadness (Westbrook & Oliver, 1991). However, these are secondary emotions that come after primary emotions such as regret (Levine, 1996). Since our choice of focusing on regret and pride is based in their association with one's sense of responsibility, other secondary emotions that do not carry this characteristic are not in the scope of this paper.

In the next section we present the conceptual framework. Then we report four experiments. Experiment 1 investigates the effects of anticipated and experienced regret on investors' hold/sell decisions in a loss domain; Experiment 2 tests the effects of anticipated and experienced pride on these decisions in a gain domain. Experiments 3 and 4 are very similar to Experiments 1 and 2 respectively, except that we test our model in a setting where the role of responsibility is highlighted. We conclude with an overall discussion of the results, their implications, and possible avenues for further research.

## Conceptual Framework

### Anticipated Regret, Anticipated Pride, and Selling Investments

*Anticipated regret.* Regret is found to be a primary negative emotion (Tsiros & Mittal, 2000). It is the second most frequently expressed emotion in daily conversations (Shimanoff, 1984). Regret is an important emotion to investigate, not only because it is commonly experienced, but also because it has strong behavioral implications. Various studies in marketing have identified regret as a relevant emotion in consumer decision making (e.g., Simonson, 1992; Tsiros & Mittal, 2000; Zeelenberg & Pieters, 2004). Pieters and Zeelenberg (2007) propose that anticipated regret has a prospective element that signals when decisions may be regrettable; this means that individuals are able to think about possible future outcomes and anticipate how regretful they would feel over their decisions.

Shefrin and Statman (1985) propose that investors resist realizing losses, which would imply that ex-post knowledge indicates the forgone alternative decisions would have led to better outcomes. For example, if investors sell an investment at a loss, they not only realize the loss but also experience a feeling of regret associated with their previous non-optimal decision. To avoid this experience of regret, investors tend to postpone selling at a loss. According to Reb's (2008) empirical findings about the role of regret aversion in decision making, the salience of regret increases the length and depth of information search and the amount of time before a decision is made. Lemon, White, and Winer (2002) reveal that consumers who anticipate regret, in the context of dropping an ongoing service provider, are less likely to discontinue the service relationship. Because this type of decision strongly resembles investors' selling decisions, we expect that anticipated regret also affects investors' hold/sell decisions.



In addition, action often leads to more regret than inaction, according to the action effect (Gilovich & Medvec, 1995). This effect is found in the short run, but not necessarily in the long run. From the moment investors initially invest in the product, holding their investment is a decision not to act, or inaction. Selling requires the decision to change the status quo, that is, action. Therefore, selling (action) should produce more regret compared with holding (inaction), given a constant outcome<sup>1</sup>. In order to avoid anticipated regret, investors tend to hold losing investments.

**H<sub>1a</sub>:** In the loss domain, greater anticipated regret leads to a smaller selling probability.

*Anticipated pride.* Pride is a positive emotion resulting from achievement, attributed to one's effort or abilities, and it is intrinsically linked to self-esteem (Tracy & Robin, 2007). Anticipated pride is found to be related to task preference (Trope, 1980), self-control/impulse control (MacInnis & Patrick, 2006; Patrick, Chun & MacInnis, 2009) and brand choices (Simonson, 1989) in non-risky settings. In addition, anticipated pride is suggested to be a determinant of consumers' ethical purchasing behavior (Angus-Leppan & Owen, 2005). In risky domains, however, there is a gap in the literature regarding the relation between anticipated pride and decisions. While pride, and in particular the expression of pride, has received increasing attention in the psychology literature (Fredrickson, 2001; Tracy & Robins, 2007; Williams & DeSteno, 2008), anticipated pride is an understudied topic, especially in terms of how it may affect risky or financial decisions. There is, nevertheless, evidence demonstrating the effects of general anticipated feelings on risky decisions. In a non-financial risk domain, anticipated feelings are found to reduce the practice of unsafe sex (Richard, van der Pligt, & de Vries, 1996). Anticipated feelings also affect individuals' gambling choices in the framework of subjective expected pleasure theory (Mellers & McGraw, 2001). The subjective expected pleasure theory

proposes that individuals anticipate pleasure for future outcomes of each decision option. Then they weigh each anticipated pleasure by the corresponding subjective expectation that an outcome will occur. Finally, the decision option with the highest anticipated pleasure is chosen. This framework deals with anticipated pleasure in general. Nonetheless, the arguments underlying this framework may also apply to anticipated pride, that the decision option associated with the highest anticipated pride is expected to be chosen.

Pride was suggested to be the counterpart of regret, in explaining the disposition effect (Shefrin & Statman, 1985). Investors are expected to take pride in their sale of a winning investment, because they regard the realized gain as proof that they have made good decisions. In order to obtain this sense of anticipated pride, investors have to sell winners. Thus, anticipated pride is proposed to result in a desire to sell winning investments too soon (Shefrin & Statman, 1985). However, this proposition has not been tested directly. Summers and Duxbury (2012) have manipulated the presence of responsibility in their study, but anticipated emotions were not measured explicitly. Although feeling responsible for a decision is a prerequisite for feeling regret or pride, it may not automatically lead to these emotions, thus their study did not provide direct support for the proposed effect of anticipated pride on selling tendency. In their preference model Muermann and Volkman (2007) provide mathematical proof that by incorporating anticipated pride and regret in individuals' preferences, investors exhibit trading behaviors consistent with the disposition effect. However, the support from this paper is theoretical instead of empirical.

Thus, we aim to provide the first direct empirical test of the proposition by Shefrin and Statman (1985). Since the feeling of pride is linked to self-esteem, when investors sell winning investment, they would feel good about their prior purchase/ holding decision and have a boost

in their self-esteem. As such, anticipated pride is expected to motivate investors to sell a winning investment:

**H<sub>1b</sub>:** In the gain domain, greater anticipated pride leads to a greater selling probability.

### **Experienced Regret, Experienced Pride, and Selling Investments**

*Experienced regret.* Regret results from counterfactual thinking, that is, a comparison between the obtained outcome and what might have been (Bell, 1982; Loomes & Sugden, 1982). Regret regulation theory suggests regret is based on past decisions (experienced) and possible future decisions (anticipated). Furthermore, Pieters and Zeelenberg (2007) propose experienced regret has a retrospective element that informs decision makers about the level of their goal achievement. It strongly depends on prior outcomes (Bagozzi et al., 2000), and it contains a prospective element that shapes subsequent behavior. For instance, marketing literature has shown that experienced regret affects consumers' subsequent repurchase intentions, word-of-mouth and switching decisions (Chitturi et al., 2008; Cooke, Meyvis, & Schwartz, 2001; Zeelenberg & Pieters, 2004).

Investing generally involves a chain of decisions, such that regret could be experienced after each decision. We argue that under such dynamic conditions, the probability of holding losing investments is larger when the level of experienced regret is high. Hart and Mas-Colell (2000) propose an adaptive procedure, known as regret matching, such that in a repeated game, players change their current strategy, at probabilities proportional to the regret experienced by not using other strategies previously. Their formulation focuses on how experienced regret, which results from a known outcome in the past, can predict subsequent choices. Empirical findings support this regret-matching proposition: Consumers who experience more regret tend to change their behaviors, such as switching products or service providers (Ratner & Herbst,

2005; Zeelenberg & Pieters, 2004), or express lower repurchase intentions (Tsiros & Mittal, 2000). We argue that switching suppliers or eliminating repurchase intentions resembles selling an investment and hypothesize:

**H<sub>2a</sub>:** In the loss domain, greater experienced regret leads to a greater selling probability.

*Experienced pride.* Shefrin and Statman (1985) also propose that pride motivates investors; specifically, anticipated pride pushes investors to sell winners, because they know they will experience pride when they do so. Because investing involves a chain of decisions, we assume investors not only anticipate pride before selling, but may already have experienced pride resulting from previous decisions concerning a winning investment.

Despite increasing research into pride (Fredrickson, 2001; Tracy & Robins, 2007; Williams & DeSteno, 2008), we still know little about its effects on financial decision making. Fredrickson (2001) suggests pride increases people's scope of attention and broadens their action repertoires, enabling them to obtain greater achievements. Thus, consumers may be more likely to search for alternatives and less likely to continue their relationship with their current product or service providers. Pride is also linked to a sense of autonomy/self-agency, that people attribute positive outcomes to their own abilities and efforts (Williams & DeSteno, 2008). The positive outcome should be independent of the chosen product/service provider, so their repurchase likelihood declines. To apply these findings in a financial setting, repurchase intentions of consumer products is similar to holding on to an investment (i.e., stick with the current product); while switching decision in the marketing domain is similar to a selling decision in an investment setting (i.e., stop using current product). If investors take pride in their own investment decisions, believing that they are making positive returns because of their own

abilities, this sense of self-agency is likely to motivate individuals to search for alternative (new investments to invest in) and thus become less likely to hold on to the current investment.

Therefore, in an investment context, we hypothesize:

**H2<sub>b</sub>:** In the gain domain, greater experienced pride leads to a greater selling probability.

### **Interconnectedness of Anticipated and Experienced Emotions**

In this article we focus on examining the separate effects of anticipated and experienced emotions on investment decisions. However, there may be correlations between anticipated and experienced emotions. This can be framed into two questions: do anticipated emotions relate to subsequent experienced emotions? (i.e., how accurate can individuals predict the emotions they will experience in the future?) And do experienced emotions relate to anticipated emotions? (i.e., would the emotions that individuals experience at this moment, affect how they anticipate to feel in the future?) The first question has been answered by the affective forecasting literature. Studies have shown that people can predict how they would feel in the future to a certain extent (MacInnis & Patrick, 2006; Patrick, Chun & MacInnis, 2009). Nonetheless, due to uncertainty in the future, it is only natural that individuals cannot perfectly predict how they would feel subsequently. The difference between anticipated emotions and actual experienced emotions is referred to as affective misforecasting (see review by MacInnis, Patrick & Park, 2005). The second question though, has not been answered by the literature. The literature of experienced regret has demonstrated that experienced regret can affect individuals' subsequent decisions/behavioral consequence (Zeelenberg, Inman & Pieters, 2001). However, we have not seen any empirical evidence of whether experienced emotions would have an impact on subsequent anticipated emotions. Although how accurately people can predict their own emotion

or whether currently experienced emotions affect subsequently anticipated emotions, are not the central questions of this paper, testing these secondary effects may lead to more fruitful insight in terms of understanding investors' decisions processes. We investigate the link between experienced and anticipated emotions in an exploratory manner. We do not formulate any hypotheses, because there is no previous literature available to support this.

We conducted Experiment 1, focused on the loss domain, to test  $H_{1a}$ , and  $H_{2a}$ , whereas Experiment 2 focused on the gain domain, tested  $H_{1b}$ , and  $H_{2b}$ . We conducted Experiments 3 (loss domain) and 4 (gain domain), to further investigate the role of responsibility in investment decision making. Apart from the two specific emotions, we have also included general (dis)satisfaction in our model, in order to control for its effect.

### **Experiment 1: Anticipated and Experienced Emotions in the Loss Domain**

#### **Participants and Procedure**

A total of 66 undergraduate students (40 men, 26 women) from a university in The Netherlands, with an average age of 22.79 years, participated. Participants are informed that their reward depended on the final value of their investment. The larger the loss (gain) one incurred, the smaller (larger) the final reward they received. On average, in the loss domain, participants received about EUR 4. Participants were assigned to individual cubicles and presented with the study scenario: They recently had started investing in a single stock X. The amount initially invested was predetermined and equal for all participants. We specified up to ten investment periods, in which the stock price declined. To enhance the realism of the price patterns, we eliminated the possibility of long runs of losses. After each period, participants received information about the stock's performance, answered a short questionnaire about emotions and other questions (see details in the *Measures* section), and were asked whether they wanted to

hold or sell the whole invested amount. The experiment ended after participants decided to sell the stock; for those who never chose to sell, the experiment ended after 10 periods.

Previous studies of the disposition effect usually employed a limited number of predetermined price patterns (Lee et al., 2008; Weber & Camerer, 1998). We randomly generated a wider range of gains or losses and intermediate price dynamics over the (up to) 10 investment periods to enhance the generalizability of the results. We divided the ten investment periods into three phases. In phase 1, with a random assignment of 5%, 10%, 20%, or 40% losses, participants considered a first decrease in the stock price, which was roughly evenly spread out over the initial 1, 3, or 5 periods. In phase 2, the prices remained relatively stable (up or down stock price movements of around 1%) for either 2 or 4 periods. In phase 3, participants were exposed to a second negative shock in the stock price of 5%, 10%, or 15%, which took place in 1 period. The experiment then ended. In total then, we used 72 possible general price patterns: 4 (first loss: 5%, 10%, 20%, 40%)  $\times$  3 (first losing period: 1, 3, 5 periods)  $\times$  2 (stable prices: 2, 4 periods)  $\times$  3 (second loss: 5%, 10%, 15%). On average, participants held the losing stock for 5.32 (SD = 2.84) periods. When participants sold the losers, they had incurred an average loss of 18.58% (SD = 13.60).

### **Measures**

The dependent variable in the model was the hold/sell decision; anticipated and experienced regret, as well as (dis)satisfaction, served to predict participants' values for this dichotomous variable. We derived the measures of experienced regret from Zeelenberg and Pieters (2004), with two questions: (1) "How good or bad do you judge your decision to hold stock X in the last month?" (1 = *very good*, 9 = *very bad*) and (2) "How much regret do you feel about holding stock X in the last month?" (1 = *none*, 9 = *very much*). We averaged their answers

to form an index of regret ( $\alpha = .74$ ).<sup>2</sup> We used three measures of experienced pride, from Williams and DeSteno (2008). On a nine-point scale (1 = *not at all*, 9 = *very much*), participants indicated how *fulfilled*, *confident*, and *proud* they felt after each investment period. The averaged answers to the three items formed an index of pride ( $\alpha = .86$ ).<sup>3</sup> To control for the effect of general (dis)satisfaction, we derived measures from Zeelenberg and Pieters (2004). Using a nine-point scale (1 = *not at all*, 9 = *very much*), after each investment period, participants indicated how *bad* and *dissatisfied* they felt; as positive opposites of these items, participants also indicated how *good* and *satisfied* they felt. The averaged answers to these four items formed an index of (dis)satisfaction, for which larger numbers indicated more dissatisfaction ( $\alpha = .91$ ).<sup>2</sup>

We used a single-item measure for anticipated regret, as well as for anticipated pride. For the former, participants were asked to imagine if they were to sell the investment now, how much regret they would anticipate to feel. Expectations are important here because if participants in the loss domain expect the price would bounce back in the next time period, selling the stock now would turn out to be a bad decision and they would anticipate regret. However, if participants expect the price to drop further, then selling the stock now would turn out to be a good move, pride could be anticipated. And for the gain domain, a selling decision before a price drop may link to anticipated pride and selling before stock price increases further may lead to anticipated regret. Therefore, in order to control for the effect of expectations, we explicitly asked participants to consider both scenarios where stock price may increase and decrease, and indicate how much regret and pride they anticipate to feel on a nine-point scale (1 = *not at all*, 9 = *very much*).

We also included several control variables. Previous literature has identified that the major difference between regret and disappointment is that disappointment does not entail a



sense of responsibility. Therefore, we include disappointment as a control variable. With this control measure, we can test our assumption that only specific emotions that are linked to responsibility are relevant in a dynamic investment decision setting. We adopted the two-item measures of disappointment from Zeelenberg and Pieters (2004): (1) “How much disappointment did you feel about the performance of stock X?” (1 = *none*, 9 = *very much*) and (2) “To what extent was the performance of stock X better or worse than you expected beforehand?” (1 = *much better*, 9 = *much worse*) ( $\alpha = .74$ ). We employed a single-item measure of expectations of future price changes, based on Ayton and Fischer (2004): “How do you think the price of stock X will change in the next period?” (1 = *surely decrease*, 9 = *surely increase*). To control for individual differences, we included age, sex, risk aversion, motivation to perform well in this study, and investment experience in general and in the stock market. We adopted the measure of risk aversion from Holt and Laury (2002), who propose a 10-pair lottery choice decision task. By observing when a respondent switches between paired options, Holt and Laury (2002) suggest they can determine how risk averse the person is. Motivation to perform well was measured by 2 items: (1) “How important is it for you to perform well in the following investment study?” (1 = *not at all*, 9 = *very much*) and (2) “How good would you feel if you perform well in this study?” (1 = *not at all*, 9 = *very much*). Control measures regarding individual differences (age, sex, investment experience, risk aversion, motivation to perform well) were administered before the investment task started. Controls concerning expectations, (dis)satisfaction and disappointment were asked in every investment period.

During each period of the investment task, price of the stock is first revealed, then participants answered questions about their experienced emotions, expectations for future prices,

and anticipated emotions, finally they decide if they want to hold or sell. This order is used in all studies.

### **Overview of Analyses**

There are four experiments reported in this paper, we first present the results of our proposed model based on data collected in each of the individual experiments, then we compare the results obtained in the loss and gain domain, finally we perform a test of interconnectedness between anticipated and experienced emotions. We aim to test all hypotheses simultaneously, in order to control for correlations among the variables. Structural equation modeling seems to be useful for this purpose; however, this type of covariance-based technique is not applicable for dichotomous dependent variables. Therefore, we used partial least squares (PLS) regression analysis, which allows the use of our dichotomous dependent variable (hold vs. sell).<sup>4</sup> We tested our model with SmartPLS 2.0 (Ringer, Wende, & Will, 2005).

The relations estimated in our proposed model are illustrated in Figure 1. Time, total price change, recent price change were regressed on experienced regret, experienced pride, dis/satisfaction, and hold/sell decisions. Experienced regret, experienced pride, dis/satisfaction, anticipated regret and anticipated pride were regressed on hold/sell decisions. Specifically, we regressed anticipated regret and experienced regret on the hold/sell decisions to test  $H_{1a}$  and  $H_{2a}$ , and the same for anticipated pride and experienced pride to test  $H_{1b}$  and  $H_{2b}$ . We also include disappointment, (dis)satisfaction, and expectations of future performance in the analysis to control for their possible influences. To control for individual differences, age, gender, investment experience, motivation, and risk aversion were also regressed on hold/sell decisions.

Since we have different patterns of losses over time, we also control for the interaction effect between time and size of the total loss, by regressing the interaction term on experienced

regret, pride, disappointment, dissatisfaction and the hold/sell decisions. These interaction terms are not shown in the figures to increase readability. Here we have clarified the relations that have been controlled for in our statistical analyses, in our results sections we will mainly focus on discussing the four hypothesized relations and the more important controls (e.g. expectation and (dis)satisfaction).

INSERT FIGURE 1 HERE

### Results

We collected 351 decisions (frequency of hold = 308, frequency of sell = 43), in which 65% of the participants sold the losing investment (43 of 66). The parameter estimates are shown in Figure 2. Our results indicate that although experienced regret seems to relate to a larger probability to sell ( $\beta = 0.166$ ,  $t = 1.870$ ,  $p = .062$ ), this relation is marginally not significant. Moreover, dissatisfaction links to a tendency to hold ( $\beta = 0.278$ ,  $t = 2.358$ ,  $p = .019$ ) (low ratings in the Dis/satisfaction variable indicate feeling more dissatisfied, as for Hold/sell, 0=hold, 1=sell). Consistent with economic theory, more negative expectations for future prices lead to a larger tendency to sell ( $\beta = -0.295$ ,  $t = 4.757$ ,  $p < .001$ ). Beside, higher anticipated pride ( $\beta = 0.113$ ,  $t = 2.295$ ,  $p = .022$ ) and lower anticipated regret ( $\beta = -0.149$ ,  $t = 2.255$ ,  $p = .025$ ) are linked to a larger selling probability. Disappointment did not significantly affect the hold/sell decision ( $\beta = 0.074$ ,  $t = 0.693$ ,  $p = .489$ ). The insignificant role of disappointment on probability to sell confirms our expectation that only specific emotions that are associated with a sense of responsibility seem to be relevant for dynamic investment decisions. Age, gender, investment experience, motivation, and risk aversion were controlled for. Higher motivation to perform well links to a larger probability to sell ( $\beta = 0.140$ ,  $t = 2.282$ ,  $p = .023$ ).

INSERT FIGURE 2 HERE

## **Discussion**

As expected, we find opposite directions of effects of anticipated and experienced regret on probability to sell losing investment: higher anticipated regret prevents participants to sell losing investments, while higher experienced regret seems to relate to a greater selling tendency, although this effect did not reach significance. These findings provide support for  $H_{1a}$  but less so for  $H_{2a}$ . In addition, more dissatisfaction is linked to a smaller selling probability. This finding is intriguing because higher experienced regret should attribute to more dissatisfaction, but the former seems to relate to a larger probability to sell losers, while the latter relates to a smaller probability to sell. These findings suggest that that if we look beyond general (dis)satisfaction, the specific emotions approach may provide us with more insights in making predictions of financial decision. Surprisingly, we found that higher anticipated pride predicts a larger probability to sell, suggesting pride is not only relevant for the gain domain. We will further explore this issue by examining the pooled data collected in both loss and gain domains in a later section.

### **Experiment 2: Anticipated and Experienced Emotions in the Gain Domain**

#### **Participants and Procedure**

The procedure for Experiment 2 was the same as in Experiment 1, except that we tested the hypotheses relevant to the gain instead of the loss domain. A total of 64 undergraduate students (40 men, 24 women) from a university in The Netherlands, with an average age of 23.16 years, participated. Participants were informed that their rewards again depended on the final value of their investment (higher increase in value of the stock, large final reward); on average, they received about EUR 6.

The price patterns for Experiment 2 were generated with the same random method as in Experiment 1 but represented mirror patterns (i.e., gains instead of losses). On average, participants held the winning stock for 3.34 periods ( $SD = 2.18$ ). When participants sold the winner, they had incurred an average gain of 19.03% ( $SD = 14.90$ ). The large standard deviation reflected the variety of price patterns. We administered the same emotions, expectation and control measures as in Experiment 1. The reliability of the emotion measures are consistent with Experiment 1 (regret:  $\alpha = .71$ ; dissatisfaction:  $\alpha = .88$ ; pride:  $\alpha = .85$ ; disappointment:  $\alpha = .68$ ).

## Results

We collected 214 decisions in the gain domain (frequency of hold = 155, frequency of sell = 59), and 92% of participants eventually sold the winning investment (59 of 64). We ran a PLS regression analysis, with the same set up as in Experiment 1. Our results indicate that while more satisfaction seems to link to a larger probability to hold, this effect is not significant ( $\beta = -0.163, t = 1.415, p = .159$ ), but more experienced pride leads to a larger probability to sell ( $\beta = 0.269, t = 3.475, p < .001$ ). In addition, more anticipated pride also predicts a larger selling probability ( $\beta = 0.133, t = 1.945, p = .053$ ). Again, consistent with economic theory, more negative expectation for future prices lead to a larger tendency to sell ( $\beta = -0.301, t = 4.684, p < .001$ ). Disappointment did not significantly affect the hold/sell decision ( $\beta = -0.058, t = 0.573, p = .567$ ). Important to note is that the effect of anticipated regret is also influential on hold/sell decisions in the gain domain, as we find that a lower anticipated regret ( $\beta = -0.187, t = 2.612, p = .010$ ) is linked to a larger selling probability.

INSERT FIGURE 3 HERE

## Discussion

In analyses reported in Figure 3, more anticipated and experienced pride predicts a larger selling probability, these provide support for our hypothesis  $H_{1b}$  and  $H_{2b}$  respectively.

Unexpectedly, we also find that a low level of anticipated regret predicts a larger selling probability in the gain domain, supporting  $H_{1a}$  outside the loss domain. Recall that in Experiment 1 we have found that higher anticipated pride predicts a larger probability to sell loser. These results together suggest that the effects of anticipated regret and pride may not be domain specific as proposed by Shefrin and Statman (1985). Thus, we will examine the role of domain by comparing and further testing the decisions obtained in Experiments 1 and 2.

### **Comparisons between Gain and Loss Domain**

First we start with some descriptive results. As expected, participants experienced more regret ( $M = 5.02$  ( $SD=1.73$ ) vs.  $M = 3.08$  ( $SD=1.54$ )) and also experienced more (dis)satisfaction ( $M = 6.06$  ( $SD=1.82$ ) vs.  $M = 3.69$  ( $SD=1.71$ )) in the loss domain than in gain domain.

Participants experienced more pride in the gain domain than in the loss domain ( $M = 5.07$  ( $SD=1.76$ ) vs.  $M = 3.77$  ( $SD=1.53$ )). For anticipated regret, it is higher in the loss than in the gain domain ( $M = 6.48$  ( $SD=1.70$ ) vs.  $M = 5.73$  ( $SD=2.09$ )). Whereas for anticipated pride, it is slightly higher in the gain domain ( $M = 5.50$  ( $SD=2.22$ ) vs.  $M = 5.15$  ( $SD=1.87$ )). These descriptive results seem to suggest that regret (pride) is more salient in the loss (gain) domain, consistent with Shefrin and Statman's (1985) propositions. Also, the selling probabilities were consistent with the disposition effect. In Experiment 2, 92% of the participants eventually sold the winning investment, and in Experiment 1, 65% of the participants sold the losing investment.

We ran an analysis to test whether the domain (gain vs. loss) affect the effects of anticipated/ experienced emotions on selling probability. We pooled data from Experiments 1 and 2 together, and included a dichotomous variable to represent domain (gain or loss).

Moderators based on and this domain variable, together with all emotion-related variables (e.g., anticipated regret\*domain, experienced pride\*domain, etc), were included in this analysis. Our results indicate that none of the effects of anticipated or experienced emotions is significantly moderated by the domain. As these moderators appear to be not influential, we dropped them and run an extra analysis of our proposed model with the pooled data of Experiments 1 and 2. The results are shown in Figure 4.

INSERT FIGURE 4 HERE

Among the key variables, the higher experienced pride ( $\beta = 0.141, t = 2.413, p = .016$ ), more negative expectation ( $\beta = -0.311, t = 7.083, p < .001$ ), lower anticipated regret ( $\beta = -0.195, t = 4.561, p < .001$ ), and higher anticipated pride ( $\beta = 0.136, t = 3.600, p < .001$ ) are linked to a larger selling probability. These results suggest that the effects of anticipated regret ( $H_{1a}$ ), anticipated pride ( $H_{1b}$ ), and experienced pride ( $H_{2b}$ ) are not domain specific.

### **Test for Interconnectedness of Anticipated and Experienced Emotions**

We ran an analysis to examine the interconnectedness between anticipated and experienced emotions. The difference between this analysis and our main model is that we also estimate the effect of previously anticipated emotion<sub>(t-1)</sub> on subsequently experienced emotion<sub>(t)</sub>, and the effect of currently experienced emotion<sub>(t)</sub> on anticipated emotions<sub>(t+1)</sub> (anticipated at time t, to be experienced at t+1). However, since we did not ask participants about their anticipated pride and regret prior to the investment procedure started, we do not have the measures for anticipated emotions<sub>(t-1)</sub> for the first investment period, hence we ran this analysis excluding the first set of decisions collect in time point 1. Due to this smaller number of decisions and the lack of moderating effect of domain, we used the pooled data of Experiments 1 and 2 for this analysis.

Our results show that previously anticipated regret<sub>(t-1)</sub> does not link to subsequently experienced regret<sub>(t)</sub> ( $\beta = 0.031, t = 0.941, p = .347$ ), but previously anticipated pride<sub>(t-1)</sub> significantly affects experienced pride<sub>(t)</sub> ( $\beta = 0.110, t = 3.131, p = .002$ ). At the same time, currently experienced pride<sub>(t)</sub> affects anticipated pride<sub>(t+1)</sub> ( $\beta = 0.208, t = 4.848, p < .001$ ), and currently experienced regret<sub>(t)</sub> predicts anticipated regret<sub>(t+1)</sub> ( $\beta = 0.101, t = 2.091, p = .037$ ). In all we have found some evidence of interconnectedness in this analysis, but the support is stronger for pride than for regret. Consistent with previous analyses, lower anticipated regret ( $\beta = -0.241, t = 6.058, p < .001$ ), higher anticipated pride ( $\beta = 0.156, t = 4.040, p < .001$ ) and higher experienced pride predict a larger selling probability ( $\beta = 0.143, t = 2.321, p = .021$ ).

INSERT FIGURE 5 HERE

### **Discussion of Overall Results of Experiments 1 and 2**

In the loss domain, as reported in Figure 2, we found an influence of anticipated regret on hold/sell decisions. This gives support to H<sub>1a</sub>. As for the gain domain, higher anticipated pride links to a large probability to sell a winning investment; which supports H<sub>1b</sub>. These results provide empirical support to Shefrin and Statman's (1985) propositions that anticipated pride motivates investors to sell winning investments and anticipated regret prevents investors to sell losing investments. On top of the effect of anticipated emotions, we find that higher experienced pride also motivates individuals to sell winners, which gives support to H<sub>2b</sub>. The support for H<sub>2a</sub> is not sufficiently strong, since the effect on experienced regret on selling decision is marginally insignificant. Nonetheless these findings suggest that experienced emotions are relevant for selling decisions.

We initially expected pride would be relevant for the gain domain and regret for the loss domain, but our results suggest that the effects for these emotions are not limited by their



relevant domain. Higher anticipated regret does not only make individuals less likely to sell losing investment, but also less likely to sell winners. Furthermore, anticipated pride does not only motivate sales in the gain domain, but also in the loss domain. These findings indicate that although regret (pride) seems primarily relevant for the loss (gain) domain, they can be applicable for both domains. A possible explanation is that the salience of each of the emotions could depend on what reference point is being used. For instance, in the gain domain, an individual could consider the scenario where he or she chooses to sell a winning investment now and the investment price increases further in the future; there will be a forgone gain. If this forgone gain is a salient reference point, it could induce a feeling of anticipated regret, although the individual is in the gain domain. Similarly, in the loss domain, an individual could consider selling his or her losing investment now, and if the price of the stock drops further afterwards, he or she would have dodged a larger loss. If this possible larger loss serves as a salient reference point, a feeling of anticipated pride would be expected, even in the loss domain.

We find interconnectedness consistently among the feelings of pride, and partly for regret. Our results show that anticipated pride reported in a previous time point is positively related to the experienced pride at the current time point, meaning that individuals can predict their emotions to a certain extent. At the same time, this currently experienced feeling of pride is also linked to the anticipated level of pride in the next time point in the future. Such that individuals' anticipation of their feelings in the future is affected by their current emotional state. Specifically, if one feels very proud about their decisions at this moment, they tend to anticipate a high level of pride in the future.

Overall, results of Experiments 1 and 2 have shown that specific emotions are relevant predictors of hold/ sell decisions. The effect of regret and pride are significant after controlling

that of dis/satisfaction. Since both pride and regret involve the feeling of responsibility towards an outcome, our results suggest that a sense of responsibility could play a significant role in financial decision making. In fact, we included disappointment as a control measure, because it is very similar to regret except that it does not involve a sense of responsibility. And we find no significant effect of disappointment in any of our analyses.

However, one limitation of Experiments 1 and 2 is that the participants did not have a chance to make the initial decision about which stock to invest in. This may reduce the sense of responsibility and their involvement towards the stock. A second issue is that the price patterns used in Experiments 1 and 2 are based on the same randomization process, but this also means that the price patterns presented in the gain and loss domain were not exact mirror images, which makes direct comparison more difficult.

Therefore, we conduct Experiments 3 and 4 to further explore the role of responsibility. In addition, in Experiment 3 and 4, we will only make use of a single price pattern for the loss domain, and the exact opposite price movements are shown in the gain domain. Due to this change of experimental setting, the results of Experiments 3 and 4 should be complementary, instead of directly comparable, to those of Experiments 1 and 2.

### **Experiment 3: Loss Domain**

#### **Participants and Procedure**

The procedures for Experiments 3 and 4 are very similar to Experiments 1 and 2, except that participants first make a choice of what to invest in. In the experimental scenario, we presented four stocks to the participants and asked them to make up their own portfolio by deciding how much to invest in each stock:

*You are already active in the stock market. You are considering investing in a new stock on the market. Four new stocks have been introduced: (1) A German stock; (2) A US stock; (3) An Australian stock and (4) A United Kingdom stock. Analysts have studied these stocks extensively and conclude that the four new stocks have a similar potential for growth and a similar risk for decreasing in value. So the most relevant difference between stocks concerns country of origin. Based on your own knowledge about the four countries you have to build a portfolio based on these four stocks.*

Participants then decide how to allocate their capital to invest in at least 1 and up to 4 stocks, the amounts invested in the four stocks have to add up to 100% of their portfolio. For example, one can invest in each of the four stocks equally (25% x 4), or invest in one stock only (100%) and none in the other three (0%). The exact composite of the portfolio is not of interest here, we just intent to have the participants actively engaged in the initial purchase and feel responsible for the decision. A total of 64 undergraduate students participated. Their rewards again depended on the final value of their investment; on average, they received about EUR 4.4. On average, participants held the losing stock for 3.8 periods ( $SD = 2.9$ ). A total of 244 decisions were collected in the loss domain. When participants sold the losing stock, they had incurred an average loss of 12%. We only made use of one price pattern in this experiment. This setting allows us to make direct comparison between results obtained in the loss (Experiment 3) and gain (Experiment 4) domains. This price pattern involves a smaller total loss, as compared to the 19% average loss in Experiment 1. We used the same measures of emotions, risk aversion and expectation as in Experiments 1 and 2.

## **Results**

Our results indicate that, in the loss domain, higher experienced regret ( $\beta = 0.185, t = 2.391, p = .018$ ) and lower anticipated regret ( $\beta = -0.214, t = 3.205, p = .002$ ) are linked to larger selling probabilities. Both  $H_{1a}$  and  $H_{2a}$  receive support. The feeling of dis/satisfaction is not relevant ( $\beta = 0.074, t = 0.527, p = .599$ ), and again, more negative expectations for future prices leads to a larger tendency to sell ( $\beta = -0.235, t = 3.885, p < .001$ ). Overall, our results suggest that regret is a relevant predictor of selling probabilities in the loss domain. Pride does not seem to be relevant in this experiment.

INSERT FIGURE 6 HERE

#### **Experiment 4: Gain Domain**

The procedure for Experiment 4 is very similar to Experiment 3, except that the price pattern for Experiment 4 is a mirror image of Experiment 3 (i.e., gains instead of losses). A total of 61 undergraduate students participated. Their rewards again depended on the final value of their investment; on average, they received about EUR 5.6 and held the winning stock for 3.3 periods ( $SD = 2.0$ ). When participants sold the winner, they had incurred an average gain of 11.4%. A total of 200 decisions were collected in gain domain.

#### **Results**

Our results indicate that, in the gain domain, higher anticipated pride is linked to a larger selling probability ( $\beta = 0.190, t = 2.712, p = .007$ ). However, the effect of experienced pride on selling probability is not significant ( $\beta = -0.069, t = 0.583, p = .561$ ). These results support  $H_{1b}$ , but not  $H_{2b}$ . The feeling of dissatisfaction does not affect selling tendency in this experiment ( $\beta = 0.150, t = 1.071, p = .286$ ). Surprisingly, this is the only analysis where we find no significant relation between a negative expectation for future price and a larger tendency to sell ( $\beta = -0.089, t = 1.190, p = .236$ ). Descriptive results of this experiment show that participants on average

have slightly positive expectations, regardless they decide to hold or to sell (hold:  $M=5.63$ , sell:  $M=5.33$ ). One possible explanation is that, perhaps the gently upwards price movement used in this particular experiment induces such a slightly positive trend of expectation.

INSERT FIGURE 7 HERE

While experienced pride does not affect selling probability of a winning investment, experienced regret seems to be linked to selling probability. In this experiment, participants are facing positive price movements, which are linked to a low level of experienced regret, and such a low level of regret is linked to a small selling probability ( $\beta = 0.385$ ,  $t = 3.293$ ,  $p = .001$ ). It appears that the selling decisions in this experiment were not driven by the feeling of pride, but by the lack of regret. Participants may have used the good performance of the stock to confirm that they did not make wrong judgments previously and feel no regrets, instead of to support that they have made good decisions that they should be proud of. These results indicate that although we assume that positive (negative) specific emotions should be more relevant for the gain (loss) domain, this does not always have to be the case, negative (positive) emotions can play a role in the gain (loss) domain as well.

### **Comparisons between Gain and Loss Domain**

We pooled data from Experiments 3 and 4, and added a dichotomous variable to represent the domain (gain or loss). Moderators based on the domain variable, together with all emotion-related variables, were included in this analysis. Again, our results indicate that none of the effects of anticipated or experienced emotions are moderated by the domain. We dropped them and run an extra analysis of our proposed model with the pooled data. Results are shown in Figure 8.

INSERT FIGURE 8 HERE

Among the key variables, the higher experienced regret ( $\beta = 0.232, t = 3.466, p < .001$ ), and more negative expectation ( $\beta = -0.170, t = 3.674, p < .001$ ) are linked to a larger selling probability. It also appears that higher anticipated pride ( $\beta = 0.089, t = 1.940, p = .053$ ) has a marginally significant effect on selling probabilities, while the effect of anticipated regret did not reach significance level with a small margin ( $\beta = -0.090, t = 1.854, p = .064$ ). These results suggest that the effects of experienced regret ( $H_{2a}$ ) and anticipated pride ( $H_{1b}$ ) are not domain specific.

### **Test for Interconnectedness of Anticipated and Experienced Emotions**

Again we ran an analysis to examine the interconnectedness between anticipated and experienced emotions. We used the pooled data of Experiments 3 and 4 for this analysis. Our results show that previously anticipated emotions<sub>(t-1)</sub> are linked to subsequently experienced emotions<sub>(t)</sub> (regret<sub>(t-1)</sub>:  $\beta = 0.112, t = 3.039, p = .003$ ; pride<sub>(t-1)</sub>:  $\beta = 0.102, t = 2.394, p = .017$ ). In addition, currently experienced emotions<sub>(t)</sub> significantly affect anticipated emotions<sub>(t+1)</sub> (regret<sub>(t)</sub>:  $\beta = 0.167, t = 3.351, p < .001$ ; pride<sub>(t)</sub>:  $\beta = 0.177, t = 3.187, p = .002$ ). In all we have found evidence of interconnectedness between anticipated and experienced emotions in this analysis. Consistent with Figure 8, the effects of experienced regret ( $H_{2a}$ ) and anticipated pride ( $H_{1b}$ ) on selling probabilities remain significant. In addition, the effect of anticipated regret reaches significance ( $\beta = -0.114, t = 2.221, p = .027$ ), therefore  $H_{1a}$  is also supported.

INSERT FIGURE 9 HERE

### **Discussion of Overall Results**

Experiments 3 and 4 differ from Experiments 1 and 2 in the sense that responsibility of the initial investment decisions is clearly higher in Experiments 3 and 4, because the participants chose it themselves. In the loss domain, individual analyses of Experiments 1 and 3 (Figures 2

and 6) suggest that anticipated regret is a predictor of selling probability, while the effect of experienced regret is partly supported. These give full support to H1<sub>a</sub> and partial support H2<sub>a</sub>. As for the gain domain, both anticipated and experienced pride are linked to a larger selling probability to sell winners in Experiment 2 (Figure 3), but only the effect of anticipated pride is also significant in Experiment 4 (Figure 7). Therefore, H1<sub>b</sub> has received consistent support in the gain domain, but H2<sub>b</sub> is only partially supported.

With a moderation analysis, we found that “domain” itself does not interact with anticipated or experienced emotions to affect selling probabilities. Our results show that pride is not only relevant for the gain domain, and regret is not solely relevant for the loss domain. In fact, in the gain domain, the results of Experiment 2 (Figure 3) have demonstrated that anticipated regret is relevant for the probability of selling a winner, while results of Experiment 4 (Figure 7) indicate that experienced regret can also be relevant for selling winners. This difference in the results could be due to the stronger sense of responsibility in Experiment 4, which was not manipulated in Experiment 2. Perhaps a stronger sense of responsibility in an experiment induces a more important role of experienced regret, even for the gain domain. Another possible reason to explain the discrepancy of the results between Experiments 2 and 4 is that the size of gain is smaller in Experiment 4, and the patterns of gain are different. It is a much more gradual gain in Experiment 4 than in Experiment 2. Perhaps the experience of small but gradual gains give more consistent confirmation to participants that they have not made any mistakes by investing in and to holding on the stock. And such a lack of regret motivates one to hold on to the winning investment.

Regarding interconnectedness, from data of Experiments 1 and 2 we find interconnectedness among anticipated pride<sub>(t-1)</sub>, experienced pride<sub>(t)</sub>, and subsequent anticipated

pride<sub>(t+1)</sub>. As for regret, we found interconnectedness between experienced regret<sub>(t)</sub> and subsequent anticipated regret<sub>(t+1)</sub>. In sum, we have found support for 3 out of 4 of the interconnected relations. In Experiments 3 and 4, we found support for all 4 interconnected relations. It seems that individuals can predict their emotions to a certain extent, and their currently experienced emotions can influence their anticipation of their emotions in the future. Comparing the results of our proposed model (with pooled data) and the model with interconnectedness (also with pooled data but exclude decisions collected in time point 1), the effects of our key variables on selling probabilities are largely consistent. However, these extra analyses give us additional insights into the process of how anticipated and experienced emotions influence each other and how they affect the hold/sell decisions. As to our knowledge, this is the first empirical evidence of interconnectedness among anticipated and experienced emotions based on a multiple time point setting. More research effort is needed to further investigate this issue.

## **Conclusion**

### **General Discussion**

Previous research considered the roles of anticipated and experienced emotions in decision models (see Anderson, 2003), however until now anticipated and experienced regret/pride were not measured and tested in the same study. This paper aims to answer two questions regarding the role of emotions in financial decisions making: (1) do anticipated regret and anticipated pride predict the selling tendency of losing and winning investments respectively? (2) do experienced regret and pride also have an impact on selling probability? We conducted four experiments to investigate the role of anticipated and experienced specific emotions (i.e., regret and pride) with regard to investors' hold/sell decisions.



With domain specific analyses, in Experiment 1, we found that lower anticipated regret leads to a greater probability of selling a losing investment; and higher experienced regret has a marginally insignificant effect on a greater probability to sell. In Experiment 2, our results indicated that higher anticipated pride and experienced pride predict a larger probability of selling a winning investment, in support of H<sub>1b</sub> and H<sub>2b</sub>. However, we found that domain does not moderate the effect of emotions on selling decisions, which suggests that regret (pride) is not only relevant for the loss (gain) domain.

We ran two extra experiments to test in the role of responsibility. Our results in Experiment 3 showed that higher experienced regret and lower anticipated regret are linked to larger probability to sell losers, in support of H<sub>1a</sub> and H<sub>2a</sub>. In Experiment 4, we find that only higher anticipated pride, but not experienced pride, predicts larger probability to sell winners. This gives support to H<sub>1b</sub>. These results are largely consistent with those in Experiments 1 and 2.

To link these findings to our first question, with regard to Shefrin and Statman's (1985) propositions that anticipated regret and pride explain the disposition effect, we found that indeed anticipated regret and pride are relevant for predicting sell probabilities. However, these effects do not need to be domain specific. We agree that regret (pride) is a salient emotion when individual are facing losses (gains), however these emotions could be experienced or anticipated in the opposite domain as well. Prospect theory (Kahneman & Tversky, 1979) can be used as a possible framework to explain these findings. Prospect theory suggests that the value of a gain or a loss depends on the difference between a neutral reference and a reference point. For example, an individual with a winning investment may consider the scenario where he or she chooses to sell the stock now and the stock price increases in the future. In this case, the forgone outcome (i.e. forgone gain) is more positive than the actual outcome (i.e. captured gain). If the forgone

gain is used as neutral reference, even the captured gain can be perceived as a loss. Thus in the gain domain, this discrepancy between actual gain and forgone gain may induce a feeling of anticipated regret. And in the loss domain, if an individual decide to sell a losing investment now, and the price of the stock drops further afterwards, he or she has made a good decision to avoid further losses. It is because compared to a larger loss; a smaller loss would produce a less negative value. This proof of good judgment may serve to elicit a feeling of anticipated pride. These are, of course, only two of many possible scenarios that individuals could consider. Nevertheless these examples have illustrated the importance of reference points – regret and pride arise not depending on the domain alone, but on which references are being used to create the values of alternative outcomes.

As for our second research question, we hypothesized that both anticipated and experienced emotions would affect selling probabilities because investing consists of a chain of decisions. And indeed we find that experienced emotions also have some predictive power over hold/sell decisions. However, the predictive powers of anticipated and experienced emotions vary across experiments. In Experiment 1 and 2, we found support for the effect of experienced pride, while in Experiments 3 and 4 we found that of experienced regret. Since we have different manipulations on (1) the price patterns used in the experiments and (2) the level of responsibility in Experiments 1 and 2, compared to Experiments 3 and 4; these two factors may play a role in determining what emotion would be salient. Future research is needed to investigate when and how an experienced emotion would be more influential on investment decisions.

We also tested whether there is any interconnectedness between anticipated and experienced emotions. Interconnectedness between anticipated and experienced emotions is an under-studied topic in the literature. The affective forecasting literature studies investigated how

accurately people can predict their feelings in the future, which can be seen as the relation between anticipated and experienced emotions. However, we made use of a dynamic setting that allows us not only to observe whether anticipated emotions match the subsequently experienced emotions, but also how experienced emotions affect the next anticipated emotion. Based on structural equation modeling, we have found evidence of interconnectedness of emotions. Individuals seem to be able to anticipate how they will feel in the future to an extent, and their currently experienced emotions have predictive power over their anticipated emotions for the future. This evidence may point to a new direction of emotions research. Further investigation is needed to understand the interconnectedness of anticipated and experienced emotion, for example, under what situations the interconnectedness would be stronger.

We hypothesized the same direction for the effect of anticipated and experienced pride in the gain domain, and the opposite direction for anticipated and experienced regret on selling probabilities in the loss domain. Since it is human nature to avoid pain and seek pleasure, the trade-off between anticipated regret and experienced regret in terms of avoiding pain is very important. It is because when experienced regret becomes sufficiently high, individuals no longer need to avoid pain by holding on to the loser because they are already experiencing a high level of regret. As such, both anticipated and experienced regret are influential on selling probabilities since they offer the values to make the trade-off. However, in the gain domain both anticipated and experienced pride are related to pleasure seeking. Since the effects of anticipated and experienced pride are not opposite to each other, there is no trade-off effect between anticipated and experienced pride. When facing constant positive outcomes, individuals prefer to obtain it soon than later due to time discounting. Thus, what can be experienced now is more important than what is anticipated at a later time point, which may motivate investors to sell winning

investments sooner than later. Nonetheless, pride is an understudied topic, let alone the anticipation of pride. More research is needed to investigate the relation between anticipated and experienced pride, and how they affect individuals' risky decisions.

The reported results also have several theoretical implications. First, we have provided first empirical support for the well-known but untested propositions offered by Shefrin and Statman (1985): Anticipated regret causes people to hold on to losers, and anticipated pride causes them to sell winners. However, contradict with these propositions, we find that regret (pride) is not only relevant for the loss (gain) domain. In addition, we contribute to the literature by initially testing how anticipated and experienced emotions affect consumers' decision simultaneously. We acknowledge that investing requires a chain of decisions, so the emotions experienced as a result of prior outcomes should affect investors' decisions. We demonstrate that experienced emotions can partially explain the disposition effect, together with anticipated emotions. Zeelenberg et al. (2002) point out that whereas previous studies have established a relation between specific emotions and corresponding thoughts, action tendencies, and goals (Frijda et al., 1989), it remains unclear how experienced regret may cause behaviors. Studies that attempt to establish this link are rare (c.f., Tsiros & Mittal, 2000; Zeelenberg & Pieters, 2004). Our findings show that even before an account is closed at a loss, investors already experience regret, which leads to a larger selling probability. Our empirical evidence has revealed that when experienced regret is high, investors become more likely to change their investment decision from hold to sell, in support of the theoretical regret-matching procedure (Hart & Mas-Colell, 2000). Finally, we show that emotions play an important role in investment decision making. According to Mellers and McGraw (2001), anticipated emotions improve the predictability of choices, over and beyond that of subjective expected utility theory. We suggest that the

predictive power of a financial decision-making model can be improved by the addition of both anticipated and experienced emotions. Further research should investigate how the implications derived from emotions research can be incorporated into economic theories and models to provide better predictions of investors' financial decisions.

### **Limitations and Further Research**

We note several limitations. First, we conducted our experiments within a short time frame, but in reality, investors often have more time between their receipts of information about changes in the stock's value. Further research should try to replicate our findings in a (more) natural setting. Second, the generalizability of our study can be questioned, because the participants in our experiments were students who may not represent the general population of investors in terms of their trading experience, income, wealth, risk aversion, and so on. Additional research would benefit from using a larger and more representative sample.

We researched two specific emotions, regret and pride. Other specific emotions could be considered in the selling of winning or losing investments too; for example, shame and guilt may affect such decisions. Shame and regret are both negative emotions. However, whereas regret relates to counterfactual thoughts about previous decisions/behaviors, shame arises when the social self is threatened, in the form of social esteem, status, or acceptance (Dickerson, Gruenewald, & Kemeny, 2004). The participants in our experiments knew that their (individual) results would be kept confidential, so the level of social self-threat was relatively low. In practice though, investment performance may be more transparent. For example, investors may discuss their performance with others and feel reluctant to realize a loss because they would experience shame. They also could experience guilt if their investment decision led to negative outcomes for others (e.g., loss of children's college fund in the stock market). To gain insight into the roles of

specific emotions in investment decision making, a broader set of emotions should be investigated in the future.

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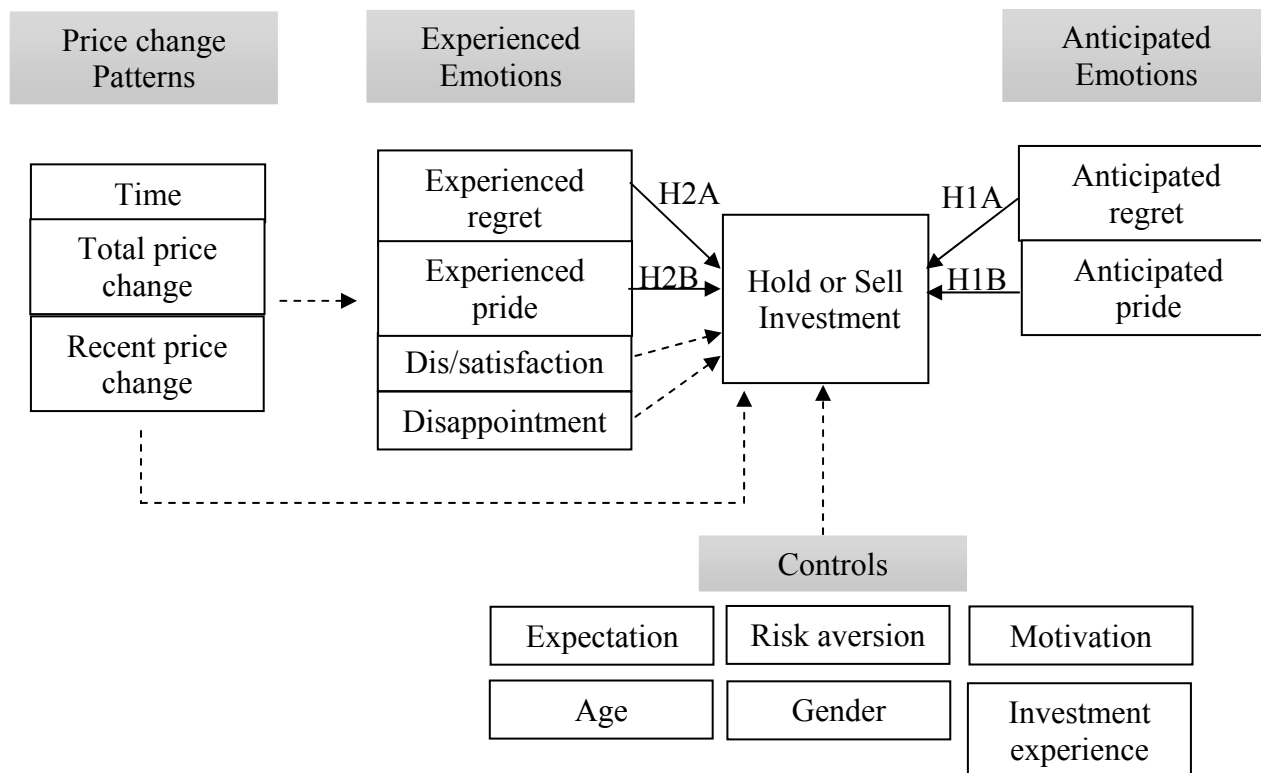
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## Footnotes

1. This interpretation of action and inaction is novel in financial decision making literature. Weber and Camerer (1998) reverse the “selling equals action, holding equals inaction” associations by using an “automatic selling” procedure in their experiment: After each investment period, the stock would be sold automatically. With this procedure, the regret associated with action (sell) declines; participants in their study faced a different set of options: to repurchase or not to repurchase the investment. In this case, repurchase (hold) is the “action” option, and not to repurchase (sell) is the “inaction” option. Their reversal also may have diminished the anticipated regret associated with selling a losing investment, hence their finding that the disposition effect was greatly reduced.
2. The measures of (dis)satisfaction, regret, and disappoint are adapted from Zeelenberg and Pieters (2004), who obtained Cronbach’s alphas of these measures of .908, .937, and .882, respectively, consistent with the alphas of these scales in our data.
3. The Cronbach’s alpha of the measure of experienced pride, from Williams and DeSteno (2008), was .81. Of the four items in their measure, we did not adopt *satisfied*, because it overlaps with the (dis)satisfaction measure.
4. Some researchers have suggested that one should be cautious when using PLS to model with dichotomous dependent variable, because it is problematic for approximations in the PLS-SEM algorithm as path coefficients are estimated by OLS regressions (Hair, Sarstedt, Ringle & Mena, 2012). Nevertheless, other studies suggest that the correlations in SEM are underestimated, and standard errors and chi-square values are overestimated (Schumacker & Beyerlein, 2000), which means SEM provided relatively conservative results (Iacobucci, 2010).



*Figure 1.* Hypothesized relations and other estimated relations. The four solid lines (H1A,1B,2A,2B) represent the four hypotheses tested in this paper. The dash lines represent the relations that are estimated in our analyses to control for the potential effects of controls and price changes on hold/ sell decisions. We also control for the effects of time, total price change and recent price change on the four experienced emotions (regret, pride, disappointment and dis/satisfaction). The effects of specific experienced emotions (experienced regret, pride and disappoint) were regressed on general emotion (dis/satisfaction). Interaction terms are included in analyses but are not shown here. Control variables (except for expectation) and variables relating to price change patterns were included in all analyses, but they will be omitted in Figures 2a to 5b to increase readability.

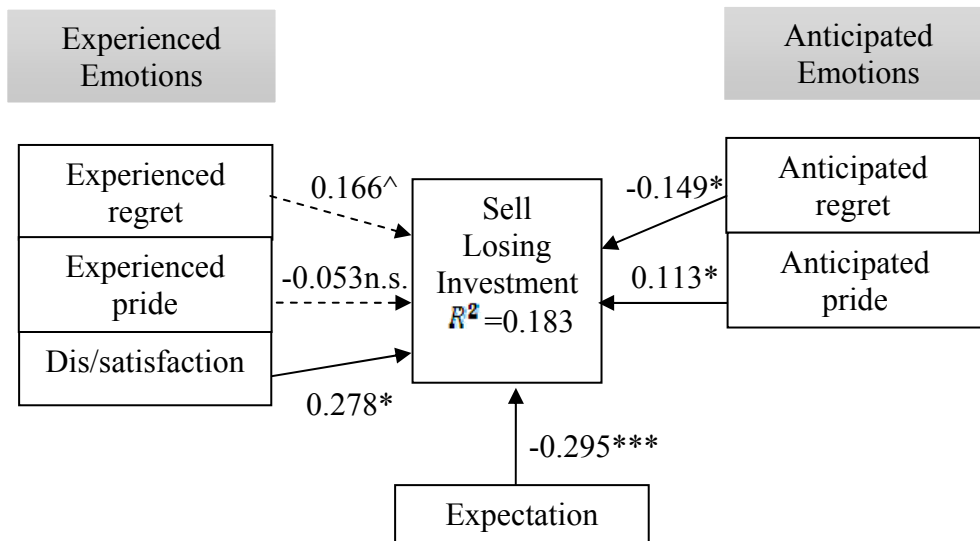


Figure 2. Results of Experiment 1 (loss domain)

\*  $p < .05$ .

\*\*  $p < .01$ .

\*\*\*  $p < .001$ .

<sup>^</sup>  $p = .06$ .

n.s. = not significant

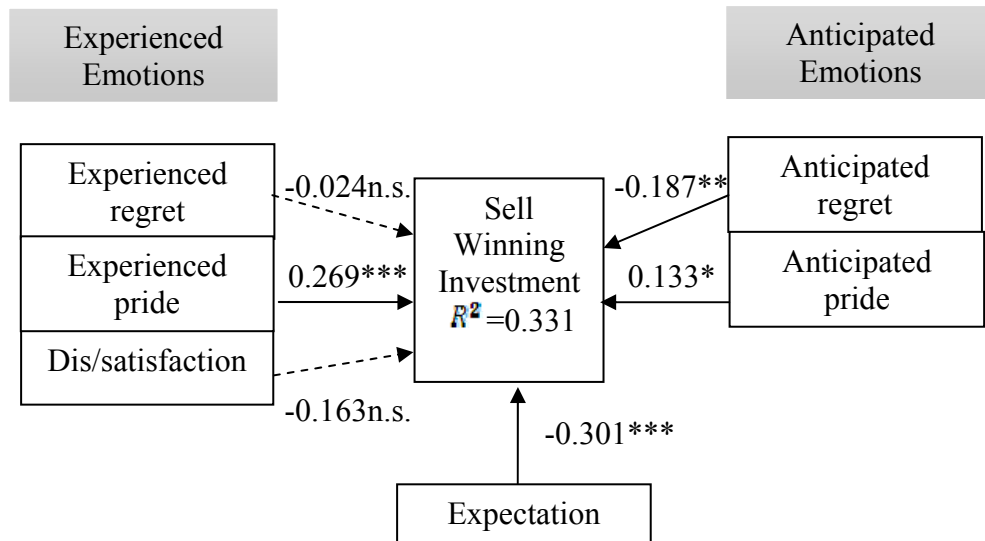


Figure 3. Results of Experiment 2 (gain domain)

\*  $p < .05$ .

\*\*  $p < .01$ .

\*\*\*  $p < .001$ .

n.s. = not significant



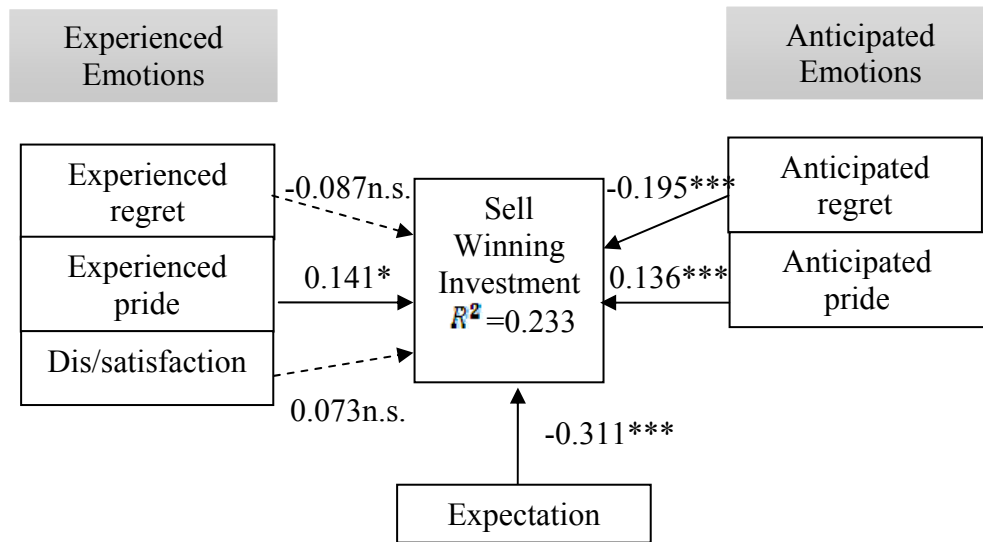


Figure 4. Results of Experiment 1 and 2 (pooled data from both gain and loss domains)

\*  $p < .05$ .

\*\*  $p < .01$ .

\*\*\*  $p < .001$ .

n.s. = not significant

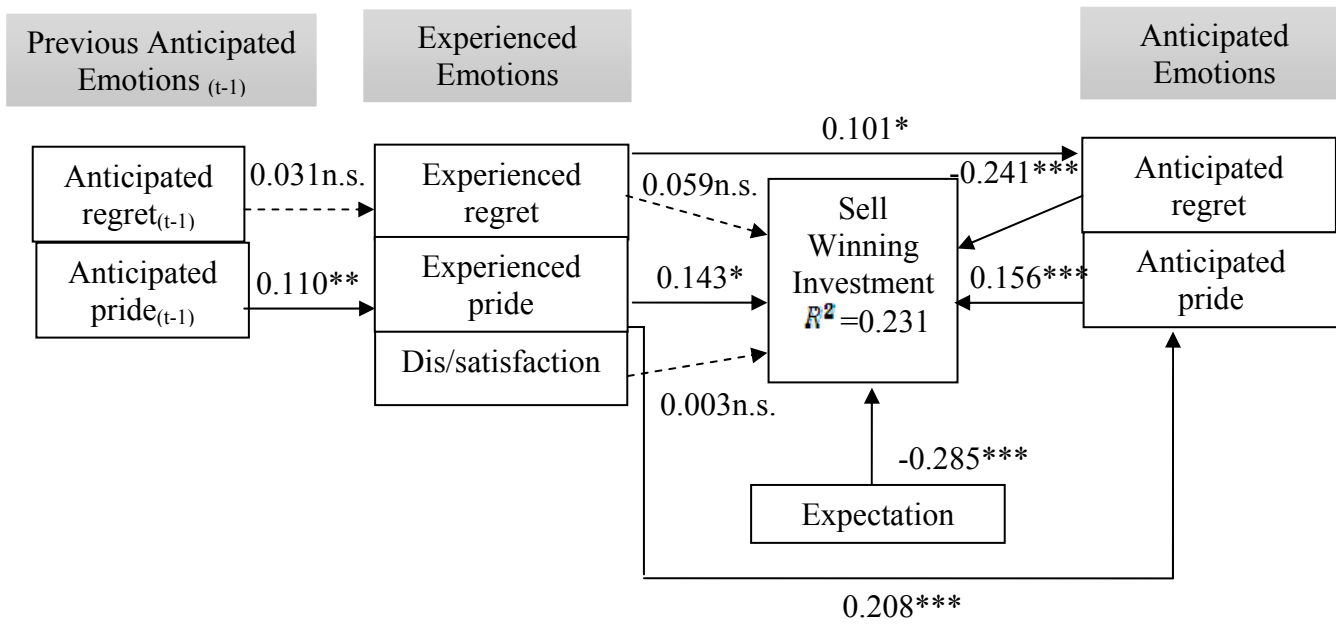


Figure 5. Results of interconnectedness among emotions using pooled data (Experiment 1 and 2)

\*  $p < .05$ .

\*\*  $p < .01$ .

\*\*\*  $p < .001$ .

n.s. = not significant

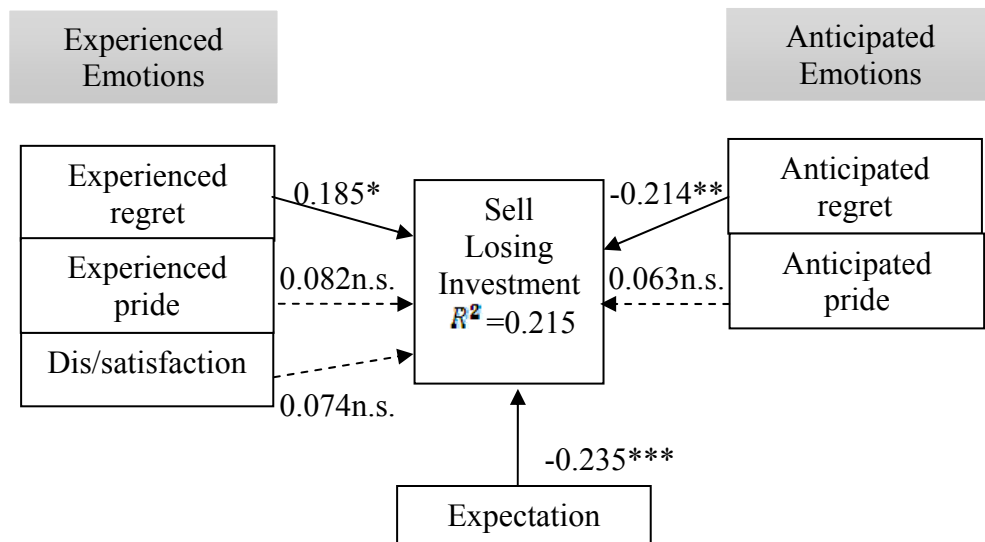


Figure 6. Results of Experiment 3 (loss domain)

\*  $p < .05$ .

\*\*  $p < .01$ .

\*\*\*  $p < .001$ .

n.s. = not significant

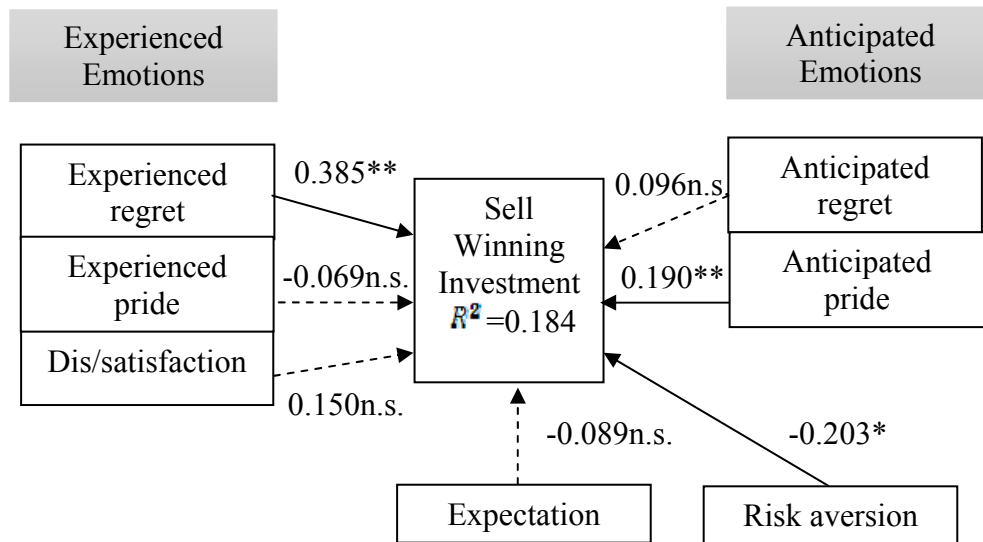


Figure 7. Results of Experiment 4 (gain domain)

\*  $p < .05$ .

\*\*  $p < .01$ .

\*\*\*  $p < .001$ .

n.s. = not significant

*Note.* In this analysis, the interaction effect between time and size of the total loss was regressed on hold/sell decisions, but not on experienced regret, pride, disappointment, and dissatisfaction. It is because the statistical program protests with such a complex model with insufficient number of observations.

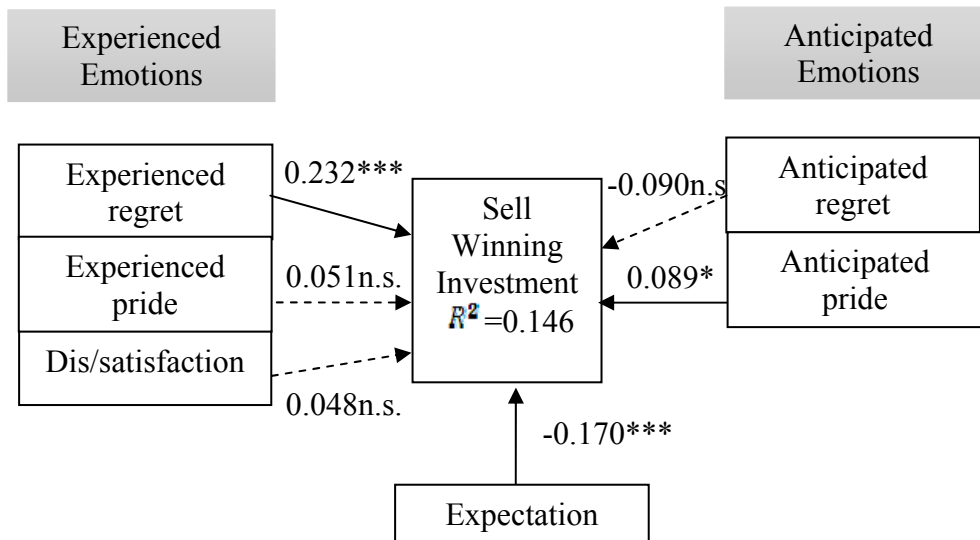


Figure 8. Results of Experiment 3 and 4(pooled data from both gain and loss domains)

\*  $p < .05$ .

\*\*  $p < .01$ .

\*\*\*  $p < .001$ .

n.s. = not significant

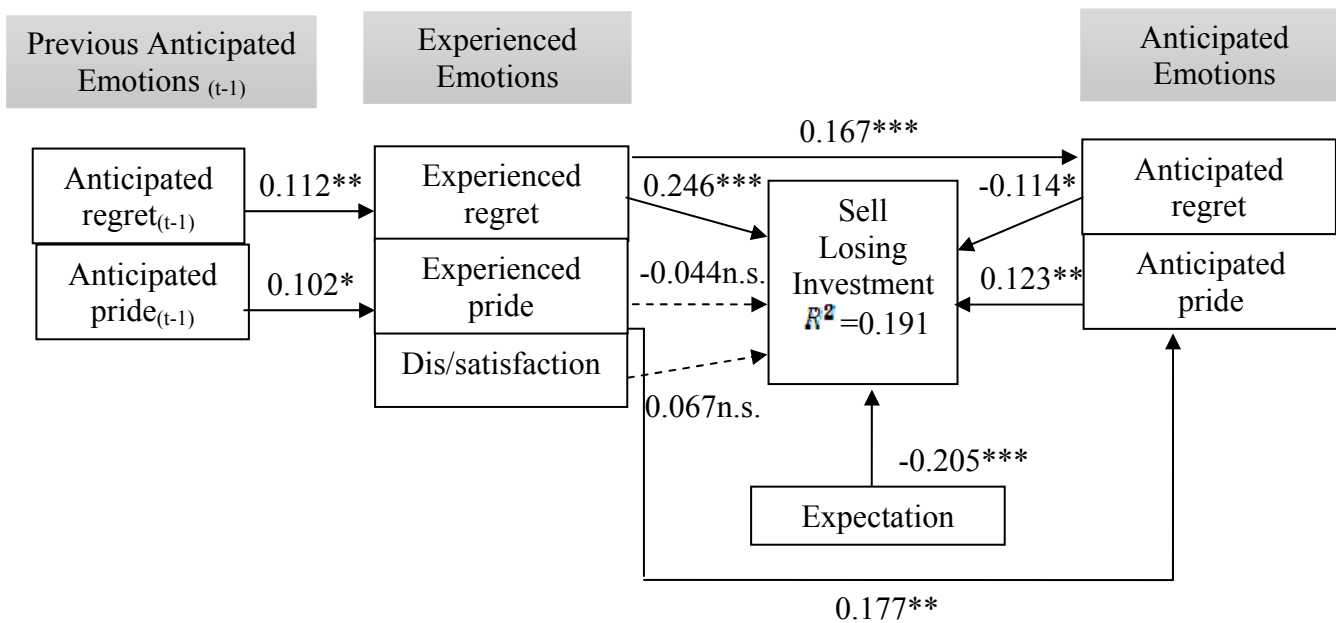


Figure 9. Results of interconnectedness among emotions using pooled data (Experiment 1 and 2)

\*  $p < .05$ .

\*\*  $p < .01$ .

\*\*\*  $p < .001$ .

n.s. = not significant

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