Hailing Vessels and Dropping Anchors: Plotting the Anchor-and-adjustment Heuristic Against Peer Effects

Pieter F. E. Verhallen[*]

Maastricht University and Netspar

Elisabeth Brüggen

Maastricht University and Netspar

Thomas Post

Maastricht University and Netspar

Gaby Odekerken-Schröder

Maastricht University

This version: October 30, 2016

Working Paper

Abstract: Agencies often use descriptive information of peer behavior to nudge individuals to behave accordingly, that is, to induce a peer effect. We argue that peer effects may be driven by anchoring effects, and test boundary conditions in two studies using an experimental setup with a hypothetical retirement savings scenario. Study 1 finds a strong similarity between the anchoring and peer effect, but follow-up study 2 reveals that the anchoring-and-adjustment heuristic does not hold when more extreme values (more distant from the average behavior) are used, whereas the peer effect does. Furthermore, we find some evidence that the informational component – as opposed to the normative component – of peer information plays a stronger role in the peer effect within financial decision-making. Lastly, we find that, for the peer effect, females consistently outperform a provided savings norm, whereas males do not.

Keywords: Social Norms, Peer Effects, Heuristics, Anchoring, Financial Decision-making, Consumer Behavior

[*] Corresponding author: Pieter F. E. Verhallen, Maastricht University, School of Business and Economics, Department of Marketing and Supply Chain Management, P.O. Box 616, 6200 MD, The Netherlands. Tel.: +31 43 38 83 774. E-mail: p.verhallen@maastrichtuniversity.nl. The remaining coauthors can be reached at this same address.

For their comments on earlier drafts of this paper, the authors thank.

1 Introduction

Innumerous interventions are taking place where descriptive peer information is provided to evoke changes in individuals' (undesirable) assessments and subsequent behavior across a multitude of contexts, putatively altering alcohol consumption (Campo & Cameron, 2006; Perkins, 2002), recycling (Schultz, 1999), (re)employment (Clark, 2003; Stutzer & Lalive, 2004), sustainability behaviors (van der Linden, forthcoming; Goldstein, Cialdini, & Griskevicius, 2008), voting (Gerber & Rogers, 2009), academic performance (Azmat & Iriberri, 2010), financial decisions (Beshears, Choi, Laibson, Madrian, & Milkman, 2015), and energy usage (Allcott, 2011). Implementation of these interventions can come at a stark financial cost, and similar marketing-based interventions have already been shown to be amongst the least cost-effective interventions for reducing some of these undesirable behaviors (e.g. Cobiac, Vos, Doran, & Wallace, 2009). It is therefore crucial that all such interventions function as intended. Yet, the success of these interventions is proclaimed to be caused by conformity to peer behavior, as subjects are exposed to salient information about peer behavior. However, as this peer information is of a quantified nature – level of others, level of consumption, level of production – it is theoretically possible that subjects simply anchor to these levels subconsciously (e.g. see anchor-and-adjustment heuristic: Tversky & Kahneman, 1974) and change their behavior accordingly, without any conscious normative or informational influence. That is, the behavioral reactions may not necessarily be triggered by the normative information about what peers do, but simply by the numeric value that they are exposed to, referred to as the anchor-and adjustment heuristic (hereafter anchoring effect). In this paper, we discuss why this may be the case, and, to exclude this possibility, plot the anchoring effect against a peer effect intervention. By doing so, we provide empirical evidence to advance the notion that peer effects are real.

The peer effect is one of Cialdini's (2001) identified channels of persuasion, inducing changes in behavior by providing behavioral information about peers, that is, individuals sharing one or more characteristics. When behavior of peers is made salient (Robert B Cialdini, Reno, & Kallgren, 1990), individuals are driven to social conformity, to conform to what others do, or what others approve or disapprove of doing, through their informational goal of accuracy and their normative goal of affiliation (Robert B Cialdini & Goldstein, 2004; Schultz, 1999). The peer effect is strongest under conditions of uncertainty with regard to the optimal choice.

The anchoring effect is conceptualized as a decision shortcut occurring when an individual has to make an estimate after exposure to a provided or self-generated initial value – an anchor – thereafter insufficiently adjusting away from this anchor (Tversky & Kahneman,

1974). Like the peer effect, the anchoring effect is a judgment heuristic that is strongest under conditions of uncertainty with regard to the optimal choice (Festinger, 1954; Goldstein et al., 2008). According to Epley and Gilovich (2006), this insufficient adjustment away from the anchor occurs as adjustment stops when the first plausible value is encountered in the adjustment process. Moreover, Epley and Gilovich (2001) found that the adjustment away from the anchor was least pronounced, that is, a stronger anchoring effect, for provided values than for self-generated values.

Thus, an anchor evokes the strongest effect when making a decision under high uncertainty and when the anchor value is provided by an external party. Similarly, the peer effect evokes the strongest conformity when making a decision under equally high uncertainty and when the peer information is equally provided by an external party. Thus, providing a subject with descriptive information on a peer group's behavior (e.g. level of consumption of a good) may both fixate an anchor, fueling the anchoring effect, as well as prompt social conformity, fueling the peer effect. This therefore begs the question, could the results from peer effect studies be driven by a mere anchoring effect as opposed to social conformity?

We investigate whether the anchoring-and-adjustment heuristic may be a driver of putative peer effects in peer effect experiments, by employing financial decision-making experiments. Financial decision-making experiments are ideal since they employ – like many peer effect interventions – numerical values, known to evoke anchors (e.g. Northcraft & Neale, 1987), and take place in a context characterized by high uncertainty.

Study 1 finds evidence indicative that the anchoring effect and peer effect may lead to similar results, as both greatly reduce the variance in subjects' behavior, and both treatments direct the behavior towards the presented anchor and peer behavior value. However, the control group's average behavior highlights that the chosen anchor and peer behavior value did not deviate much from the average behavior without intervention. As such, follow-up study 2 was conducted, where treatment groups were exposed to more extreme anchor and peer behavior values, both further below and above the average behavior. Study 2 reveals that the anchoring effect no longer holds when more extreme values (more distant from the average behavior) are used. Peer effects, on the other hand, remain strong at more extreme values.

Furthermore, as peer effects are driven by the goal of accuracy and the goal of affiliation, we predicted that a consumer's susceptibility to interpersonal influence (CSII) (Bearden, Netemeyer, & Teel, 1989, 1990) would explain a peer effect, but no anchoring effect. A subject's

CSII highlights a subject's susceptibility to normative influence (driving goal of affiliation) and informational influence (driving goal of accuracy). We find some evidence that a subject's susceptibility to informational influence – as opposed to normative influence – plays a stronger role in explaining the peer effect within financial decision-making.

Lastly, we find that, for the peer effect, females consistently outperform a provided savings norm, whereas males do not.

2 Experiment 1 – Peer versus Anchoring Effect Treatments

2.1 Design of Experiment 1

We test our hypotheses in an online survey by placing subjects into a hypothetical retirement savings scenario, randomly assigning them to either a peer effect condition, an anchoring effect condition, or a control condition. The peer effect condition presents subjects with a relevant numerical value on what their peers are saving, whereas the anchoring effect condition simply presents them with an irrelevant statement containing this same numerical value. The former theoretically stimulates both the peer and anchoring effects, whereas the latter stimulates merely the anchoring effect. The control condition does not provide either piece of information and thus should not stimulate either effect. We examine how the provision of the information in the peer effect and anchoring effect conditions affect the savings rate of subjects, and provide insights on the efficacy of numerical peer effect interventions.

We conducted an internet survey with Amazon's Mechanical Turk (mTurk) workers, recruiting 303 subjects, of whom 295 completed all survey questions. 53.2% of those subjects reported being female, 55.6% being single, and 36.6% having one or more children. Median age was 31 years old (M_{AGE} = 33.9, SD_{AGE} = 12.1). Amazon's Mechanical Turk (mTurk) recruitment platform was used to recruit subjects exclusively from the United States (U.S.), as U.S. citizens are particularly familiar with the retirement savings scenario used in the experiment (U.S. Department of Labor, 2014). Moreover, mTurk has become an accepted recruitment platform for obtaining subjects for experiments (e.g. Paolacci, Chandler, & Ipeirotis, 2010), especially when employing decision-making heuristics (Horton, Rand, & Zeckhauser, 2011).

Subjects were first placed into a hypothetical retirement savings scenario: The scenario placed the subjects in the position of a fresh graduate from a fictional ABC College, accepting his or her first job and asked to contribute a percentage of his or her salary to a 401(k) retirement fund. Subjects were randomly assigned to either a control group (n = 102) or one of two treatment groups: a peer effect group (n = 100) and an anchoring effect group (n = 93). The

peer effect group was primed with an additional, relevant sentence containing a descriptive social norm that similar graduates contribute 11 percent to their 401(k) ("Other recent ABC college graduates contribute 11% of their salary to their pension fund."), whereas the anchoring effect group was primed with an irrelevant sentence containing the 11 percent anchor ("Among ABC college graduates, 11% have a similar job."). The control group received no such additional information. Experimental instructions are shown in Table 1.

-----Insert Table 1 here-----

The subjects were elicited to submit their desired retirement savings contribution rate by the question: "what percentage of your salary would you contribute to your pension?" This was followed by a prompt to confirm why they chose to contribute this particular amount, to screen for typological errors: "could you please shortly explain why you selected to contribute [embedded percentage from prior question] percent to the retirement account?"

Next, respondents filled out the CSII scale by Bearden and Netemeyer (1989, 1990). Finally, subjects were asked to provide a number of demographic details, in order to identify any differences between groups. The subjects were queried to provide their age, gender, nationality, relationship status, and whether they have any children.

2.2 Results

2.2.1 Effect on distance to contribution rate value

We deducted the 11 percent anchor of the peer effect and anchoring effect conditions from the subjects' contribution rates, and took the absolute value of the outcomes, to measure the actual distance to the norm. This allowed us to escape the negating effect of over- and underperformers relative to the norm, as we are interested not only in the actual mean contribution rate, but also the mean convergence (distance) towards the contribution rate norm.

-----Insert Table 2 here-----

Table 2 shows descriptive statistics for the distance to the provided contribution rate value, i.e. convergence to the 11 percent anchor and peer norm, between the three independent groups. The contribution rate distance was largest for the control group ($M_{DISTANCE}$ = 6.14, SD = 6.62), and similar across the peer effect group ($M_{DISTANCE}$ = 3.73, SD = 3.78) and anchoring effect group ($M_{DISTANCE}$ = 3.70, SD = 3.99). The data was tested for normality (Daniel, 1990; Shapiro & Wilk, 1965), and failed both the Komolgorov-Smirnov and Shapiro-Wilk tests. Furthermore, Levene's test for homogeneity of variances (Levene, 1960) was violated, $F(2,292)=12.88$, p = .001). Nevertheless, given the large sample size, a one-way between

subjects ANOVA is suitable and was conducted to compare the effect of the provided peer and anchoring stimuli on the contribution rate[1] (Glass, Peckham, & Sanders, 1972). The ANOVA showed a significant difference in distance to the 11 percent anchor/norm between the control, peer effect, and anchoring effect groups, $F(2,292)=7.83$, $p = .000$). Dunnett's post hoc test revealed that, compared to the control group, both the peer effect and the anchoring effect groups had significantly lower contribution rate distances ($p < .01$).

2.2.2 Effect on contribution rate

Table 2 shows descriptive statistics for the contribution rate between the three independent groups. The mean contribution rate was highest for the control group (M_{RATE} = 12.41). The mean contribution rate for the anchoring effect group (M_{RATE} = 10.26) and peer effect group (M_{RATE} = 12.05) both converge towards the 11 percent anchor, but at opposing ends. The data was tested for normality and failed both the Komolgorov-Smirnov and Shapiro-Wilk tests. Furthermore, Levene's test for homogeneity of variances was violated, $F(2,292)=12.88$, $p = .001$). Nevertheless, given the large sample size, a one-way between subjects ANOVA is suitable and was conducted to compare the effect of the provided peer and anchoring stimuli on the contribution rate[2]. The ANOVA showed a significant difference in chosen contribution rate between the control, peer effect, and anchoring effect groups, significant at the 10 percent level, $F(2,292)=2.74$, $p = .066$). As the peer and anchor stimulus used was 11 percent, a single sample t-test was conducted for both treatment groups against a specified test value (mean) of the contribution rate at 11 percent. The results from this test demonstrate that only the mean contribution rate of the peer effect group is significantly different from the 11 percent norm, $t(99) = 2.01$, $p = .047$. The mean contribution rate of the anchoring effect group is not significantly different from the 11 percent anchor, $t(92) = -1.30$, $p = .196$.

2.2.3 Correlation between treatment effects and consumer susceptibility to interpersonal influence

Consumer susceptibility to interpersonal influence (CSII) measures a subject's sensitivity to peer information and is a driver of peer effects. Thus, the CSII measure should correlate with differences in the contribution rate of subjects in the peer effect group, but not for subjects in the anchoring effect group. Pearson product-moment correlation coefficients were therefore

[1]The same results hold for more conservative non-parametric tests (e.g. Kruskal & Wallis, 1952; Wilcoxon, 1954).
[2]The same results hold for more conservative non-parametric tests (e.g. Kruskal & Wallis, 1952; Wilcoxon, 1945).

computed to assess the relationship between CSII and a subject's contribution rate as well as contribution rate distance from norm, across all three groups (Pearson, 1895). There was no significant correlation between the CSII score and the contribution rate for the peer effect group, r = -.030, n = 100, p = .769, anchoring effect group, r = .073, n = 93, p = .490, and control group, r = -.000, n = 102, p = .997. Also the correlation between the CSII score and the contribution rate distance from the norm for the peer group, r = -.143, n = 100, p = .155, anchoring effect group, r = .065, n = 93, p = .538, and control group, r = -.032, n = 102, p = .748, was not significant. This can be explained by the composition of the total CSII score. The CSII score is a cumulative score, composed of two measured dimensions, an informational dimension and a normative dimension. Computing Pearson product-moment correlation coefficients between the contribution rate and contribution rate distance to norm and the individual dimensions of CSII across all three groups, provides an answer to the insignificant findings of the total CSII score. While the informational dimension of CSII significantly positively correlates with distance to the contribution rate norm for the peer effect group, r = -.297, n = 100, p = .003, the normative dimension of CSII does not, r = -.048, n = 100, p = .633. For the anchoring effect and control groups, neither dimensions of CSII correlate with the distance to the contribution rate norm. This provides evidence that the informational component of peer information drives convergence towards this peer behavior more than the normative component of this information.

2.2.4 Gender effect

An independent-samples t-test was conducted to compare contribution rate in male and female subjects for the peer effect, anchoring effect, and control groups. Surprisingly, there was a significant difference in the contribution rate for males (M_{RATE} = 10.19) and females (M_{RATE} = 14.03) in the control group, t(100)=8.21, p = 0.031. There was no significant gender effect in the anchoring effect or peer effect groups.

3 Experiment 2 – Extreme Values, Non-social Anchor

3.1 Design of Experiment 2

The same hypothetical retirement savings scenario from study 1 was used in study 2, and we again examine how the provision of the information in the peer effect and anchoring effect conditions affect the savings rate of subjects. This follow-up study exhibits four extra treatments; low and high peer effect and anchor groups with more extreme values to test boundary conditions, and a new variation of the anchoring condition.

We conducted an Internet survey with mTurk workers, recruiting 709 subjects, of whom 665 completed all survey questions. 44.2% of those subjects reported being female, 53.2%

being single, and 35.2% having one or more children. Median age was 32 years old (M_{AGE} = 35.2, SD_{AGE} = 11.3).

The survey followed the same setup as study 1, with four added treatment groups. Subjects were randomly assigned to either a control group (*n* = 98) or one of six treatment groups: low and high peer effect groups (*n* = 94 and *n* = 92, respectively), low and high anchoring effect groups (*n* = 98 and *n* = 91, respectively), and low and high non-social anchoring groups (*n* = 97 and *n* = 95, respectively) (see Table 1.2). The peer effect group was primed with an additional, relevant sentence containing a descriptive social norm that similar graduates contribute 8 (low) or 16 (high) percent to their 401(k) ("Other recent ABC college graduates contribute 8/16% of their salary to their pension fund."). The first anchoring effect group was again primed with an irrelevant sentence containing an 8 or 16 percent anchor ("Among ABC college graduates, 8/16% have a similar job". Since the effects in study 1 could potentially be explained by the formulation of the anchor condition sentence, still providing a social context by referring to fellow college graduates, we also include a non-social anchor condition in study 2. This non-social anchor condition was primed with "You have completed 8/16% of the survey so far". As the 11 percent value used in study 1 was close to the mean contribution rate, 8 and 16 percent were chosen as more distal values, with a distance of approximately 4 percent below and above, respectively, the mean contribution rate of study 1's control group. The control group in study 2 again received no additional information. Subjects were then asked to provide their desired retirement savings contribution rate, followed by a prompt to confirm why they chose to contribute this particular amount. Lastly, subjects were again asked to fill out items from the CSII scale, followed by socio-demographics.

3.2 Results

3.2.1 Effect on distance to contribution rate value

-----Insert Table 3 here-----

Table 3 shows descriptive statistics for the distance to the provided contribution rate value, i.e. distance to the 8 or 16 percent anchor and peer norm, between the seven independent groups. For the *low* groups, the distance to the provided 8 percent value was lowest for the peer effect group ($M_{DISTANCE}$ = 3.22, *SD* = 4.27), followed by the original anchor group ($M_{DISTANCE}$ = 4.59, *SD* = 5.77), non-social anchor group ($M_{DISTANCE}$ = 5.24, *SD* = 5.85), and control group ($M_{DISTANCE}$ = 6.27, *SD* = 7.79). Similarly, for the *high* groups, the distance to the provided 16 percent value was lowest for the peer effect group ($M_{DISTANCE}$ = 4.58, *SD* = 4.06), followed by the original anchor group ($M_{DISTANCE}$ = 7.88, *SD* = 5.04), control group ($M_{DISTANCE}$ =

8.16, *SD* = 5.66), and non-social anchor group ($M_{DISTANCE}$ = 8.19, *SD* = 5.72). One-way ANOVAs were conducted to compare the effects of the provided peer and anchoring values on the convergence towards these values. For the *low* groups, the ANOVA showed a significant difference in distance to the provided 8 percent value between the control, low peer effect, and low original and non-social anchoring effect groups, $F(3,383)=4.22$, $p = .006$). Moreover, for the *high* groups, the ANOVA also showed a significant difference in distance to the provided 16 percent value between the control, high peer effect, and high original and non-social anchoring effect groups, $F(3,372)=10.69$, $p = .000$). Dunnett's post hoc test revealed that for the *low* groups, only the peer effect group had a significantly lower contribution rate distance to the provided value compared to other groups, that is, lower than the non-social anchoring group ($p < .05$) and control group ($p < .01$), but not statistically significantly lower than the original anchor group. Similarly, Dunnett's post hoc test revealed that for the *high* groups, only the peer effect group had a significantly lower contribution rate distance to the provided value compared to the original anchoring, non-social anchoring, and control groups ($p < .000$)[3].

3.2.2 Effect on contribution rate

Table 3 shows descriptive statistics for the contribution rate between the seven groups. As expected, the mean contribution rate for the peer effect groups converge towards the provided norms of 8 and 16 percent (M_{RATE} = 9.16 and M_{RATE} = 15.51, respectively). Unexpectedly, the mean contribution rate for the low and high groups receiving the original anchor condition (M_{RATE} = 10.73 and M_{RATE} = 11.35, respectively), as well as the low and high groups receiving the new non-social anchor condition (M_{RATE} = 10.60 and M = 11.54, respectively), are surprisingly similar, also to the control condition (M_{RATE} = 12.06). As in study 1, normality tests failed, and Levene's test for homogeneity of variances was violated, $F(2,292)=12.88$, $p = .001$). Nevertheless, sufficiently large sample size allows for conducting an ANOVA to compare the effects of the provided peer and anchoring stimuli on the contribution rate[4]. The ANOVA showed that there was a significant difference in contribution rate between the three groups, $F(6,658)=6.33$, $p = .000$). Dunnett's post hoc test revealed that only the 16 percent peer effect group had a significantly different contribution rate compared to other groups. Moreover, this group had a higher contribution rate compared to all other treatment groups ($p < .000$), but not the control group. No other pairwise comparison showed a significant difference in contribution rate between the other groups.

[3] The same results hold for more conservative non-parametric tests (e.g. Kruskal & Wallis, 1952; Wilcoxon, 1954).
[4] The same results hold for more conservative non-parametric tests (e.g. Kruskal & Wallis, 1952; Wilcoxon, 1954).

3.2.3 Correlation between treatment effects and consumer susceptibility to interpersonal influence

As in study 1, Pearson product-moment correlation coefficients were computed to assess the relationship between CSII and a subject's contribution rate across all treatment groups. Unfortunately, no significant CSII results were found in study 2.

3.2.4 Gender effect

-----Insert Table 4 here-----

An independent-samples t-test was conducted to compare contribution rate in male and female subjects for each of the treatment groups. See Table 4 for descriptive statistics. Interestingly, there was a significant difference in the contribution rate for males (M_{RATE} = 8.10 and M_{RATE} = 13.26, respectively) and females (M_{RATE} = 10.48 and M_{RATE} = 17.76, respectively) for the low and high norm groups, t(92)=2.24, p = 0.028, and t(90)=-3.78, p = 0.000, respectively. For the social and non-social anchor groups, no significant difference was found between males and females, except for the low non-social anchor group. Surprisingly, there was a significant difference in the scores for males (M_{RATE} = 8.98, *SD* = 5.75) and females (M_{RATE} = 12.80, *SD* = 8.84) for the low non-social anchor group, t(95)=-2.58, p = 0.011. Moreover, while the contribution rate of females in the low non-social anchor group and control group were not different (M_{RATE} = 12.80 and M_{RATE} = 12.36, respectively), the contribution rate of males in these groups was different (M_{RATE} = 8.98 and M_{RATE} = 11.78, respectively).

4 Discussion

We investigated whether the anchoring effect could be a driver of putative peer effects in numerical peer effect experiments. We find strong evidence in favor of a peer effect, and limited evidence of an anchoring effect. Furthermore, we find that, in the peer effect groups, females consistently outperform the provided savings norm, whereas males do not. Lastly, we find some evidence that the informational component – as opposed to the normative component – of peer information plays a stronger role in the peer effect within financial decision-making.

The findings from study 1 would have one believe that while providing numerical information about peers' behavior leads to convergence towards this behavior, an irrelevant numerical anchor has a strikingly similar convergence effect on behavior. Follow-up study 2, however, exposes that the similarity of the anchoring and peer effects is largely driven by the proximal nature of the 11 percent peer and anchor value to the control group's mean of the

measured contribution rate (*M* = 12.41). For more distal values, only the peer effect remains robust. The anchoring effect group shows mixed results, and a significant effect only for males in the low non-social anchor condition, hinting that males may be more susceptible to anchoring than females. Moreover, these results suggesting different systems at play, as per dual process theory (Sloman, 1996). As Bartels and Sussman (2016) discuss in a recent working paper, peer information – in their study also provided in a financial decision context – may influence the goal-setting of subjects, altering their reference points altogether. Thus, while anchors may adjust behavior towards an individual's existing range of behavior, salient peer information may actually change this very range of behavior.

Additionally, our results show that while males and females are both influenced by peer information, males have a tendency to shift their behavior towards the salient norm, whereas females have a tendency to outperform it. As higher contribution rates involve a tradeoff where short-term resources are depleted in favor of long-term resources, these differences may be driven by gender differences in risk aversion and self-control. Males have been found to be more risk-seeking than females (Borghans, Heckman, Golsteyn, & Meijers, 2009; Sapienza, Zingales, & Maestripieri, 2009), and exhibit less self-control (Nakhaie, Silverman, & LaGrange, 2000). For instance, in a similar vein, controlling for gender differences in self-control diminished the gender gap in crime (Burton, Cullen, Evans, Alarid, & Dunaway, 1998).

As our contrasting results for the anchoring and peer effects may be explained by dual process theory (Evans, 2003), future research may address these concerns by identifying and controlling for which system – the more automatic, implicit system 1, or the more controlled, explicit system 2 – is driving the change in behavior. Moreover, the strong peer effects found for both male and female subjects may be driven by different mechanisms as highlighted by the varying contribution rates. Thus, future research may also focus on delineating these underlying mechanisms, by identifying and incorporating self-control (Baumeister, 2002) or risk aversion(Hartog, Ferrer-i-Carbonell, & Jonker, 2002)

In conclusion, our findings demonstrate that peer effects work not only for proximal nudges, but also for more distal ones. We do not find evidence for an anchoring effect. Interestingly, we find strong gender effects in that women outperform the norm, even at high norm values.

Acknowledgements

References

Allcott, H. (2011). Social norms and energy conservation. *Journal of public Economics, 95*(9), 1082-1095.

Azmat, G., & Iriberri, N. (2010). The importance of relative performance feedback information: Evidence from a natural experiment using high school students. *Journal of public Economics, 94*(7), 435-452.

Baumeister, R. F. (2002). Yielding to temptation: Self-control failure, impulsive purchasing, and consumer behavior. *Journal of consumer research, 28*(4), 670-676.

Bearden, W. O., Netemeyer, R. G., & Teel, J. E. (1989). Measurement of consumer susceptibility to interpersonal influence. *Journal of consumer research*, 473-481.

Bearden, W. O., Netemeyer, R. G., & Teel, J. E. (1990). Further validation of the consumer susceptibility to interpersonal influence scale. *Advances in consumer research, 17*(1), 770-776.

Beshears, J., Choi, J. J., Laibson, D., Madrian, B. C., & Milkman, K. L. (2015). The effect of providing peer information on retirement savings decisions. *The Journal of Finance, 70*(3), 1161-1201.

Borghans, L., Heckman, J. J., Golsteyn, B. H., & Meijers, H. (2009). Gender differences in risk aversion and ambiguity aversion. *Journal of the European Economic Association, 7*(2-3), 649-658.

Burton, V. S., Cullen, F. T., Evans, T. D., Alarid, L. F., & Dunaway, R. G. (1998). Gender, self-control, and crime. *Journal of Research in Crime and Delinquency, 35*(2), 123-147.

Campo, S., & Cameron, K. A. (2006). Differential effects of exposure to social norms campaigns: A cause for concern. *Health communication, 19*(3), 209-219.

Cialdini, R. B. (2001). Harnessing the Science of Persuasion. *Harvard Business Review, 79*(9), 72-81.

Cialdini, R. B., & Goldstein, N. J. (2004). Social influence: compliance and conformity. *Annu Rev Psychol, 55*, 591-621. doi:10.1146/annurev.psych.55.090902.142015

Cialdini, R. B., Reno, R. R., & Kallgren, C. A. (1990). A focus theory of normative conduct: recycling the concept of norms to reduce littering in public places. *Journal of personality and social psychology, 58*(6), 1015.

Clark, A. E. (2003). Unemployment as a social norm: Psychological evidence from panel data. *Journal of labor economics, 21*(2), 323-351.

Cobiac, L., Vos, T., Doran, C., & Wallace, A. (2009). Cost-effectiveness of interventions to prevent alcohol-related disease and injury in Australia. *Addiction, 104*(10), 1646-1655.

Daniel, W. W. (1990). Applied nonparametric statistics.

Epley, N., & Gilovich, T. (2001). Putting adjustment back in the anchoring and adjustment heuristic: Differential processing of self-generated and experimenter-provided anchors. *Psychological science, 12*(5), 391-396.

Epley, N., & Gilovich, T. (2006). The anchoring-and-adjustment heuristic Why the adjustments are insufficient. *Psychological science, 17*(4), 311-318.

Evans, J. S. B. (2003). In two minds: dual-process accounts of reasoning. *Trends in cognitive sciences, 7*(10), 454-459.

Festinger, L. (1954). A theory of social comparison processes. *Human relations, 7*(2), 117-140.

Gerber, A. S., & Rogers, T. (2009). Descriptive social norms and motivation to vote: Everybody's voting and so should you. *The Journal of Politics, 71*(01), 178-191.

Glass, G. V., Peckham, P. D., & Sanders, J. R. (1972). Consequences of failure to meet assumptions underlying the fixed effects analyses of variance and covariance. *Review of educational research, 42*(3), 237-288.

Goldstein, N. J., Cialdini, R. B., & Griskevicius, V. (2008). A room with a viewpoint: Using social norms to motivate environmental conservation in hotels. *Journal of consumer research, 35*(3), 472-482.

Hartog, J., Ferrer-i-Carbonell, A., & Jonker, N. (2002). Linking measured risk aversion to individual characteristics. *Kyklos, 55*(1), 3-26.

Horton, J. J., Rand, D. G., & Zeckhauser, R. J. (2011). The online laboratory: Conducting experiments in a real labor market. *Experimental Economics, 14*(3), 399-425.

Kruskal, W. H., & Wallis, W. A. (1952). Use of ranks in one-criterion variance analysis. *Journal of the American Statistical Association, 47*(260), 583-621.

Levene, H. (1960). Robust tests for equality of variances1. *Contributions to probability and statistics: Essays in honor of Harold Hotelling, 2*, 278-292.

Nakhaie, M. R., Silverman, R. A., & LaGrange, T. C. (2000). Self-control and social control: An examination of gender, ethnicity, class and delinquency. *Canadian Journal of Sociology/Cahiers canadiens de sociologie*, 35-59.

Northcraft, G. B., & Neale, M. A. (1987). Experts, amateurs, and real estate: An anchoring-and-adjustment perspective on property pricing decisions. *Organizational behavior and human decision processes, 39*(1), 84-97.

Paolacci, G., Chandler, J., & Ipeirotis, P. G. (2010). Running Experiments on Amazon Mechanical Turk. *Judgment and Decision Making, 5*(5), 411-419. doi:http://journal.sjdm.org

Pearson, K. (1895). Note on regression and inheritance in the case of two parents. *Proceedings of the Royal Society of London, 58*, 240-242.

Perkins, H. W. (2002). Social norms and the prevention of alcohol misuse in collegiate contexts. *Journal of Studies on Alcohol, supplement*(14), 164-172.

Sapienza, P., Zingales, L., & Maestripieri, D. (2009). Gender differences in financial risk aversion and career choices are affected by testosterone. *Proceedings of the National Academy of Sciences, 106*(36), 15268-15273.

Schultz, P. W. (1999). Changing behavior with normative feedback interventions: A field experiment on curbside recycling. *Basic and Applied Social Psychology, 21*(1), 25-36.

Shapiro, S. S., & Wilk, M. B. (1965). An analysis of variance test for normality (complete samples). *Biometrika, 52*(3/4), 591-611.

Sloman, S. A. (1996). The empirical case for two systems of reasoning. *Psychological bulletin, 119*(1), 3.

Stutzer, A., & Lalive, R. (2004). The Role of Social Work Norms In Job Searching and Subjective Well-Being. *Journal of the European Economic Association, 2*(4), 696-719.

Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *science, 185*(4157), 1124-1131.

U.S. Department of Labor. (2014). *Private Pension Plan Bulletin*. Retrieved from http://www.dol.gov/ebsa/pdf/2011pensionplanbulletin.pdf.

Wilcoxon, F. (1945). Individual comparisons by ranking methods. *Biometrics bulletin, 1*(6), 80-83.

Appendix B: Tables

Table 1
Hypothetical retirement savings scenario.

[control] Please imagine the following: You have just graduated from ABC college and have landed your first job, earning you an annual gross salary of USD 45,000. You are single and have no children, and are therefore able to allocate this salary as you wish. The 401(k) pension scheme that you are enrolled in allows you to define your own contribution rate for your pension. The contribution rate is the percentage of your annual salary that you invest into your pension. Assume that your company does not provide any contribution to your pension. [anchoring effect treatment] Other recent ABC college graduates contribute 11% of their salary to their pension fund. [peer effect treatment] Among ABC college graduates, 11% have a similar job.

Table 1.2
Hypothetical retirement savings scenario.

[control] Please imagine the following: You have just graduated from ABC college and have landed your first job, earning you an annual gross salary of USD 45,000. You are single and have no children, and are therefore able to allocate this salary as you wish. The 401(k) pension scheme that you are enrolled in allows you to define your own contribution rate for your pension. The contribution rate is the percentage of your annual salary that you invest into your pension. Assume that your company does not provide any contribution to your pension. [study 1 anchoring effect treatment low] Other recent ABC college graduates contribute 8% of their salary to their pension fund. [study 1 anchoring effect treatment high] Other recent ABC college graduates contribute 16% of their salary to their pension fund. [non-social anchoring effect treatment low] You have completed 8% of the survey so far. [non-social anchoring effect treatment high] You have completed 16% of the survey so far. [peer effect treatment low] Among ABC college graduates, 8% have a similar job.

[peer effect treatment high]
Among ABC college graduates, 16% have a similar job.

Table 2
Mean contribution rate across treatment groups in study 1.

	N	Mean contribution rate (S.D.)	Mean distance to the 11% norm/anchor (S.D.)
Control	102	12.412 (8.932)	6.137 (6.615)
Anchor	93	10.269 (5.408)	3.699 (3.004)
Peer	100	12.050 (5.219)	4.553 (3.782)

Table 3
Mean contribution rate across treatment groups in study 2.

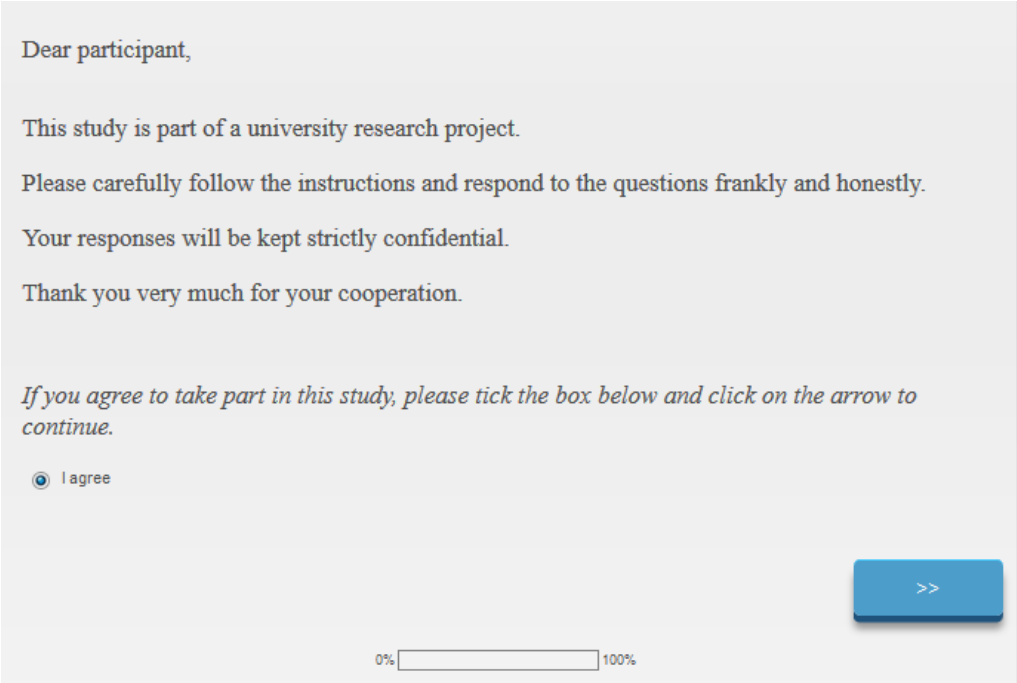
	N	Mean contribution rate (S.D.)	Mean distance to the 8% norm/anchor (S.D.)	Mean distance to the 16% norm/anchor (S.D.)
Control	98	12.061 (9.146)	6.265 (7.788)	8.163 (5.656)
Peer low	94	9.160 (5.233)	3.223 (4.271)	N/A
Anchor low	98	10.735 (6.862)	4.592 (5.774)	N/A
Non-social anchor low	97	10.598 (7.424)	7.876 (4.682)	N/A
Peer high	92	15.511 (6.115)	N/A	4.576 (4.058)
Anchor high	91	11.352 (8.145)	N/A	7.879 (5.042)
Non-social anchor high	95	11.537 (8.965)	N/A	5.916 (7.593)

Table 4
Mean male and female contribution rates across treatment groups in study 2.

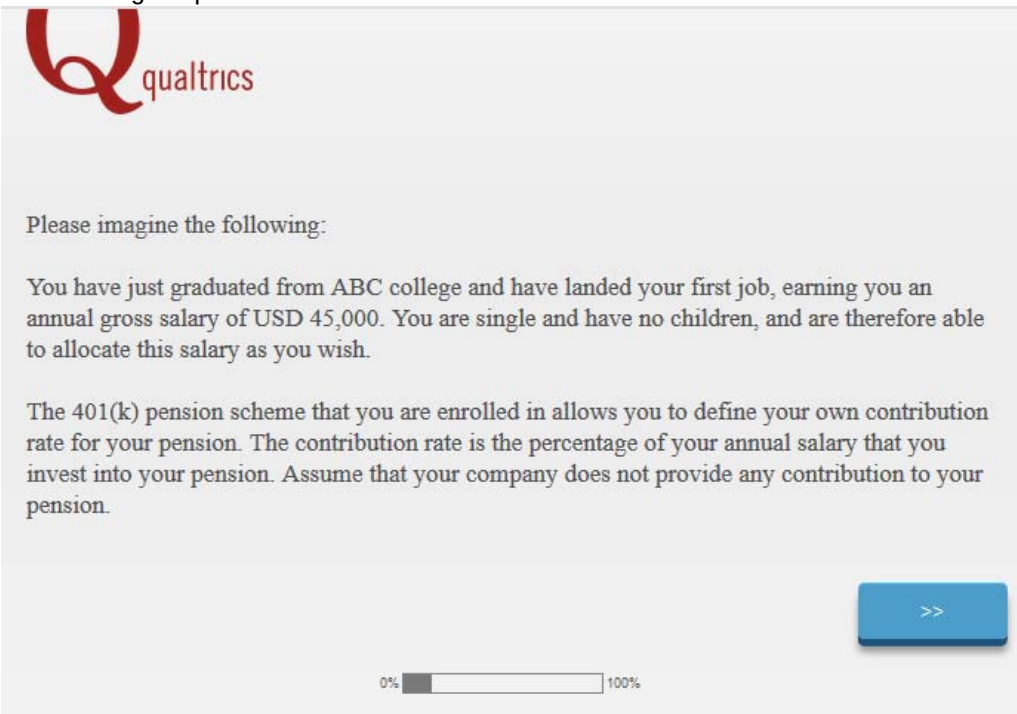
	N	Mean contribution rate for males (S.D.)	Mean contribution rate for females (S.D.)
Control	98 (51 M, 47 F)*	11.784 (9.542)	12.362 (8.788)
Peer low	94 (52 M, 42 F)*	8.096 (3.717)	10.476 (6.459)
Anchor low	98 (54 M, 44 F)*	10.167 (5.745)	11.432 (8.039)
Non-social anchor low	97 (56 M, 41 F)*	8.982 (5.751)	12.805 (8.841)
Peer high	92 (46 M, 46 F)*	13.261 (5.503)	17.761 (5.915)
Anchor high	91 (52 M, 39 F)*	10.539 (7.344)	12.436 (9.090)
Non-social anchor high	95 (60 M, 35 F)*	12.117 (9.891)	10.543 (7.130)

*M designates male, F designates female.

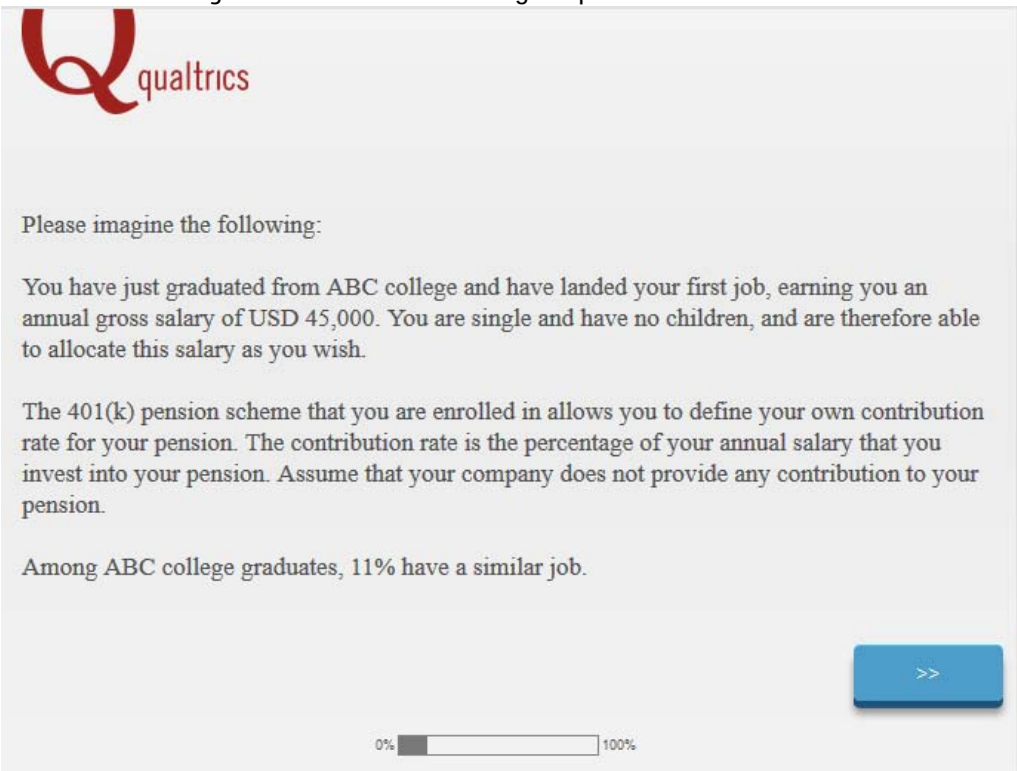
Appendix B: Study 1 Survey



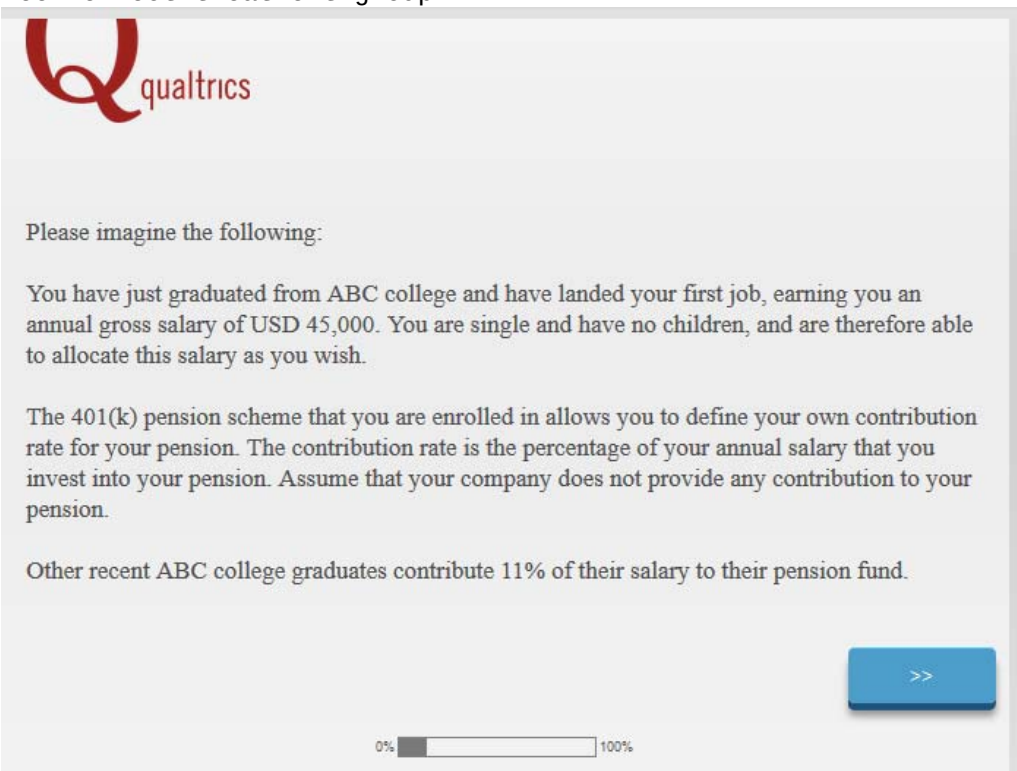
Control group

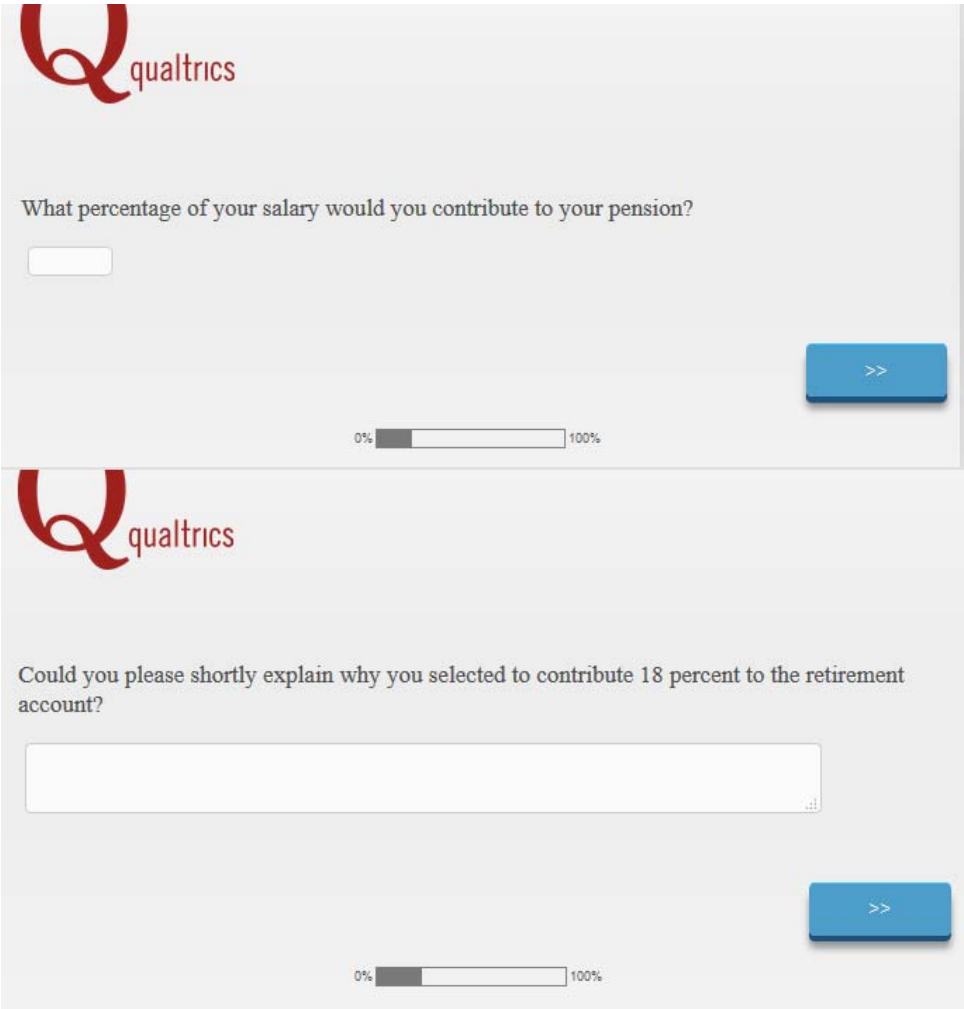


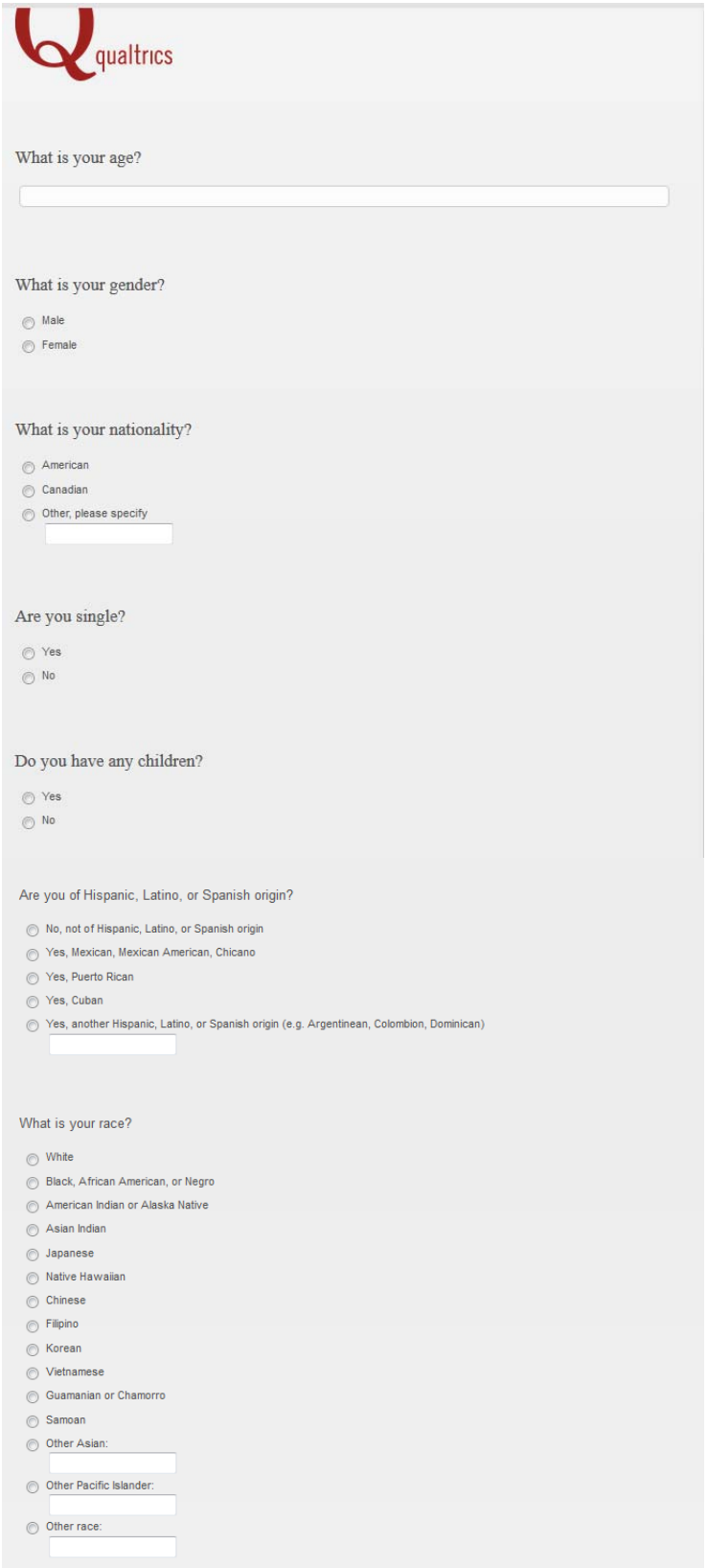
Anchor-and-adjustment treatment group



Peer effect treatment group




Qualtrics
What percentage of your salary would you contribute to your pension?
>>
0%
100%
Qualtrics
Could you please shortly explain why you selected to contribute 18 percent to the retirement account?
>>
0%
100%



qualtrics

What is your age?

What is your gender?

- Male
- Female

What is your nationality?

- American
- Canadian
- Other, please specify

Are you single?

- Yes
- No

Do you have any children?

- Yes
- No

Are you of Hispanic, Latino, or Spanish origin?

- No, not of Hispanic, Latino, or Spanish origin
- Yes, Mexican, Mexican American, Chicano
- Yes, Puerto Rican
- Yes, Cuban
- Yes, another Hispanic, Latino, or Spanish origin (e.g. Argentinean, Colombion, Dominican)

What is your race?

- White
- Black, African American, or Negro
- American Indian or Alaska Native
- Asian Indian
- Japanese
- Native Hawaiian
- Chinese
- Filipino
- Korean
- Vietnamese
- Guamanian or Chamorro
- Samoan
- Other Asian:
- Other Pacific Islander:
- Other race: