CHAN JEAN LEE and EDUARDO B. ANDRADE*

The number of individual investors who trade stocks online has significantly increased in recent years. Surprisingly, consumer researchers have paid little attention to how emotions influence individual investors' stock-trading decisions. In a series of three experiments, the authors investigate the impact of incidental fear on the decision to sell in a stock market simulation. The results show that fearful (vs. control) participants sell their stock earlier (Experiments 1–3). This effect, however, is contingent on particular features of the market. Fear leads to early sell-off when participant believe the value of the stock is peer generated but not when they believe the value of the stock is computer generated (Experiment 2). Early sell-off as a result of incidental fear also occurs when participants believe their risk attitude is common in the market but not when they believe their risk attitude is unique (Experiment 3). Social projection—that is, people's tendency to rely on their current state of mind to estimate other people's actions—explains the phenomenon.

Keywords: emotion, feeling, fear, social projection, decision making, behavioral finance

Fear, Social Projection, and Financial Decision Making

In recent years, an increased number of individual investors have begun trading stocks online (Barber and Odean 2001; Bogan 2009). What used to be the exclusive work of stock brokers is now the mundane task of millions of individual consumers around the globe. Even long-term investments, such as retirement plans and mutual funds, can be (re)invested with a few mouse clicks. Surprisingly, consumer researchers have paid little attention to how people make financial decisions (Raghubir and Das 2009).

Given that individual investors often form market expectations to make financial decisions with limited information and that emotions influence judgment and decision making in general (see Cohen, Pham, and Andrade 2008), it is plausible that feeling states at the time of the deci-

sion will influence investors' preferences. Indeed, the media frequently cites investors' sentiments as a major force in the stock market (e.g., Richards 2010). Moreover, recent research indicates that emotions and financial decision are often correlated. At the individual level, Lo and Repin (2002) and Lo, Repin, and Steenbarger (2005) demonstrate that emotional reactivity varies significantly as a result of specific market events, such as price volatility or intraday breaks. Furthermore, emotionality tends to be negatively correlated with a trader's performance: Those who displayed stronger emotional reactions to gains and losses displayed worse performances. In naturalistic settings, researchers have relied on affect-laden events to test the impact of incidental emotions on financial decision making. Hirshleifer and Shumway (2003) show that sunshine was correlated with stock returns. Kamstra, Kramer, and Levi (2001) demonstrate that stock returns were lower during the fall and winter, when daylight decreased. Finally, Edmans, Garcia, and Norli (2007) report that the market declined after the target country lost important international sports matches (e.g., Soccer World Cup).

Although the contribution of these studies to the literature is undeniable (see also Tetlock, Saar-Tsechansky, and Macskassy 2008), they present a few limitations. First, the correlational properties of the data limit inferences about causality. Second, the absence of direct measures of emotions in the studies that rely on aggregate data makes it

difficult to assess with confidence whether emotions per se played a role in the process and, if so, which emotional state represented the main causal link. Third, most of the previous studies do not systematically investigate potential underlying processes through which a given emotional experience might be influencing a particular decision.

In this article, therefore, we conducted three laboratory experiments in an attempt to better understand the role of emotions on financial decision making. Following the traditional paradigm adopted in the emotion literature, we first induced participants' emotion orthogonally in an ostensibly unrelated task and then observed their financial behavior in a subsequent stock market simulation. Because specific emotions trigger specific action tendencies (Frijda 1987), we focus on one particular emotional experience—namely, fear—and one single type of financial decision—that is, when to sell a liquid asset in a stock market simulation. Note that actual online stock trading often involves inexperienced investors making decisions in front of a computer. Therefore, simulated online trading with naive participants in a behavioral lab does not represent a completely unrealistic setting.

FEAR AND THE DECISION TO SELL

Anecdotal and theoretical reasons led us to focus the research question on the impact of fear on the decision to sell. A Google search for "fear" plus "stock market" highlights a strong association between these two constructs. In June 2011, this search generated more than 33 million results, at least twice as many as other specific emotions, such as sadness, happiness, guilt, or anger. Moreover, fear is often associated with "bearish" behavior (e.g., Shell 2010). Beyond anecdotal speculations, however, there are also theoretical arguments to justify why and how fear may influence selling decisions in the stock market.

Negative emotions in general and fear in particular are known to influence risk perception. In their seminal work, Johnson and Tversky (1983) find that after participants read a newspaper article on human-related traumatic events (e.g., leukemia, fire, homicide), they gave higher likelihood estimates to various negative events, regardless of the similarity between the topic of the article and the estimated risk. The authors claim that the negative emotional reaction to the newspaper influenced people's general risk estimates. Under the appraisal tendency framework, subsequent research has argued that people experience fear when they face uncertain and/or uncontrollable threat (Lazarus and Folkman 1984; Lerner and Keltner 2000, 2001; Smith and Ellsworth 1985). As a result, fearful people take cognitive and behavioral actions to minimize uncertainty and the aversive fearful state. Indeed, attempts to reduce the uncertainty under incidental fear and/or anxiety have been observed, for example, in people's reported willingness to choose a safer bet (Raghunathan and Pham 1999) and to take more precautionary action in the midst of terrorism threats (Lerner et al. 2003). Likewise, fearful people process information more carefully to reduce uncertainty (Tiedens and Lipton 2001).

From an individual investor's point of view, financial markets represent scenarios of high uncertainty and low controllability. Moreover, investors are continuously presented with the choice between a sure gain/loss and an uncertain outcome. Consider, for example, the stock market. At any point in time, an investor faces the dilemma of deciding between a certain outcome (i.e., to sell the stock at the present value) and an uncertain one (i.e., not to sell and wait for a potential change in stock value in the next period). Because fear leads people to approach certain environments and avoid uncertain environments, incidentally scared investors would then, at any given period, be more likely to choose the certain option (i.e., to sell the stock). Therefore, in a stock market scenario, in which the investor decides at multiple points in time on whether to sell or keep the stock, fear should accelerate selling behavior.

H$_1$: In a stock market simulation, in which the sole decision is whether to keep (i.e., uncertain outcome) or sell (i.e., certain outcome) a stock, fearful investors will sell their stock earlier than nonfearful investors.

THE ROLE OF SOCIAL PROJECTION

In many financial markets, the value of one's asset is contingent on other investors' decisions. Such contingency spontaneously leads investors to try to predict what others will do, before making their own decision. This type of scenario is prone to social projection biases—that is, people's tendency to believe that others are likely to feel, think, and behave like them (Robbins and Krueger 2005; Ross, Greene, and House 1977). Social projection has proved to be a strong, difficult-to-eradicate, egocentric bias (Krueger and Clement 1994). Thus, it is likely to be prevalent in the financial market as well.

Furthermore, a person's feeling states may play an important role in predicting others' feelings and preferences. For example, Van Boven and Loewenstein (2003) show that participants' current level of thirst was positively correlated with their prediction of others' level of thirst. In a similar vein, Van Boven, Loewenstein, and Dunning (2005) show that participants' feelings of embarrassment (or lack thereof) affected their prediction of other participants' propensity to put themselves in an embarrassing situation. In short, mounting evidence demonstrates that people rely on their current state of mind to predict their own future preferences as well as others' thoughts, feelings, and actions (Loewenstein, O'Donoghue, and Rabin 2003; Van Boven and Loewenstein 2003). In a stock market context, this means that investors may rely on their current emotions when predicting what other investors will do, which in turn will affect their own decision. Specifically, fearful investors are more likely to believe that their action tendencies (i.e., inclination to sell the stock) are shared by the other investors, which will lead them to accelerate selling behavior in anticipation of a drop in the value of the stock.

If social projection represents an important mechanism through which emotion influences financial decision making, it implies that the characteristics of the target object or person—the market—represent a critical component of the process. As a result, contrary to the notion that affect produces a *general* impact on risk perception independent of the aspects associated with the target event (Johnson and Tversky 1983), we propose that the effects of fear on risk taking should be contingent on whether and, if so, how social projection operates. Specifically, in a stock market environment, the perceived (dis)similarity between an individual and the other investors in the market will moderate

the impact of fear on risk taking. Some evidence suggests that properties of the evaluated object can moderate the impact of specific emotions on risk estimates. For example, DeSteno et al. (2000) find that sadness and anger led to different probability estimates of sad and angering events. In this case, however, they focused exclusively on the emotional fit between the individual and the event and relied on affect-as-information to explain the interaction.

Along the same lines, social projection implies that not only the level of uncertainty but also the features of the uncertainty (e.g., the features of the market) may moderate the role of fear on financial decision making. More precisely, features that make an investor less (vs. more) likely to project his or her fear-based action tendencies—holding constant the initial level of uncertainty—are less likely to influence his or her risk-taking decisions. Furthermore, features that are believed to move in an opposite manner relative to oneself may even produce contrasting effects on risk taking (i.e., make a scared investor more of a risk taker).

In Experiments 2 and 3, we manipulate the features of the market simulation across conditions to address these possibilities. In Experiment 2, we take the extreme case to mitigate social projection such that the value of the stock is either peer generated (everybody's decision in the room) or computer generated. Because people are unlikely to believe that a computer will share their emotions and action tendencies, we expect the computer condition to mitigate social projection and thus reduce the impact of incidental fear on the decision to sell. It is worth noting that this approach has been successfully used to confirm that an observed effect is not simply a risk-taking/averse reaction. For example, Kosfeld et al. (2005) show that oxytocin increased the amount of money sent to the trustee in the trust game, but only when the trustee was another person. The impact of oxytocin disappeared when the trustee was a computer. Following a similar approach and rationale, we hypothesize that fear will not lead to a general risk-averse decision.

> H_2: When participants are told that the other participants in the market determine the value of the stock, fearful (vs. control) participants will sell their stock earlier. When participants are told that a computer determines the value of the stock, the impact of incidental fear on selling behavior will not occur.

To assess the impact of social projection on judgment and decision making, researchers have traditionally manipulated participants' perceptions of trait (dis)similarity between themselves and others: "Typically, participants complete a psychometric task and then receive feedback regarding their group membership" (Robbins and Krueger 2005, p. 33). The benefit of this type of manipulation is that experimenters can vary a trait of interest (e.g., others' risk attitudes) while holding constant other traits and aspects of the target object. In Experiment 3, through an ostensible risk attitude survey, we lead participants to believe that their own risk attitude is *either* very common *or* very unique among the players in the room. Within this scenario, we hypothesize the following:

> H_3: When led to believe that their risk attitude is common in the market, fearful (vs. control) participants will sell their stock earlier. When participants are led to believe that their risk attitude is unique in the market, the impact

of incidental fear on early selling behavior will not occur or even reverse.

The reversal would be possible in case participants used the "unique risk attitude" information to infer that others would be inclined to do the exact opposite of what they wanted to do (e.g., "If I feel like selling, it means that others will probably not sell. So, I'll stay.").

Across all three experiments, we use video exposure to manipulate incidental fear. In the fear condition, the contents of horror videos vary across the experiments to ensure that a particular content of one particular fear-inducing video is not responsible for the effects. In the control condition, the videos across the experiments vary not only by content but also by intensity (i.e., arousal). Both video conditions were run in every experimental session. As part of a "movie preference" cover story, participants were explicitly told that they would be randomly assigned to different movie genres, and two genres (i.e., horror and control) were actually played across participants within a session.

EXPERIMENT 1

The goal of this experiment is to test the intuition that fear leads to selling in the stock market context (H_1). After the emotion manipulation, participants played a stock market simulation. Of their $15 participation fee, $10 was converted into a stock. Participants' main task was to decide on when to sell the stock.

Method

Sample and design. Eighty students participated in the experiment in exchange for an expected $15 participation fee. The experiment employed a two-level (emotion: fear vs. neutral) single-factor between-subjects design. Three experimental sessions were conducted with 26, 27, and 27 participants, respectively.

Procedure. Participants came to the lab and were assigned to one of the cubicles equipped with a laptop computer and a headset. They were then introduced to ostensibly two independent studies: "Study 1: Video Evaluation Task" and "Study 2: Financial Decision-Making Task." They were told that given the short length of time for each study, both would be conducted in the same session (a common practice in this lab). The entire session lasted approximately 40 minutes.

Emotion manipulation. Video exposure is a widely used and relatively effective incidental emotion manipulation (Rottenberg, Ray, and Gross 2007; Westermann et al. 1996). Therefore, in Study 1, participants were informed that the purpose of the study was to investigate people's preferences for different movie genres. Precisely, they were provided with the following information: "You will be presented with a sequence of two video clips from the same genre. There can be dramas, comedies, sitcoms, actions, documentaries, horror movies, etc. A few general questions will be asked after the videos." This instruction conveyed the information that different videos could be presented to different participants. Indeed, both genres were run in every experiment session. In the control condition, scenes from two documentaries were presented (*Benjamin Franklin* and *Vincent Van Gogh*), and in the fear condition, participants were exposed to scenes from two horror

movies (*The Sixth Sense* and *The Ring*). Within each condition, participants were exposed to approximately 13 minutes of video clips. Participants then answered a series of questions about the video clips. Embedded among those questions, two emotion-related items captured participants' current level of fear and anxiety, respectively (1 = "not at all," and 9 = "very much"). These items were collapsed and served as a manipulation check.

Financial decision task. In a purportedly unrelated Study 2, participants were presented with a financial decision-making task, labeled "Cash-out game." The task consisted of 25 rounds. Each participant began the task with $10 of his or her own participation fee (i.e., the stock). The value of the stock varied from round to round. After the dollar amount was displayed in a given round, the participants needed to decide whether they wanted to "stay" (i.e., play the next round) or "cash out" (i.e., sell the stock). Participants could sell the stock at any time from round 0 to round 25. If they cashed out at round 0, they would finish the game with a guaranteed $10. After a participant sold the stock, he or she could not return to the game. If a participant never sold it, he or she would earn the dollar amount that corresponded to the stock value displayed in the last round of the game (for a screenshot of the interface, see the Appendix). To acquaint participants with the procedure, a three-round trial version with a hypothetical payoff preceded the actual task.

The value of the stock per round was in part randomly determined and in part peer induced. Specifically, the absolute amount of change per round was randomly drawn from a predetermined set {|$.5|, |$1.0|, |$1.5|, |$2.0|, |$2.5|, and |$3.0|}. However, whether the randomly drawn amount would represent a positive or negative change was peer induced. More precisely, if *any* participant in a given round sold the stock, the change would be negative. In this case, the value of the stock would decrease in the next round. However, if *no* participant sold the stock in a given round, the change would be positive. In this case, the value of the stock would go up in the next round. All participants had full information about the rules of the game, and the rules were followed accordingly. During the task, the stock values from the previous rounds were also displayed on the screen in graph format.

Dependent variable. The number of rounds the participants stayed in the game represented the main dependent variable. Note that the value of the stock could vary significantly and directly affect participants' earnings in the entire experimental session. Again, participants were fully aware of this. After the game was over, participants answered a few open-ended questions about their decision-making process and potential problems they experienced during the task.

Results

Manipulation check. Fear was induced as intended. We averaged the degree to which participants felt anxious and scared after viewing the video clips to create a fear index ($\alpha = .93$). Participants who watched the sequence of horror movie clips reported significantly more fear/anxiety than those who watched the documentaries ($M_{fear} = 6.91$, SD = 1.72 vs. $M_{neutral} = 1.47$, SD = .78; $F(1, 78) = 328.47$, $p < .0001$).

Decision to sell. Given that participants observed slightly different stock values during the trial and actual phases of the task, two covariates were included: the average stock value observed during the trial ($F(1, 76) = 10.97$, $p = .001$) and during the actual task ($F(1, 76) = 29.27$, $p < .001$).[1] The analysis of covariance (ANCOVA) indicated, as predicted, that the fearful participants cashed out earlier than the participants in the control condition ($M_{fear} = 15.47$, SD = 10.37 vs. $M_{control} = 19.13$, SD = 8.74; $F(1, 76) = 3.95$, $p = .05$). Although fear was incidentally induced, it was still influential enough to lead participants to sell their stock earlier. Figure 1 displays the distribution of cash-out decisions per emotion condition. Note that by round 9, 75% of participants in the control condition were in the market, whereas only 55% of participants in the fear condition were still willing to hold their stock ($z = 1.87$, $p < .05$).

Discussion

Experiment 1 provides support for H_1. Compared with the control condition, incidental fear accelerated selling behavior. The use of an orthogonal, controlled, and directly measured manipulation of fear confirms the causal impact of fear on this type of financial decision making. The main effect provides initial evidence for the impact of fear on risk aversion in a relatively consequential scenario. However, how could incidental fear hasten the decision to sell? One possibility is that fearful (vs. control) participants felt more pessimistic about, uncomfortable with, or threatened by the financial task in general and, as a result, decided to

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[1]For the sake of consistency, we included the analysis of covariance with the two indicated covariates in all three experiments. The main effect in Experiment 1 and interaction in Experiments 2 and 3 remain significant if the covariates are excluded from the analysis. We report adjusted means in all three experiments.

Figure 1

PROPORTION OF PARTICIPANTS WHO STAYED IN THE STOCK MARKET SIMULATION IN A GIVEN ROUND (EXPERIMENT 1)
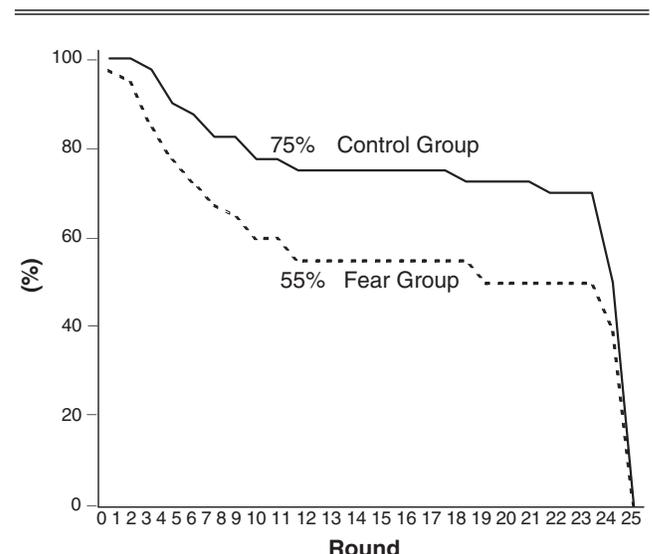
leave it earlier. Another possibility, advanced here, is that social projection played a key role in the process. Fearful (vs. control) participants were initially tempted to choose a safer option (i.e., sell the stock). As a result of social projection biases, they also believed that others shared the same action tendencies, which in turn accelerated selling behavior in anticipation of a drop in the value of the stock. We examine this possibility more directly in the next two experiments.

EXPERIMENT 2

If social projection is a key underlying mechanism through which emotion influences financial decision making, it implies that the features of the market would moderate the impact of emotions on financial decisions. Generally speaking, people are more likely to expect similar feelings and action tendencies from in-group than out-group members (Ames 2004; Robbins and Krueger 2005). Nonhuman agents (e.g., a computer) represent extreme instances of out-group targets, which would make any type of egocentric social projection biases rather unlikely. In our paradigm, therefore, participants are told that the value of the stock is determined either by all participants in the room or by a computer. As H_2 states, when the value of the stock is peer generated, social projection will lead fearful (vs. control) participants to sell their stock earlier—that is, a replication of Experiment 1. When the value of the stock is computer generated, however, social projection will not operate. As a result, fear should not affect selling.

The use of a human versus computer manipulation also addresses an important implication of our theoretical argument. In both conditions, participants face a situation of high uncertainty, but only in the peer-generated condition do we expect to find the impact of fear. Such a finding would imply that fear does not produce a general risk-averse tendency. Instead, the impact of fear is moderated by the features of the market (i.e., how the value of the stock is computed).

Finally, all participants in Experiment 1 were exposed to a group-generated market trend. As a result, fear, though exogenously induced, was endogenously incorporated into the value of the stock. Moreover, and as a result, all participants were then exposed to similar U-shaped patterns. It is an open question whether the results would still hold if participants were exogenously provided with *both* the emotion manipulation and the market trend. In this second experiment, therefore, participants were randomly assigned to two predetermined market trends.

Method

Sample and design. One hundred twenty-seven people participated in the study in exchange for an expected $15 participation fee. The study employed a 2 (emotion: fear vs. control) × 2 (stock value: peer-generated vs. computer-generated) × 2 (market trend: down-up vs. up-down) between-subjects design. The number of participants in the lab at a given session varied from 28 to 32. The procedure was similar to that of Experiment 1, except for a few main changes to the manipulations.

Emotion manipulation. Four new video clips were used to induce emotions. In the control condition, two clips from emotionally neutral documentaries were presented (*Treasures of Italy* and *Africa*). In the fear condition, participants saw two clips from horror movies (*Salem's Lot* and *The Exorcist*). The use of different video clips was meant to rule out the possibility that the findings observed in the previous experiment were somehow influenced by a specific content of the videos rather than the fearful reactions associated with them.

Stock value manipulation. To test for the role of social projection, participants were presented with different instructions about the features of the market simulation. In the peer-generated condition, participants were told, as in Experiment 1, that the value of the stock per round was in part randomly determined (i.e., absolute change) and in part peer induced (i.e., the direction of the change). However, in the computer-generated condition, participants were told that a computer would randomly determine both the absolute value and its direction. That is, the amount of change in each round would be randomly drawn from the $\{\pm\$.5, \pm\$1.0, \pm\$1.5, \pm\$2.0, \pm\$2.5,$ and $\pm\$3.0\}$ set.

Market trends manipulation. Contrary to Experiment 1, in which the value of the stock was endogenously generated by participants' selling decisions, this experiment used, unbeknownst to the participants, two predetermined mirror-imaged patterns of stock value (Figure 2). The exact dollar amount per round varied slightly $[-\$.5 \sim \$.5]$ across participants within a given market trend to increase generalizability. Finally, upper and lower boundaries were set $[\$5 \sim \$15]$ to avoid dramatic differences in payoffs across participants. During a five-round trial version of the game, participants were exposed to randomly determined dollar amounts in each round within the same upper and lower boundaries used in the main task $[\pm\$.5 \sim \pm\$3.0]$.

Results

Manipulation check. Fear was induced as intended. We averaged the degree to which participants reported feeling anxious and scared after viewing the video clips to create a fear index ($\alpha = .94$). Participants who watched the sequence of horror movie clips reported a higher level of fear than those who watched the documentaries ($M_{fear} = 6.79$, SD = 1.87 vs. $M_{control} = 1.80$, SD = .98; $F(1, 125) = 356.84$, $p < .0001$).

Figure 2
PREDETERMINED MARKET TRENDS USED IN EXPERIMENT 2
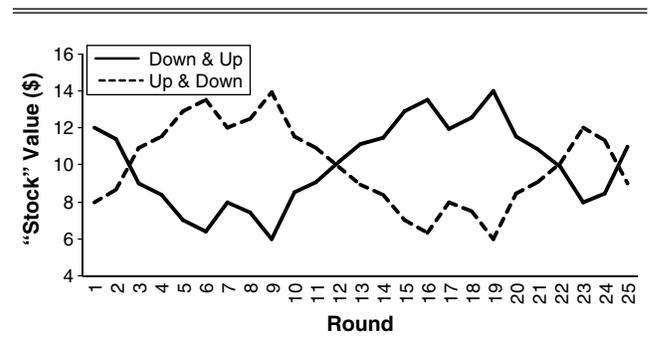
Decision to sell. As in Experiment 1, two covariates were included in the analysis: the average value observed during the trial ($F(1, 121) = 2.04$, $p = .16$) and during the actual task ($F(1, 121) = 12.22$, $p < .001$). A three-way ANCOVA did not reveal any significant interactions with the market trend factor ($F < 1$). We then collapsed the treatments of this factor.

A two-way ANCOVA was conducted to assess the impact of fear and social projection on the number of rounds played in the task. The results reveal a significant interaction ($F(1, 121) = 6.16$, $p = .01$; see Figure 3). When participants were led to believe that the value of their stock was determined by everybody's decision in the room—peer-generated condition—fearful participants sold it earlier than participants in the control condition ($M_{fear} = 10.46$, $SD = 9.66$ vs. $M_{control} = 15.74$, $SD = 8.46$; $F(1, 121) = 5.71$, $p < .02$). When the computer determined the value of the stock, however, fearful and nonfearful participants sold their stock at the same time ($M_{fear} = 16.47$, $SD = 9.11$ vs. $M_{control} = 14.10$, $SD = 8.99$; $F(1, 121) = 1.16$, $p = .28$).

Pairwise comparisons within each emotion condition showed that fearful participants sold their stock much earlier in the peer-generated condition than in the computer-generated condition ($F(1, 121) = 7.56$, $p < .01$). Among nonfearful participants, however, the manner in which the stock value was generated did not influence the selling decision ($F(1, 121) = .570$, $p = .45$).

Discussion

Experiment 2 offers a few additional contributions. First, it replicated the main findings of Experiment 1 with a new emotion induction. Second, fear was influential even in a scenario in which the values of the stock were exogenously generated. Moreover, the impact of incidental fear was present whether the prices initially went up or down

Figure 3
CASH-OUT ROUND AS A FUNCTION OF THE PARTICIPANTS'
EMOTIONAL STATE AND HOW THE STOCK VALUE WAS
DETERMINED (EXPERIMENT 2)

(i.e., no interaction with market trends). Finally, this experiment provides initial evidence that social projection represents a key underlying mechanism. Consistent with H_2, the impact of fear on the decision to sell was moderated by the features of the market. Incidental fear accelerated selling behavior only when participants believed that the value of their asset in each period was partly contingent on other people's decisions—that is, when social projection was likely to take place. When participants believed that the computer randomly determined the value of the stock—that is, when social projection was unlikely to operate—incidental fear had no impact on the number of rounds participants stayed in the market. Moreover, only scared participants were affected by the features of the market. This indicates that the changes in the rules of the game per se did not meaningfully affect participants' perceived levels of uncertainty, discomfort, or appeal associated with the task; otherwise, the control condition would have captured this effect.

Although initial evidence for the role of social projection is provided, it is possible that the computer-generated versus peer-generated stock value manipulation added another source of confound. An argument can be made that (biased) subjective probabilistic judgments are more likely to occur when people are unaware (human: probability of winning not directly stated) rather than aware (computer/random device: 50% chance of winning) of the objective probabilities. In other words, when there is less variance for subjective probabilities to operate, there is also less room for fear to play a role. This is indeed a possibility. It is worth noting, however, that irrelevant/incidental cues have been shown to influence subjective probability assessments and, consequently, risk taking, even when probabilities were readily available (e.g., Denes-Raj and Epstein 1994). Another possibility is that the manipulation also varied the perceived diagnosticity of the affective signal (Schwarz and Clore 1983) such that, holding constant social projection differences, participants' incidental fear was perceived in general as less diagnostic—thus, discounted—in the computer-generated than in the peer-generated condition. Experiment 3 relies only on peer-generated stock value to control for these potential sources of confound.

EXPERIMENT 3

A common approach used to test the role of social projection is to vary the extent to which the individual is perceived to share a particular trait with others in the group (Robbins and Krueger 1995). In the traditional procedure, participants undergo a psychometric test and are then informed about their place in the distribution before the main task takes place. The intuition is that the perceived level of (dis)similarly between the individual and others influences the social projection processes and type of inferences made, which in turn affects the individual's decisions. In this final experiment, therefore, participants were asked before the financial task to answer a short survey purportedly used to assess the group's risk attitudes. Each participant was then led to believe that his or her risk attitude represented either a very common or a very unique attitude relative to that of the other players in the room. As H_3 states, we expected that when a participant was told that he or she shared a similar risk attitude with most participants in the room, fear would
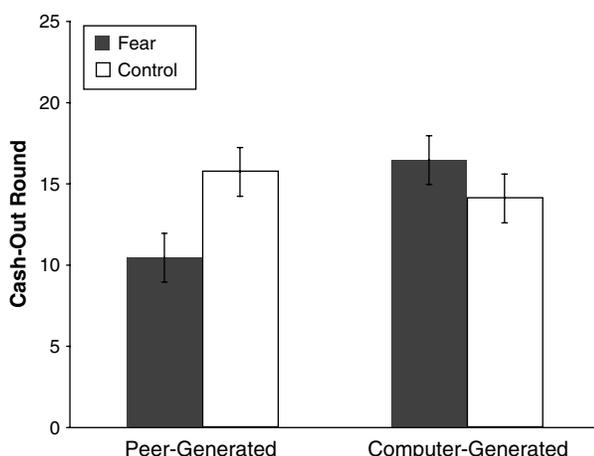
lead him or her to sell the stock earlier (than the control condition), thus replicating the fear effect observed in the first two experiments. However, when a participant was told that he or she displayed a unique risk attitude compared with the other participants in the room, the impact of incidental fear on early selling behavior would disappear or even reverse. The reversal would be possible in case a participant used the "unique risk attitude" information to infer that others would be inclined to do the opposite of what he or she wanted to do.

In addition, in this experiment, we changed the control condition's emotional state. Whereas in Experiments 1 and 2 fear was compared with an emotionally neutral and, consequently, low arousal state, in this experiment fear was compared with excitement, a highly arousing state. Participants in the control condition were presented with exciting scenes from two action movies. If arousal per se was responsible for the previous results, the difference in selling behavior should not be replicated when the control and the fear conditions shared similar levels of arousal.

Method

Sample and design. One hundred ten students participated in this study in exchange for an expected $15 participation fee. The study employed a 2 (emotion: fear vs. control) × 2 (perceived risk attitude: common vs. unique) between-subjects design. The procedure was similar to that in Experiment 2 with the exception of the following changes.

Emotion manipulation. Participants in the fear condition watched the two horror movie clips used in Experiment 1 (*The Sixth Sense* and *The Ring*). In the control condition, however, they watched two highly arousing/exciting action movie clips (*Knight and Day* and *Mr. and Mrs. Smith*).

Perceived risk attitude manipulation. After the trial rounds, all participants were presented with a six-item, seven-point scale ostensibly used to measure people's attitudes toward risk and money ("I don't like to take risks," "I don't care if I lose a bit of money in risky bets," "Taking risks for a few more dollars is not worth it," "I am willing to take chances to get more money," "It is exciting to take risks with money," and "No risk, no reward" [1 = "strongly disagree," and 7 = "strongly agree"]). After indicating the extent to which they agreed with each of the items, participants were asked to wait while the computer purportedly calculated their risk attitude relative to that of the other players in the room. Each participant was then told that his or her attitude was either very common or very unique in the market: "Your attitude toward money and risk is QUITE COMMON (vs. QUITE UNIQUE). About 88% (vs. Only 8%) of the participants have an attitude toward money and risk that is similar to yours." After reading this feedback, participants played the stock market simulation.

Market trends. We used a single but new market trend. The lower ($5) and upper ($15) boundaries as well as value change per round (±$.50 to ±$3.00) were the same as those in Experiment 2.

Results

Manipulation check. Emotions were induced as intended. Participants who watched the sequence of horror movie clips felt more scared than those who watched the action movies ($M_{fear} = 6.76$, SD = 1.94 vs. $M_{control} = 2.55$, SD =

1.91; $F(1, 109) = 131.60$, $p < .0001$). However, both conditions reported comparable levels of arousal (arousal index: ["The clips made me feel active" + "The clips made me feel calm" (recoded)]/2; 1 = "not at all," and 9 = "very much"; $M_{fear} = 3.84$ vs. $M_{control} = 3.55$; $F(1, 108) = .316$, $p > .10$). At the end of the experiment, participants indicated whether their attitude was very similar to or very different from that of the other participants in the lab. The overwhelming majority of participants answered it in a manner consistent with the perceived risk attitude manipulation (common attitude = 94.6%; unique attitude = 96.3%).

Decision to sell. We conducted a two-way ANCOVA to assess the impact of emotion and perceived risk attitude on the number of rounds participants stayed in the market. A significant two-way interaction was revealed ($F(1, 109) = 7.82$, $p = .006$; see Figure 4). In the common risk attitude condition, fearful participants sold their stock significantly earlier than those in the control condition ($M_{fear} = 13.39$, SD = 7.86 vs. $M_{control} = 18.17$, SD = 7.83; $F(1, 104) = 5.06$, $p < .05$). Not only did the effect disappear in the unique risk attitude condition, but a trend toward reversal occurred such that fearful participants stayed in the market slightly longer than those in the control condition ($M_{fear} = 17.24$, SD = 7.56 vs. $M_{control} = 13.55$, SD = 8.36; $F(1, 104) = 2.93$, $p < .10$).

Discussion

Experiment 3 provides three final contributions. First, it confirms the robustness of the effect. Fearful participants sold their stock earlier than those in the control condition, in a scenario in which a new market trend was exogenously presented. Second, the intensity of the emotional experience per se cannot account for the results. In this third experiment, both fear and control conditions experienced similar levels of arousal. Third, Experiment 3 corroborates the hypothesis that social projection represents a key under-

Figure 4
CASH-OUT ROUND AS A FUNCTION OF THE PARTICIPANTS' EMOTIONAL STATE AND PERCEIVED SIMILARITY IN RISK ATTITUDE (EXPERIMENT 3)
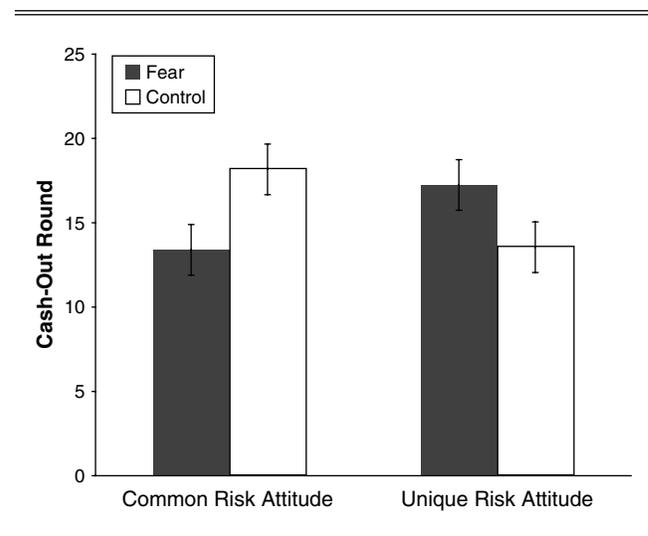
lying mechanism. The perceived similarity in risk attitude between each participant and the other players in the market simulation strongly interacted with the emotion manipulation. When the participants were led to believe that their risk attitudes were very common within the market, fearful (vs. control) participants wanted to sell and predicted that others would feel the same, which in turn resulted in early selling in anticipation of a drop in the value of the stock. However, when the participants were told that their own risk attitudes were very unique, fearful (vs. control) participants wanted to sell but probably predicted that others would do the opposite, which in turn resulted in later selling in anticipation of an increase in the value of the stock. Thus, H_3 was confirmed.

GENERAL DISCUSSION

This research focuses on whether, when, and how individual investors' fear influences their decision to sell a liquid asset. The main findings demonstrate, in a series of multiple decision rounds, that scared investors sell their assets earlier than those in control conditions. Three experiments replicate the main findings using different market trends, different sets of emotion inductions, and different modalities of control conditions.

Furthermore, this research demonstrates that social projection represents a critical underlying mechanism through which fear promotes selling. According to this theoretical proposition, people tend to rely on their own emotional state to predict other people's behavior, which in turn affects their own actions. In the stock market, a scared investor who is initially inclined to favor the certain action (i.e., sell the stock) will be more likely to believe that others share the same action tendency, which in turn will lead him or her to accelerate selling behavior in anticipation of a drop in the value of the stock. In line with this rationale, the results show that the early sell-off was strongly contingent on the features of the market. Fearful (vs. control) investors sold their stock earlier when the value of the stock was peer generated than when the stock value was computer generated (Experiment 2). Early sell-off also occurred when investors were told that others shared their risk attitude but not when they were told that their risk attitude was very unique in the market (Experiment 3). These findings demonstrate that, rather than leading to a generalized impact on risk, fear is more likely to produce contingent effects as a result of social projection. Likewise, the level of uncertainty per se, though necessary, is not sufficient to explain when and how fearful investors search for safer options in these types of financial environments. The features of the market are also a critical component of the process.

In the experiments, participants were informed that different participants would be watching different video clips. Furthermore, across all the experiments, we asked participants to explain their behavior (i.e., selling period) at the end of the task through an open-ended question. None of the participants mentioned that they believed other players had watched the same clips, which in turn would affect their own decisions. Therefore, participants' beliefs about what others' had been exposed to before the simulation cannot account for our results.

In contrast with the ubiquitous commentaries in the media emphasizing the impact of emotions on financial decision making, little experimental work has investigated whether and how emotions in general and fear in particular influence investors' decisions. Understanding the causal links and psychological underpinnings could, on the one hand, help us model financial decision making more accurately and, on the other hand, help individual investors recognize and try to correct for unwanted tendencies and biases. This research represents an initial step toward this goal.

Appendix
COMPUTER INTERFACE OF THE TASK USED ACROSS THE EXPERIMENTS
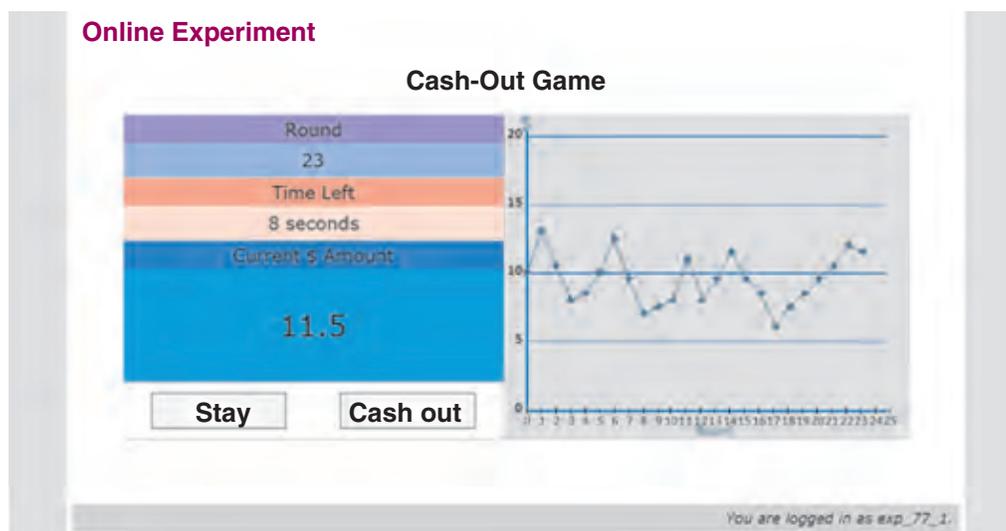
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