Erasmus
School of
Economics

Master's Thesis

Rhys McKenna 452181

Word count (excl. references, appendix, and abstract): 6908 | Date: 22-05-2023

Erasmus University Rotterdam
Make it happen.

Abstract

The following paper used an experimental approach to understand the relationship between emotions and financial decision making. Using two dog-themed video clips as treatments, one including puppies and one including a sad dog, a survey was distributed to record participants' propensity to invest in a risky asset having been exposed to either treatment. Emotions were captured via a Positive and Negative Affect Schedule. It was found that those who were exposed to the video of puppies self-reported higher average positive affect scores and lower average negative affect scores than those exposed to the clip of the sad dog. It was also found that those exposed to the video clip of puppies invested, on average, more into the risky asset than those exposed to the sad dog clip. The differences between averages of positive and negative affect scores as well as average amount invested into the risky asset were not found to be statistically significant.

Table of Contents

1. Introduction

In 1987, Warren Buffet, CEO and founder of Berkshire Hathaway, the investment conglomerate managing as much as $331 billion (Wallmine, 2022), wrote the following in the annual shareholder letter:

"We simply attempt to be fearful when others are greedy and to be greedy only when others are fearful" (Buffet, 1987)

Deliberately or inadvertently, Buffet's simplification of how his firm invests capital touches upon an area of interest that has direct relevance in the driving factors influencing both an individual's decisions and quality of such decisions. The categorization of 'others' as 'greedy' or 'fearful' exemplifies how objective financial decision making can be prone to the influence of one's emotions.

It is precisely this influence that motivated interest in this topic. In financial markets, traders with effective emotion regulation tend to perform better (Fenton O'Creevy, Soane, Nicholson, & Willman, 2010) (Fenton-O'Creevy, et al., 2012). The implications of a lack of emotional control are reinforced by Statman (2015) as well as Baker and Ricciardi (2015), who contextualize the necessity for financial planners to understand behavioural heuristics in clients as they may impede investment performance.

Given the role of emotions in decision making the following research question is developed:

"To what extent do emotions impact investment decisions?"

This paper focuses specifically on the role of emotions in individual investment decision making. Furthermore, the research aims to assess the impact of exogenously induced emotions via video clips on financial decisions. Studies that have implemented such techniques include Andrade et al. (2016) as well as Lahav and Meer (2012), all of which use video clips to externally induce emotional states in the participants of their studies on price bubbles in experimental asset markets.

This paper expands on emotions and decision making in finance by examining how they impact investment decisions. This was carried out through an experimental design that included the distribution of a survey which respondents were required to fill out. The survey included two dog-themed videos, the treatments, one with puppies and the other with a crying wolfdog, that respondents were randomly assigned to watch, after which negative and positive emotional values would be reported via the Positive and Negative Affect Schedule (PANAS).

Respondents who were exposed to the crying wolfdog video reported lower positive affect scores and higher negative affect scores compared to the group exposed to the puppies video, which reported higher positive affect and lower negative affect scores. The differences in these averages were not found to be statistically significant. On the other hand, statistically significant differences in averages were found between the positive affect scores of the group of respondents that was not shown a video and the group that was shown the video of the crying wolfdog. This effect found support in further robustness checks.

It was found that respondents who viewed the video about the puppies allocated, on average, more towards the riskier asset than the safe asset. Conversely, those who viewed the video of the crying wolfdog invested less in the risky asset. Further, log transformed investment in the risky asset was inversely correlated to log transformed negative affect scores, while being positively correlated with log transformed positive affect scores. Ultimately, while associations were uncovered, no causal effect was found between positive or negative affect scores and investment into the riskier asset.

The remainder of the paper will highlight the selected literature that helped in shaping the idea for this research, define the hypotheses, and detail the design of the experiment. This is then followed by a breakdown of the results from the online survey, analysis of the positive and negative affect schedule results, and the results of the investments into the risky asset. Finally, the paper ends with a discussion and overall conclusion.

2. Academic Literature

The literature pertaining to the role of emotions under risky choice has been extensively explored. The emotions of interest in this paper centres on immediate rather than expected emotions. Rick and Loewenstein (2008) make the distinction between the two types of emotions, with expected emotions being those an individual anticipates occurring because of a particular course of action, while immediate emotions are those experienced at the moment of choice.

They further decouple immediate emotions into two types: Incidental and Integral. The former type is experienced at the moment of choice but is driven by situational sources that are not related to the specific task, such as a radio or television playing in the background while a choice is being made. Integral emotions on the other hand arise from thoughts relating to the consequences of one's decision (Rick & Loewenstein, 2008).

Under a laboratory setting and using software to track facial expressions as a proxy for emotions, Breaban and Noussair (2018) find positive emotional states in traders are associated with higher prices, bigger bubbles, and a greater risk tolerance. They conclude a strong correlation between fear and loss aversion. Similarly, Stanton et. al (2023) find that individuals induced into a happy mood gambled more frequently than individuals induced into a neutral or a sad mood.

Externally induced state of excitement, via video clips, is found to produce larger pricing bubbles compared to externally induced states of fear or calm in experimental asset markets (Andrade, Odean, & Lin, 2016). This finding is substantiated in a similar mood induction study, of a similar method, by Lahav and Meer (2012) who found that when traders are induced with positive mood, large positive price deviations occur. Emotion induction via music has also shown that participants are more prone to risk taking in lotteries when they are exposed to 'happy' music compared to 'sad' or 'random tones' music (Schulreich, et al., 2014).

In an experiment using face reading software, Nguyen and Noussair (2014) highlight that positive emotions promote more risk-taking. They find that stronger emotions, such as fear, happiness, anger, and surprise, are associated with risk aversion. Analogously, Campos-Vasquez and Cuilty (2014), under the context of Prospect Theory, studied participants that made a series of financial related decisions involving risky gambles. It was found that risk aversion increases with emotions such as fear and anxiety, while risk-taking was enhanced through emotions of excitement and happiness.

In another set of experiments by Yang et. al (2015), participants' levels of anxiety were altered while deciding between a riskless payoff and a risky payoff. They found that suboptimal decisions were often made by more anxious individuals compared to those that were not, and that this may have been due to an anxious individual's tendency to focus on the negative outcomes of a decision (Yang, Saini, & Freling, 2015).

Gong and Corter (2022) investigated the effects of induced incidental moods under a risky choice task by randomly assigning participants to watch short video clips that induced either a happy mood or a sad mood. It was found that those allocated to either sad or happy mood states used less analytical processing for expected value maximization and more heuristic-based patterns of processing for risky choice decisions (Gong & Corter, 2022).

Studies have also shown that the impact of incidental emotions on risk-taking depends on the exact type of uncertainty involved. In an experiment with real payoffs, Kulger et. al (2012) induced participants with emotions of fear and anger, via a writing task, finding that participants induced with the former emotion showed elevated levels of risk aversion in lottery-based choices compared to respondents induced with the latter. These roles were reversed under situations where the uncertainty levels were driven by people rather than by a randomization device (Kulger, Connolly, & Ordóñez, 2012). Similarly, Smith et. al (2016) found that anxiety predicted less risk-taking in a highly ambiguous task compared to a low ambiguity task.

Druckman and McDermott (2008) find emotions seem to be affected by the framing of the choice to be made, with additional evidence highlighting that their exact role depends on the problem domain, such as a financial decision. Lee and Andrade (2015) complement this assertion, finding that individuals induced with fear tended to be more risk-taking when a decision task was framed as an exciting casino game and more risk averse when the task was framed as a stock investment.

In a study on expected emotions, Mellers and McGraw (2001) find that individuals who overestimate the pleasure of favourable outcomes tend to be overly risk seeking while those who overestimate the displeasure of an unfavourable outcome are overly risk averse. Panno, Laurriola, and Figner (2013) find emotion-regulation to be significant predictors of risky choice. Specifically, cognitive reappraisal, which are antecedent-focused strategies that show one's ability to reframe a situation to change the emotional impact, was correlated with increased risk taking as well as decreased sensitivity to changes in loss amount (Panno, Lauriola, & Figner, 2013). Further, Martin and Delgado (2011), found that less risky choices were made when participants used cognitive strategies to regulate emotions.

These findings are synonymous with financial markets-oriented literature, such as Fenton-O'Creevy, et al. (2012) who find traders find it difficult to regulate emotions in volatile markets and that greater experience was associated with more effective emotional regulation. This is in turn is also consistent with the paper mentioned in the introduction, which finds a performance advantage in traders who employ antecedent-focused emotional regulation tactics and concluding that effective emotional regulation appears to be a differentiator in higher performing traders (Fenton-O'Creevy, et al., 2012).

3. Hypotheses

To address the research question defined above and build on the existing literature, this study aims to investigate whether a causal relationship exists between, as defined by Rick and Lowenstein (2008), immediate emotions and financial decision making. Specifically, the experimental design has been constructed to observe whether changes in *incidental*

emotions have a causal relationship with one's level of financial risk-taking between a risky and risk-free option.

While measuring an individual's emotions is challenging, an augmented version of the Positive and Negative Affect Schedule (PANAS), as used by Parslow & Rose (2021) and coined by Watson et. al (1988), is used. The reason incidental emotions are of interest, rather than integral, is they are unrelated to the decision at hand (Rick & Loewenstein, 2008) yet may still affect how a decision is made. In previous studies for example, incidental emotions have been shown to impact the size of charitable donations (Kurtz, Furnagiev, & Forbes, 2023) and effect the evaluation of consumer products that make specific emotional claims (Kim, Park, & Schwarz, 2010).

Based on the academic literature, positive emotions seem to increase risk-taking (Breaban & Noussair, 2018) (Stanton, Reeck, Huettel, & LaBar, 2023) while negative emotions are associated with elevated levels of risk aversion (Nguyen & Noussair, 2014) (Yang, Saini, & Freling, 2015) (Campos-Vazquez & Cuilty, 2014). As a result, two hypotheses are defined in this study:

H1: Positive emotions are associated with more invested into the risky option.

H2: Negative emotions are associated with less invested to the risky option.

4. Experimental Design

The experiment was investment oriented with three treatments, two of which aim to induce emotions in participants. Two of the treatments are videos that respondents are randomly assigned to watch, while one treatment shows no video. After answering a selection of demographic related questions, participants are randomly assigned to a treatment, after which they answer the investment related question.

The present study contained no tangible 'good' or 'bad' outcomes for participants of the survey. That being said, some studies have indicated that even under hypothetical

situations, individuals still tend to be concerned about outcomes (Wiseman & Levin, 1996). This thus lends some validity to the responses acquired during the data collection phase of the study as not simply a series of random data points.

4.1 Survey Design

The primary means for data collection was via an online survey curated in the Qualtrics software. The survey began with demographic questions which, upon completion, led to one of three situations; respondents were prompted to watch one of two short dog videos, or were presented with no video, and then proceeded directly to the emotional screening. Participants were randomized into these groups via the Qualtrics software.

The survey was distributed via online sources such as SurveySwap and SurveyCircle. Additionally, the survey was also shared on the author's personal LinkedIn with the objective of collecting results from individuals with both financial and non-financial industry experience. The survey was also distributed via selected friends and family.

4.2 Video Selection

Each video, except for the control group treatment, was aimed at eliciting an emotional response. The video intended to invoke a positive emotional response is referred to as the 'positive treatment'. The 'negative treatment' describes the second treatment, the video aimed at invoking a negative emotional response. The former video is a short clip showing two very young Shiba Inu puppies while the latter is a video of a wolfdog crying over the grave of one of its owners. No video was shown to the control group.

Support for both of the selected dog videos can be found in select literature. Wheeler & Faulkner (2015) investigate the 'pet effect' and conclude that interactions with a companion dog reduced stress for all participants in their study, even more so for participants that were high in trait anxiety. Ein, Hadad, Reed, & Vickers (2019) find that presenting a picture of a personal pet to participants attempting a mental arithmetic task did not reduce their stress response to the task but was rated as subjectively relaxing.

Another academic article finds evidence that dog videos are associated with a decrease in subjective anxiety and increase in positive affect, more so than nature videos (Ein, Reed, & Vickers, The Effect of Dog Videos on Subjective and Physiological Responses to Stress, 2021). Further, studies have shown that people tend to have more empathy for puppies and dogs in situations of suffering than they do for adult humans in similar circumstances (Levin, Arluke, & Irvine, 2017).

4.3 Investment Question

The full investment question can be referred to in Appendix C. The question asked respondents to state their preferred level of investment, out of €1000, into either a risky investment, which returned on average 5.8%, or a risk-free option with a guaranteed return of 3.0%. Any amount of capital not invested into the risky option was to be automatically invested into the risk-free option.

The risky option was characterized by the monthly returns of Tesla (NYSE:TSLA) stock starting from the 4th of June, 2021 up until May 3rd, 2022. The monthly stock returns were normally distributed and were subsequently described to respondents. Example calculations were also provided to respondents to demonstrate how they could calculate their payoffs.

The investment question was elaborated as clearly and simplistically as possible to minimize experimental demand effects (Zizzio, 2010) as well as comprehension difficulties. The presentation of investment choices as well as the PANAS remained consistent for all respondents to mitigate order effects (Krosnick & Alwin, 1987).

4.4 Statistical Methods

The main form of statistical analysis for this between-subject analysis was a Randomized Controlled Trial. The negative and positive treatments, which were the video of the crying wolfdog and the video of the two puppies respectively, aimed at eliciting different emotional response from participants. The treatments were issued randomly for any given participant, with the possibility that some could receive a version of the survey with no

treatment. These respondents formed the control group, the benchmark with which the effects of both treatments were compared to.

A balance test was carried out in the form of an ordinary least squares regression.

5. Survey Results

The survey contained a total of seven questions. The first three aimed to collect data related to age, gender, and study or working status, the latter of which was split into responses for being a finance or non-finance professional. These questions were followed by a randomization into one of three scenarios; participants would be shown a video of a pair of puppies, a video of a crying wolfdog, or no video at all.

The fourth question in the survey was for respondents to **self-report** which video they had seen. The fifth question related to the Positive and Negative Affect Schedules (refer to Appendix A), where participants self-reported how they felt on a scale of 1 to 5 from a list of emotions. The sixth question asked participants how much they would invest between the choices of a risky or risk-free asset (refer to Appendix B), and the final question asked what participants attitudes towards dogs was (whether they liked, did not like, or were indifferent towards dogs).

The key variables were thus:

- Age (continuous)
- Gender (Options were ‘male’, ‘female’, ‘non-binary/third gender’, and ‘prefer not to say’)
- Occupation (Options were ‘student bachelors/masters’ and ‘working professional finance/non-finance’)
- Exposed to video (Options were ‘I was shown the video of two puppies’, ‘I was shown the video of the crying wolfdog’, and ‘I was not shown a video’)
- Positive and Negative Affect Schedule (PANAS) (for calculation, refer to Appendix A)
- Level of Investment allocated towards a risky and/or risk-free option (continuous)

- Attitude towards dogs (Options were ‘I like dogs’, ‘I don’t like dogs’, and ‘I’m indifferent’)

5.1 Raw Data

Through the selected distribution channels, the total number of responses was 192. Of these, only 106 responses contained all the required data, with a further 8 data points being removed from the analysis. Overall, 98 observations were used for the final analysis.

On average, the time taken to complete the survey for individuals exposed to either one of the treatments was 328 seconds, roughly 5.5 minutes. For those that did not see a video, the average time taken was 228 seconds, or 3.8 minutes. Of the 106 data points that were complete, 8 responses took nearly or more than one hour to complete, exceeding the average times taken to complete the survey when exposed or not exposed to a video.

Of these eight data points, two saw the puppy video, two saw the crying wolfdog video, and four were not shown a video at all. These responses were treated as outliers and removed from the analysis as it is not known why it took so long to complete the survey. If the respondents exposed to either one of the videos took a break immediately before the PANAS question, for example, then it could theoretically influence their incidental emotions from having watched one of the videos.

Of the 192 responses, 86 data points contained incomplete information. These responses were either missing PANAS score responses, self-reporting on which video had been shown, investment level data, or a combination of all three. Of the 98 usable data points, 38 respondents were not shown a video, 31 saw the video of the crying wolfdog, and 29 saw the video of the two puppies.

It is unknown why 45% of responses did not record all data points. In designing the survey in Qualtrics, the option to *force a response for each question was purposefully selected* to **avoid** such an issue. In other words, respondents theoretically should not have been able to skip the survey questions relating to self-reporting exposure to one or no video, the PANAS scores, or the level of investment in either risky or risk-free options.

5.2 Descriptive Statistics

Table 1 displays summary statistics for the continuous variables of the 98 data points used for the analysis. The age range of participants was between 17 and 85, with the average age being around 31 years old, and a standard deviation of about 14 years.

The average investment levels, represented by the variable 'Investment', that respondents allocated to the risky option was €445.95, with a standard deviation of €255.32. The minimum and maximum range here is consistent with the question as individuals could select a minimum of €0 into the risky investment option and up to a maximum of €1000. The average positive and negative affect scores (refer to Appendix B for PANAS calculations) were 10 and 5.60 respectively, with the associated standard deviations being 5.65 and 5.27. The minimum for both was 0 while the maximums were 24 and 21 respectively.

The gender split between respondents was 42 males and 55 females, with 1 respondent refusing to disclose. The sample consisted of 35 Master's students, 11 Bachelor's students, 11 Working Professionals in finance, and 32 Working Professionals in a non-finance field.

Finally, 29 respondents self-reported seeing the video of the two puppies. A further 31 participants self-reported seeing the video of the crying wolfdog and 38 respondents self-reported not being shown any video. Limitations on the self-reporting in the survey are highlighted in the Discussions section.

Variable	Obs	Mean	Std.Dev.	Min	Max
Age	98	30.62	14.23	17	85
Investment	98	445.95	255.32	0	1000
Positive Affect	98	10.00	5.65	0	24
Negative Affect	98	5.60	5.27	0	21

***Table 1**: Descriptive statistics for continuous variables of the survey*

5.3 Noncompliance and Balance Tests

The Qualtrics software immediately sorts respondents into treatment or control groups. Despite this, noncompliance was clearly an issue in this survey given that only 98 of 192 responses had complete information. As mentioned earlier, **forced** responses in the survey ***were activated*** as part of the survey design, including the self-reporting of which video participants saw.

Due to noncompliance across the entire sample, only the 98 usable data points were further analysed and evaluated. Balance tests were carried out for both the observations that were exposed to at least one video and those that were not to assess if randomization within these two groups was implemented correctly. 29 respondents were sorted into the group that self-reported seeing the video of the two puppies. 31 respondents self-reported seeing the video of the crying wolfdog, and a further 38 self-reported not being exposed to any video.

Balance tests were run on the covariates for gender, occupation, and attitudes towards dogs to check if both treated and control groups are relatively. These tests were linear regressions, the results of which determined if there were statistical differences in the treated groups, which in the case of this experiment were the respondents who had seen a video. The treated groups and control group (i.e. the groups that saw a video and those that did not) were considered balanced if no statistical significance was found between the treatment and the covariate of choice.

The results of the balance tests can be referred to in Appendix D. A dummy variable (Puppy video treatment) was constructed to indicate if participants had been exposed to the video of the two puppies and was regressed against the covariates of gender, occupation, and general attitude towards dogs. The p-values for each regression did not show any statical significance, indicating that the samples were balanced in their demographics.

This implies that 98 observations were not skewed heavily towards any one gender, occupation, or dog preference, implying randomization among the set of completed data points occurred appropriately.

6. Assessment of PANAS scores

In understanding the causal effects of incidental emotions on investment decisions, an assessment of the relationship between the administered treatments and the PANAS scores follows. First, a comparison between positive and negative affect scores of both the control and the two treatment groups was carried out.

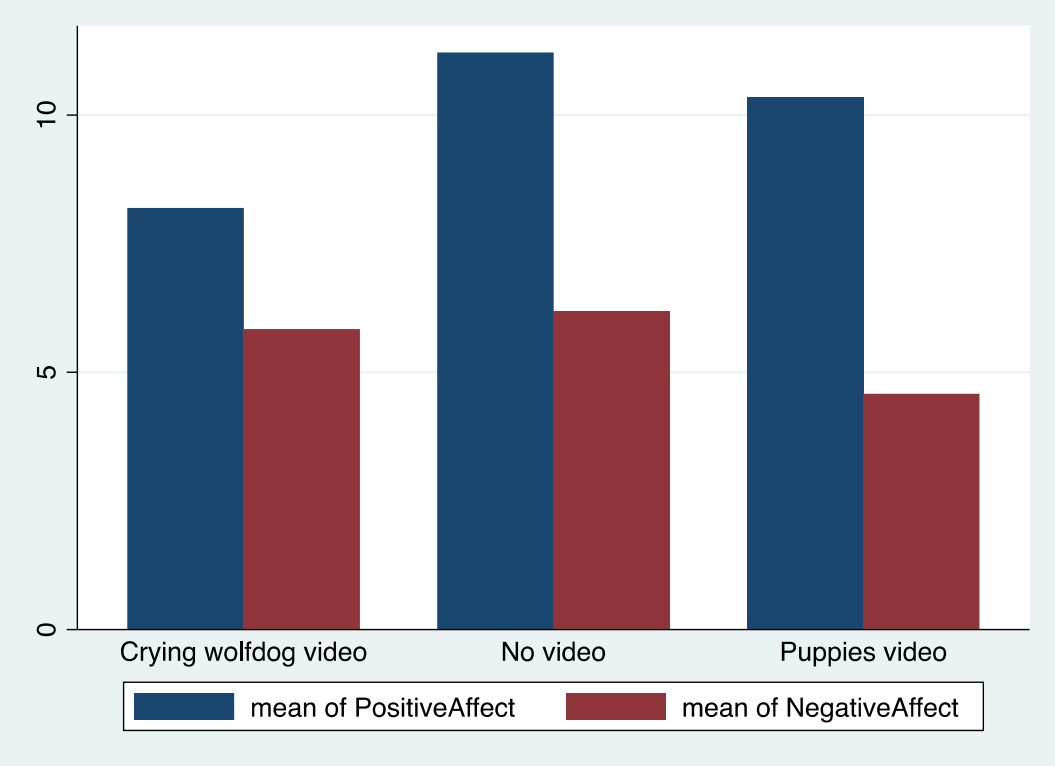

***Figure 1**: Breakdown of PANAS across all three groups (those exposed to at least one video and the control group)*

Group	Median PA	Median NA	Mean PA	Mean NA
No video	11.00	5.00	11.21	6.18
Crying Wolfdog video	7.00	6.00	8.19	5.84
Puppies video	11.00	5.00	10.34	4.59

***Table 2**: Average and median values for both positive affect (PA) and negative affect (NA), split across both treated and control group*

Group	Max. PA	Min. PA	Max. NA	Min. NA
No video	24	0	21	0
Crying Wolfdog video	21	0	17	0
Puppies video	20	2	19	0

***Table 3**: Maximum and minimum values for PA and NA*

The visualization of scores in Figure 1 show the average positive and negative affect scores for each group. These are followed by Tables 2 and 3 which provide an overview of the mean, median, and range for both positive affect and negative affect. The group that self-reported not seeing any video, the control group, had on average the highest positive and negative affect scores at 11.21 and 6.18 respectively.

The group which saw the video of the crying wolfdog reported an average of 8.19 and 5.84 for positive and negative affect scores respectively. Finally, the average positive and negative affect scores for the group exposed to the video of the puppies were 10.34 and 4.59 respectively. Relatively, respondents exposed to the crying wolfdog video self-reported, on average, lower positive affect and higher negative affect scores compared to the group exposed to the puppies video, which reported higher positive affect and lower negative affect scores.

The distribution for the positive and negative affect scores for all groups demonstrated high skewness and non-normal characteristics. The data was therefore log transformed to address this skewness and to allow for better data fitting in the linear regression models used later in the analysis. The resulting data distributions can be found under Appendix D for all groups. Due to the sample sizes, each consisting of around 30 observations, and the non-normal distribution, the Mann-Whitney U test was used to test for differences across the means of each group.

Video	Obs.	Rank Sum	Expected
Crying wolfdog	31	906.50	1085
No video	38	1508.50	1330
Combined	69	2415	2415
Unadjusted variance	6871.67		
Adjustment for ties	-21.84		
Adjusted variance	6849.82		

Ho: Positive Affect (Status==Crying wolfdog video) = Positive Affect (Status==No video)

z = -2.157

Prob > | z | = 0.0310

Table 4: *Two sample Mann-Whitney U test of Positive Affect (PA) scores of group exposed to crying wolfdog video and group that did not see any video*

Table 4 displays the results of the Mann-Whitney U test comparing the means of the positive affect scores of the respondents exposed to the crying wolfdog video and those who did not see a video. The p-value of 0.031 is smaller than the 5% level of significance, implying that there is a statistical difference in averages of both groups. This infers that the treatment intervention, by means of the crying wolfdog video, may have induced an emotional response in those who saw the video compared to those that did not, and is reflected in the self-reported positive affect values.

The remaining Mann-Whitney tests did not show any statistical significance across averages when comparing positive and negative affect scores between groups. These can be found under Appendix F.

As a robustness check, table 5 shows the several coefficients and standard errors for a series of ordinary least squares regressions, where dummy variables for respondents shown the puppies video, the crying wolfdog, and no video were regressed on the log transformed positive and negative affect scores, while controlling for dog attitudes.

		Log. Positive Affect		Log. Negative Affect	
	Model	**Coef.**	**Std.Err.**	**Coef.**	**Std.Err.**
1.	Puppies video	0.008	0.144	-0.175	0.202
	Likes Dogs (LD)	-0.129	0.141	-0.196	0.167
	Constant	**2.253*** **	0.124	**1.903*** **	0.142
2	Puppies video	0.018	0.142	-0.156	0.199
	Dislikes Dogs (DLD)	0.149	0.188	0.132	0.252
	Constant	**2.139*** **	0.082	**1.173*** **	0.111
3	Puppies video	0.011	0.142	-0.166	0.202
	Indifferent to Dogs	0.036	0.178	0.137	0.143
	Constant	**2.152*** **	0.084	**1.736*** **	0.111
4	**Crying wolfdog video**	**-0.316** **	0.141	0.133	0.168
	Likes Dogs (LD)	-0.126	0.138	-0.177	0.169
	Constant	**2.352*** **	0.125	**1.796*** **	0.146
5	**Crying wolfdog video**	**-0.314** **	0.143	0.137	0.170
	Dislikes Dogs (DLD)	0.133	0.166	0.139	0.258
	Constant	**2.245*** **	0.814	**1.645*** **	0.130
6	**Crying wolfdog video**	**-0.319** **	0.142	0.395	1.024
	Indifferent to Dogs	0.053	0.189	-1.805	1.119
	Constant	**2.254*** **	0.077	**5.735*** **	0.749
7	**No video**	**0.278** **	0.128	0.005	0.196
	Constant	**2.056*** **	0.085	1.705	0.099

****p<0.01, **p<0.05, ***p<0.01***

Table 5: *Regressing puppy video and crying wolfdog video dummy variables on Positive and Negative Affect scores, controlling for various dog attitudes*

When regressed against Positive Affect, the dummy variable 'Crying wolfdog video' coefficients for models 4, 5, and 6 showed statistical significance at the 5% level, as well as model 7's 'No video' dummy. The latter could be the result of the sample size of respondents not shown a video being larger, with 38 of the 92 respondents not having seen either of the videos.

The former result shows that the log transformed positive affect scores were inversely related to whether a respondent had seen the video of the crying wolfdog. This result is consistent with Table 4's Mann-Whitney U test and the average positive affect scores illustrated in Figure 1. Finally, the constants in each regression are shown to be statistically significant at the 1% level of significance across all models, implying that factors, other than those specified, are drivers for the model's variance.

6.1 Treatment Efficacy

The treatment videos appear to have been only partially effective in their intended effects on the respondents. When comparing the mean log positive affect scores of the group not shown a video and the group shown the crying wolfdog video, there appears to be a statistically significant causal effect on the latter group's self-reported positive affect scores. All other remaining tests show no statistically significant causal effects of a respondent's exposure to one treatment on their positive or negative affect scores.

Respondents who were exposed to the video of the crying wolfdog appeared to self-report positive affect scores that were statistically significantly different and lower than the self-reported averages of those who had not seen a video (figure 1), a result that is robust when controlling for self-reported dog preferences (table 5).

This is further supported by the Mann-Whitney test, as shown in table 4, which shows a statistically significant difference in averages self-reported by those exposed to the crying wolfdog video and those who had not seen a video. There seems to therefore be partial evidence that incidental emotions, driven by exposure to the treatments, were effectively induced as intended.

7. Investment Decision Variability

7.1 Investment Decision

The sixth question of the survey (the full question can be referred to in Appendix C) asked participants to select an amount between 0 and €1000 to invest into a risky asset, with the remainder being invested in a risk-free asset.

The risky asset was characterized by the monthly returns of Tesla (NYSE:TSLA) stock beginning from the 4th of June, 2021 up until May 3rd, 2022. The monthly stock returns are normally distributed and described to respondents. Respondents were given the choice to invest into a risk-free asset returning 3% with no risk of loss. They are informed that any remaining sum of the initial €1000 not invested into the risky asset is invested into the risk-free asset.

7.2 Between group comparison of Investment levels

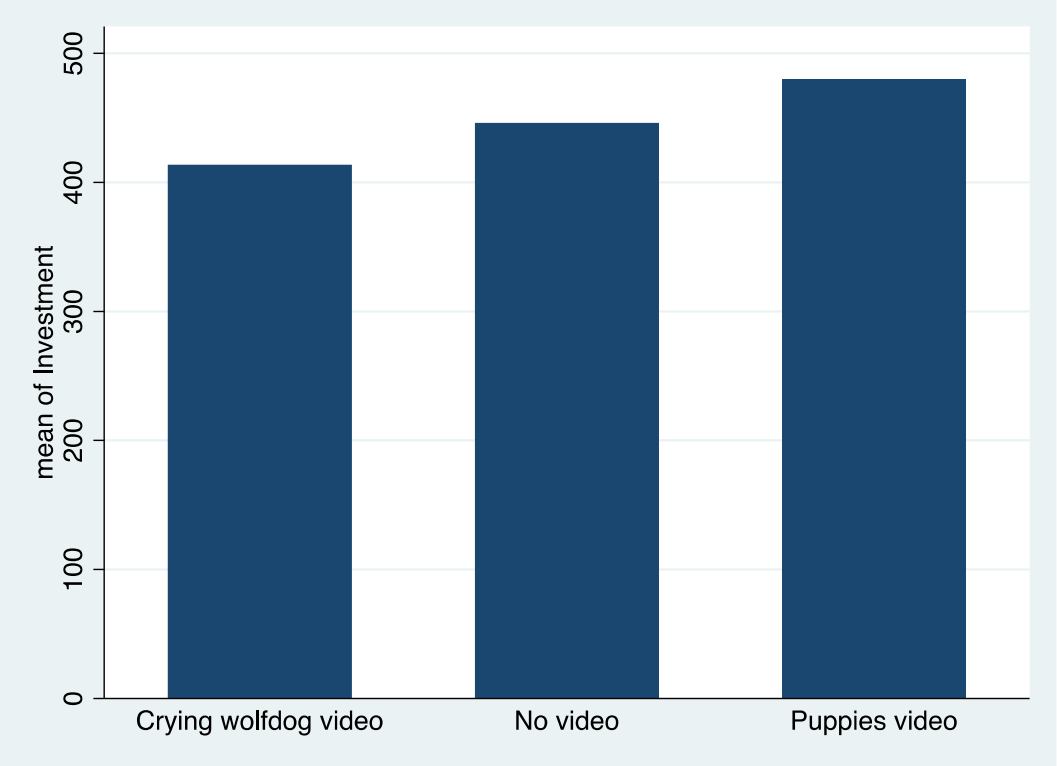

Figure 2: Average amount invested into risky asset, split across groups

Group	Sample Size	Mean Invest. level	Median Invest. level	Std. Deviation
No video	38	446.24	481	255.94
Crying Wolfdog video	31	413.61	449	249.32
Puppies video	29	480.14	450	265.12

***Table 6**: Average and median values for both positive affect (PA) and negative affect (NA), split across both treated and control group*

The group that did not see a video averaged an investment of €446.24 into the risky asset compared to the group exposed to the crying wolfdog video's €413.61 and the group that saw the puppy video's average of €480.14. The median investment levels were, respectively, €481, €449, and €450. The minimum and maximum possible values for each category was €0 and €1000, respectively.

Similar to the positive and negative affect scores, the averages for the investment level data are assessed using a Mann-Whitney U test and then log transformed to address the skewness of the data, the relatively small sample sizes, as each group contains around 30 to 40 observations, and finally to allow for better fit in ordinary least squares regressions. Visualizations of the log transformed data can be referred to in Appendix G.

Investment by group	Obs.	Rank Sum	Expected
Crying wolfdog video	31	1034	1085
No video	38	1381	1330
Combined	69	2415	2415
Unadjusted variance 6871.67			
Adjustment for ties -11.05			
Adjusted variance 6860.62			
Ho: Investment (Group==Crying wolfdog video) = Investment (Group==No video)			
z = -0.616			
Prob > z = 0.5381			

Table 7: *Two sample Mann-Whitney test of investment levels of group exposed to crying wolfdog video and group that did not see any video*

As illustrated by Table 7 above, the Mann-Whitney U test shows no statistical significance at the 1%, 5%, and 10% levels with a p-value of 0.5381. This suggests that there are no statistically significant differences in the averages of investment levels of the group that saw the crying wolfdog video and the group that saw no video. Appendix H contains the remaining Mann-Whitney U tests for average investment into the risky asset, showing that the remaining averages were not statistically significantly different from each other.

7.3 Relationship between PANAS scores and Investment

Variables	(1)	(2)	(3)
(1) Log Investment	1.000		
(2) Log Positive Affect	0.106	1.000	
(3) Log Negative Affect	-0.082	0.169	1.000

Table 8: *Correlation matrix for log transformed investment level data as well as log transformed positive and negative scores*

Table 8 illustrates the correlation between the log transformed investment levels in the riskier asset with respect to their self-reported positive and negative affect scores. The log

transformed positive affect scores are positively associated with the log transformed investment levels chosen by participants, while the log transformed negative affect scores show a negative relationship with the amount survey participants chose to invest.

To further understand the relationship between PANAS scores and the amounts survey respondents chose to invest into the risky asset, a series of ordinary least squares regressions are run to assess any causal effects of exposure to either of the two videos on the amounts respondents chose to invest.

Log Investment	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Log Positive Affect	0.614	0.088	0.69	0.491	-0.114	0.238	
Puppies video	0.715	0.141	0.51	0.614	0.614	0.353	
Likes Dogs	0.294	0.152	1.94	0.056	-0.007	0.596	*
Constant	5.655	0.212	26.72	0.000	5.234	6.075	***

*** p<0.01, ** p<0.05, * p<0.1

Table 9: *Log transformed positive affect scores regressed against log transformed investment in the risky asset, controlling for exposure to the puppies video and dog attitude 'Likes Dogs'*

Log Investment	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Log Positive Affect	0.059	0.096	0.62	0.534	-0.131	0.251	
Crying wolfdog video	-0.010	0.133	-0.08	0.937	-0.275	0.254	
Likes Dogs	0.291	0.151	1.92	0.058	-0.010	0.591	*
Constant	5.687	0.251	22.67	0.000	5.188	6.186	***

*** p<0.01, ** p<0.05, * p<0.1

Table 10: *Log transformed positive affect scores regressed against log transformed investment in the risky asset, controlling for exposure to the crying wolfdog video and dog attitude 'Likes Dogs'*

Log Investment	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Log Positive Affect	0.072	0.087	0.83	0.410	-0.101	0.245	
No video	-0.060	0.131	-0.46	0.648	-0.320	0.200	
Likes Dogs	0.292	0.151	1.94	0.055	-0.007	0.592	*
Constant	5.678	0.217	22.67	0.000	5.247	6.110	***

*** p<0.01, ** p<0.05, * p<0.1

Table 11: *Log transformed positive affect scores regressed against log transformed investment choices, controlling for exposure to the crying wolfdog video and dog attitude 'Likes Dogs'*

For the full overview of regressions, refer to Table 19 under Appendix I.

Tables 9 to 11 show selected output from regressing log transformed PANAS scores against log transformed investment levels in the risky asset, controlling for both type of video

viewed and attitudes towards dogs. As shown above, a respondent's preference for dogs ('Likes Dogs') seems to have a statistically significant causal effect at the 5% level of significance on the amount invested in the risky asset.

However, closely examining the raw data of the 98 usable data points reveals that 71 respondents indicated that they liked dogs. The results displayed in Tables 9 to 11 are thus more likely to have resulted from the asymmetric nature of responses in the sample.

In general, all regressions, including those placed in the Appendix, the constant is statistically significant at the 1% level, implying that factors outside those specified in the models are responsible for the variation. Therefore, while there is an association between PANAS scores and the amount invested in the riskier asset (see Table 8), no causal effect was found.

To briefly conclude and combine the above results with the PANAS analysis, being exposed to the crying wolfdog video seems to have an inverse and statistically significant effect on self-reported positive affect scores. However, this effect does not translate into any statistically meaningful differences in the average investment levels into the risky asset.

8. Discussion

This study was not without limitations. It is evident that the Qualtrics survey software was not as effective at capturing the relevant information necessary for this study. Despite designing the survey in such a way that **explicitly forced** respondents to provide answers to all sections of the survey, respondents were still able to submit incomplete observations, and in a minority of cases submitted completely blank responses.

While the sample size of 98 usable data points, out of 192, was able to provide some insights, more observations would have been preferred. For example, the computed power for the 31 participants who saw the crying wolfdog video was only 7.3% and 7.2% for the 29 participants that saw the video of the puppies, which are very low values. A more desirable sample size to increase power, taking conventional levels of significance at α = 0.05 (t statistic of 1.96) and β = 0.20 (t statistic of 0.84), would have been around 928 respondents for both video treatments.

The efficacy of the treatments, which aimed at eliciting an emotional response, to be captured by the PANAS scores, appeared to be only partially successful. Analysis on the causal effect of the treatments on these scores found evidence only for those exposed to the crying wolfdog video and their associated positive affect scores. This provides weak evidence that the dog-themed clips are drivers of variation in self-reported emotions. In other academic works, the full PANAS schedule is sometimes accompanied by methods that measure a participant's physiological state, such as the study conducted by Parslow and Rose (2021). It can be argued that the standalone PANAS method of measuring emotions is not an effective method on its own.

It may be more reasonable to assume that incidental emotions in individuals, prior to accessing the survey, determine their self-reported emotional state. It may also be that truthfulness in the responses of individuals was inconsistent. In either case, future research may consider a controlled setting where factors affecting incidental emotions are considered as well as ensuring that each respondent completes the survey under identical, controlled conditions.

A final acknowledgement relates to the amount invested by respondents into the hypothetical risky asset. While careful attention was paid to explicitly and simplistically describing the task, ultimately whether individuals fully comprehended what was being asked of them is unknown. The author does not discount the notion that participants in the survey aimed to complete the questions as rapidly as possible, potentially leading to a random selection of investment amounts. As the results of the survey were not influenced by larger outliers, it may not have been a central issue.

An improved design may include either a simpler investment task, or one that is usable with different forms of analysis, such as non-linear probability models, which would measure the propensity for individuals to take risk, depending on their emotional state. Future studies may also attempt to collect a sufficient number of data points in order to increase the power of the obtained results.

9. Conclusion

In this study, the aim was to investigate the causal effects of emotions, specifically incidental emotions, on financial decision making. The survey-based experimental randomized controlled trial design asked respondents to select their preferred level of investment into either a risky or safe asset after having watched one of two dog-themed video clips. These were intended to induce emotions into the viewer to be compared to the control group, which was not shown any video.

Those exposed to the video of the puppies self-reported the second highest average positive affect values, second only to the group that saw no video. They also reported the lowest average negative affect values. This group, on average, invested the largest amount into the risky asset. Conversely, those exposed to the video of the crying wolfdog reported, on average, the lowest positive affect scores and second highest average negative affect score. On average, this group invested the least into the risky asset.

The control group self-reported, on average, the highest positive affect and highest negative affect scores of the three groups. This group invested the second largest amount into the risky asset on average. These findings seem to support hypotheses 1 and 2, which were, respectively, that positive emotions are associated with more invested in the risky asset and negative emotions are associated with less invested in the risky asset.

The log transformed investments in the risky asset were found to be positively and inversely correlated with, respectively, log transformed positive and negative affect scores. Through a series of regressions, log transformed positive and negative affect scores were found to have no statistical significance on log transformed investment into the risky asset.

Statistically significant differences in averages were found only between the positive affect scores of the group that saw the crying wolfdog video and the control group. No other statistically significant differences in averages were found among the positive and negative affect scores as well as average amount invested into the risky asset between groups.

The study has limitations pertaining to data collection and treatment efficacy that were highlighted under the discussions section. Despite this, an association between emotions

and average investment was uncovered, although a statistically significant causal relationship could not be determined.

Bibliography

Wallmine. (2022, February 20). *Berkshire Hathaway Inc 13F annual report*. Retrieved from Wallmine: https://wallmine.com/fund/139/berkshire-hathaway-inc

Buffet, W. E. (1987, February 27). *BERKSHIRE HATHAWAY INC. .* Retrieved from BERKSHIRE HATHAWAY INC. : https://www.berkshirehathaway.com/letters/1986.html

Kramer, L. (2022, January 29). *How Is a Company's Stock Price and Market Capitalization Determined?* Retrieved from Investopedia: https://www.investopedia.com/ask/answers/how-companys-stock-price-and-market-cap-determined/#:~:text=After%20a%20company%20goes%20public,factors%2C%20the%20price%20will%20increase.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: the PANAS scales. *Journal of Personality and Social Psychology*.

Zizzio, D. J. (2010). Experimenter demand effects in economic experiments. *Experimental Economics*, 75-98.

Breaban, A., & Noussair, C. N. (2018). Emotional State and Market Behavior. *Review of Finance*, 279-309.

Krosnick, J. A., & Alwin, D. F. (1987). An evaluation of a cognitive theory of response - Order effects in survey measurements. *Public Opinion Quarterly*, 201-219.

Nguyen, Y., & Noussair, C. N. (2014). Risk Aversion and Emotions. *Pacific Economic Review*, 296-312.

Statman, M. (2015, June 14). *How Your Emotions Get in the Way of Smart Investing*. Retrieved from The Wall Street Journal: https://www.wsj.com/articles/how-your-emotions-get-in-the-way-of-smart-investing-1434046156

Baker, H., & Ricciardi, V. (2015). Understanding Behavioral Aspects of Financial Planning and Investing. *Journal of Financial Planning*, 191-208.

Rick, S., & Loewenstein, G. (2008). The role of emotion in economic behaviour. In M. Lewis, J. Haviland-Jones, & L. Feldman Barrett, *Handbook of Emotions* (pp. 138-156). New York: The Guilford Press.

Druckman, J. N., & McDermott, R. (2008). Emotion and the Framing of Risky Choice. *Political Behavior*, 297-321.

Mellers, B. A., & McGraw, A. P. (2001). Anticipated Emotions as Guides to Choice. *Current Directions in Psychological Science*, 210-214.

Campos-Vazquez, R. M., & Cuilty, E. (2014). The role of emotions on risk aversion: A Prospect Theory experiment. *Journal of Behavioral and Experimental Economics*, 1-9.

Panno, A., Lauriola, M., & Figner, B. (2013). Emotion regulation and risk taking: Predicting risky choice in deliberative decision making. *Cognition & Emotion*, 326-334.

Fenton O'Creevy, M., Soane, E., Nicholson, N., & Willman, P. (2010). Thinking, feeling and deciding: The influence of emotions on the decision making and performance of traders. *Journal of Organizational Behavior*, 1044-1061.

Fenton-O'Creevy, M., Lins, J., Vohra, S., Richards, D., Davies, G., & Schaaff, K. (2012). Emotion regulation and trader expertise: heart rate variability on the trading floor. *Journal of Neuroscience, Psychology and Economics*, 227-237.

Ein, N., Reed, M. J., & Vickers, K. (2021). The Effect of Dog Videos on Subjective and Physiological Responses to Stress. *Anthrozoös*, 1-20.

Parslow, E., & Rose, J. E. (2021). Stress and Risk - Preferences versus Noise. *SSRN*, 1-70.

Ein, N., Hadad, M., Reed, M. J., & Vickers, K. (2019). Does Viewing a Picture of a Pet During a Mental Arithmetic Task Lower Stress Levels? *Anthrozoös*, 519-532.

Wheeler, E. A., & Faulkner, M. E. (2015). The "Pet Effect": Physiological Calming in the Presence of Canines. *Society & Animals*, 425-438.

Lahav, Y., & Meer, S. (2012). The Effect of Induced Mood on Prices in Asset Markets - Experimental Evidence. *SSRN*.

Andrade, E. B., Odean, T., & Lin, S. (2016). Bubbling with Excitement: An Experiment*. *Review of Finance*, 447–466.

Yang, Z., Saini, R., & Freling, T. (2015). How Anxiety Leads to Suboptimal Decisions under Risky Choice Situations. *Risk Analysis*, 1789-1800.

Gong, R., & Corter, J. E. (2022). Effects of Induced Mood on Attention and Decision Strategies in Risky Choice. *Psychological Reports*, 1-24.

Kulger, T., Connolly, T., & Ordóñez, L. D. (2012). Emotion, Decision, and Risk: Betting on Gambles versus Betting on People. *Journal of Behavioral Decision Making*, 123-134.

Schulreich, S., Heussen, Y. G., Gerhardt, H., Mohr, P. N., Binkofski, F. C., Koelsch, S., & Heekeren, H. R. (2014). Music-evoked incidental happiness modulates probability weighting during risky lottery choices. *Frontiers in Psychology*.

Smith, A. R., Ebert, E. E., & Broman-Fulks, J. J. (2016). The relationship between anxiety and risk taking is moderated by ambiguity. *Personality and Individual Differences*, 40-44.

Martin, L. N., & Delgado, M. R. (2011). The Influence of Emotion Regulation on Decision-making under Risk. *Journal of Cognitive Neuroscience*, 2569-2581.

Stanton, S. J., Reeck, C., Huettel, S. A., & LaBar, K. S. (2023). Effects of induced moods on economic choices. *Judgment and Decision Making*, 167-175.

Lee, C. J., & Andrade, E. B. (2015). Fear, excitement, and financial risk-taking. *Cognition and Emotion*, 178-187.

Levin, J., Arluke, A., & Irvine, L. (2017). Are People More Disturbed by Dog or Human Suffering? . *Society & Animals*, 1-16.

Wiseman, D. B., & Levin, I. P. (1996). Comparing Risky Decision Making Under Conditions of Real and Hypothetical Consequences. *Organizational Behavior and Human Decision Processes*, 241-250.

Kurtz, M., Furnagiev, S., & Forbes, R. (2023). A field study on the role of incidental emotions on charitable giving. *Theory and Decision*, 167-181.

Kim, H., Park, K., & Schwarz, N. (2010). Will This Trip Really Be Exciting? The Role of Incidental Emotions in Product Evaluation. *Journal of Consumer Research*, 983-991.

Appendix

Appendix A: Text and survey questions

Welcome and thank you for participating in this survey!

My name is Rhys McKenna. I am a Behavioral Economics Masters student at Erasmus University. This survey is part of my Master's thesis, the topic of which is related to financial decision making behaviour. For the validity of my results, I would be grateful if you could, to the best of your ability, answer as truthfully as possible.

If you are worried about giving up sensitive information, I would like to stress that your participation in this study is fully anonymous such that no information collected here can identify you and thus cannot be attributed to you.

The data collected in this survey will be used solely for the purposes of my thesis. Your responses will not be distributed elsewhere for personal or financial gain on my part.

By starting the survey, it is assumed that you provide your consent for the collection and analysis of the data you provide.

This survey is voluntary and you can withdraw your consent at any time. If you wish to withdraw at a later stage or you would like to know more about my study and its results, please feel free to contact me via this email: rhys.a.mckenna@gmail.com.

The survey should take you maximum around 8-10 minutes to complete. To proceed, please click the button to the bottom right.

P.S. There is a code available at the end for Survey Circle and Survey Swap users

Q1 – How old are you?

Q2 – Please select your gender

Q3 – What is your occupation?

Please finish watching this selection of the clip before proceeding to the next question

Instructions: Please finish watching this selection of the clip before proceeding to the next question.

Or

Instructions: Please finish watching this selection of the clip before proceeding to the next question.

Q4 – Please select one of the options ('I was shown the video of two puppies', 'I was shown the video of the crying wolfdog', or ' I was not shown a video'

Q5 – Positive and Negative Affect Schedule

Q6 – Investment Question

Q7 – Please select the option that best represents your attitude towards dogs ('I like dogs', 'I don't like dogs' or 'I'm indifferent')

Thank you for completing the survey!

For SurveyCircle users (www.surveycircle.com): The Survey Code is: ZJWM-NKR1-J8T7-3829

The following code gives you credits that can be used to get free research participants at

SurveySwap.io.

Go to: https://surveyswap.io/sr/2O0B-PCLN-1MKF Or, alternatively, enter the code manually: 2O0B-PCLN-1MKF

Appendix B: Positive and Negative Affect Schedule

Q6 – The following contains words that describe different feelings and emotions. Please indicate on the scale to what extent you have felt this way in the last 10 minutes

1 – Very slightly or not at all
2 – A little
3 – Moderately
4 – Quite a bit
5 – Extremely

Selected emotions (from top to bottom): Interested, Distressed, Excited, Upset, Enthusiastic, Irritable, Inspired, Nervous, Attentive, Afraid

Positive Affect score calculation:

Score of Interested + Score of Excited + Score of Enthusiastic + Score of Inspired + Score of Attentive

Negative Affect score calculation:

Score of Distressed + Score of Upset + Score of Irritable + Score of Nervous + Score of Afraid

Appendix C: Investment Question

Q7 – Consider the following scenario: You are deciding how to invest €1000. You can choose to allocate money between a risky investment and a risk-free investment. The risky investment has the following information:

On average, this investment made a 5.8% monthly return over the past year.
In 92 out of 231 cases, the risky investment returned between 1.6% and 10.8% a month
In 138 out of 231 cases, the risky investment returned between -7.5% and 19.8% a month
In 194 out of 231 cases, the risky investment returned between -16.6% and 28.9% a month
In 223 out of 231 cases, the risky investment returned between -25.7% and 38.0% a month

The risk-free investment has the following information:

Guaranteed fixed 3.0% return a month
No risk of loss

You may choose how much to allocate to the risky investment. Your remaining money is automatically invested in the risk-free investment. As an example, if you choose to invest €600 (60% of your capital) in the risky investment in a randomly selected month, and the monthly return of that randomly selected month is 5.0%, then the return on your total investment for that month will be:

€600 x 1.05 = €630. €400 x 1.03 = €412 €630 + €412 = €1042 Another way to calculate your return would be: 60% x 5% + 40% x 3% = 4.2% Leading to €1000 x (1+4.2%) = €1042

Please select how much you would like to invest in the risky investment below.

Appendix D: Balance Tests

Linear regression

Male	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Puppy video treatment	-0.021	0.111	-0.19	0.850	-0.241	0.199	
Constant	0.435	0.060	7.22	0.000	0.315	0.554	***

Mean dependent var	0.429	SD dependent var	0.497
R-squared	0.000	Number of obs	98.000
F-test	0.036	Prob > F	0.850
Akaike crit. (AIC)	144.198	Bayesian crit. (BIC)	149.368

*** *p<0.01*, ** *p<0.05*, * *p<0.1*

Linear regression

Masters	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Puppy video treatment	0.080	0.107	0.75	0.453	-0.132	0.293	
Constant	0.333	0.058	5.74	0.000	0.218	0.449	***

Mean dependent var	0.357	SD dependent var	0.482
R-squared	0.006	Number of obs	98.000
F-test	0.567	Prob > F	0.453
Akaike crit. (AIC)	137.332	Bayesian crit. (BIC)	142.502

*** *p<0.01*, ** *p<0.05*, * *p<0.1*

Linear regression

LD	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Puppy video treatment	-0.049	0.100	-0.50	0.621	-0.248	0.149	
Constant	0.739	0.054	13.62	0.000	0.631	0.847	***

Mean dependent var	0.724	SD dependent var	0.449
R-squared	0.003	Number of obs	98.000
F-test	0.246	Prob > F	0.621
Akaike crit. (AIC)	123.942	Bayesian crit. (BIC)	129.112

*** *p<0.01*, ** *p<0.05*, * *p<0.1*

Appendix E: Histogram's of log transformed Positive and Negative Affect scores by group

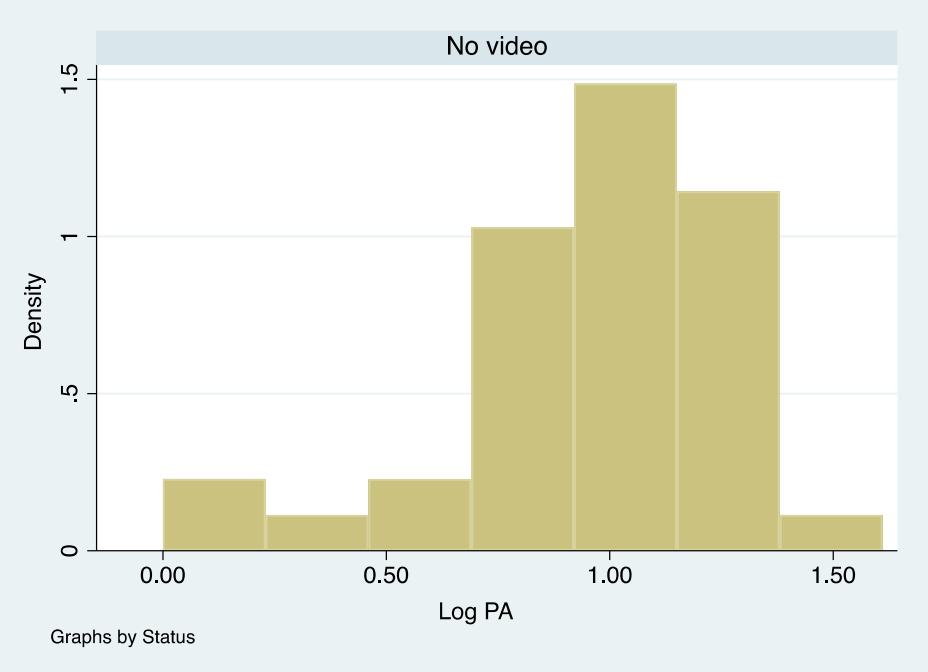

Figure 3: *Histogram of log transformed positive affect scores for respondents who did not see any videos*

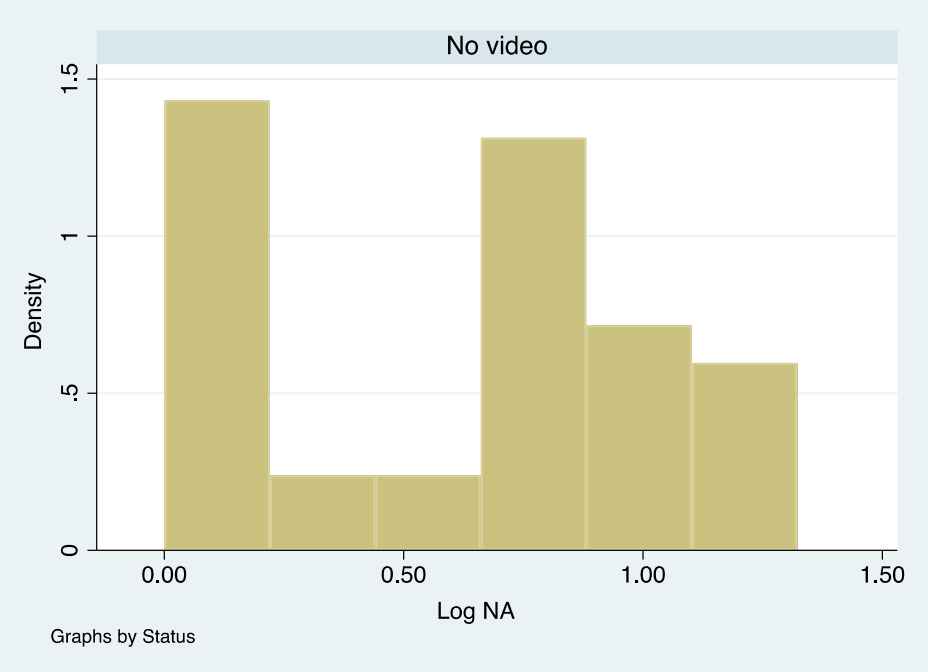

Figure 4: *Histogram of log transformed negative affect scores for respondents who did not see any video*

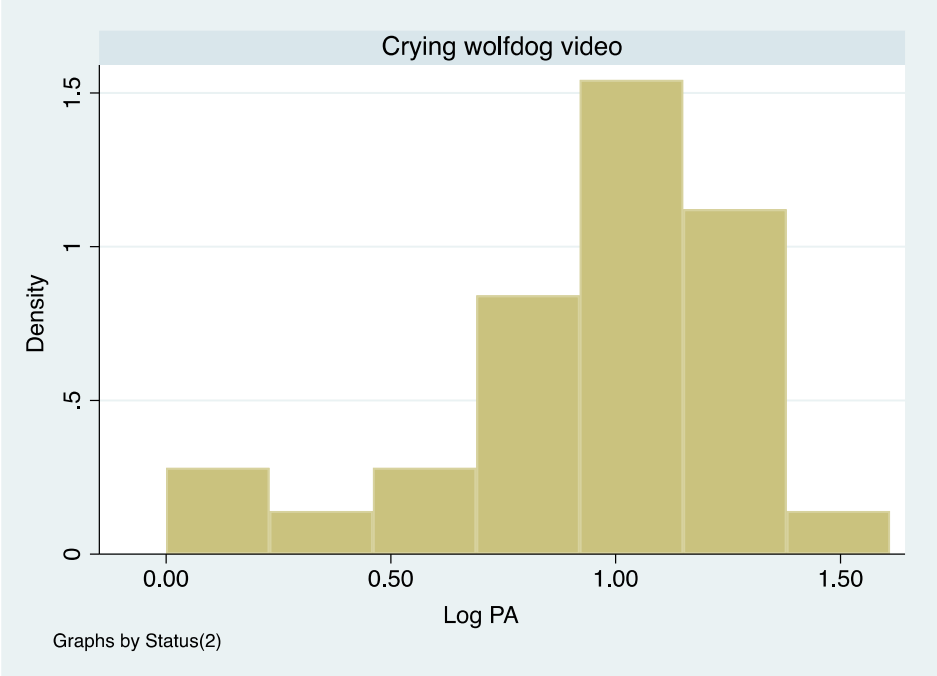

Figure 5: *Histogram of log transformed positive affect scores for respondents who saw the video of the crying wolfdog*

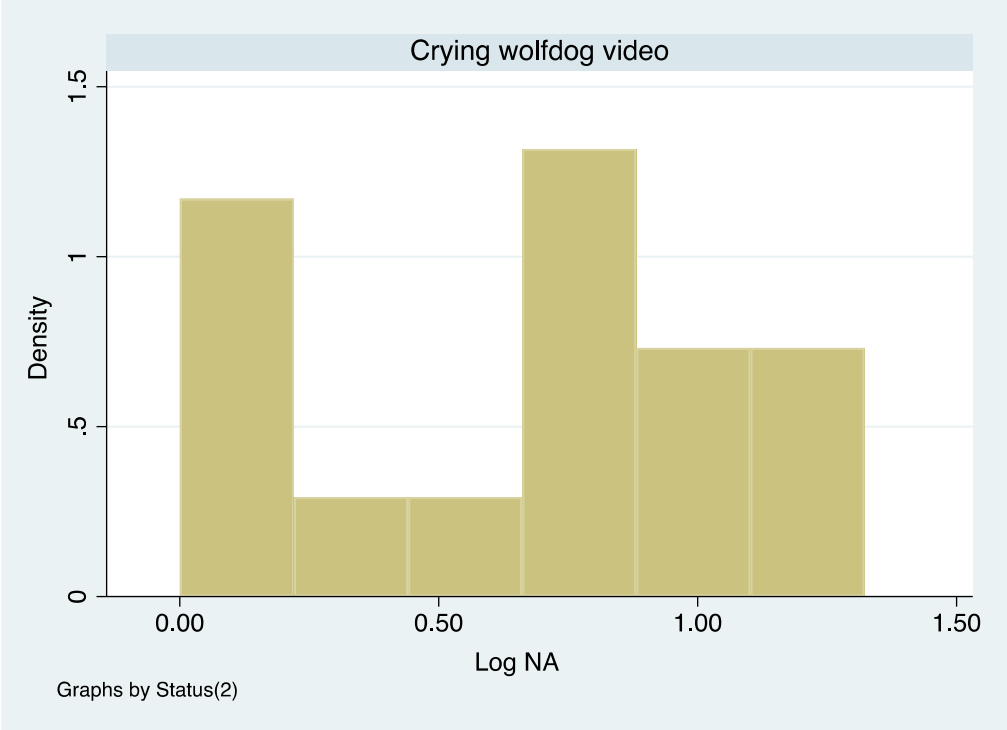

Figure 6: *Histogram of log transformed negative affect scores for respondents who saw the video of the crying wolfdog*

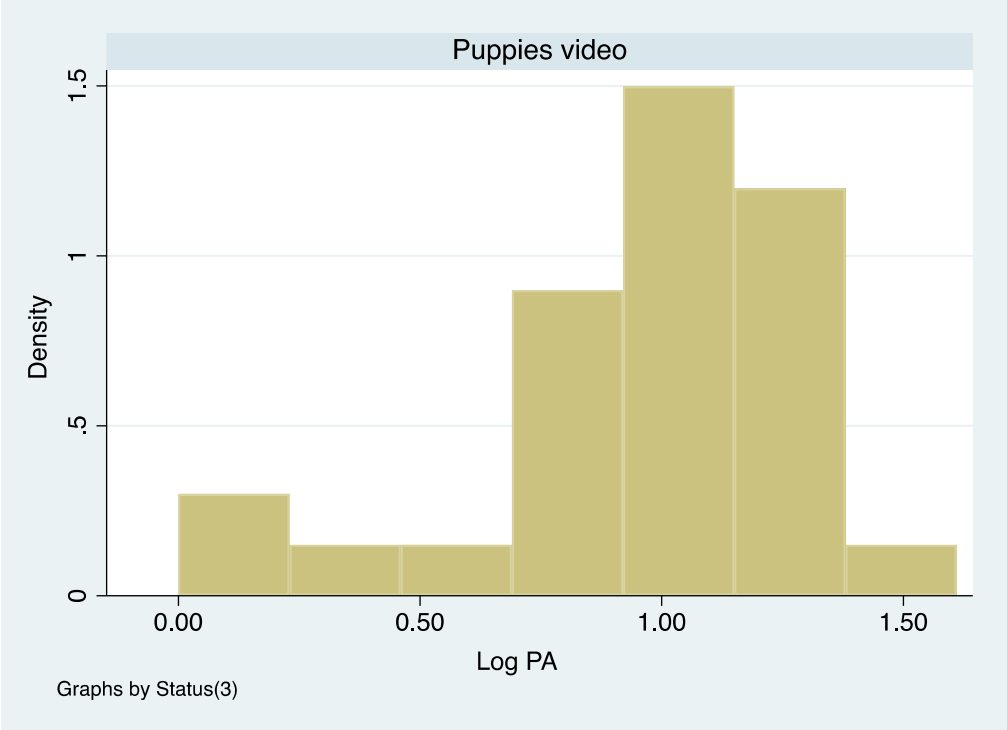

Figure 7: *Histogram of log transformed positive affect scores for respondents who saw the video of the puppies*

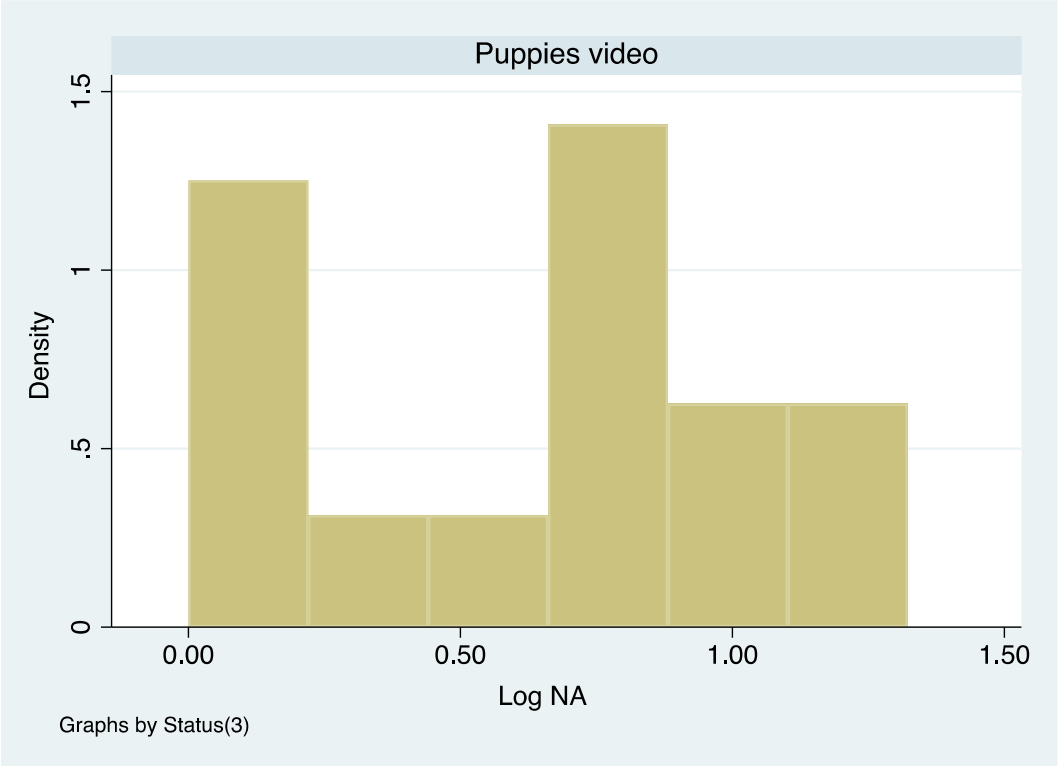

Figure 8: *Histogram of log transformed positive affect scores for respondents who saw the video of the puppies*

Appendix F: Remaining Mann Whitney U tests of positive and negative affect scores of control group (no video), group that saw puppies video, and group that saw crying wolfdog video

Video	Obs.	Rank Sum	Expected
Crying wolfdog	31	836	945.50
Puppies video	29	994	884.50
Combined	60	1830	1830
Unadjusted variance	4569.92		
Adjustment for ties	-17.40		
Adjusted variance	4552.52		

Ho: Positive Affect (Status==Crying wolfdog video) = Positive Affect (Status==Puppies video)

z = -1.623

Prob > | z | = 0.1046

Table 12: *Two sample Mann-Whitney test of Positive Affect (PA) scores of group exposed to crying wolfdog video and group exposed to puppies video*

Video	Obs.	Rank	Sum	Expected
Crying wolfdog	31	1044		945.50
Puppies video	29	786		884.50
Combined	60	1830		1830
Unadjusted variance	4569.92			
Adjustment for ties	-93.46			
Adjusted variance	4476.46			

Ho: Negative Affect (Status==Crying wolfdog video) = Negative Affect (Status==Puppies video)

z = 1.472

Prob > | z | = 0.1410

Table 13: *Two sample Mann-Whitney test of Negative Affect (PA) scores of group exposed to crying wolfdog video and group exposed to puppies video*

Video	Obs.	Rank Sum	Expected
Crying wolfdog	31	1120.500	1085
No video	38	1294.500	1330
Combined	60	2415	2415
Unadjusted variance	6871.67		
Adjustment for ties	-102.18		
Adjusted variance	6769.48		

Ho: Negative Affect (Status==Crying wolfdog video) = Negative Affect (Status==No video)

z = 0.431

Prob > | z | = 0.6661

Table 14: *Two sample Mann-Whitney test of Negative Affect (NA) scores of group exposed to crying wolfdog video and group exposed to no video*

Video	Obs.	Rank Sum	Expected
No video	38	1342	1292
Puppies video	29	936	986
Combined	67	2278	2278
Unadjusted variance	6244.67		
Adjustment for ties	-20.81		
Adjusted variance	6223.86		

Ho: Positive Affect (Status==No video) = Positive Affect (Status==Puppies video)

z = 0.634

Prob > | z | = 0.5262

Table 15: *Two sample Mann-Whitney test of Positive Affect (PA) scores of group exposed to no video and group exposed to puppies video*

Video	Obs.	Rank Sum	Expected
No video	38	1365.50	1292
Puppies video	29	912.50	986
Combined	67	2278	2278
Unadjusted variance	6244.67		
Adjustment for ties	-130.96		
Adjusted variance	6113.71		

Ho: Negative Affect (Status==No video) = Negative Affect (Status==Puppies video)

z = 0.940

Prob > | z | = 0.3472

Table 16: *Two sample Mann-Whitney test test of Negative Affect (PA) scores of group exposed to no video and group exposed to puppies video*

Appendix G: Histograms for log transformed investment level data by group

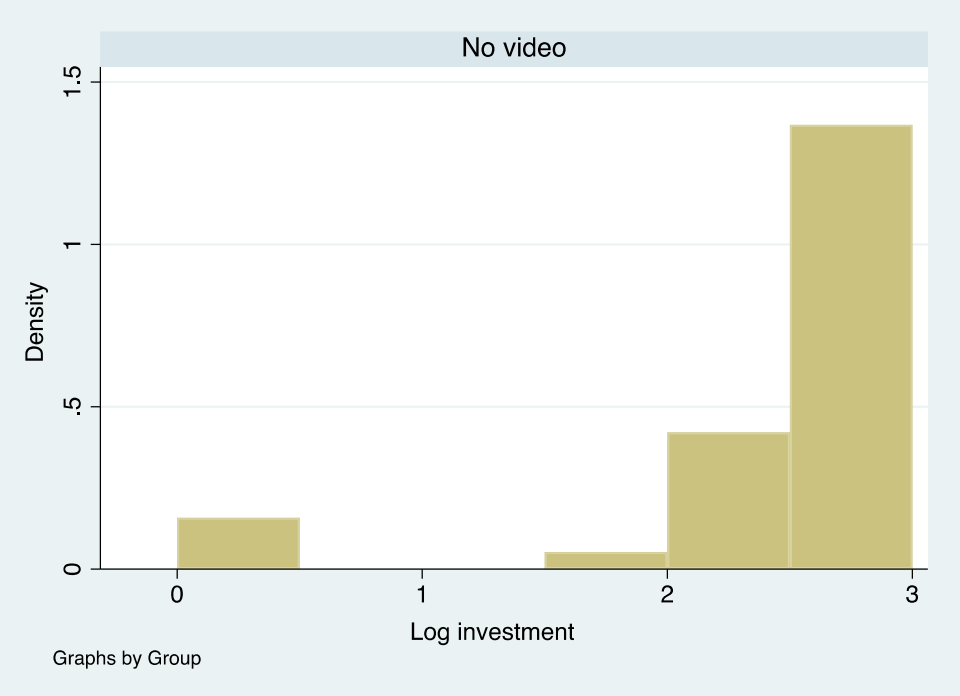

Figure 9: *Histogram of log transformed investment level data for those who did not see a video*

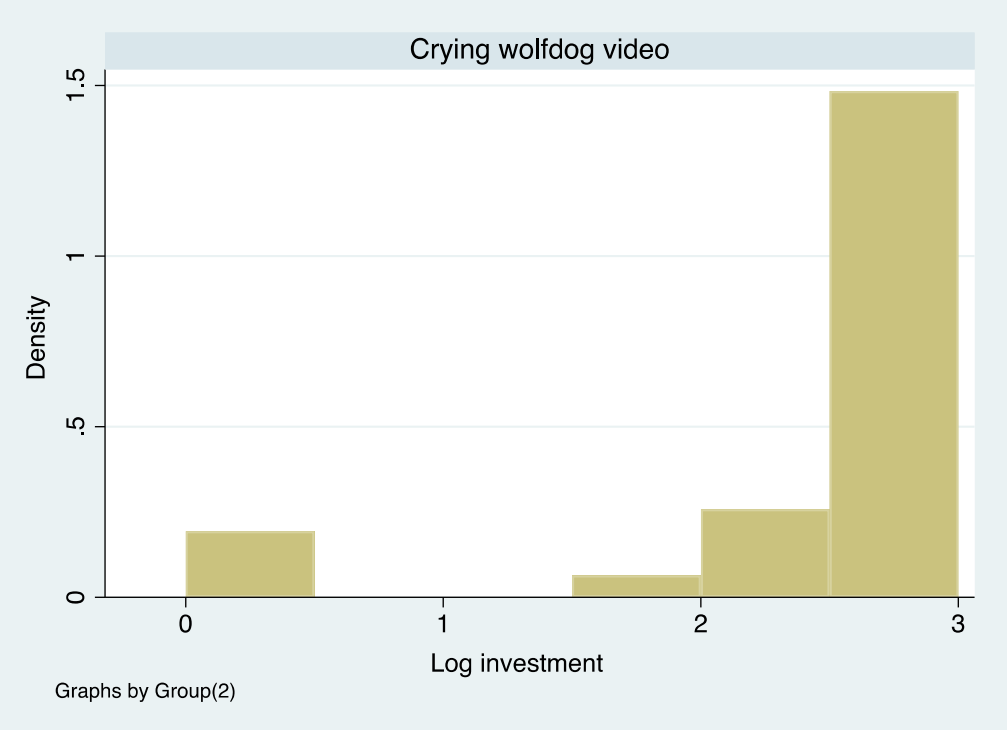

Figure 10: *Histogram of log transformed investment level data for those saw the crying wolfdog video*

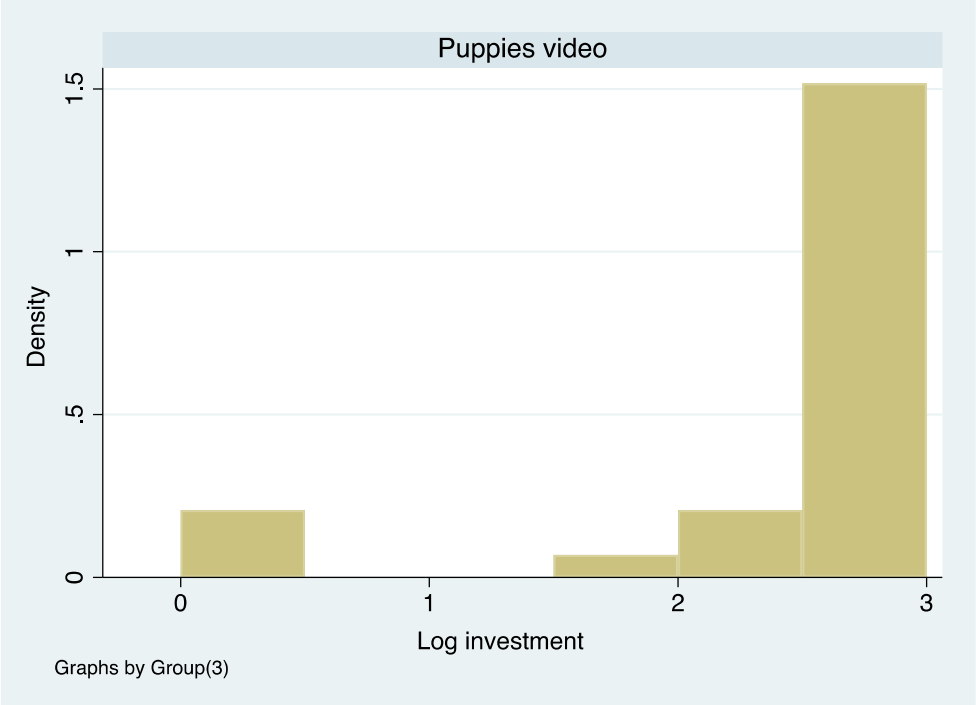

Figure 11: *Histogram of log transformed investment level data for those saw the puppies video*

Appendix H: Remaining Mann-Whitney tests for comparison of average investment levels across groups

Investment by group	Obs	Rank Sum	Expected
Crying wolfdog video	31	895	945.500
Puppies video	29	935	884.500
Combined	60	1830	1830
Unadjusted variance	4569.92		
Adjustment for ties	-11.55		
Adjusted variance	4558.36		

Ho: Investment (Group==Crying wolfdog video) = Investment (Group==Puppies video)
z = -0.748
Prob > z = 0.4545

Table 17: *Two sample Mann-Whitney test of investment levels of group exposed to crying wolfdog video and group that saw the puppies video*

Investment by group	Obs.	Rank Sum	Expected
No video	38	1276.500	1292
Puppies video	29	1001.500	986
Combined	67	2278	2278
Unadjusted variance	6244.67		

Adjustment for ties	-4.73
Adjusted variance	6239.93

Ho: Investment (Group==No video) = Investment (Group==Puppies video)
z = -0.196
Prob > z = 0.8444

Table 18: *Two sample Mann-Whitney test of investment levels of group exposed to no video and group that saw the puppies video*

Appendix I: Remaining ordinary least squares regressions for log PANAS scores regressed on log investments, controlling for video exposure and for dog attitudes

			Log. Positive Affect		Log. Negative Affect
	Model	**Coef.**	**Std.Err.**	**Coef.**	**Std.Err.**
1	Log. Investment	(See Table 9)	(See Table 9)	-0.051	0.063
	Puppies video	(See Table 9)	(See Table 9)	0.073	0.141
	Likes Dogs (LD)	(See Table 9)	(See Table 9)	0.156	0.184
	Constant	(See Table 9)	(See Table 9)	**6.043*** **	0.243
2	Log. Investment	0.055	0.915	-0.054	0.062
	Puppies video	0.047	0.137	0.060	0.136
	Dislikes Dogs (DLD)	-0.314	0.215	-0.259	0.260
	Constant	**5.927*** **	0.205	**6.192*** **	0.141
3	Log. Investment	0.045	0.096	-0.060	0.616
	Puppies video	0.074	0.142	0.051	0.134
	Indifferent to Dogs	-0.202	0.206	0.002	0.237
	Constant	**5.930*** **	0.203	**6.172*** **	0.146
4	Log. Investment	(See Table 10)	(See Table 10)	-0.052	0.062
	Crying wolfdog video	(See Table 10)	(See Table 10)	-0.039	0.134
	Likes Dogs (LD)	(See Table 10)	(See Table 10)	0.149	0.179
	Constant	(See Table 10)	(See Table 10)	**6.075*** **	0.216
5	Log. Investment	0.055	0.098	-0.054	0.061
	Crying wolfdog video	-0.007	0.133	-0.046	0.131
	Dislikes Dogs (DLD)	-0.317	0.218	-0.262	0.256
	Constant	**5.945*** **	0.255	**6.224*** **	0.132
6	Log. Investment	0.045	0.102	-0.061	0.061
	Crying wolfdog video	-0.003	0.135	-0.028	0.134
	Indifferent to Dogs	-0.189	0.204	0.016	0.233
	Constant	**5.952*** **	0.254	**6.195*** **	0.139
7	Log. Investment	(See Table 11)	(See Table 11)	-0.054	0.061
	No video	(See Table 11)	(See Table 11)	-0.025	0.147
	Likes Dogs (LD)	(See Table 11)	(See Table 11)	0.147	0.180
	Constant	(See Table 11)	(See Table 11)	**6.077*** **	0.200
8	Log. Investment	0.062	0.089	-0.056	0.061
	No video	-0.039	0.129	-0.009	0.139
	Dislikes Dogs (DLD)	-0.313	0.215	-0.255	0.254
	Constant	**5.941*** **	0.217	**6.216*** **	0.126
9	Log. Investment	0.058	0.093	-0.062	0.061
	No video	-0.069	0.133	-0.016	0.143
	Indifferent to Dogs	-0.201	0.202	0.011	0.230
	Constant	**5.952*** **	0.215	**6.120*** **	0.120

****p<0.01, **p<0.05, ***p<0.01***

Table 19: *Remaining regression output for log transformed PANAS scores regressed against log transformed investment levels*