Can Educational Interventions Reduce Susceptibility to Financial Fraud?

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Abstract

Financial fraud is pervasive and can be devastating for its victims. While numerous campaigns designed to warn and educate consumers about financial fraud exist, there is very little evidence on whether these initiatives are effective at reducing susceptibility to scams. We conduct a randomized experiment among a representative sample of U.S. adults and find that short, online educational interventions can meaningfully reduce fraud susceptibility, and that effects persist for at least three months following a reminder. Investigating mechanisms, we find no evidence that the educational intervention reduced willingness to invest generally, but rather increased knowledge which participants were able to selectively apply. We find that beneficial effects are concentrated among individuals who are more likely to invest, particularly the financially sophisticated. Our results indicate that brief financial education interventions can meaningfully reduce susceptibility to financial fraud.

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1. Introduction

In recent decades, the financial landscape has become increasingly complex and consumers are now faced with a myriad of complicated financial decisions. Investment products marketed to retail investors have become increasingly complex, and risky products have become more widely available (Célérier and Vallée, 2017). In the wake of the increasing financial complexity, it may become even more difficult for individuals to recognize investment opportunities that are likely fraudulent.

Though it is difficult to precisely measure the prevalence of financial fraud, due to numerous factors including victims' reluctance to report that they've been defrauded, recent estimates suggest that as much as 10 percent of adults in the U.S. have been victimized (Kieffer and Mottola, 2017; Anderson, 2013). Moreover, the economic impacts of financial fraud are staggering – Deevy et al. (2012) estimate that approximately $50 billion is lost annually to financial fraud in the U.S. The personal consequences can be devastating. In addition to monetary losses, fraud victimization is associated with depressive symptoms (DeLiema et al., 2020; FINRA Foundation, 2015), anger and disappointment (Shichor et al., 2000), marital problems (Button et al., 2014), and lower financial well-being and confidence in financial matters (Brenner et al., 2020).

A broad body of work has examined factors associated with falling victim to financial fraud, finding evidence that age-related decline in fluid cognitive ability (Gamble et al., 2014; Han et al., 2015), depression and social needs-fulfillment (Lichtenberg et al., 2013; Lichtenberg et al., 2016), risk taking (Shadel and Pak, 2017), overconfidence (Gamble et al., 2014; McAlvanah et al., 2015), impulsivity (McAlvanah et al., 2015; Knutson and Samanez-Larkin, 2014), and numeracy (McAlvanah et al., 2015) are all associated with the likelihood of being victimized. Other research has found evidence that more financially knowledgeable consumers have a higher propensity to detect fraud (Engels et al., 2020) and numerous authors and policymakers have suggested that increased financial education may be a key component to reducing levels of fraud victimization (DeLiema et al., 2020; Engels et al., 2020).

While there is a growing body of literature examining the predictors of financial fraud victimization, and numerous calls for increased education to reduce susceptibility, relatively little work has examined whether fraud susceptibility can be causally reduced through intervention generally, or educational interventions specifically. Scheibe et al. (2014) finds evidence that forewarning past fraud victims over the phone about particular scams can increase resistance to

telemarketing schemes (particularly when consumers are pitched the same scheme about which they were warned) two to four weeks later. While encouraging, past victims of fraud may be particularly receptive to education and phone based outreach efforts can be time intensive and costly. Additionally, the ever changing nature of financial fraud, and scammers increasing sophistication, suggests that highlighting techniques and methods that fraudsters use to separate consumers from their money may be a more broadly effective intervention than warnings about individual scams (Engels et al., 2020).

Education about financial fraud may reduce fraud incidence by improving individual's ability to spot fraudulent schemes, making them more savvy and leading them to choose non-fraudulent investments. However, education could also reduce fraud incidence by making people more aware of and scared about the existence of fraud and thus dissuading people from financial investments generally, both fraudulent and not. Given the importance of investing for economic and retirement security, this could be a significant negative side effect of educational programs. Hence, it is crucial not only to investigate whether education can reduce suceptibility to financial fraud, but also to study the mechanisms through which it does so.

In this paper, we aim to fill this gap in the literature by conducting a randomized controlled trial among a representative sample of U.S. adults to investigate whether a brief, online educational intervention can reduce consumers' susceptibility to investment fraud, which is one type of financial fraud. We drew a sample of 2,000 individuals from the Understanding America Study, a nationally representative probability-based internet panel of U.S. adults aged 18 and above, and randomized participants into one of three groups with equal probability: a **video treatment** in which subjects viewed a three minute educational video about techniques often present in investment fraud; a **text treatment** in which participants received the same information as the video treatment in textual form; and a control group which received no educational intervention. We also implemented a second, orthogonal randomization that provided half the participants in treatment with a reminder three months after the original intervention, in the form of the educational mode they had not already seen (e.g. participants in the video treatment would receive the text treatment as a reminder, and vice versa). We measured fraud susceptibility immediately after the initial intervention and six months later using investment pitches drawn from real-world examples and enforcement actions initiated by the U.S. Federal Trade Commission (which we adapted for our environment). We interspersed legitimate investment pitches among the fraudulent

investments to examine effects on willingness to invest generally. For both the fraudulent and legitimate investment opportunities, we elicited respondents' willingness to invest and subjective beliefs over the potential outcomes conditional on investment. Additionally, to examine the mechanisms through which the intervention might have an effect, we also assessed participants' knowledge on the content contained in the educational interventions.

We find that short online educational interventions can meaningfully reduce individuals' susceptibility to investment fraud. Shortly after receiving the initial intervention at baseline, participants in both the video and text treatments were significantly less likely to express interest in investing when presented with the fraudulent investment opportunities (p-values < 0.001). Moreover, participants in both treatments assigned significantly more probability mass to losing at least some money (p-value < 0.001) and losing "most or all" of their money (p-value < 0.001) conditional on investment. We find much more muted effects on the likelihood of investing when presented with the legitimate opportunities, suggesting that respondents became better at identifying likely fraudulent schemes. We find little difference in impact between the text and video treatments, on average.

As with many educational interventions, we find that effects decay over time. Individuals who saw only the video or text treatment at baseline were no better at identifying fraudulent investment opportunities six months later than individuals assigned to control. However, we find that effects persist if consumers are provided reminders. In particular, respondents who received the reminder intervention three months after baseline were less likely to express an interest in investing in the fraudulent investment opportunities (p-value < 0.001) at the six month mark, and assigned more probability mass to losing at least some money (p-value $= 0.001$) and "most or all" of their money (p-value $= 0.002$) conditional on investment. In contrast, we find no differences in willingness to invest, or beliefs over outcomes conditional on investment, between treatment conditions (including those who received reminders) and control for legitimate investment opportunities at the six month mark. This suggests that the reminder intervention did not reduce participants' general willingness to invest, but did improve their ability to spot fraudulent investment opportunities. Examining mechanisms, we find that individuals who received the reminder were significantly more likely to correctly answer five knowledge test questions about fraudulent investments, indicating that the intervention indeed improved knowledge and suggesting that this improved knowledge translated into an increased ability to spot fraud.

We also examine heterogeneity on dimensions prior research has suggested are predictive of fraud susceptibility and that are measured in our data – cognitive ability and financial literacy – and find evidence of heterogeneous treatment effects. Individuals with higher cognitive ability and higher financial literacy benefit differentially from receiving the educational interventions, particularly the text-based treatment and the reminder. In fact, individuals with lower cognitive ability and lower financial literacy assign *less* weight to losing money conditional on investment in the fraudulent investments six months after baseline if they receive only the text-based intervention. Despite being designed to educate using relatively simple language, fraud education interventions that rely exclusively on text may be counterproductive for individuals who are less financially sophisticated. We find no evidence of heterogeneity for individuals who received only the video treatment.

Collectively, our results indicate that online educational interventions can significantly reduce individuals' susceptibility to financial fraud, and do so by making them more discerning investors. Our interventions were short, a few minutes in length, and easily scalable across providers at relatively low marginal cost. While effects decay over time, we find persistent improvements in abilities to spot fraudulent investment opportunities when participants were provided reminders, and that these effects persist for at least three months after the intervention. Additionally, the interventions were more effective for individuals who are more likely to be (or become) investors – individuals with higher cognitive ability and higher financial literacy were differentially more likely to spot fraudulent investments relative to their less sophisticated peers after being exposed to treatment. Broadly, our results are supportive of the educational efforts being implemented by many practitioners in the field, and provide causal evidence that they can meaningfully reduce individuals' susceptibility to investment fraud.

2. Study Setting and Experimental Design

We implemented our experiment in the Understanding America Study (UAS) panel. The UAS is a nationally representative, probability-based internet panel that longitudinally tracks a U.S. representative sample of over 8,000 adults. Panel members are recruited exclusively through Address Based Sampling. Respondents without prior internet access receive a tablet and broadband access (and related training). This mitigates selection problems facing convenience panels, where respondents are recruited from existing internet users. The UAS contains a very large set of background characteristics for all panel members, including demographic (e.g. age,

gender, race), financial (e.g. income, financial literacy), health (e.g. self-assessed health), personality traits (the big five) and cognition measures (e.g., number series, propositional analogies, picture vocabulary).

We implemented our baseline survey and experiment in May 2019, inviting 2,600 panelists to participate and receiving 1,976 completions (76% response rate). The baseline survey elicited a few personal characteristics then randomized participants into one of three groups: a **video treatment** that highlighted warning signs for investment fraud, a **text treatment** that provided participants the same information in the video treatment only in written form; or a control group which did not receive either intervention. The educational interventions were centered on five techniques fraudsters often employ when engaging in fraud: (1) promising exorbitant rates of return ("phantom riches"); (2) presenting themselves as legitimate experts ("source credibility"); (3) claiming that many individuals like them have already taken advantage of the opportunity ("social consensus"); (4) creating a sense of urgency ("scarcity"); and (5) creating a sense of obligation by providing freebies or discounts ("reciprocity").[1]

Subsequently, participants were presented with three investment opportunities, two of which exhibited several of the above-noted techniques used to pitch fraudulent investments. For the fraudulent investment opportunities, we used real-world, deceptive investment solicitations drawn from prior research,[2] and adapted them slightly to our environment. Our legitimate investment opportunity was captured verbatim from a large U.S. brokerage firm.[3] The order of the investment opportunities was randomized across participants.

After viewing each investment opportunity, participants were asked, "Assuming you had the money available, how likely would you be to invest in this opportunity if you had the chance?" on a scale from 1 (Not at all likely) to 10 (Extremely likely). While a negative response to this question is consistent with the respondent viewing the investment as possibly fraudulent, it may also reflect general disinterest in investing or dislike of other features of the product. To more directly capture respondents' views on legitimacy, we elicited their subjective probability distributions over outcomes conditional on having invested in the opportunity using a balls-and-bins approach (Delavande and Rohwedder, 2008). In particular, respondents were asked "what do

[1] Transcript of the text intervention is in Appendix C and the video treatment can be viewed here: https://youtu.be/6SJvxgMQxW8.
[2] Applied Research and Consulting, LLC (2013)
[3] All of the investment pitches are contained in Appendix B.

you think would happen if you invested in this opportunity?" and asked to assign 20 balls across five bins: "Lose most or all of my money"; "Lose some of my money"; "Neither make money nor lose money (break even)"; "Make some money"; and "Make a lot of money" (see Figure 1). Each ball, therefore, represents five percent of the probability mass. After responding to these questions for each of the investment opportunities, participants were presented with a five questions test eliciting their knowledge on how to check that an investment opportunity is likely not to be fraudulent.

In a second randomization, half of the treatment group participants were assigned to receive a reminder intervention three months after baseline. If randomized into the reminder treatment, participants received the form of the intervention that they did not already receive at baseline (e.g. if a participant received the video treatment at baseline she would receive the text treatment as a reminder).

Finally, we resurveyed participants six months after baseline. In the six-month survey, participants were presented with the same investment opportunities as at baseline, as well as two additional fraudulent investments drawn from enforcement actions brought forth by the U.S. Federal Trade Commission and adapted to our environment, and one additional legitimate investment captured verbatim from a large U.S. brokerage firm. The order of the investment opportunities was randomized across participants. Following each investment opportunity, participants were presented with the same willingness to invest and subjective probability distribution questions as in the first survey. Following the questions regarding the investments, participants again completed the five item knowledge test.

We retained 90 percent of our respondents between baseline and the six-month survey, resulting in 1,780 participants.[4] Table 1 presents summary statistics and balance tests across our sample. Average age is 54, 56 percent of our sample is female, 88 percent are white, and 61 percent of participants are married. About half our sample is above the median U.S. household income and 40 percent of our sample has a bachelors degree or more education. Consistent with a valid randomization, we do not find evidence of statistical differences across study conditions. Relatedly, baseline characteristics do not jointly predict treatment assignment.

[4] We find no evidence of differential attrition. Across the conditions, retention was 89.5 percent in control, 90.0 percent in the text intervention, and 90.3 percent in the video condition.

Before data were collected, we registered our hypotheses and experimental design in the American Economic Association RCT registry (Burke and Perez-Arce, 2019)

3. Results

A. Effects at Baseline

We first examine effects of the intervention immediately after exposure to treatment at baseline. For each individual, we average, across the two fraud elicitations, the likelihood of investing and the probability mass assigned to each of the five outcome categories.[5] Figure 2 documents average willingness to invest. Participants who received either the video or text intervention displayed significantly lower willingness to invest in the fraudulent pitches – average willingness to invest in control was 5.41 (on a scale of 1 – 10), while average willingness to invest in treatment was 3.03 for the text condition and 3.21 for the video condition. Differences between treatment and control are highly significant (p-values < 0.001), while the difference between the two treatment conditions is not statistically significant from zero (p-value = 0.32).

Figure 3 depicts the average of participants' subjective probability distributions over outcomes conditional on investment (that is, the distribution that results from the responses to the question, "*What do you think would happen if you invested in this opportunity?"* about the fraudulent pitches). Participants in the treatment groups place significantly more probability on negative outcomes (losing money) than participants in control. In particular, participants in control place an average of 28.8 percent of their probability mass on "Losing some" or "Losing most or all" of their money, while participants in the text condition place 55.7 percent (p-value < 0.001) and participants in the video condition place 54.6 percent (p-value < 0.001) of their probability mass on the same outcomes, respectively. Differences are even starker in the "Lose most or all" outcome, where participants in control place only 12.8 percent of their probability mass, while those in the text and video conditions assign 33.0 (p-value < 0.001) and 32.0 (p-value < 0.001) probability mass, respectively. Thus, participants in treatment were significantly more skeptical of the fraudulent investments, as indicated by the large leftward shifts in their subjective probability distributions relative to control.

We see much more muted differences for the legitimate investment pitch. Figure 4 depicts average willingness to invest in the legitimate investment opportunity across study condition. Average willingness to invest was 5.14 in control, 4.51 in the text treatment, and 4.80 in the video

[5] Results are qualitatively unchanged when analyzing each investment pitch separately.

treatment. Although differences between treatment and control are statistically significant, they are considerably smaller than the greater than the 2-point shifts in willingness to invest observed for the fraudulent investment opportunities.

We also see much more muted differences in beliefs over outcomes conditional on investment for the legitimate pitch (Figure 5). Participants in control place an average of 32.4 percent of their probability mass on losing at least some money, while participants in the text condition place 36.4 percent (p-value = 0.01) and participants in the video condition place 35.5 percent (p-value = 0.05) of their probability mass, respectively. Differences between treatment and control are statistically significant, though relatively small. Notably, participants in treatment were much more pessimistic about what would happen if they invested in the fraudulent investment opportunity than the legitimate opportunity (they assigned approximately 20 percentage points more to negative outcomes for the fraud pitches), while participants in control were actually *less* pessimistic about investing in the fraudulent pitch than the legitimate pitch. Our evidence indicates that the treatments had large immediate effects on individuals' ability to spot investment fraud, while having little effect on their willingness to invest generally, suggesting that participants in treatment understood and internalized the presented information and become more savvy investors.

To generate estimates of effects of treatment controlling for baseline covariates, we estimate the following specification using ordinary least squares:

$$(1)\ Y_i = \alpha + \beta_1 Text_i + \beta_2 Video_i + \gamma X_i + \varepsilon_i$$

where Y_i is an outcome of interest for individual i (e.g. willingness to invest), $Text_i$ and $Video_i$ denote random assignment to the text and video interventions respectively, and X_i is a vector of baseline characteristics including age and gender. Results are contained in Table 2. As expected given balance across conditions at baseline, regression adjusted estimates are similar to the raw comparisons. Column 1 documents that individuals assigned to the text or video intervention were significantly less likely to express a willingness to invest in the fraudulent investment opportunities than individuals in control. In particular, participants randomly assigned to the video and text interventions had a lower willingness to invest than participants in control by 2.2 points and 2.3 points, respectively. These estimates represent reductions of approximately 40 percent relative to the control mean of 5.4.

Columns 2 and 3 examine effects on participants' beliefs over how likely it would be that they would lose at least some money (Column 2) or most or all of their money (Column 3) if they invested in the fraudulent opportunities. Participants assigned to treatment placed approximately 25 percentage points more probability on losing at least some money and 20 percentage points more probability on losing all their money than individuals in control. These estimates reflect approximately 85 percent and 155 percent increases relative to control means.

Table 3 documents effects on willingness to invest and beliefs over outcomes conditional on investment for the legitimate opportunity. Similar to the raw comparisons, difference across conditions are statistically significant, though much more muted than effects observed for the fraudulent investments.

Shortly after exposure to treatment at baseline, individuals who received either the text or video intervention were significantly better at detecting fraudulent investment opportunities, and significantly more pessimistic about possible monetary returns conditional on investment, than participants in control. Additionally, we see much more muted effects on legitimate investment opportunities, suggesting that the treatments improved abilities to spot fraud without dissuading participants from investing generally. While encouraging, it is not particularly surprising that educational interventions designed to improve awareness of fraudulent investment techniques have an effect immediately after implementation. The next subsection investigates a more policy-relevant question of whether these effects persist over time.

B. Effects Six Months after Baseline

As noted above, half the participants in treatment were assigned to receive a reminder intervention three months after baseline. Participants in the video (text) condition received the text (video) intervention as a reminder. In total, 92 percent of individuals assigned to the reminder intervention actually received it. Below we report intent-to-treat estimates, though note that estimates for local average treatment effect (LATE) specifications would yield similar results given our high rate of compliance. As in the analysis at baseline, we average responses across the fraud solicitations and also average responses across the legitimate investment opportunities.[6]

[6] At six months, participants were presented with the same investment opportunities as at baseline as well as two new fraudulent investments and one new legitimate investment. Results remain qualitatively unchanged when we restrict attention to the new investment opportunities.

Figure 6 examines average willingness to invest in the fraudulent opportunities six months after the baseline intervention. Notably, the stark differences observed at baseline decay almost entirely for individuals in treatment who did not receive a reminder. Average willingness to invest in the fraudulent investment opportunities was 5.8 in control, 5.7 for individuals who only received the video intervention at baseline, and 5.6 for those who only received the text intervention at baseline. Differences across conditions are not statistically significant. However, individuals who received a reminder three months prior expressed a significantly lower willingness to invest than individuals in control (5.2; p-value < 0.001). Differences between the reminder condition and the video only (p-value = 0.003) and text only (p-value = 0.015) conditions are also statistically significant.

We find similar patterns for beliefs over outcomes conditional on investment. At six months, there is little difference in subjective probability distributions across control and the video only and text only at baseline treatments (Figure 7). Individuals in control assigned 26.1 percentage points to negative outcomes (losing some money or most or all money), while participants in the text only and video only treatments assigned 25.0 and 26.3 percentage points, respectively. Similarly, individuals randomized into control placed 11.3 percentage points of probability mass onto losing most or all their money on average across the fraudulent investments, while individuals in the text only and video only conditions placed 11.0 and 11.1 percentage points on the same outcome, respectively. Differences across conditions are not statistically significant for either losing any money or losing most or all of one's money. Individuals who received the reminder intervention, however, assigned significantly more probability mass to negative outcomes – 30.7 percentage points (p-value < 0.001) – and more probability mass to losing most or all money – 14.5 percentage points (p-value = 0.002). Differences in beliefs between the reminder intervention and text only or video only are also highly significant. Thus, while effects of the intervention disappear almost entirely after six months, attenuated effects persist for at least three months after exposure to a reminder intervention both in terms of willingness to invest in fraudulent investment opportunities and beliefs over outcomes conditional on investment.

In contrast, we find that none of the interventions – video, text, or the reminder – had any measurable impact on willingness to invest in the legitimate investment opportunities at the six month mark (Figure 8), again consistent with the improvements arising through better discernment rather than increased aversion to all investment opportunities. Willingness to invest in control was

4.8, while willingness to invest in the treatment arms ranged from 4.5 – 4.8 (4.6 for the reminder condition), and none of the differences across conditions are statistically significant. Similarly, we find little evidence of impacts on beliefs conditional on investment for the legitimate opportunities at six months (Figure 9). Participants in control assigned 37.2 percentage points to negative outcomes, while participants in the video only condition assigned 39.1 percentage points, participants in text only assigned 34.9 percentage points, and participants in the reminder condition assigned 38.3 percentage points. None of the differences between treatment arms and control are statistically significant.[7] Relatedly, we find no significant differences across conditions in the amount of probability assigned to losing most or all one's money.

As expected, we find a similar story after accounting for covariates using an equation like (1), but where the treatment conditions are now "video only", "text only" or "reminder", where the latter combines the cases that received video at baseline and text at 3-months, and those that received text at baseline and video at 3-months. Table 4 documents that individuals assigned to the reminder treatment had lower willingness to invest in the fraudulent opportunities at six months than participants in control by 0.55 points, a reduction of 9.5 percent relative to the control mean. We do not detect any effects of the video only or text only at baseline interventions. Column (2) documents that the order in which participants in the reminder condition viewed the educational interventions does not meaningfully affect estimated impact. The difference between viewing text first and video first is small and not statistically significant (p-value = 0.263).

Table 5 contains regression adjusted results for beliefs over outcomes conditional on investment in the fraudulent investment opportunities. We find similar patterns as in the raw comparisons. There are no detectable effects for either the video only or text only interventions, point estimates are small and not statistically different than zero. However, respondents randomized into the reminder condition assigned significantly more probability mass to losing at least some money (point estimate = 4.6pp) and losing most or all money (point estimate = 3.1pp). These estimated effects represent 18 percent and 27 percent increases relative to control means. As for willingness to invest, the order in which participants received the educational interventions appears to be of little importance as differences are muted and not statistically significant.

[7] Participants in the text only condition assigned significantly less probability mass to negative outcomes for the legitimate advertisements at six months than participants in the video only (p-value = 0.029) or reminder intervention (p-value = 0.032).

In contrast, we find no discernable effects of any of the treatments for the legitimate investments. Table 6 documents that effects on willingness to invest for each treatment arm are relatively precisely estimated zeros. Table 7 documents similarly null results for beliefs over outcomes conditional on investment.

Comparing across the investment pitches, we find that the reminder intervention meaningfully reduced participants' willingness to invest in fraudulent investment opportunities, yet had no effect on their willingness to invest in legitimate opportunities. Similarly, we find participants who received the reminder were significantly more pessimistic about potential outcomes following investment in the fraudulent opportunities, but no more pessimistic about legitimate opportunities than individuals in control. Our results suggest that while effects of a single intervention decay over time (and mostly vanish by six months), exposing participants to reminder interventions can increase ability to spot fraud, without introducing distortions in general proclivity to invest, and that these effects can persist for a period of at least three months.

Next, we further inspect possible mechanisms. The contrasting results for the reminder intervention between the legitimate and fraudulent investments suggests that the effects are not driven by increased skepticism of investing generally, and may be driven by changes in knowledge. To test for this, we presented respondents with a five-question test measuring knowledge of information contained in the educational interventions, particularly how someone can check whether an investment is likely not to be fraudulent. We classify individuals as "passing" the test if they answered all five questions correctly. Table 8 presents regression adjusted estimates for the probability of passing the knowledge test. We find that neither the video only nor the text only at baseline interventions significantly improve participants' likelihood of passing the knowledge test at 6 months (though our confidence interval for the text only intervention includes meaningful effects). However, consistent with the results presented above, participants assigned to the reminder intervention are nine percentage points (p-value = 0.002) more likely to pass the knowledge test than participants in control, which represents a 21 percent increase on the 43 percent pass rate in control. Thus, we find evidence that the reminder intervention created lasting impacts on consumer knowledge, and evidence suggesting that it is this increased knowledge that led to the meaningful increases in the ability to recognize fraudulent investments.

4. Heterogeneous Effects

Prior research has linked lower cognitive ability and lower financial literacy with increased susceptibility to financial fraud (Gamble et al., 2014; Engels et al., 2020) – both of which are captured in the UAS. Motivated by these findings, we examine whether there are heterogeneous treatment effects for our educational interventions along these dimensions.

A. Cognitive Ability

Cognitive ability in the UAS is measured through a comprehensive battery of tests – 15 tests for numeracy, 15 tests for picture vocabulary, and 15 tests for verbal analogies. We sum the scores across these 45 cognitive tests to form a total cognitive ability index score, which we then transform to take mean zero and standard deviation one in the sample. Table 9 examines whether there are differential effects of our interventions across the cognitive ability spectrum at six months. We find no evidence of heterogeneous effects for the video only intervention, but we do find evidence of heterogeneity for both the text only and reminder interventions. These interventions lead to a stronger reduction in the willingness to invest in fraudulent investments among higher cognitive ability individuals than among their lower cognitive ability peers. Similarly, these interventions resulted in larger increase in the reported probability of losing money among those with higher cognitive ability scores. For example, a one standard deviation increase in cognitive ability is associated with a 0.4 point (7 percent) larger (more negative) effect on willingness to invest in fraudulent investments, and 3.7 percentage point (13 percent) larger effect in the probability assigned to losing at least some money conditional on investment. This suggests that the treatments that include text are more effective among those with higher cognitive ability, perhaps because these individuals are better equipped to process the contained information.

For robustness, Table 10 examines differential effects across the distribution at six months, focusing on individuals with the lowest cognitive ability in our sample. Here we split the sample by cognitive ability terciles, labeling individuals in the bottom third of the distribution as "Low" cognitive ability, and individuals in the top two terciles as "Higher" cognitive ability. Nearly all of the effects of the reminder intervention are concentrated on those with higher cognitive ability – estimates for participants in the bottom tertile are small and statistically indistinguishable from zero. Remarkably, the text only intervention appears *counterproductive* for individuals with low cognitive ability. In particular, participants in the bottom third of the cognitive ability distribution

assigned to this condition placed significantly *less* probability weight to losing at least some money (by 5.9pp) and losing most or all their money (by 4.5pp).

B. Financial Literacy

The UAS elicits individuals' level of financial literacy using 14 questions covering topics from compound interest rate and inflation to risk and return of different assets and house prices. We create a composite score for financial literacy by summing the number of correct answers across these questions. As for cognitive ability, we standardize this index within the sample. Information on financial literacy is available for nearly 90 percent of our study participants.

Table 11 examines whether the educational interventions interact with financial literacy at six months. Results mirror those found for cognitive ability: we find no evidence of heterogeneity for the video only treatment but we do find evidence of heterogeneity for the text only and reminder interventions – individuals with higher financial literacy are more positively impacted by the treatments. Specifically, the impacts of these interventions were stronger for individuals with higher financial literacy, both in terms of willingness to invest and the probability placed on negative outcomes.

Table 12 splits the sample by financial literacy terciles to examine effects across the distribution at six months. As with our analysis of heterogeneity by cognition, we separate the bottom tercile from the top two terciles to focus on effects for the least financially literate. Similar to our analysis for cognitive ability, we find that the effects of the reminder intervention are concentrated almost entirely among individuals who are more financially literate. Our estimated effects for those in the bottom tercile are small and not statistically significant. For the text only treatment, estimates for impacts on subjective probability distributions are negative for those with low financial literacy and similar in size to the corresponding estimates in our analysis examining heterogeneity by cognitive ability. However, estimates here are imprecise and not statistically significantly different from zero.

Though the educational interventions were designed to be brief and accessible to a broad audience, we find evidence that they were ineffective for individuals with lower financial sophistication. While individuals with lower sophistication may be more easily deceived by fraudsters, individuals with higher financial literacy and cognitive ability are more likely to be investors and may be disproportionately targeted for investment fraud. Improvements in ability to

spot investment fraud among individuals with higher sophistication is notable, and may translate into considerably less losses annually due to investment fraud.

5. Conclusion

Financial fraud is a pervasive problem in the U.S., with severe consequences for its victims. Despite considerable effort and resources devoted to fraud education and prevention campaigns, there has been very little research examining whether educational interventions can meaningfully reduce individuals' susceptibility to financial fraud, whether they can do that without discouraging investing generally, and whether any effects might persist over time.

We examine whether short, online educational interventions can increase consumers' abilities to recognize fraudulent investment opportunities. We find that shortly after the intervention, individuals randomized into treatment (either text-based or video-based) were significantly less likely to express interest in investing in fraudulent opportunities and were significantly more pessimistic in their beliefs about financial outcomes for these opportunities conditional on investment. While these effects decay over time, we find that they persist for at least three months after a reminder intervention (and six months after baseline).

In examining mechanisms through which the intervention had an effect, we find no differences between treatment and control in willingness to invest, or beliefs over outcomes conditional on investment, for legitimate investment opportunities six months after baseline. This suggests that individuals in treatment (particularly those who received reminders) were able to internalize the information and apply it without being dissuaded from investing generally. Consistent with this, we find that participants randomly assigned to the reminder condition were significantly more likely to pass a knowledge test eliciting understanding of fraudulent investment topics at the six month mark. Thus, our evidence suggests that the educational intervention indeed improved knowledge and that this improved knowledge translated into reduced susceptibility to investment fraud without negative effects on willingness to invest in general.

We also examine whether there are differential effects based on individuals' financial literacy or cognitive ability as past research has indicated that these dimensions may be predictive of fraud susceptibility. We find that individuals with higher cognitive ability and higher financial literacy benefit differentially from receiving the educational interventions, particularly the text-based treatment and the reminder. On the other hand, fraud education interventions that rely exclusively

on text may be ineffective for individuals who are less financially sophisticated, despite the use of relatively simple language in the intervention.

Altogether, our results indicate that short, easily scalable online educational interventions can meaningfully reduce individuals' susceptibility to investment fraud and that these effects may persist over time when coupled with reminders. Additionally, effects were concentrated among individuals with high cognitive ability and financial literacy, who are also more likely to invest, and as a result may be more likely to be exposed to investment fraud. Our findings are supportive of efforts to reduce susceptibility to financial fraud through education, though suggest that approaches that feature a single educational intervention may be ineffective. Indeed, it is worth noting that at six months across all treatment conditions participants were more willing to invest in the fraudulent opportunities than the legitimate opportunities. This speaks to how much more compelling fraudulent opportunities can be relative to legitimate opportunities, and highlights the difficult task financial fraud educators face. However, we find that approaches that feature repeated exposure to well-designed educational content can causally increase individuals' abilities to spot financial fraud and may meaningfully reduce its occurrence.

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Appendix A

Figure 1: Subjective Probability Distribution Elicitation

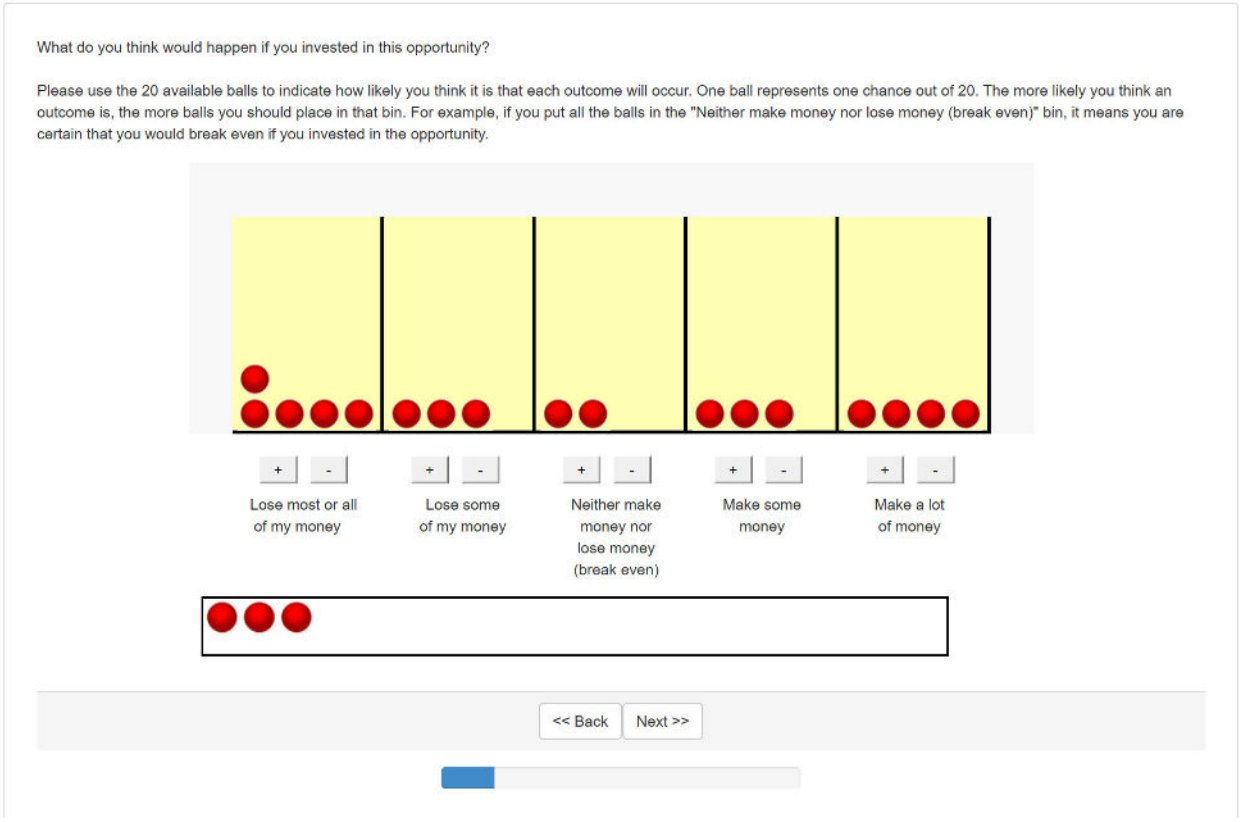
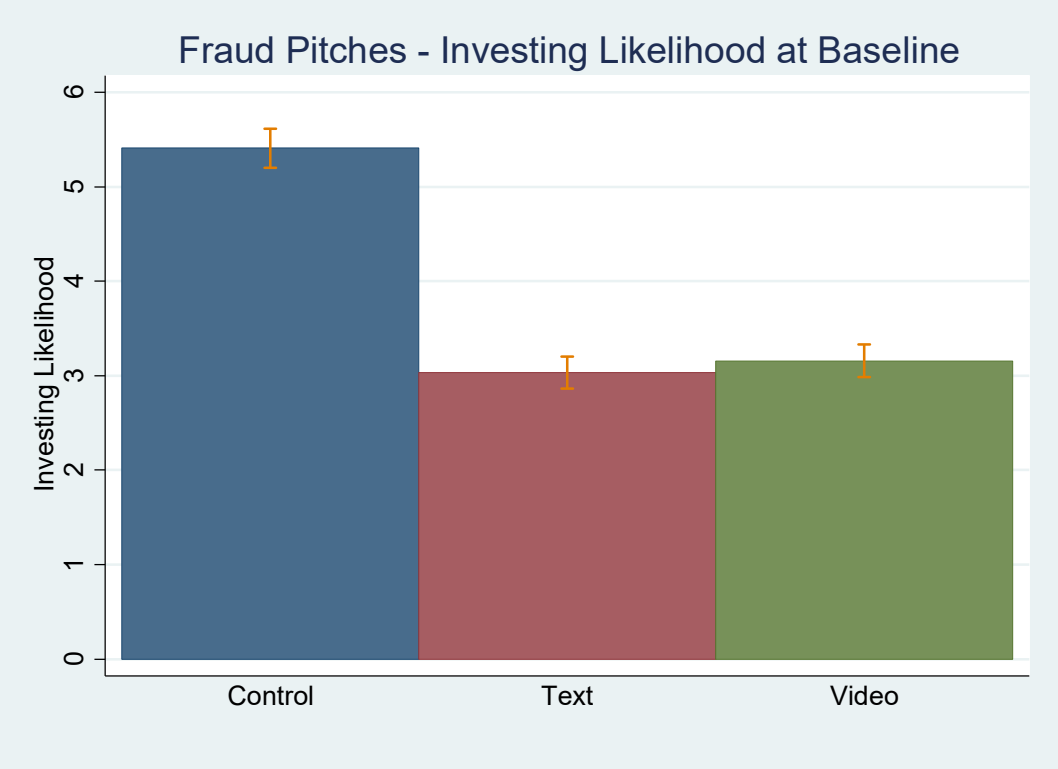
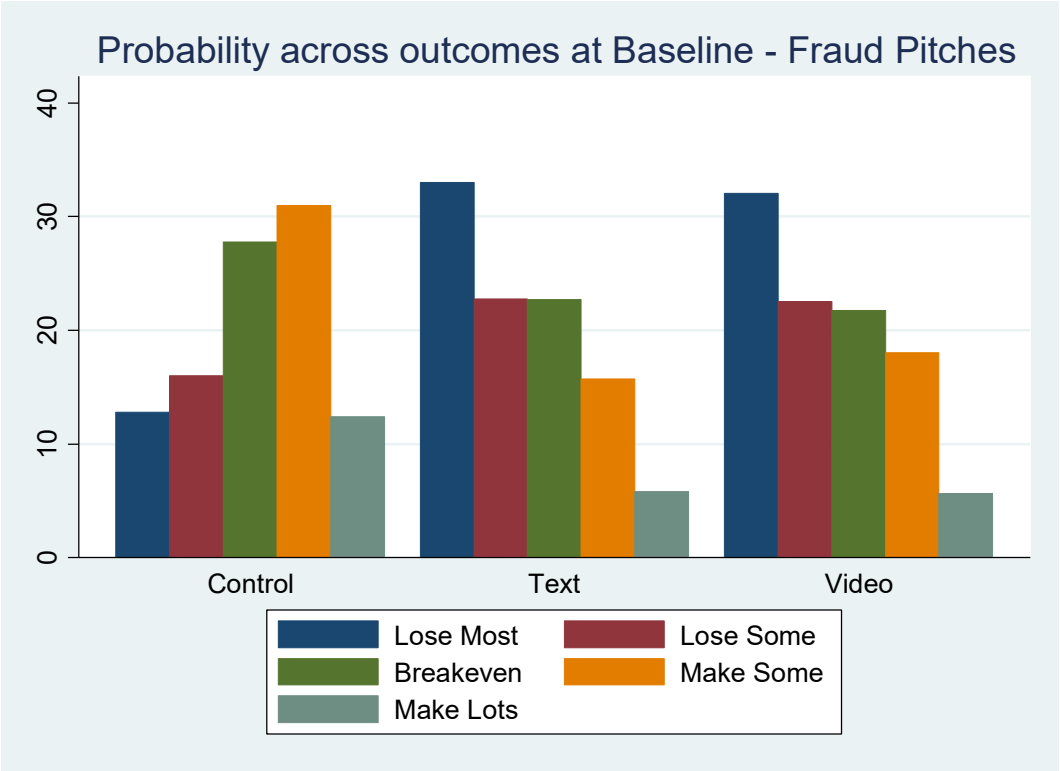


Figure 2: Willingness to Invest in Fraudulent Opportunities at Baseline



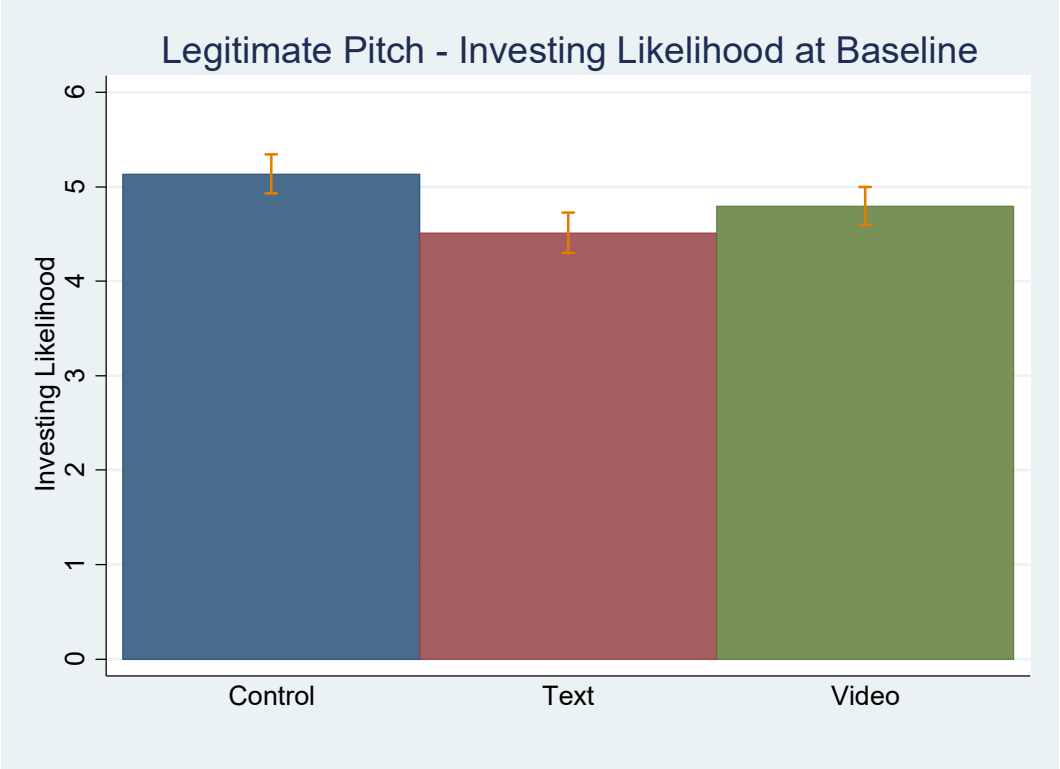
Notes: The figure depicts the average willingness to invest in the two fraudulent opportunities at baseline across condition. Whiskers represent 95% confidence intervals.

Figure 3: Probability Distributions across Outcomes at Baseline - Fraud Pitches



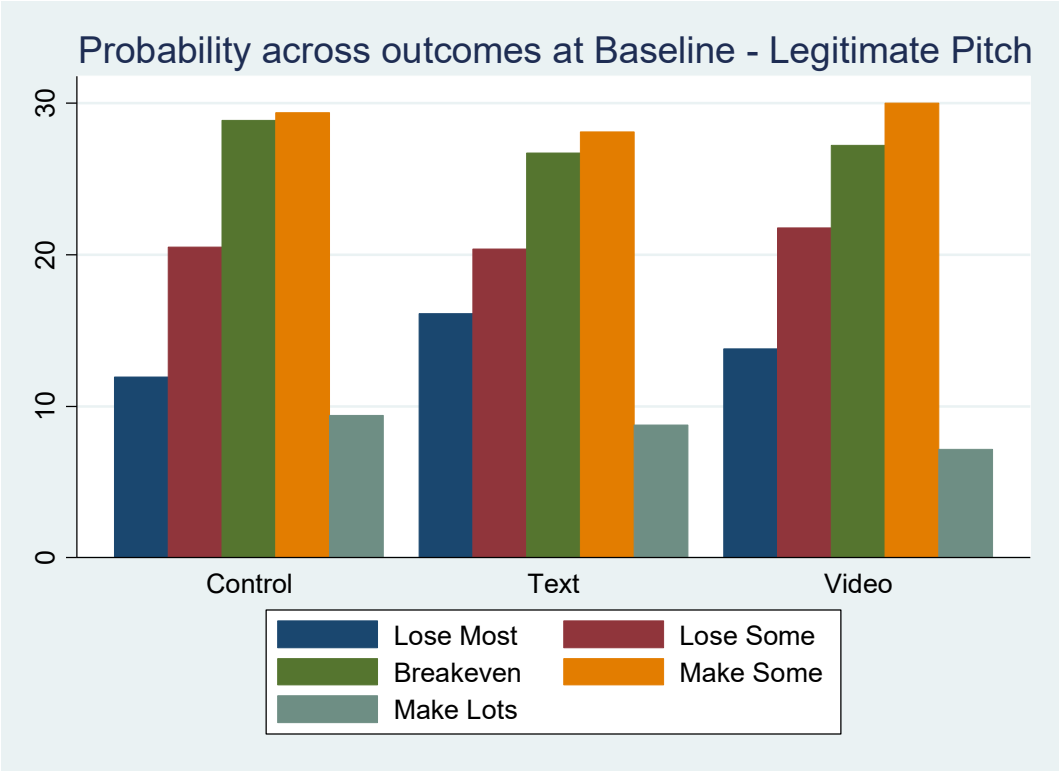
Notes: The figure depicts average probability assigned to each outcome category for the fraudulent investment opportunities at baseline.

Figure 4: Willingness to Invest in Legitimate Opportunity at Baseline



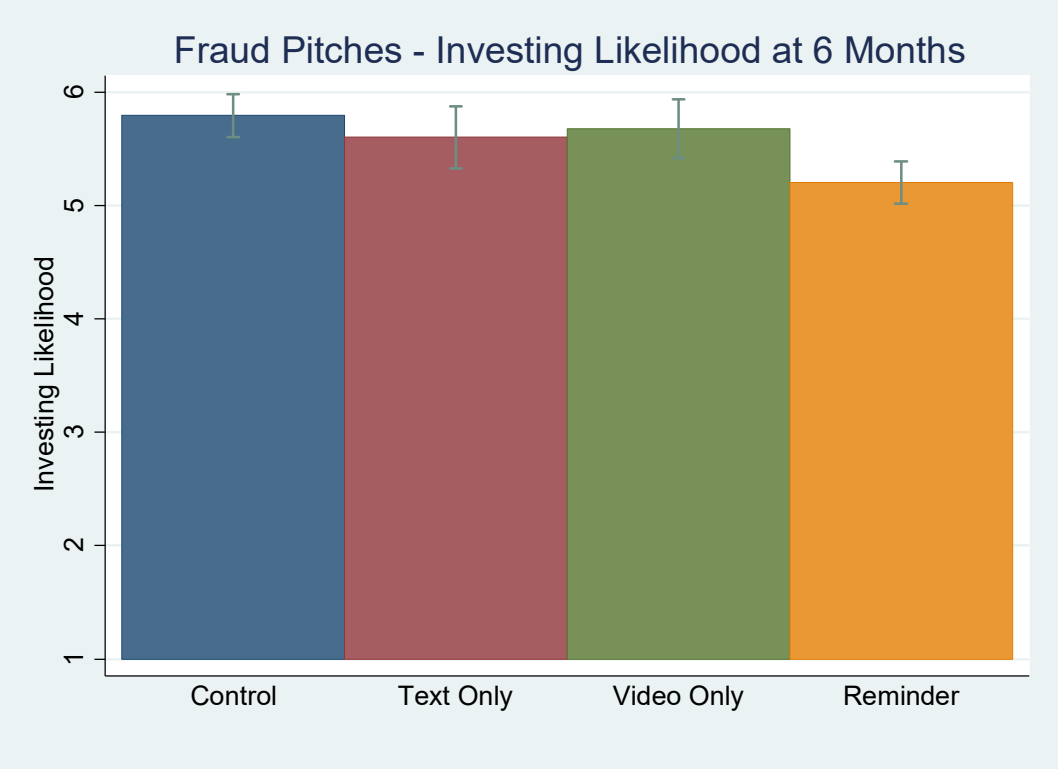
Notes: The figure depicts the average willingness to invest in the legitimate opporunity at baseline across condition. Whiskers represent 95% confidence intervals.

Figure 5: Probability Distributions across Outcomes at Baseline – Legitimate Pitch



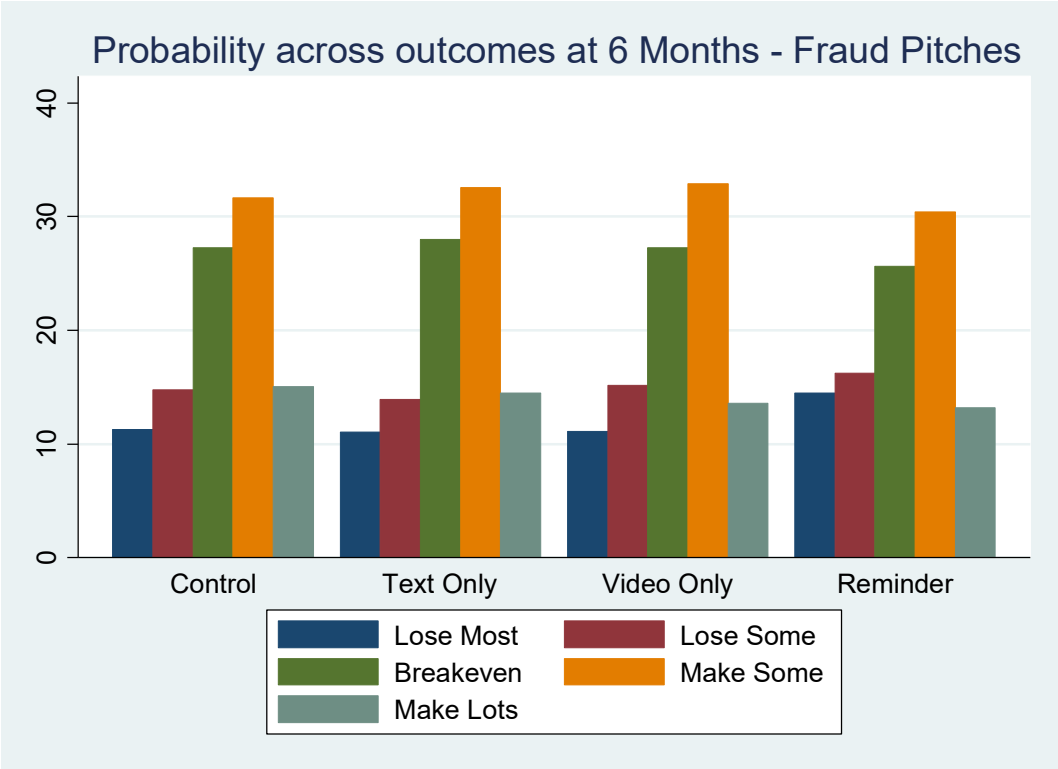
Notes: The figure depicts average probability assigned to each outcome category for the legitimate investment opportunity at baseline.

Figure 6: Willingness to Invest in Fraudulent Opportunities at 6 Months



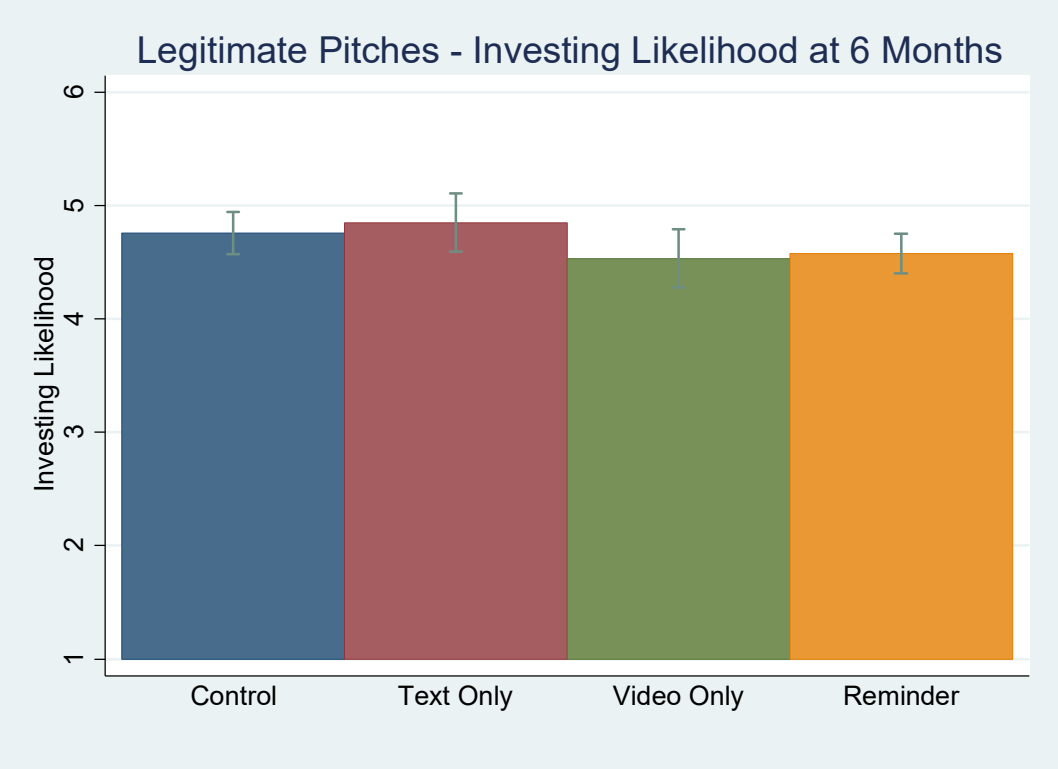
Notes: The figure depicts the average willingness to invest in the four fraudulent investment opportunities at six months across condition. Whiskers represent 95% confidence intervals.

Figure 7: Probability Distributions across Outcomes at 6 Months - Fraud Pitches



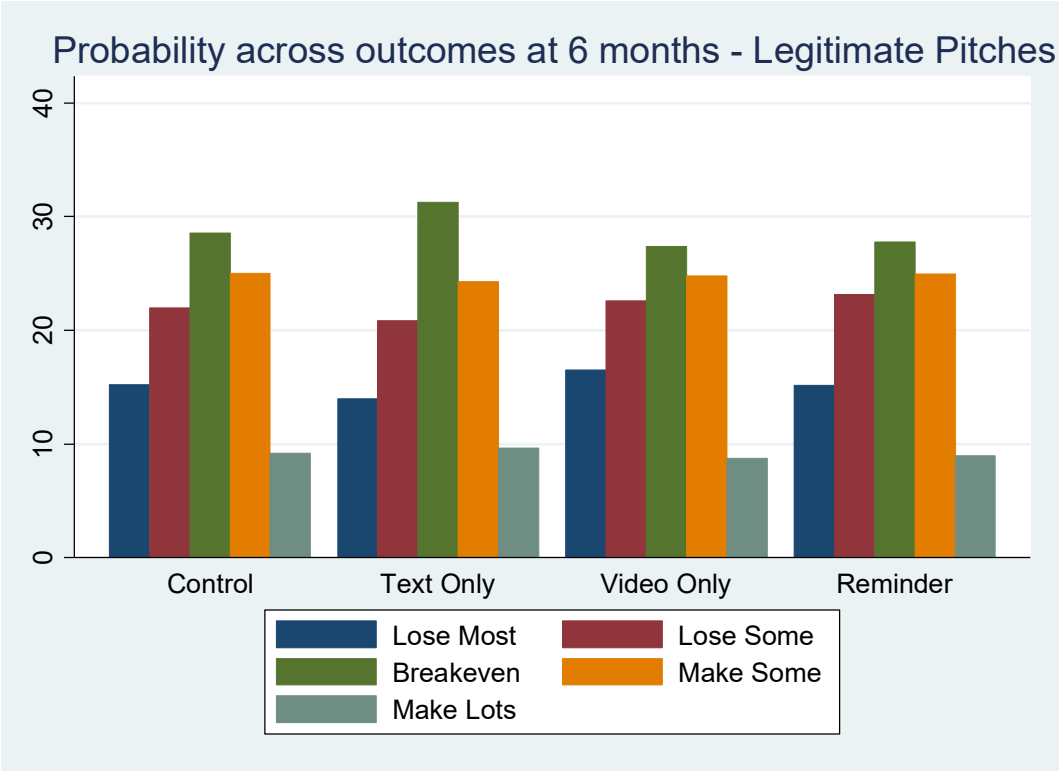
Notes: The figure depicts average probability assigned to each outcome category for the fraudulent investment opportunities at six months.

Figure 8: Willingness to Invest in Legitimate Opportunities at 6 Months



Notes: The figure depicts the average willingness to invest in the two legitimate opportunities at six months across condition. Whiskers represent 95% confidence intervals.

Figure 9: Probability Distributions across Outcomes at 6 Months – Legit Pitches



Notes: The figure depicts average probability assigned to each outcome category for the legitimate investment opportunities at six months.

Table 1: Summary Statistics and Randomization Balance

	Study Condition			
	Control	**Video**	**Text**	**p-value**
Age	52.7	54.3	54.2	0.110
Female (%)	0.545	0.572	0.548	0.582
Married (%)	0.591	0.600	0.630	0.349
White (%)	0.873	0.887	0.884	0.736
College Degree (%)	0.368	0.399	0.421	0.173
HHI > $60,000 (%)	0.488	0.523	0.488	0.379
Observations	582	611	587	

Notes: p-value is for an F-test on three-way equality across treatment arms

Table 2: Effects of Treatment for Fraudulent Opportunities at Baseline

VARIABLES	(1) Willingness to Invest	(2) Probability Lose at Least Some	(3) Probability Lose Most or All
Video	-2.196***	25.155***	18.819***
	(0.136)	(1.646)	(1.421)
Text	-2.312***	26.271***	19.767***
	(0.135)	(1.636)	(1.442)
Age	-0.028***	0.210***	0.187***
	(0.004)	(0.045)	(0.040)
Female	0.245**	-3.384**	-2.944**
	(0.111)	(1.417)	(1.298)
Married	0.265**	-2.229	-1.678
	(0.115)	(1.511)	(1.392)
HHI > $60K	0.081	2.113	-0.317
	(0.115)	(1.548)	(1.433)
College or more	-0.462***	7.227***	4.136***
	(0.112)	(1.506)	(1.411)
White	-0.678***	4.244**	2.095
	(0.179)	(2.130)	(1.956)
Constant	7.289***	13.545***	2.329
	(0.277)	(3.262)	(2.913)
Observations	1,776	1,777	1,777
R-squared	0.233	0.184	0.128

Notes: Willingness to invest is measured on a 10 point scale ranging from 1 (Not at all Likely) to 10 (Extremely Likely). Column 2 examines the combined probability weight assigned to the "Lose Some Money" and "Lose Most or All Money" categories, while Column 3 restricts to the "Lose Most or All Money" category. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 3: Effects of Treatment for Legitimate Opportunity at Baseline

VARIABLES	(1) Willingness to Invest	(2) Probability Lose at Least Some	(3) Probability Lose Most or All
Video	-0.343**	3.322**	2.087*
	(0.141)	(1.577)	(1.172)
Text	-0.622***	4.157**	4.232***
	(0.146)	(1.619)	(1.253)
Age	-0.015***	0.002	0.003
	(0.004)	(0.045)	(0.034)
Female	-0.746***	6.751***	3.849***
	(0.122)	(1.369)	(1.063)
Married	-0.047	0.335	0.569
	(0.128)	(1.470)	(1.178)
HHI > $60K	0.891***	-5.973***	-6.569***
	(0.131)	(1.513)	(1.179)
College or more	0.559***	-3.219**	-2.003*
	(0.125)	(1.420)	(1.098)
White	-0.435**	2.044	0.332
	(0.193)	(2.075)	(1.627)
Constant	6.115***	30.721***	12.957***
	(0.298)	(3.344)	(2.547)
Observations	1,776	1,777	1,777
R-squared	0.102	0.039	0.044

Notes: Willingness to invest is measured on a 10 point scale ranging from 1 (Not at all Likely) to 10 (Extremely Likely). Column 2 examines the combined probability weight assigned to the "Lose Some Money" and "Lose Most or All Money" categories, while Column 3 restricts to the "Lose Most or All Money" category. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 4: Average Likelihood of Investing across Fraudulent Opportunities at 6 Months

VARIABLES	(1) Willingness to Invest	(2) Willingness to Invest
Video only	-0.107	-0.106
	(0.164)	(0.164)
Text only	-0.158	-0.158
	(0.169)	(0.169)
Reminder	-0.550***	
	(0.134)	
Text + Reminder		-0.652***
		(0.161)
Video + Reminder		-0.444***
		(0.165)
Age	-0.012***	-0.012***
	(0.004)	(0.004)
Female	0.155	0.151
	(0.112)	(0.112)
Married	0.145	0.147
	(0.120)	(0.120)
HHI > $60K	-0.002	-0.008
	(0.120)	(0.120)
College or more	-0.325***	-0.325***
	(0.117)	(0.117)
White	-0.540***	-0.539***
	(0.171)	(0.171)
Constant	6.848***	6.857***
	(0.269)	(0.269)
Observations	1,776	1,776
R-squared	0.030	0.031

Notes: Willingness to invest is measured on a 10 point scale ranging from 1 (Not at all Likely) to 10 (Extremely Likely). *** p<0.01, ** p<0.05, * p<0.1

Table 5: Probability Assigned to Negative Outcomes at 6 Months – Fraud Pitches

VARIABLES	(1) Probability Lose at Least Some	(2) Probability Lose at Least Some	(3) Probability Lose Most or All	(4) Probability Lose Most or All
Video only	0.170	0.168	-0.240	-0.241
	(1.641)	(1.642)	(1.182)	(1.182)
Text only	-1.144	-1.146	-0.196	-0.196
	(1.619)	(1.619)	(1.225)	(1.225)
Reminder	4.562***		3.142***	
	(1.385)		(1.033)	
Text + Reminder		5.384***		3.355***
		(1.680)		(1.264)
Video + Reminder		3.703**		2.920**
		(1.742)		(1.323)
Age	0.001	0.002	0.006	0.006
	(0.036)	(0.037)	(0.028)	(0.028)
Female	-2.713**	-2.675**	-3.052***	-3.042***
	(1.162)	(1.162)	(0.886)	(0.884)
Married	-2.553**	-2.571**	-1.644*	-1.649*
	(1.237)	(1.237)	(0.928)	(0.930)
HHI > $60K	0.883	0.929	-0.262	-0.250
	(1.248)	(1.249)	(0.901)	(0.905)
College or more	3.907***	3.902***	1.873**	1.872**
	(1.220)	(1.221)	(0.882)	(0.882)
White	-0.775	-0.781	0.054	0.052
	(1.576)	(1.575)	(1.128)	(1.129)
Constant	27.788***	27.714***	12.992***	12.973***
	(2.733)	(2.734)	(2.183)	(2.182)
Observations	1,777	1,777	1,777	1,777
R-squared	0.022	0.023	0.019	0.019

Notes: Columns 1 and 2 examine the combined probability weight assigned to the "Lose Some Money" and "Lose Most or All Money" categories, while Columns 3 and 4 restrict to the "Lose Most or All Money" category. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 6: Average Likelihood of Investing across Legitimate Opportunities at 6 Months

VARIABLES	(1) Willingness to Invest	(2) Willingness to Invest
Video only	-0.198	-0.198
	(0.157)	(0.158)
Text only	0.113	0.113
	(0.155)	(0.155)
Reminder	-0.163	
	(0.125)	
Text + Reminder		-0.147
		(0.148)
Video + Reminder		-0.180
		(0.152)
Age	-0.018***	-0.018***
	(0.003)	(0.003)
Female	-0.467***	-0.466***
	(0.106)	(0.106)
Married	0.049	0.048
	(0.112)	(0.112)
HHI > $60K	0.492***	0.493***
	(0.111)	(0.112)
College or more	0.404***	0.404***
	(0.107)	(0.107)
White	-1.193***	-1.193***
	(0.180)	(0.180)
Constant	6.574***	6.573***
	(0.271)	(0.271)
Observations	1,776	1,776
R-squared	0.086	0.086

Notes: Willingness to invest is measured on a 10 point scale ranging from 1 (Not at all Likely) to 10 (Extremely Likely). Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 7: Probability Assigned to Negative Outcomes at 6 Months – Legitimate Pitches

VARIABLES	(1) Probability Lose at Least Some	(2) Probability Lose at Least Some	(3) Probability Lose Most or All	(4) Probability Lose Most or All
Video only	1.673	1.671	1.229	1.229
	(1.768)	(1.768)	(1.362)	(1.362)
Text only	-2.399	-2.400	-0.947	-0.947
	(1.623)	(1.623)	(1.302)	(1.303)
Reminder	1.224		0.229	
	(1.367)		(1.057)	
Text + Reminder		1.868		0.332
		(1.661)		(1.304)
Video + Reminder		0.550		0.121
		(1.666)		(1.276)
Age	0.013	0.014	-0.009	-0.009
	(0.036)	(0.036)	(0.028)	(0.029)
Female	3.907***	3.937***	1.388	1.393
	(1.162)	(1.163)	(0.924)	(0.923)
Married	0.388	0.374	0.284	0.282
	(1.269)	(1.269)	(0.999)	(0.999)
HHI > $60K	-1.689	-1.653	-2.264**	-2.258**
	(1.304)	(1.308)	(0.998)	(1.002)
College or more	-2.362**	-2.366**	-4.538***	-4.539***
	(1.190)	(1.191)	(0.888)	(0.888)
White	5.514***	5.509***	1.135	1.134
	(1.743)	(1.743)	(1.273)	(1.273)
Constant	30.992***	30.934***	16.516***	16.507***
	(2.804)	(2.807)	(2.272)	(2.275)
Observations	1,777	1,777	1,777	1,777
R-squared	0.020	0.021	0.027	0.027

Notes: Columns 1 and 2 examine the combined probability weight assigned to the "Lose Some Money" and "Lose Most or All Money" categories, while Columns 3 and 4 restrict to the "Lose Most or All Money" category. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 8: Probability of Passing the Knowledge Test at 6 Months

VARIABLES	(1) Passed	(2) Passed
Video only	0.020	0.020
	(0.036)	(0.036)
Text only	0.048	0.048
	(0.035)	(0.035)
Reminder	0.090***	
	(0.028)	
Text + Reminder		0.074**
		(0.035)
Video + Reminder		0.107***
		(0.035)
Age	0.001	0.001
	(0.001)	(0.001)
Female	-0.034	-0.035
	(0.024)	(0.024)
Married	0.019	0.019
	(0.026)	(0.026)
HHI > $60K	0.098***	0.097***
	(0.027)	(0.027)
College or more	0.112***	0.112***
	(0.026)	(0.026)
White	0.063*	0.063*
	(0.036)	(0.036)
Constant	0.245***	0.247***
	(0.057)	(0.057)
Observations	1,777	1,777
R-squared	0.045	0.046

"Passed" is an indicator variable taking the value of 1 if a participant correctly answered all five items on the knowledge quiz. Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Table 9: Heterogeneity for Fraudulent Opportunities at 6 Months by Cognitive Ability Score

VARIABLES	(1) Willingness to Invest	(2) Probability Lose at Least Some	(3) Probability Lose Most or All
Video Only	-0.113	0.202	-0.246
	(0.164)	(1.639)	(1.182)
Video Only * Cog Ability	-0.171	0.148	0.356
	(0.181)	(1.733)	(1.197)
Text Only	-0.156	-1.195	-0.281
	(0.169)	(1.611)	(1.213)
Text Only * Cog Ability	-0.344*	3.622**	2.998**
	(0.178)	(1.692)	(1.310)
Reminder	-0.554***	4.537***	3.139***
	(0.135)	(1.393)	(1.042)
Reminder * Cog Ability	-0.366***	3.693***	2.384**
	(0.132)	(1.357)	(1.053)
Cog Ability	0.129	-2.223**	-1.777**
	(0.111)	(1.115)	(0.866)
Age	-0.011***	-0.001	0.007
	(0.004)	(0.037)	(0.028)
Female	0.135	-2.722**	-3.083***
	(0.113)	(1.166)	(0.882)
Married	0.134	-2.240*	-1.416
	(0.120)	(1.238)	(0.927)
HHI > $60K	0.020	0.902	-0.192
	(0.123)	(1.264)	(0.920)
College or more	-0.267**	3.996***	2.107**
	(0.122)	(1.264)	(0.908)
White	-0.429**	-0.703	0.309
	(0.181)	(1.706)	(1.258)
Constant	6.692***	27.625***	12.471***
	(0.285)	(2.869)	(2.290)
Observations	1,770	1,771	1,771
R-squared	0.034	0.028	0.024

Notes: Willingness to invest is measured on a 10 point scale ranging from 1 (Not at all Likely) to 10 (Extremely Likely). Column 2 examines the combined probability weight assigned to the "Lose Some Money" and "Lose Most or All Money" categories, while Column 3 restricts to the "Lose Most or All Money" category. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 10: Heterogeneity for Fraudulent Opportunities at 6 Months by Cognitive Ability Terciles

VARIABLES	(1) Willingness to Invest	(2) Probability Lose at Least Some	(3) Probability Lose Most or All
Video Only * Higher Cog	-0.152	0.133	-0.305
	(0.199)	(1.964)	(1.341)
Video Only * Low Cog	-0.046	0.561	0.057
	(0.291)	(2.921)	(2.260)
Text Only * Higher Cog	-0.318	1.427	2.058
	(0.205)	(2.074)	(1.608)
Text Only * Low Cog	0.125	-5.862**	-4.452**
	(0.296)	(2.537)	(1.787)
Reminder * Higher Cog	-0.737***	6.795***	4.749***
	(0.169)	(1.765)	(1.285)
Reminder * Low Cog	-0.203	0.287	0.159
	(0.223)	(2.263)	(1.780)
Higher Cog	6.980***	24.364***	10.344***
	(0.292)	(2.954)	(2.291)
Low Cog	6.616***	30.609***	14.966***
	(0.297)	(2.939)	(2.367)
Age	-0.012***	0.003	0.010
	(0.004)	(0.036)	(0.028)
Female	0.164	-2.946**	-3.208***
	(0.113)	(1.166)	(0.890)
Married	0.131	-2.293*	-1.455
	(0.120)	(1.233)	(0.925)
HHI > $60K	-0.023	1.253	-0.015
	(0.122)	(1.255)	(0.913)
College or more	-0.333***	4.486***	2.354***
	(0.120)	(1.243)	(0.889)
White	-0.543***	-0.017	0.618
	(0.174)	(1.614)	(1.163)
Observations	1,770	1,771	1,771
R-squared	0.854	0.585	0.341

Notes: Willingness to invest is measured on a 10 point scale ranging from 1 (Not at all Likely) to 10 (Extremely Likely). Column 2 examines the combined probability weight assigned to the "Lose Some Money" and "Lose Most or All Money" categories, while Column 3 restricts to the "Lose Most or All Money" category. "Low Cog" indicated participants in the bottom tercile of cognitive ability score, while "Higher Cog" denotes that a participants is in the top two terciles. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 11: Heterogeneity for Fraudulent Opportunities at 6 Months by Financial Literacy

VARIABLES	(1) Willingness to Invest	(2) Probability Lose at Least Some	(3) Probability Lose Most or All
Video only	-0.095	0.621	0.011
	(0.175)	(1.749)	(1.254)
Video Only * Fin Lit	-0.076	-0.794	-0.958
	(0.184)	(1.974)	(1.478)
Text only	-0.162	-0.674	-0.020
	(0.182)	(1.701)	(1.272)
Text Only * Fin Lit	-0.413**	4.707**	3.329**
	(0.193)	(1.911)	(1.584)
Reminder	-0.592***	4.987***	3.150***
	(0.142)	(1.444)	(1.065)
Reminder * Fin Lit	-0.277*	4.574***	3.358***
	(0.149)	(1.509)	(1.236)
Financial Literacy	0.284**	-3.065***	-2.225**
	(0.120)	(1.156)	(0.907)
Age	-0.015***	0.012	0.009
	(0.004)	(0.041)	(0.032)
Female	0.155	-2.374*	-2.876***
	(0.122)	(1.240)	(0.945)
Married	0.185	-2.691**	-1.719*
	(0.128)	(1.316)	(0.977)
HHI > $60K	-0.029	1.690	0.272
	(0.132)	(1.363)	(0.972)
College or more	-0.419***	3.716***	1.715*
	(0.132)	(1.330)	(0.924)
White	-0.472**	-1.674	-0.420
	(0.194)	(1.727)	(1.212)
Constant	7.024***	26.987***	12.604***
	(0.331)	(3.243)	(2.516)
Observations	1,561	1,562	1,562
R-squared	0.038	0.034	0.029

Notes: Willingness to invest is measured on a 10 point scale ranging from 1 (Not at all Likely) to 10 (Extremely Likely). Column 2 examines the combined probability weight assigned to the "Lose Some Money" and "Lose Most or All Money" categories, while Column 3 restricts to the "Lose Most or All Money" category. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 12: Heterogeneity for Fraudulent Opportunities at 6 Months by Financial Literacy Terciles

VARIABLES	(1) Willingness to Invest	(2) Probability Lose at Least Some	(3) Probability Lose Most or All
Video Only * Higher Fin	-0.214	1.296	0.614
	(0.226)	(2.261)	(1.556)
Video Only * Low Fin	0.044	0.067	-0.487
	(0.275)	(2.795)	(2.098)
Text Only * Higher Fin	-0.552**	1.762	2.011
	(0.244)	(2.454)	(1.845)
Text Only * Low Fin	0.325	-3.760	-2.600
	(0.273)	(2.331)	(1.730)
Reminder * Higher Fin	-0.800***	8.585***	6.070***
	(0.187)	(1.970)	(1.409)
Reminder * Low Fin	-0.330	0.295	-0.647
	(0.218)	(2.121)	(1.633)
Higher Fin	7.202***	24.873***	10.640***
	(0.353)	(3.476)	(2.700)
Low Fin	6.672***	30.183***	15.183***
	(0.325)	(3.221)	(2.584)
Age	-0.015***	0.010	0.009
	(0.004)	(0.041)	(0.032)
Female	0.147	-2.388*	-2.904***
	(0.122)	(1.244)	(0.948)
Married	0.187	-2.790**	-1.779*
	(0.129)	(1.322)	(0.980)
HHI > $60K	-0.006	1.618	0.244
	(0.131)	(1.345)	(0.964)
College or more	-0.408***	3.613***	1.691*
	(0.130)	(1.318)	(0.918)
White	-0.458**	-1.626	-0.354
	(0.192)	(1.720)	(1.219)
Observations	1,561	1,562	1,562
R-squared	0.855	0.586	0.338

Notes: Willingness to invest is measured on a 10 point scale ranging from 1 (Not at all Likely) to 10 (Extremely Likely). Column 2 examines the combined probability weight assigned to the "Lose Some Money" and "Lose Most or All Money" categories, while Column 3 restricts to the "Lose Most or All Money" category. "Low Fin" indicated participants in the bottom tercile of financial literacy score, while "Higher Fin" denotes that a participants is in the top two terciles. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Appendix B – Investment Opportunities

The following pitches were used to assess participant willingness to invest in fraudulent and legitimate invest opportunities. Pitches 1, 2, and 3 were presented to participants both at baseline and endline, while Pitches 4, 5, and 6 were presented to participants at endline. Pitches 1, 2, 4 and 5 are fraudulent.

Pitch 1:

My friends informed me about a very reliable high-yield investment program I've been extremely impressed with. The program pays from 2% to 3.4% daily depending on the investment plan you choose. The minimum term of investment is 180 days, after which you can either recover the sum of your initial investment or continue further participation in the project. You can also invest on a compound basis and get huge returns. It guarantees the safety of the invested amount and even pays a 5% referral commission.

Pitch 2:

We are a highly regarded and profitable Investment Management Company specializing in the Foreign Exchange market, Futures, Options, Commodities, Stocks, Bonds, Real estate, Business startup, and many other investments. We promise to invest your deposits and deliver returns as stated in a professional and courteous manner. We guarantee you will not lose your principle investment with our company. We promise to deliver excellent customer service and answer any questions you may have regarding our business and your deposits invested with us in a timely manner. We promise to give you a positive experience with our company and deliver on all promises we make and as stated on our website. This opportunity is only open to a limited number of investors.

"This company has created a revolutionary investment system that is incorporating short term and long term investments into an around the clock profit generating machine. The system is truly unique and revolutionary." – Richard Seguin, Senior Financial Analyst, FX Daily Tribune

Pitch 3:

This fund is designed to provide investors with exposure to the entire U.S. equity market, including small-, mid-, and large-cap growth and value stocks. The fund's key attributes are its low costs, broad diversification, and the potential for tax efficiency. Investors looking for a low-cost way to gain broad exposure to the U.S. stock market who are willing to accept the volatility that comes with stock market investing may wish to consider this fund as either a core equity holding or your only domestic stock fund.

Pitch 4:

This managed fund specializes in investments in exchange traded funds of precious metals such as gold, silver, platinum and palladium and provides a safe haven against volatility. Investments in precious metals are low risk due to the underlying value of the asset and the fund does not trade in risky options or futures contracts. Your investment will not lose value and investors can expect

high profits in a short amount of time. The fund's management team are experts and can predict future precious metal prices with a high degree of accuracy.

Pitch 5:

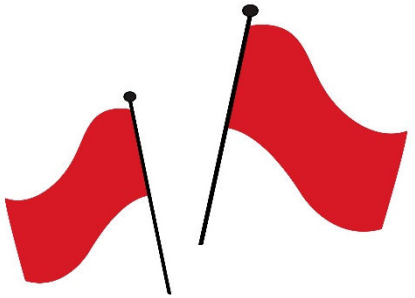
We specialize in investments in websites that drive internet traffic to e-commerce sites, such as Amazon.com and Target.com. Our system monetizes click-through rates to generate substantial return on investment. We guarantee returns between 4% - 5% quarterly, with a 100% money back guarantee on your initial investment. Investors can choose their desired length of maturity, with longer maturities delivering significantly higher returns. We manage assets of over 1 million investors with an A+ rating from the Better Business Bureau.

Pitch 6:

This fund offers investors a low cost way to gain equity exposure to both developed and emerging international economies. The fund tracks stock markets all over the globe, with the exception of the United States. Because it invests in non-U.S. stocks, including those in developed and emerging markets, the fund can be more volatile than a domestic fund. Long-term investors who want to add a diversified international equity position to their portfolio might want to consider this fund as an option.

Appendix C – Text Treatment

Learn to Spot the Red Flags of Investment Fraud

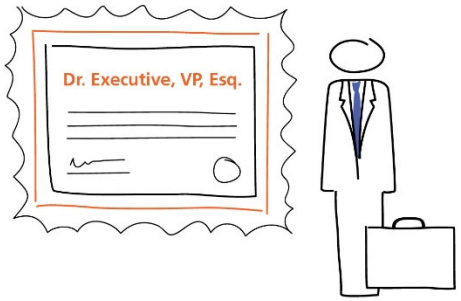


Investment fraud criminals use a wide array of sophisticated and highly-effective tactics to get people to part with their money.

Fraudsters—who spend their "careers" developing schemes to defraud victims—are continually creating new, innovative scams but knowing the exact scam is not as important as understanding the types of persuasion tactics that are applied across many different schemes.

Learn how to spot these red flags of fraud—and help protect not just yourself, but friends, neighbors, and family members.

Source Credibility



Step 1. Verify credentials

Fraudsters often work hard to appear legitimate, a tactic known as source credibility. They might use an impressive title or fill their corner office with framed certificates.

They hope that if they look successful, you won't bother checking their credentials. Remember: ***Credibility can be faked!***

Investment professionals—like brokers, investment advisers, and insurance agents—must be registered with regulators, such as the Financial Industry Regulatory Authority (FINRA), the Securities and Exchange Commission (SEC), or your state securities or insurance regulator.

Red Flag Rule 

Regardless of your trust or ties, or prior dealings with the professional, do your homework. Before you invest or pay for any investment advice:

- CHECK that the salesperson is licensed using FINRA BrokerCheck (www.finra.org/brokercheck) or by calling your state securities regulator.
- CHECK that the product is registered with the SEC (www.Investor.gov).

If the source or the claims cannot be independently verified, be particularly skeptical. One call or web search may save you from sending your money to a con artist, an unscrupulous financial professional, or a disreputable firm.

Phantom Riches

Step 2. Steer clear of "phantom riches."
Be wary of an investment pitch that guarantees a certain return or promises spectacular profits—what fraud fighters call "phantom riches."

No legitimate salesperson can make those kinds of promises. An ethical salesperson will admit that ***every investment involves risk***.

Red Flag Rule

Take time to think through the pitch:

- Is the salesperson dangling unreasonably high or unusually steady returns? Guarantees?
- Is the opportunity extremely low- or no-risk?
- Are they saying that the investment itself will lead to a different—and much better—lifestyle?

When it comes to investing, there is a tradeoff between the potential for greater rewards and the risk of loss. There is no such thing as a risk-free investment. You can manage and take steps to minimize your exposure by taking time to do your own homework so that you fully understand the risks associated with the investment.

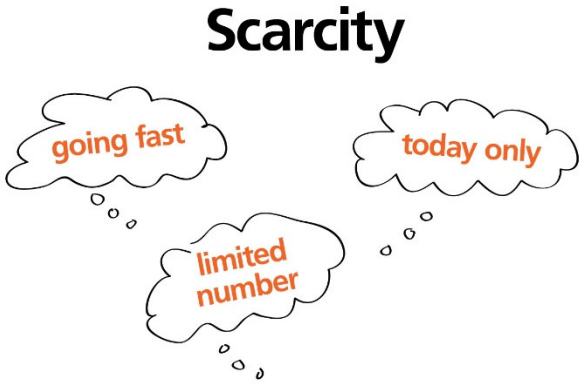
Step 3. Be skeptical of claims that "everyone is doing it". Don't be swayed by a seller's claim that other savvy investors or people in the same social or civic group have already invested.

This tactic takes advantage of our desire to not miss out on an opportunity that others are profiting from. It also leads us to believe that if everyone wants the investment, it must be good—and that surely someone else has done the homework to verify it's a legitimate opportunity.

Red Flag Rule 

- A pitch that focuses on who and how many people are invested, rather than why the investment is sound, should be viewed with great skepticism.

Just because others are investing in it, doesn't mean its right for you. Think about your goals, the time frames for meeting those goals, and your ability to tolerate potential investment losses.



Step 4. Refuse to be rushed.

Scarcity is an incredibly powerful motivator. Using this tactic, a salesperson creates a (often fake) sense of urgency by claiming limited supply or limited time, or claiming that the investment opportunity is only available to an exclusive group.

The seller is attempting to push you into making a quick (and emotional) decision, and to make the investment look valuable by implying it is in scarce supply due to great demand.

Red Flag Rule 

- If the salesperson says it's a limited time offer, or that there's a limited supply of whatever's being peddled, consider it a red flag.
- Ask yourself, why is the investment only available for a limited time or in limited quantity? Is it really possible that the opportunity will be gone if I don't act immediately?

Even if the offer is legitimate, it's still a good idea to be aware of the added pressure of scarcity and to take the time to evaluate the offer for your own circumstances.

Reciprocity

Step 5. Never feel obligated.
Never feel obligated to make an investment because the seller gives you something free.

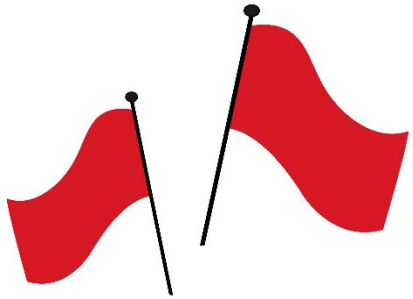
Salespeople count on those freebies and discounts to guilt you into reciprocating in some way—whether that's buying what they are selling at that moment, disclosing personal information, or simply agreeing to a follow-up meeting.

Red Flag Rule

Think about any freebies or discounts you may have received.

- Why did the salesperson offer this free meal, book, or vacation?
- How could they possibly benefit from the deal?
- Do you feel obligated (consciously or not) to give something in return?

Question why you feel obligated to turn over a portion or all of your savings just because someone bought you a $20 dinner—or even a $200 dinner. While reciprocity is a social norm in our society, what is given should be proportionate to what is received. And nothing is truly free.



Further educate yourself about fraud tactics so you can protect yourself and your loved ones. Knowing how to recognize investment fraud red flags is the best way to avoid falling victim to them.