The Impact of Financial Literacy on Negotiation Behavior

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Abstract. This research investigates the role of financial literacy on initiating and achieving a favorable outcome from a negotiation in an employment context. As individuals in today's society have increasing responsibility for their own long-term financial well-being, it becomes critical to document and address the unexpected wide-ranging effects of low financial literacy. This research first assesses the correlation between financial literacy and (a) the likelihood of initiating a negotiation and (b) the likely outcome from a negotiation, if initiated. In a series of studies engaging students in undergraduate business courses as well as adults recruited from an online crowdsourcing service, results of the correlational analyses suggest that financial confidence impacts participants' willingness to engage in negotiation, while financial knowledge impacts the level of participants' first offer. The research then evaluates the causal impact of improvements in financial knowledge via feedback on participants' own responses to financial literacy questions. The causal nature of the relationship is confirmed with feedback on participants' own responses to financial literacy questions leading to improved measures of knowledge and in turn, increasing participants' first offer in a negotiation. These findings suggest a person's financial literacy likely has important implications for his or her career advancement and compensation over time, as well as the successful management of interpersonal communications, even in fields that have not traditionally been thought to require or involve numerical reasoning skills.

[227 words]

Keywords: Financial literacy, financial confidence, negotiation

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1. Introduction

This research examines the role of financial literacy on initiating and achieving a favorable outcome from a negotiation in an employment context. Individuals have increasing responsibility for their own long-term financial well-being in today's society (e.g., Fernandes, Lynch Jr., and Netemeyer, 2014). Many recognize the importance of financial decision making and planning for the long term (e.g., Howlett, Kees, and Kemp 2008), and prior research has suggested positive correlations between a person's level of financial literacy and their investment experience. For example, analyses of RAND's American Life Panel find that financial literacy, age, and income are significant predictors of planning for retirement, with age and education being predictors of 401K retirement savings balances (Hung et al. 2009; see also Lusardi and Mitchell 2011b). Analyses of Swedish data (Almenberg and Dreber 2015; Almenberg and Widmark 2011) and Danish data (van Rooij et al. 2011) also document a positive relationship between financial literacy and stock market participation.

We propose that the impact of financial literacy is not strictly limited to financial planning decisions, but rather also has the potential to impact individual behavior during negotiations. Recent research finds that a person's financial literacy can change the influence of financial disclosures on investment-related judgments (Krische 2019). That research argues that financial literacy is one measure of investors' broader understanding of business and economic activities and may help to identify individuals who are more likely able and willing to study financial reporting information with reasonable diligence as they form their investment-related judgments. Financial literacy may similarly impact an individual's behavior both before and during negotiations through its effects on an individual's willingness to initiate a negotiation in

the first place, as well as its impact on an individual's desire to reach a quick agreement. Thus, a person's financial literacy would likely have important implications for his or her career advancement and compensation over time, as well as the successful management of interpersonal communications, even in fields that have not traditionally been thought to require or involve numerical reasoning skills.

In this research, we investigate the role of financial literacy on initiating and achieving a favorable outcome from a negotiation by analyzing data from a series of experiments that ask students recruited from undergraduate business courses and adults recruited from an online crowdsourcing service to engage in negotiation situations and to complete relevant demographic survey questions. We note that the most common definition of financial literacy is of fundamental financial *knowledge* or understanding, for example, "knowledge of basic financial concepts, such as the working of interest compounding, the difference between nominal and real values, and the basics of risk diversification" (Lusardi 2008, p. 2; see Hung et al. 2009). However, others have also considered *perceived* (e.g., Allgood and Walstad 2016) or *subjective* (e.g., Tang and Baker 2016) financial knowledge, which we refer to as financial *confidence* (e.g., Tokar 2015).

From these data, we first examine the correlation between financial literacy and the focal negotiation behaviors (i.e., the likelihood of initiating a negotiation, and the likely outcome from a negotiation in a financial context, if initiated). Results suggest that financial confidence impacts participants' willingness to engage in negotiation, while financial knowledge impacts the level of participants' first offer. Although prior research has already documented that the first offer in a negotiation is, in turn, positively correlated with the final outcome of a negotiation (e.g., Galinsky & Mussweiler, 2001), we also confirm that financial knowledge continues to

impact the relative favorability of the final negotiated outcome for undergraduate business students negotiating in dyads.

In a second series of experiments, we provide feedback with learning opportunities for participants' initial responses to financial literacy questions to improve participants' financial knowledge. The objective is not to assess the efficacy of feedback as a financial education program, but instead to assess the causal impact of any resulting improvements in financial understanding on negotiation behavior. Results show that feedback improves participants' financial literacy (at least in the short term) which, in turn, leads to an increase in participants' first offer in a negotiation.

This work has important implications in several areas. As financial literacy influences how individuals negotiate, a person's financial literacy likely has important implications for his or her career advancement and compensation over time, as well as the successful management of interpersonal communications, even in fields that have not traditionally been thought to require or involve numerical reasoning skills. Further, because women have lower levels of financial literacy on average (Almenberg and Dreber 2015; Chen and Volpe 2002; Luisardi and Mitchell 2008, 2011; cf Wagland and Taylor 2009), women may currently face even higher hurdles in career advancement and compensation than previously believed. However, the active improvement of financial literacy suggests a proactive method of reducing gender differences in career advancement and compensation over time, which could be further evaluated in extensions of this research.

2. Theoretical development

Financial literacy is often defined on the basis of fundamental financial knowledge or understanding, for example, "knowledge of basic financial concepts, such as the working of

interest compounding, the difference between nominal and real values, and the basics of risk diversification" (Lusardi 2008, p. 2). In their review, Hasting, Madrian, and Skimmyhorn (2013) observe that there is a growing literature documenting the correlation between financial literacy and various financial behaviors and outcomes (e.g., the likelihood of paying bills on time or of maintaining an emergency fund—Hilgert et al. 2003; planning for retirement, savings, and wealth accumulation—Lusardi & Mitchell 2006, 2007, Hung et al. 2009, van Rooij et al. 2011; stock market participation—Kimball & Shumway 2006, van Rooij et al. 2011; and, choice of a low-fee investment portfolio—Choi et al. 2011).

Recent research finds that a person's financial literacy can change the interpretation and influence of financial disclosures on investment-related judgments (Krische 2019). That research argues that financial literacy is one measure of investors' broader understanding of business and economic activities and may help to identify individuals who are more likely able and willing to study financial reporting information with reasonable diligence as they form their investment-related judgments.

Financial literacy may similarly impact an individual's behavior both before and during negotiations. An individual's confidence in their ability to negotiate has been shown to impact their willingness to initiate a negotiation in the first place (Bandura, 2001; Huppertz, 2003, cf Volkema 2009). Negotiators who have low confidence in their financial literacy may thus be less likely to initiate a negotiation and ask for what they want. This reluctance to negotiate may be particularly pronounced in a financial context, where an individual with lower self-efficacy is likely to believe him-/herself to be less competent and capable of performing well. Yet even in a non-financial context, lower financial confidence may reduce clarity surrounding what an individual may need or want from a negotiation in the first place. A reduced clarity of purpose

can negatively impact willingness to initiate a negotiation request (Volkema, 2009).

Lower financial knowledge may also impact behavior during a negotiation. Education research has shown that the lower a student's ability level, the higher their test anxiety (e.g. Hembree 1988, Young 1991) and specifically that math anxiety and ability are highly negatively correlated (e.g. Fennema & Sherman, 1976, Wigfield & Meece 1988). Thus, individuals with lower financial knowledge are likely more prone to distress and anxiety when anticipating negotiating over financial matters. Negotiation scholars have shown that anxious negotiators are eager to escape anxiety-producing negotiations, and this motivates them to reach a quick agreement by lowering their aspirations and making more modest first offers (Brooks & Schweitzer 2011), in turn leading to worse negotiation outcomes (Galinsky, Seidin, Kim, & Medvec, 2002; Liebert, Smith, Hill, & Keiffer, 1968; Neale & Bazerman, 1991; Yukl, 1974). Yet even if the negotiation does not explicitly involve financial matters, individuals with low financial knowledge may be relatively less aware of the broader potential implications (e.g., opportunity cost) of negotiating poorly over matters that are not explicitly financial. We thus predict that financial literacy will directly impact both the willingness to negotiate as well as negotiation performance, and include both financial and non-financial negotiation contexts in order to control for potential differences due to context.

H: Participants' financial literacy improves their willingness to engage in negotiation and likelihood of achieving a favorable outcome from a negotiation.

As Hasting, Madrian, and Skimmyhorn (2013) discuss, although there are multiple measures of financial literacy available (e.g., FINRA undated; see Knoll and Houts 2012 or Hung et al. 2009 for a discussion), the measures developed by two particular researchers (A. Lusardi and O. Mitchell) have been used repeatedly in recent research (e.g., Almenberg and Widmark 2011; Li, Baldassi, Johnson, and Weber 2013; Krische 2019) and nationwide surveys

(e.g., FINRA Foundation 2009a, 2009b, 2012). These measures consist of a straightforward set of quiz questions, typically covering the concepts of compound interest, inflation, present value, and diversification. We apply this approach as our primary measure of financial literacy, which we refer to as financial *knowledge*.

However, others have also considered *perceived* (e.g., Allgood and Walstad 2016) or *subjective* (e.g., Tang and Baker 2016) financial knowledge, which we refer to as financial *confidence* (e.g., Tokar 2015). Because this prior research has documented that both financial knowledge and financial confidence can influence behaviors, we collect a measure of financial confidence that has also been collected from nationwide surveys (e.g., FINRA Foundation 2009a, 2009b, 2012) as a secondary measure of financial literacy.

We employ Studies 1 and 2 to examine the correlation between participants' financial literacy (measured by their financial knowledge and financial confidence) and their willingness to engage in negotiation and likelihood of achieving a favorable outcome from a negotiation. Study 1 recruits student participants, while Study 2 replicates fundamental aspects of Study 1 using a broader sample of the adult population.

Nevertheless, "the causality in these relationships is inherently difficult to pin down" (Hasting, Madrian, and Skimmyhorn 2013, p. 358). As Hastings et al. (2013) observe, individuals with greater facility with numbers or with higher general cognitive abilities also tend to have higher levels of financial literacy (Banks & Oldfield 2007, Gerardi et al. 2010). In sensitivity tests for Studies 1 and 2, we therefore control for numeracy (Schwartz et al. 1997; Cokely et al. 2012), for quantitative analytical reasoning (Frederick 2005), and for risk preferences (Dohmen et al. 2011, Sages and Grable 2010).

We also extend our correlational analyses from these first two studies to causational

analyses in the next two studies. In Studies 3 and 4, we provide feedback with learning opportunities for participants' initial responses to financial literacy questions to improve participants' financial knowledge. The objective is not to assess the efficacy of feedback as a financial education program, but instead to confirm the causal nature of the relationships.

3. Studies 1 and 2: The relationship between financial literacy and negotiation behaviors with statistical controls

Study 1

Method

Participants. 236 students (41% male) students from a private university in the United States were recruited to participate in this study for research participation credit in core management or marketing courses. The vast majority of participants (n=231, 98%) reported being in the age category defined as "18-25 years old."

Procedure. In this two-part computerized study, participants first read a scenario about a hypothetical workplace inequity between themselves and a similar coworker. In the first-part of the study, participants answered a series of questions about whether and how they would approach their manager regarding the inequity. In the second part of the study, participants were randomly assigned either the role of 'manager' or 'employee' in this same scenario. Participants assigned to the role of employee were asked to, "Imagine that you are the EMPLOYEE described in the scenario that you just read" and informed that they would now be given the opportunity to negotiate with the manager. Participants assigned to the role of manager were asked to, "Imagine that you are the MANAGER described in the scenario that you just read." Participants negotiated anonymously via computer terminals using chat programs. They were given 15 minutes to negotiate. Participants completed the study by answering a series of background questions, including the financial literacy measures.

Independent and Control Variables. ***Financial literacy.*** Financial knowledge was assessed using a series of five questions previously applied in nationwide samples (FINRA Foundation 2009a, 2009b, 2012), each of which has been applied in prior research in a multiple choice format (e.g., Lusardi and Mitchell 2011a; van Rooij et al. 2011; Krische 2019). These questions cover fundamental concepts of interest compounding, inflation, diversification, and present value. Each question is coded as 1 if answered correctly, and 0 otherwise, then combined as a total percentage correct. Financial confidence was assessed using a series of four questions also previously applied in nationwide samples (FINRA Foundation 2009a, 2009b). These questions asked participants for their self-assessment of their ability in dealing with day-to-day financial matters, at math, at keeping up with economic and financial news, and their overall financial knowledge. See Appendix A.

***Controls*.** Because prior research has documented that women are less likely than men to engage in and to earn a favorable outcome from negotiations (e.g., Small, Gelfand, Babcock, and Gettman, 2007; Stuhlmacher & Walters, 1999), we also collect participants' gender, applying an indicator variable coded as 1 if male and 0 if female.

In sensitivity tests, we statistically control for participants' numeracy, quantitative analytical reasoning, and risk preferences. Numeracy or numerical literacy is generally defined as familiarity with fundamental probability and numerical concepts (e.g., Schwartz et al. 1997; Lipkus, Samsa, and Rimer 2001). Basic numeracy involves "an understanding of the real number line, time, measurement, and estimation" and was assessed using three questions from Schwartz et al. (1997) covering simple probabilities and conversions to frequencies. Higher-order levels of numeracy would incorporate "basic logic and quantitative reasoning skills, knowing when and how to perform multistep operations, and an understanding of ratio concepts, notably fractions,

proportions, percentages, and probabilities" (Reyna et al. 2009, p. 945). We assessed higher-order numeracy skills using four questions from Cokely et al. (2012) covering probability estimates as well as Bayes' Theorem. In addition to numeracy, separate measures of analytical reasoning have been developed, including the Raven's Standard or Advanced Progressive Matrices (e.g., Bors and Stokes 1998) and the Cognitive Reflection Test (Frederick 2005). Our measure of quantitative analytical reasoning was based on Frederick's (2005) research on cognitive reflection, consisting of three quantitative questions in which the initial intuitive response differs from the correct response.[1] We also collected a measure of general risk preferences (Dohmen et al. 2011) and of financial risk preferences (Sages and Grable 2010). All questions apply a multiple choice format, except for the measure of general risk preferences from Dohmen et al. (2011) which applies a 10-point scale (see Appendix B).

Finally, to assess potential effects of negotiation context, two scenarios for the hypothetical workplace inequity were crafted and randomized between negotiating dyads (see Appendix C). Participants in the financial context read a workplace scenario that highlighted an inequity in bonus pay structure, with the alternative employee receiving "19% more bonus for sales exceeding $100,000" than the target employee, and these participants negotiated the bonus structure of the employee's compensation contract. Participants in the non-financial context received a workplace scenario that featured an inequity in the number of vacation days, with the coworker receiving two more vacation days than the target employee, and these participants

[1] The Raven's Standard or Advanced Progressive Matrices are likely the most widely known measures of analytical reasoning. The Raven's Matrices and related short forms represent non-verbal, multiple-choice measures of general intelligence, in which participants are asked to identify the missing element that completes a pattern in a series of 12, 36, or 60 questions (e.g., Bors and Stokes 1998). However, the length of the instrument prohibited its application in our experiment. For example, even Bors and Stokes' (1998) 12-item short form of the Raven's Matrices is intended to be administered in approximately 20 minutes. By comparison, the Cognitive Reflection Test consists of three quantitative questions in which the intuitive responses differ from the correct responses (Frederick 2005). Cokely et al. (2012) reports that the three-item Cognitive Reflection Test from Frederick (2005) had a mean duration 2.5 minutes, a Cronbach's alpha of 0.62, and a moderate correlation of 0.40 with Bors and Stokes' 12-item short form of the Raven's Matrices.

negotiated whether there would be an increase in the vacation days.

Dependent Variables. ***Pre-negotiation.*** We analyze two questions that participants answered after reading the inequity scenario: (1) the likelihood of approaching their manager to engage in a negotiation, measured on a seven-point scale coded from 1 ("Very Unlikely") to 7 ("Very Likely"), and (2) the level of the first offer the participant would make, measured using a drop-down menu of eight options ranging from their current status quo (coded as 1) up to a bonus rate or number of vacation days that is ten percent higher than their co-employee in the scenario (coded as 8).[2]

Post-negotiation. We analyze two aspects of the dyad negotiations: (1) whether a negotiated agreement was reached, measured with an indicator variable coded as 1 if an agreement was reached and 0 otherwise, and (2) the value of the agreement, initially measured as a bonus rate or number of vacation days, then standardized by context to a mean of 0 and standard deviation of 1 for further analysis.

Results

Effects of financial knowledge and financial confidence. Table 1, panel A, presents descriptive statistics for our financial literacy variables. Participants' mean financial knowledge is 69.7% (SD=25.3%, range=0% to 100%) and mean financial confidence is 4.66 (SD=1.32, range=1 to 7).[3] Participants' financial knowledge is significantly correlated with their financial confidence (r=0.510, p<0.001 one-sided).[4]

[2] We collect an additional indicator variable, measured as 1 if the participant indicated he or she would make the first offer if he or she approached their manager for a negotiation and as 0 if the participant indicated he or she would wait for their manager to make the first offer. However, this measure was not found to be significantly related to either financial knowledge or financial confidence (all Spearman r<0.063 and all p>0.336 for Study 1) and will not be discussed further.

[3] These means are similar to some reported samples of financial knowledge (Krische 2019) although the mean financial knowledge may be slightly higher and the mean financial confidence may be slightly lower than those reported in national samples (FINRA 2009a, 2012).

[4] Reported p-values are two-sided unless otherwise noted.

Pre-negotiation. Table 1, panel B, presents descriptive statistics for our pre-negotiation dependent variables. Participants report a mean likelihood of engaging in a negotiation of 5.07 (SD=1.47, range=1 to 7 on the 7-point scale). In univariate analyses, participants are more likely to engage in negotiation when they have higher financial knowledge (r=0.122, p=0.030 one-sided) or when they have higher financial confidence (r=0.180, p=0.003 one-sided). When asked for their first offer, participants select a mean offer of 6.02 (SD=1.87, range=1 to 8) from the 8-point drop-down menu of potential offers. On a univariate basis, participants make a higher first offer when they have higher financial knowledge (r=0.117, p=0.036 one-sided), but not when they have higher financial confidence (r=0.020, p=0.380 one-sided).

Figure 1 presents the levels of our pre-negotiation dependent variables based on analyses of median splits of financial knowledge and financial confidence. In untabulated analyses, we confirm that participants with higher financial knowledge scores based on a median split are more likely to engage in negotiation (mean of 4.84 and 5.24 for lower and higher financial knowledge participants, t=2.06, p=0.020 one-sided) and to make a higher first offer (mean of 5.78 and 6.19 for lower and higher financial confidence participants, t=-1.68, p=0.048 one-sided). Analyses of median splits confirm that participants with higher financial confidence report being more likely to engage in negotiation (mean of 4.87 and 5.21 for lower and higher financial confidence participants, t=-1.78, p=0.038 one-sided).

The above analyses suggest that (1) financial confidence impacts participants' willingness to engage in negotiation, but not the level of the first offer and (2) financial knowledge impacts participants' willingness to engage in negotiation as well as the level of the first offer. Because financial knowledge and financial confidence are correlated, we run additional regression analyses using both financial confidence and financial knowledge as

explanatory variables to examine the potential mediating effects of one variable on the other on participants' willingness to engage in the negotiation and of participants' first offers (see Table 2, Panel A). In predicting participants' willingness to engage in negotiation, financial confidence remains a significant predictor (β=0.177, t=2.12, p=0.018 one-sided) while financial knowledge becomes insignificant (β=0.240, t=0.55, p=0.582). In predicting the level of participants' first offer, financial knowledge remains a significant predictor (β=1.070, t=1.91, p=0.028 one-sided) while financial confidence remains insignificant (β=-0.076, t=-0.71, p=0.478). Thus, results suggest that financial confidence drives participants' willingness to engage in negotiation, while financial knowledge influences the level of participants' first offer.

Post-Negotiation. One hundred and fourteen of 236 participants (48.3 percent) reported successfully negotiating an agreement in their negotiating dyads. Because participants are assigned roles in negotiating dyads, each participant no longer represents an independent observation, rather they represent two sides of a single post-negotiation outcome. Of the potential matches, seven do not report the same response when asked if an agreement was reached, another 14 report different negotiated outcomes, and five do not have valid partner data, leaving 92 complete dyads for analysis.[5] For ease of analysis and comparison across contexts, we standardize the reported outcomes by context to a mean of 0 and standard deviation of 1 for further analysis; however, because the assigned negotiation roles assume opposite perspectives in the negotiation, employees benefit from higher negotiated outcomes while managers benefit from lower negotiated outcomes. Thus, we expect the employee's financial knowledge will increase the negotiated outcome, while the manager's financial knowledge will decrease the negotiated outcome.

[5] Limiting the analysis of the pre-negotiation dependent measures to the members of these 92 dyads has no significant impact on the reported results.

Table 1, panel C, presents descriptive statistics for the post-negotiation dependent variables for these 92 dyads. Of these dyads, 46 (50%) report reaching a reported agreement; interestingly, dyads are *less* likely to report reaching an agreement when participants in the role of the employee have higher levels of financial knowledge (Spearman rank r=-0.199, p=0.057) or higher levels of financial confidence (Spearman rank r=-0.240, p=0.021), perhaps because employees are demanding more while the manager has relatively more 'power,' thus increasing the likelihood of impasse. The financial confidence and financial knowledge of participants in the role of the manager show no statistically significant correlations. Nevertheless, for the 44 dyads who report a final negotiated outcome, higher levels of financial knowledge benefit the participant, with the negotiated outcome increasing when participants in the role of the employee have higher levels of financial knowledge (r=0.349, p=0.010 one-sided) or higher levels of financial confidence (r=0.272, p=0.037 one-sided), and decreasing when participants in the role of the manager have higher levels of financial knowledge (r=-0.436, p=0.002 one-sided).

Similar to our analyses of the pre-negotiation variables, we again run a series of regression analyses to examine whether financial confidence mediates the effects of financial knowledge, and whether financial knowledge mediates the effects of financial confidence (see Table 2, Panel B). First, although univariate analyses found that both the financial confidence and financial knowledge of participants in the role of the employee decreased the likelihood that the dyad would reach an agreement, the multivariate regression suggests that the effect is driven by the financial confidence of participants in the role of the employee (t=-2.10, p=0.039), with the financial knowledge of participants in the role of the employee no longer significant, and the financial confidence and financial knowledge of participants in the role of the manager remaining not statistically significant (all other p>0.20). Second, the univariate analyses found

that the financial knowledge of both participants in the role of the employee and in the role of the manager affected the negotiated outcome, and the multivariate regression confirms this finding. Consistent with the univariate analyses, the negotiated outcome marginally increases when participants in the role of the employee have higher levels of financial knowledge (t=1.35, p=0.092 one-sided) and significantly decreases when participants in the role of the manager have higher levels of financial knowledge (t=-2.34, p=0.012 one-sided).

Sensitivity analyses. Table 1, panel D, presents descriptive statistics for our control variables used in sensitivity testing.

Gender. Prior research suggests that female participants will report lower financial confidence and achieve lower financial knowledge scores than male participants, and we confirm that males tend to report higher financial knowledge and financial confidence than females in our data (Spearman rank r=0.283 and 0.313 for financial knowledge and financial confidence, respectively, both p<0.001).[6] However, supplementing the models reported in Panel A of Table 2 to include gender does not result in any significant interactions with either financial knowledge or financial literacy (all p > 0.369, untabulated).

Alternative cognitive skill sets. Participants' numeracy skills (basic–Schwartz et al 2007– and advanced– Cokely et al 2012) and tendency to engage in cognitive reflection (Frederick 2005) are each correlated with participants financial knowledge scores and reported financial confidence (all p<0.001), but the moderate Cronbach Coefficient Alpha of 0.62 (untabulated) suggests that these measures remain at least somewhat different constructs. However, in a series of untabulated supplemental analyses in which we add each of these

[6] Female (vs. male) participants report lower mean financial knowledge scores (64.1% and 77.7% for female and male participants, respectively, t=-4.19, p<0.001 one-sided) and lower mean financial confidence (4.33 and 5.15 for female and male participants, respectively, t=-4.93, p<0.001 one-sided).

individual measures to the models reported in Panel A of Table 2, financial confidence remains related to participants' willingness to engage in negotiation (all p<0.020 one-sided), while financial knowledge remains at least marginally related to the level of participants' first offer (all p<0.089 one-sided).

Risk preferences. An alternative explanation is that participants with higher financial confidence are more likely to take risks, and hence, be more willing to engage in a perceived risky negotiation. A measure of general risk preferences (Dohmen et al 2011) and of financial risk preferences (Sages and Grable 2010) were collected. Both risk preference measures are correlated with financial confidence (both p=<0.045), but the low Cronbach Coefficient Alpha of 0.40 suggests that the two measures represent different constructs. Indeed, only the measure of financial risk preferences is significantly correlated with financial knowledge (r=0.240, p<0.001), while the measure of general risk preference is not (r=0.064, p=0.325). In a series of untabulated supplemental analyses, we add each of these individual measures to the models reported in Panel A of Table 2 to confirm that financial confidence remains related to participants' willingness to engage in negotiation (all p<0.038 one-sided), while financial knowledge remains at least marginally related to the level of participants' first offer (all p<0.057 one-sided).

Negotiation context. As expected, there is no significant univariate relationship between our manipulation of the negotiation context and either financial knowledge or financial confidence (both p>0.688). Nevertheless, relative to participants in the non-financial context, participants in the financial context report being more likely to engage in negotiation (mean of 4.86 and 5.25 for the non-financial and financial contexts respectively, t=-2.01, p=0.046, untabulated) and to make a higher first offer (mean of 5.47 and 6.49 for the non-financial and

financial contexts respectively, t=-4.33, p<0.001, untabulated). Therefore, it may be important to examine and control for the potential differences between the non-financial and financial contexts. However, supplementing the models reported in Panel A of Table 2 to include context does not result in any significant interactions with either financial knowledge or financial literacy (all p > 0.274, untabulated).[7]

Discussion

Results of Study 1 suggest that (1) financial confidence impacts participants' willingness to engage in negotiation, (2) the common element to financial confidence and financial knowledge impacts participants' reaching an agreement, and (3) while financial knowledge impacts the level of participants' first offer and agreed-upon outcome. No statistically significant evidence was found to suggest that these effects are explained by gender, alternative cognitive skill sets (that is, numeracy and quantitative analytical reasoning), or risk preferences. Because Study 1 was completed with student data, Study 2 replicates fundamental aspects of Study 1 using a broader sample of the adult population.

Study 2

Method

Participants. Usable responses are collected from 986 participants (53.1% male) recruited from Amazon's Mechanical Turk (MTurk) service. Participants were required to report that they were over 18 years old and currently residing in the United States. Participants received a payment of $1 for completing the study via MTurk. The median participant reported being

[7] Analyzing each context separately, some differences are suggestive: For example, we find that financial confidence marginally increases the likelihood of engaging in negotiation in the non-financial context but not in the financial context (one-sided p<0.056 and <0.131, respectively), while financial knowledge increases participants' first offers in the financial context but not in the non-financial context (one-sided p<0.021 and <0.289, respectively). We therefore extend this investigation of negotiation context in Study 2.

between 26-34 years of age (with reported age categories ranging from "18-25 years old" up to "65 or older") and reported holding a college degree (with reported education level ranging from "Less than high school or equivalency" up to "Some postgraduate or postgraduate degree").

Procedure. In an online survey, participants completed the informed consent process then read a scenario about a hypothetical workplace inequity between themselves and a similar coworker. After answering a series of question about whether and how they would approach their manager regarding the inequity (similar to the pre-negotiation dependent variables in Study 1), participants answered a series of demographic and skill questions.

Independent and Control Variables. Financial knowledge and financial confidence were measured as in Study 1. Additional sensitivity measures for numeracy, quantitative analytical reasoning, risk preferences, and gender were also collected as in Study 1. Negotiation context was manipulated and randomized across participants in a 2 x 2 x 2 x 2 design (see Appendix D). Participants were assigned to either a Financial or a Non-Financial context, with each context including two exemplar scenarios. Participants in the first Financial context received a workplace scenario that featured an inequity in hourly salary, with the coworker receiving a higher hourly wage than the target employee. Participants in the second Financial context received a workplace scenario that featured an inequity in 401(K) retirement plan contributions, with the coworker receiving a higher retirement contributions than the target employee. Participants in the first Non-financial context received a workplace scenario that featured an inequity in the number of vacation days, with the coworker receiving more vacation days than the target employee. Participants in the second Non-financial context received a workplace scenario that featured an inequity in the number of permitted telecommuting days, with the coworker receiving more telecommuting days than the target employee. Each scenario was also manipulated to have two

levels of inequity (higher or lower) and two levels of complexity (simple, in which the different between the employee and co-worker's situations was computed, and complex, which required some calculation to determine the amount of the inequity).

Dependent Variables. We analyze two questions that participants answered after reading the inequity scenario, similar to Study 1: (1) the likelihood of approaching their manager to engage in a negotiation; and (2) the level of the first offer the participant would make, measured using a drop-down menu of eleven options ranging from their current status quo (coded as 1) up to a recommendation that is 24 percent higher than their current status quo (coded as 11).

Results

Effects of financial knowledge and financial confidence. Table 3, panel A, presents descriptive statistics for our independent variables. Similar to Study 1, participants' mean financial knowledge of 71.3% (SD=23.3%, range=0% to 100%) and mean financial confidence of 4.88 (SD=1.11, range=1 to 7) are significantly correlated ($r=0.304$, $p<0.001$).

Table 3, panel B, presents descriptive statistics for our dependent variables. Participants report a mean likelihood of engaging in a negotiation of 5.17 (SD=1.54, range=1 to 7). In univariate analyses, participants are more likely to engage in negotiation when they have higher financial confidence ($r=0.194$, $p<0.001$), but not when they have higher financial knowledge ($r=0.031$, $p=0.334$). When asked for their first offer, participants select a mean offer of 7.52 (SD=3.32, range=1 to 11) from a drop-down menu of potential offers coded from 1 to 11. On a univariate basis, participants make a higher first offer when they have higher financial confidence ($r=0.082$, $p<0.001$) or when they have higher financial knowledge ($r=0.107$, $p<0.001$). Similar to Study 1, we run regressions of participants' willingness to engage in the negotiation and of participants' first offers using both financial confidence and financial

knowledge as explanatory variables (see Table 4). In predicting participants' willingness to engage in negotiation, financial confidence remains a significant predictor (β=0.282, t=6.21, p<0.001 one-sided) while financial knowledge remains insignificant (β=-0.205, t=-0.95, p=0.828 one-sided). In predicting the level of participants' first offer, financial knowledge remains a significant predictor (β=1.282, t=2.71, p=0.003 one-sided) while financial confidence weakens to marginally significant (β=0.162, t=1.64, p=0.051 one-sided). Thus, like Study 1, results suggest that financial confidence primarily influences participants' willingness to engage in negotiation, while financial knowledge primarily influences the level of participants' first offer.

Sensitivity analyses. Table 3, panel C, presents descriptive statistics for our control variables used in sensitivity testing. Similar to Study 1, supplementing the models reported in Table 4 to include gender does not result in any significant interactions with either financial knowledge or financial literacy (all p > 0.219, untabulated). Also similar to Study 1, in a series of untabulated supplemental analyses in which we add basic numeracy, advanced numeracy, cognitive reflection, general risk preference, and financial risk preference measures, in turn, to the models reported in Table 4, financial confidence remains positively related to participants' willingness to engage in negotiation (all p<0.001 one-sided), while financial knowledge remains positively related to the level of participants' first offer (all p<0.021 one-sided).

Finally, recall that the negotiation scenario was randomized to vary the context, with two financial and two non-financial scenarios across two levels of inequity and two levels of complexity.[8] As expected, there is no significant univariate relationship between our three

[8] We did not ask participants any manipulation check questions regarding the financial vs. non-financial nature of the scenario. We asked two manipulation check questions related to the level of inequity in the scenario: (1) compared with participants in the lower inequity conditions, participants in the higher inequity conditions were more likely to identify receiving a scenario with higher rather than lower stakes (31.6% of higher stakes participants identified receiving the higher stakes scenario, compared to 16.0% of lower stakes participants, $\chi 2$=33.2, p<0.001), and (2) compared with participants in the lower stakes conditions, participants in the higher stakes condition also rated the stakes more highly (mean of 3.693 and of 3.000 for higher and lower stakes participants respectively,

manipulations of the negotiation scenario and either financial knowledge or financial confidence (Table 3, Panel C, all p>0.156). However, in untabulated sensitivity analyses, we find evidence suggesting that participants' negotiations behaviors may also be affected by interactions between their financial literacy and some aspects of the negotiation context.

Specifically, we regress participants' reported likelihood of engaging in negotiation on financial confidence along with indicator variables for context, inequity, complexity, and the related interactions. We continue to identify a significant main effect of financial confidence ($p<0.001$ one-sided), but we also identify only one significant interaction, between confidence and context ($p<0.012$). Simple effects tests suggest that the tendency for participants with higher financial confidence being more likely to engage in negotiation is stronger in the financial contexts ($\beta=0.376$, $t=6.87$, $p<0.001$ one-sided) than in the non-financial contexts ($\beta=0.146$, $t=2.16$, $p=0.016$ one-sided).

We also regress participants' selected first offers on financial knowledge along with indicator variables for context, inequity, complexity, and the related interactions. We continue to identify a significant main effect of financial knowledge ($p<0.001$ one-sided), but we also identify only one marginal interaction, between financial knowledge and inequity ($p=0.100$). Simple effects tests suggest that the tendency for participants with higher financial knowledge make higher first offers is stronger in the higher inequity conditions ($\beta=1.717$, $t=3.80$, $p<0.001$ one-sided) than in the lower inequity conditions ($\beta=0.708$, $t=1.13$, n.s. at $p=0.129$ one-sided).

t=6.97, p<0.001). We also asked two manipulation check questions related to the level of complexity in the scenario: (1) compared with participants in the simpler conditions, participants in the complex conditions were more likely to identify receiving a complex scenario (16.6% of complex scenario participants identified receiving the complex scenario, compared to 1.8% of simpler scenario participants, $\chi2=66.3$, $p<0.001$), and (2) compared with participants in the simpler conditions, participants in the complex conditions also rated the complexity as higher (mean of 2.69 and of 1.65 for complex and simple scenario participants respectively, $t=12.2$, $p<0.001$).

Discussion

Studies 1 and 2 suggest financial confidence as a significant predictor of participants' willingness to engage in negotiation, and financial knowledge as a significant predictor of participants' first offer and agreed-upon outcome, but often without statistically significant interactions with the negotiation scenario. Based on correlational relationships, these studies are suggestive. In the next section, Studies 3 and 4 focus on the impact of improving financial literacy in order to confirm the causal nature of the relationships.

4. Studies 3 and 4: The causal impact of increasing financial knowledge

In both Studies 3 and 4, we provide feedback with learning opportunities for participants' initial responses to financial literacy questions to improve participants' financial knowledge. Our objective is not to assess the efficacy of feedback as a financial education program *per se*, but instead to assess the causal impact of any resulting improvements in financial understanding on negotiation behavior.

Method for Studies 3 and 4

Participants.

Similar to Study 1, Study 3 recruits 304 (45.1% male) students from a private university in the United States to participate for credit in core management or marketing courses. The vast majority of participants (98.4%) reported being between 18-25 years of age.

Similar to Study 2, Study 4 collects 404 usable responses from participants (50.5% male) recruited from Amazon's Mechanical Turk (MTurk) service. Participants were required to report that they were over 18 years old and currently residing in the United States. Participants received a payment of $1 for completing the study via MTurk. The median participant reported being between 35-44 years of age (with reported age categories ranging from "18-25 years old" up to

"65 or older") and reported holding a four-year college degree (with reported education level ranging from "Less than high school or equivalency" up to "A postgraduate degree (MS, MA, PhD, MD, etc.)").

Procedure.

Participants completed Study 3 electronically in an on-campus computer lab and Study 4 as an online survey. For both studies, participants completed the informed consent process then answered a series of financial literacy knowledge and confidence questions, with or without feedback provided, as described below. Participants then read a scenario about a hypothetical workplace inequity in hourly salary between themselves and a similar coworker receiving a higher hourly wage (based on the financial scenario used in Studies 1 and 2) and answered a series of question about whether and how they would approach their manager regarding the inequity. Participants in Study 3 were provided with instructions for negotiation dyads (including their assigned role as employee or manager) and participated in a negotiation as in Study 1. Participants in both studies then completed a series of demographic questions followed by a repetition of the earlier financial knowledge questions.

Variables

Independent and Control Variables. In both studies, participants were assigned to a control condition or to a feedback condition for financial knowledge. In the control condition, participants simply answered each of the financial knowledge questions as in Studies 1 and 2. In the feedback condition, participants who answered a financial knowledge question incorrectly were asked to think through the answer to that question, were provided with reasoning to reach the correct answer to the question (see Appendix E), and were asked to try answering the question again (up to three times before they were allowed to proceed to the next question).

When participants in the feedback condition answered a financial knowledge question correctly, they were informed that their response was correct along with a copy of the reasoning to reach the correct answer to the question. As a measure of learning, all participants completed the same set of financial knowledge questions at the end of the study without feedback to capture the change between participants' first responses to each question (pre-test) and their debriefing responses to each question (post-test). In Study 4, participants were randomly assigned to the control and feedback conditions in a 1 x 2 between-subjects design. In Study 3, participants were randomly assigned to negotiating dyads such that (a) both participants in the dyad were assigned to the control condition or (b) one participant in the dyad was assigned to the control condition while the other participant was assigned to the feedback condition, counterbalanced across negotiating roles as employee or manager. In both studies, participants then responded to the same financial confidence questions as in Studies 1 and 2 as a control variable.

Dependent Variables. We analyze two questions that participants answered after reading the inequity scenario, as in Study 1: (1) the likelihood of approaching their manager to engage in a negotiation; and (2) the level of the first offer the participant would make. In Study 3, we also analyze two aspects of the dyad negotiations, as in Study 1: (1) whether a negotiated agreement was reached, and (2) the value of the agreement, standardized to a mean of 0 and standard deviation of 1.

Results for Studies 3 and 4

Impact of feedback on financial knowledge

Table 5, panel A, presents descriptive statistics for participants' financial knowledge for both Studies 3 and 4. Participants in Study 3 earn a pre-test mean financial knowledge score of 73.4% (SD=21.2.0%, range=0% to 100%) and participants in Study 4 earn a pre-test mean

financial knowledge score of 79.3% (SD=19.0%, range=0% to 100%). In both studies, feedback leads to a significant improvement in financial knowledge, with the post-test measure of financial knowledge being significantly higher for participants in the feedback conditions (93.0% and 95.3% in Studies 3 and 4, respectively) compared to the control conditions (72.9% and 75.9% in Studies 3 and 4, respectively). The within-subjects change in financial knowledge is significantly positive for participants in the feedback conditions (means of 19.4% and 14.8% in Studies 3 and 4, respectively, both $p<0.001$ one-sided) and not significant or significantly negative for participants in the control conditions (means +0.3%, $p=0.693$ one-sided, in Study 3 and -0.4%, $p=0.004$, in Study 4).[9]

Participants in Study 3 report a mean financial confidence of 4.27 (SD=1.06, range=1 to 6) and participants in Study 4 report a mean financial confidence of 4.84 (SD=1.06, range=1 to 7). In Study 3 (but not Study 4), participants in the feedback condition report higher confidence than participants in the control condition (Study 3 means of 4.43 and 4.19 for the feedback and control conditions, respectively, $t=1.82$, $p=0.069$; Study 4 means of 4.91 and 4.78 for the feedback and control conditions, respectively, $t=1.23$, $p=0.109$). We therefore control for participants' reported financial confidence in our analyses of the impact of changes in participants' financial knowledge.

[9] In both Studies 3 and 4 (untabulated), female participants have lower reported lower initial financial knowledge scores (means of 69.3% and 78.4% for female and male participants respectively, $t=3.79$, $p=0.0002$ in Study 3, and means of 75.5% and 82.9% for female and male participants respectively, $t=4.02$, $p<0.0001$ in Study 4) than male participants. However, feedback leads to female participants earning a higher within-subject improvement in their financial knowledge scores than male participants (mean increase of 24.0% and 14.5% for female and male participants respectively, $t=2.13$, $p=0.036$ in Study 3, mean increase of 17.1% and 12.4% for female and male participants respectively, $t=1.92$, $p=0.056$ in Study 4). The difference in financial knowledge is statistically eliminated in our post-test measure for participants in the feedback condition (means of 91.6% and 94.5% for female and male participants respectively, $t=1.02$, $p=0.311$ in Study 3, means of 94.2% and 96.5% for female and male participants respectively, $t=1.22$, $p=0.222$ in Study 4).

Effects of financial knowledge with feedback on pre-negotiation dependent variables

Table 5, panel B, presents descriptive statistics for our pre-negotiation dependent variables for both Studies 3 and 4. Recall that Studies 1 and 2 suggest that financial knowledge is a significant predictor of participants' first offer. We find similar univariate results in Studies 3 and 4. When asked for their first offer, participants select a mean offer of 7.12 (SD=1.72, range=1 to 8) in Study 3 and of 7.35 (SD=1.51, range=1 to 8) in Study 4 from the drop-down menu options, coded from 1 to 8. We observe that participants who *pre-test* with higher financial knowledge are more likely to make a higher first offer ($r=0.144$ with $p=0.006$ one-sided in Study 3, and $r=0.206$ with $p<0.001$ one-sided in Study 4).[10] Similarly, in the first model in Panel A of Table 6 using regressions controlling for financial confidence, we confirm that pre-test financial knowledge remains a significant predictor of participants' first offer ($\beta=1.109$, $t=2.23$, $p=0.013$ in Study 3, and $\beta=1.440$, $t=3.49$, $p<0.001$ in Study 4) while financial confidence is less significant ($\beta=0.035$, $t=0.0350$, $p=0.363$ in Study 3 and $\beta=0.112$, $t=1.51$, $p=0.066$ in Study 4). Thus, we replicate the earlier result that financial knowledge impacts the level of participants' first offer, controlling for financial confidence.

In the second model of Panel A of Table 6, we add the effects of participants change in knowledge (post-test minus pre-test financial knowledge). Results of Study 3 suggest a continuing effect of participants' initial financial knowledge ($\beta=2.023$, $t=3.760$, $p<0.001$) and a significant effect of participants' change in financial knowledge ($\beta=2.147$, $t=3.940$, $p<0.001$). Including feedback condition as an additional explanatory variable does not lead to any

[10] Univariate results from Studies 3 and 4 are also consistent with the finding from Studies 1 and 2 that financial confidence is a significant predictor of participants' willingness to engage in negotiation. Participants report a mean likelihood of engaging in a negotiation of 5.13 (SD=1.04, range=1 to 6) in Study 3 and of 5.25 (SD=1.36, range=1 to 7) in Study 4. We observe that participants with higher levels of financial confidence are more likely to engage in negotiation ($r=0.317$ with $p<0.001$ in Study 3, and $r=0.145$ with $p=0.004$ in Study 4). However, because Studies 3 and 4 focus on the impact of changing financial knowledge through feedback, our analyses are likewise focused the outcomes affected by financial knowledge while simply controlling for financial confidence.

significant interactions ($p>0.340$ for all interactions) and we observe similar results in the control and feedback conditions in Study 3 when analyzed separately (untabulated).

Results of Study 4 also suggest a continuing effect of participants' initial financial knowledge, but with a significant interaction between feedback condition and participants' change in financial knowledge. In the second model of Panel A of Table 6, we see a continuing effect of participants' initial financial knowledge ($\beta=1.53$, $t=3.40$, $p<0.001$ one-sided) but with a marginal effect of participants' confidence ($\beta=2.15$, $t=3.94$, $p<0.064$ one-sided) rather than their measured change in financial knowledge ($\beta=0.249$, $t=0.51$, $p=0.304$ one-sided). However, unlike the Study 3, including feedback condition as an additional explanatory variable does lead to a significant interaction with participants' change in knowledge (with $p=0.002$) and we observe different results in the control and feedback conditions in Study 4 when analyzed separately (untabulated). In the control condition, we continue to observe initial financial knowledge increasing participants' first offer ($\beta=1.32$, $t=2.07$, $p=0.02$ one-sided), but any (unpredicted) changes in knowledge have a negative impact on participants' first offer ($\beta=-2.538$, $t=-2.39$, $p=0.018$). In the feedback condition, participants' initial financial knowledge and the change in their financial knowledge both have the predicted positive effects on participants' first offer ($\beta=2.187$, $t=2.85$, $p=0.003$ one-sided and $\beta=1.601$, $t=1.89$, $p=0.03$ one-sided for participants' initial financial knowledge and change in financial knowledge, respectively). Thus, although results in the control conditions are mixed, we confirm that feedback regarding financial knowledge improves financial knowledge in a pre-test/post-test design and that the measured improvement in financial knowledge also increases the level of participants' first offer.

Effects of financial knowledge with feedback on post-negotiation variables (Study 3)

Because participants in Study 3 are assigned roles in negotiating dyads, each participant

no longer represents an independent observation for the post-negotiation variables, rather they represent two sides of a single post-negotiation outcome. The 304 participants resulted in 125 matched dyads had the same final negotiation outcome reported by both negotiation partners for further analysis.[11] Table 5, panel C, presents descriptive statistics for the post-negotiation dependent variables for these 125 dyads.

Of the matching dyads, 63 (50.4 percent) reported reaching an agreement.[12] As in Study 1, we standardize the reported negotiation outcomes to a mean of 0 and standard deviation of 1 for further analysis. Again, because the assigned negotiation roles assume opposite perspectives in the negotiation, we expect the employee's financial knowledge will increase the negotiated outcome, while the manager's financial knowledge will decrease the negotiated outcome. For the 63 dyads who reach an agreement, we find no significant univariate relationships between the negotiated outcome and participants' initial (pre-test) financial knowledge (all $p>0.10$), unlike Study 1. However, the change in participants' financial knowledge is significantly related to the negotiated outcome, at least for participants in the role of the manager ($r=-0.329$, $p<0.004$ one sided). In multivariable analyses, while we verify that results are initially weaker than in Study 1, the second model in Panel B of Table 6 suggests that participants' financial knowledge and change in knowledge are significantly related to the negotiated outcome, at least for participants in the role of the manager ($\beta=-1.18$, $t=-1.61$, $p=0.056$ for managers' initial financial knowledge, and $\beta=-2.21$, $t=-2.74$, $p=0.004$ for the measured change in managers' financial knowledge). Thus, the results again suggest that financial knowledge can impacts the level of participants'

[11] Twenty-two 22 dyads had different outcomes reported by the two negotiating partners and 5 dyads had outcome that were not interpretable.

[12] The rate of reaching an agreement does not differs significantly between the feedback and control conditions ($\chi^2=0.341$, $p=0.559$), nor is it significantly related to participants' financial confidence, financial knowledge, or change in financial knowledge in a multivariate regression analysis (untabulated).

negotiated offers.[13]

5. Summary and conclusion

With individuals having increasing responsibility for their own long-term financial well-being in today's society (e.g., Fernandes et al. 2016), it becomes increasingly important to recognize the value of financial literacy, not only in affecting financial decision making and planning for the long term (e.g., Howlett, Kees, and Kemp 2008, Hung et al. 2009; Lusardi and Mitchell 2011b), but also to understand the potential broader implications of financial literacy for everyday life, including its potential to impact individual behavior during negotiations.

In this research, we investigate the role of financial literacy on initiating and achieving a favorable outcome from a negotiation. We analyzing data from a series of experiments that ask students recruited from undergraduate business courses and adults recruited from an online crowdsourcing service to engage in negotiation situations and to complete relevant demographic survey questions. We first examine the correlation between financial literacy and the focal negotiation behaviors (i.e., the likelihood of initiating a negotiation, and the likely outcome from a negotiation in a financial context, if initiated). Results suggest that financial confidence impacts participants' willingness to engage in negotiation, while financial knowledge impacts the level of participants' first offer. These effects persist after controlling for gender, alternative cognitive skill sets (including participants' numeracy skills and tendency to engage in cognitive reflection), and risk preferences.

In a second series of experiments, we provide feedback with learning opportunities for

[13] Because feedback across the dyads is randomized across three conditions (both members in the control condition, the employee in the control condition with the manager receiving feedback, or the employee receiving feedback with the manager in the control condition), we define a categorical variable with three levels to capture the experimental condition. Including the experimental condition in the regression model does not result in any significant interactions with either financial knowledge or the change in financial knowledge for either the employee or the manager (all $p > 0.152$, untabulated).

participants' initial responses to financial literacy questions to improve participants' financial knowledge. The objective is not to assess the efficacy of feedback as a financial education program, but instead to assess the causal impact of any resulting improvements in financial understanding on negotiation behavior. Results show that feedback improves participants' financial literacy (at least in the short term) which, in turn, leads to an increase in participants' first offer in a negotiation.

Overall, this research documents that financial literacy has the potential to influence an individual's behavior both before and during negotiations through its effects on willingness to initiate a negotiation as well as the desire to reach a quick agreement. Thus, a person's financial literacy would likely have important implications for his or her career advancement and compensation over time, as well as the successful management of interpersonal communications, even in fields that have not traditionally been thought to require or involve numerical reasoning skills. While we do not find strong evidence that the effects of financial literacy vary significantly with specific features of the negotiation scenario, we suggest that the conditions under which financial literacy would matter more or less to a negotiation could be further evaluated in extensions of this research.

Further, because women have lower levels of financial literacy on average (Almenberg and Dreber 2015; Chen and Volpe 2002; Luisardi and Mitchell 2008, 2011; cf Wagland and Taylor 2009), women may currently face even higher hurdles in career advancement and compensation than previously believed. However, the active improvement of financial literacy suggests a proactive method of reducing gender differences in career advancement and compensation over time, which could also be further evaluated in extensions of this research.

APPENDIX A – Measurement of Financial Literacy

This appendix presents the primary financial literacy questions. Question numbers are included below for ease of reference; participants did not see these numberings as part of their materials. Sources for the questions, if applicable, are provided within parentheses following the text of the question (also not seen by participants).

Panel A: Financial Knowledge

A1. Suppose you had $100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow? *(Source: Lusardi and Mitchell 2011a; FINRA Foundation 2009a, 2009b)*
Multiple choice: Less than $102; Exactly $102; More than $102; Don't know

A2. Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account? *(Source: Lusardi and Mitchell 2011a; FINRA Foundation 2009a, 2009b)*
Multiple choice: More than today; Less than today; Exactly the same; Don't know

A3. If the interest rate falls, what should happen to bond prices? *(Source: van Rooij et al. 2011; FINRA Foundation 2009a, 2009b)*
Multiple choice: Rise; Fall; Stays the same; Don't know

A4. Please indicate whether this statement is true or false: Buying a single company's stock usually provides a safer return than a stock mutual fund. *(Source: Lusardi and Mitchell 2011a; FINRA Foundation 2009a, 2009b)*
Multiple choice: True; False; Don't know

A5. Please indicate whether this statement is true or false: A 15-year mortgage typically requires higher monthly payments than a 30-year mortgage, but the total interest paid over the life of the loan will be less. *(Source: van Rooij et al. 2011; FINRA Foundation 2009a, 2009b)*
Multiple choice: True; False; Don't know

Panel B: Financial Confidence

How strongly do you agree or disagree with the following statements?
Seven-point scale from "Strongly Disagree" to "Strongly Agree"
(Source: FINRA Foundation 2009a, 2009b)

B1. I am good at dealing with day-to-day financial matters, such as checking accounts, credit and debit cards, and tracking expenses
B2. I am pretty good at math
B3. I regularly keep up with economic and financial news.

B4. On a scale from 1 to 7, where 1 means "Very Low" and 7 means "Very High," how would you assess your overall financial knowledge? *(Source: FINRA Foundation 2009a, 2009b)*

APPENDIX B – Measurement of Alternative Cognitive Processes

This appendix presents the questions used to measure alternative cognitive processes for sensitivity analyses. Question numbers are included below for ease of reference; participants did not see these numberings as part of their materials. Sources for the questions, if applicable, are provided within parentheses following the text of the question (also not seen by participants).

Panel A: Basic Numeracy

A1. Imagine that we flip a fair coin 1,000 times. What is your best guess about how many times the coin would come up heads in 1,000 flips? *(Source: Schwartz et al. 1997, adapted to multiple choice format)*
Multiple choice: 50 times out of 1,000; 100 times out of 1,000; 500 times out of 1,000; 505 times out of 1,000; None of the above; Don't know

A2. In the BIG BUCKS LOTTERY, the chance of winning a $10 prize is 1%. What is your best guess about how many people would win a $10 prize if 1,000 people each buy a single ticket to BIG BUCKS? *(Source: Schwartz et al. 1997, adapted to multiple choice format)*
Multiple choice: 1 person out of 1,000; 10 people out of 1,000; 100 people out of 1,000; 990 people out of 1,000; None of the above; Don't know

A3. In ACME PUBLISHING SWEEPSTAKES, the chance of winning a car is 1 in 1,000. What percent of tickets to ACME PUBLISHING SWEEPSTAKES win a car? *(Source: Schwartz et al. 1997, adapted to multiple choice format)*
Multiple choice: 0.001%; 0.1%; 1%; 10%; None of the above; Don't know

Panel B: Advanced Numeracy

B1. Imagine we are throwing a five-sided die 50 times. On average, out of these 50 throws how many times would this five-sided die show an odd number (1, 3 or 5)? *(Source: Cokely et al. 2012, adapted multiple choice options)*
Multiple choice: 5 out of 50 throws; 20 out of 50 throws; 25 out of 50 throws; 30 out of 50 throws; None of the above; Don't know

B2. Out of 1,000 people in a small town, 500 are members of a choir. Out of these 500 members in the choir, 100 are men. Out of the 500 inhabitants that are not in the choir, 300 are men. What is the probability that a randomly drawn man is a member of the choir? Please indicate the probability in percent. *(Source: Cokely et al. 2012, adapted multiple choice options)*
Multiple choice: 10%; 20%; 25%; 40%; None of the above; Don't know

B3. Imagine we are throwing a loaded die (6 sided). The probability that the die shows a 6 is twice as high as the probability of each of the other numbers. On average, out of these 70 throws how many times would the die show the number 6? *(Source: Cokely et al. 2012, adapted multiple choice options)*
Multiple choice: 20 out of 70 throws; 23 out of 70 throws; 35 out of 70 throws; 40 out of 70 throws; None of the above; Don't know

B4. In a forest, 20% of mushrooms are red, 50% brown and 30% white. A red mushroom is poisonous with a probability of 20%. A mushroom that is not red is poisonous with a probability of 5%. What is the probability that a poisonous mushroom in the forest is red? *(Source: Cokely et al. 2012, adapted multiple choice options)*
Multiple choice: 4%; 15%; 25%; 50%; None of the above; Don't know

Panel C: Quantitative analytical reasoning

C1. A bat and a ball cost $1.10 in total. The bat costs $1.00 more than the ball. How much does the ball cost? *(Source: Frederick 2005, adapted to multiple choice format)*
Multiple choice: 5 cents; 10 cents; 50 cents; 105 cents; None of the above; Don't know

C1. If it takes 5 machines 5 minutes to make 5 widgets, how long would it take 100 machines to make 100 widgets? *(Source: Frederick 2005, adapted to multiple choice format)*
Multiple choice: 5 minutes; 20 minutes; 100 minutes; 500 minutes; None of the above; Don't know

C1. In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half of the lake? *(Source: Frederick 2005, adapted to multiple choice format)*
Multiple choice: 12 days; 24 days; 47 days; 96 days; None of the above; Don't know

Panel D: Risk Preferences

General risk preferences:

D1. How do you see yourself: Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks? *(Source: Dohmen et al. 2010, 2011)*
10-point scale, numbered from 1 ("Not at all willing to take risks") to 10 ("Very willing to take risks")

Financial risk preferences:

D2. Which of the statements below comes closest to the amount of financial risk that you are willing to take when making investments or saving? *(Source: Sages and Grable 2010)*
Multiple choice: Take substantial financial risk expecting to earn substantial returns;
Take above-average financial risks expecting to earn above-average returns;
Take average financial risks expecting to earn average returns;
Not willing to take any financial risk.

APPENDIX C– Study 1 Negotiation Scenarios

Panel A: Study 1 Scenario Descriptions and Pre-Negotiation Questions

Financial Scenario:

Imagine that you have recently graduated from college with BA degree and that you accepted a job with a medium-sized company in corporate sales. You have been with the company for about one year and are earning a base salary of $30,000 per year plus a bonus. You are paid a cash bonus of 8.4% for all sales that you successfully close for your company after the first $75,000. You recently learned that your co-worker with the same salary and bonus plan, similar qualifications and performance reviews as you, and who joined this company at the same time you did, received an increase in bonus payments. While your co-worker still earns 8.4% bonus on sales beyond $75,000, your co-worker is now earning 19% more bonus for sales exceeding $100,000.

Non-Financial Scenario:

Imagine that you have recently graduated from college with BA degree and that you accepted a job with a medium-sized company in corporate sales. You have been with the company for about one year and are earning 10 vacation days per year. You recently learned that your co-worker with the same salary and bonus plan, similar qualifications and performance reviews as you, and who joined this company at the same time you did, received an increase in vacation days. Your co-worker is now awarded 12 vacation days per year.

Pre-Negotiation Questions for Financial [Non-Financial] Scenario

- Given the circumstances just described, how likely is it that you would approach your boss to negotiate an increase in your bonus percentage [paid vacation days]? (Likert 1-7)
- Suppose you decided to approach your boss regarding your bonus pay [vacation days]. Do you think you would ask for a specific cash bonus that exceeds your current 8.4% after the first $75,000 sold [increase in number of vacation days]? Or would you rather wait for your boss to make a recommendation? (Yes vs. No)
- Now suppose that you set a meeting with your current boss to discuss your current bonus pay [number of vacation days], and suppose that you decided that you would start the conversation with a specific request for a higher bonus percentage [more vacation days]. What percentage and terms would you specifically would you ask for? [How many total paid vacation days per would you request?] (That is, what would be your 1st offer in this negotiation?) (open-ended) Please describe the justification that you would give your boss for your request below:
- Once again, suppose that you set a meeting with your current boss to discuss your current bonus pay [number of vacation days], and suppose that you decided that you would start the conversation with a specific request for a higher bonus percentage [more vacation days]. Please indicate the specific bonus percentage that you would ask for, for bonus payments on sales that exceed $100,000: (Range from 8.4%-11%) coded 1-8
  [How many total paid vacation days per would you request? (Responses constrained between 10 – 13.5 days) coded 1-8]

Panel B: Study 1 Negotiation Instructions

The computer-mediated negotiation instructions for participants assigned to the Manager vs. Employee roles within the Financial vs. Non-financial contexts are presented below.

Financial Context – Manager Role

You are the **COMPANY MANAGER** in this negotiation

Next you will have the opportunity to negotiate. Imagine that you are the **COMANY MANAGER** from the scenario that you just read.

Your employee scheduled a meeting with you to discuss to discuss the situation. Please review the background details below:

- You are a manager of a staff of salespeople in a medium-sized company.
- Your company manufactures and sells audio components to companies that produce a variety of goods, from microphones to professional music gear and sound systems.
- About half your sales staff recently graduated from college with BA degree. The starting salary is a base salary of $30,000 per year plus a bonus.
- Incoming sales staff are paid a cash bonus of 8.4% for all sales that they successfully close for your company after the first $75,000.
- One employee who was hired about a year ago was doing exceptionally well, and as a result, you recently allocated a 19% increase in bonus for sales exceeding $100,000 to this employee.
- You don't usually negotiate higher bonuses until employees have been with your company at least 5 years. This is because it is expensive for your company and it actually reduces your own year-end bonus paid based on your division's profits.

Financial Context – Employee Role

You are the **EMPLOYEE** in this negotiation

Next you will have the opportunity to negotiate. Imagine that you are the **EMPLOYEE** described in the scenario that you just read.

You have scheduled a meeting with your employer to discuss the situation. Please review the details of your situation below:

- You have recently graduated from college with BA degree.
- You accepted a job with a medium-sized company that manufactures and sells audio components to companies that produce a variety of goods, from microphones to professional music gear and sound systems.
- You have been with the company for about one year and are earning a base salary of $30,000 per year plus a bonus.
- You are paid a cash bonus of 8.4% for all sales that you successfully close for your company after the first $75,000.
- You recently learned that your co-worker with the same salary and bonus plan, similar qualifications and performance reviews as you, and who joined this company at the same time you did, received an increase in bonus payments.
- Your co-worker received a19% increase in bonus for sales exceeding $100,000.
- You would like to receive a larger bonus payment.

NON-Financial Context – Manager Role

You are the **COMPANY MANAGER** in this negotiation

Next you will have the opportunity to negotiate. Imagine that you are the **COMANY MANAGER** from the scenario that you just read.

Your employee scheduled a meeting with you to discuss to discuss the situation. Please review the background details below:

- You are a manager of a staff of salespeople in a medium-sized company.
- Your company manufactures and sells audio components to companies that produce a variety of goods, from microphones to professional music gear and sound systems.
- About half your sales staff recently graduated from college with BA degree. The standard starting vacation allocation is 10 days.
- One employee who was hired about a year ago was doing exceptionally well, and as a result, you recently increased the paid vacation days of this employee to 12 days.
- You don't usually negotiate an increase in vacation days until employees have been with your company at least 5 years. This is because it is expensive for your company and it actually reduces your own year end bonus paid based on your division's profits.

NON-Financial Context – Employee Role

You are the **EMPLOYEE** in this negotiation

Next you will have the opportunity to negotiate. Imagine that you are the **EMPLOYEE** described in the scenario that you just read.

You have scheduled a meeting with your employer to discuss the situation. Please review the details of your situation below:

- You have recently graduated from college with BA degree.
- You accepted a job with a medium-sized company that manufactures and sells audio components to companies that produce a variety of goods, from microphones to professional music gear and sound systems.
- You have been with the company for about one year and are earning 10 vacation days per year.
- You recently learned that your co-worker with the same salary and bonus plan, similar qualifications and performance reviews as you, and who joined this company at the same time you did, received an increase in vacation days.
- Your co-worker is now awarded 12 vacation days per year.
- You would like to receive more paid vacation days.

APPENDIX D– Study 2 Negotiation Scenarios

This appendix presents the negotiation scenarios used in the 2 x 2 x 2 x 2 design applied in Study 2. The wording of each of the two financial scenarios and non-financial scenarios is presented for the higher (lower) inequity for the simpler [complex] variations.

Financial scenario #1:

Imagine that in your current job you are being paid $10.50 per hour. You just learned that your co-worker with the same salary, similar qualifications and performance reviews as you, and who joined this company at the same time you did, just received a raise from your boss. Your co-worker was offered a salary increase of to $12.50 [$11.00] per hour (19% [4.75%] compared to your current per hour wage).

Financial scenario #2:

Imagine that in your current job you are earning $50,000 per year. You employer matches your contributions to your 401(k) retirement plan up to the first 3% of your pay [$1,500] per year. You just learned that your co-worker with the same salary and retirement plan, similar qualifications and performance reviews as you, and who joined this company at the same time you did, received an increase in retirement contributions from your boss. Your co-worker was offered an increase in retirement contributions of 4.75% compared to contributions made to your own retirement account [$1,570] (19% compared to contributions made to your own retirement account [$1,785]).

Non-financial scenario #1:

Imagine that in your current job you are earning 10.5 paid vacation days per year in your job. You just learned that your co-worker with the same vacation days, similar qualifications and performance reviews as you, and who joined this company at the same time you did, just received an increase in vacation time from your boss. Your co-worker was offered an increase in vacation days of 4.75% compared to your current vacation days per year [11 paid vacation days per year] (19% compared to your current vacation days per year [12.5 paid vacation days per year]).

Non-financial scenario #2:

Imagine that in your current job you are allowed to telecommute and work from home for up to 21 days per year. You just learned that your co-worker with the same telecommute days, similar qualifications and performance reviews as you, and who joined this company at the same time you did, received an increase in telecommute days from your boss. Your co-worker was offered an increase in telecommute days of 4.75% compared to your current telecommute days per year [22 telecommute days per year] (19% compared to your current telecommute days per year [25 telecommute days per year]).

APPENDIX E– Studies 3 and 4 Financial Knowledge Feedback Manipulations

This appendix presents the feedback manipulations used for the financial knowledge questions as applied in Studies 3 and 4. The response option of "Don't know" was removed from each question because of the feedback manipulation. Due to programming differences across technologies, question numbers were seen by the participants in Study 3 as part of their materials, but not by participants in Study 4. Depending on their response to the question, participants in the feedback condition either saw the red text (e.g., "**That's correct!"**) or the blue text (e.g., "**Let's think through the answer to that question:"**) as the introduction to the textual explanation for the correct answer to that question. Participants who did not receive feedback (that is, participants in the control group) proceeded to the next numbered question.

Question 1:

Suppose you had $100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow?

- ❍ More than $102
- ❍ Exactly $102
- ❍ Less than $102

Feedback:

That's correct!
OR
Let's think through the answer to that question:

If you had $100 in a savings account and the interest rate was 2% per year, you would earn 2% each year.

- In the first year, you would earn $2.00, for a total of $102.00 at the end of the year.
- In the second year, you would earn $2.04, for a total of $104.04. *That's a little higher because of compounding -- you've earned interest on the extra $2 from the first year in addition to the original $100.*
- In the third year, you would earn $2.08, for a total of $106.12.
- In the fourth year, you would earn $2.12, for a total of $108.24.
- In the fifth year, you would earn $2.16, for a total of $110.40.

So, if you had $100 in a savings account and the interest rate was 2% per year, then you would have $110.40 after five years if you left the money to grow.

Please click on CONTINUE to proceed to the next question.
OR
Please click on CONTINUE to try this question again.

Question 2:

Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account?

- ❍ More than today
- ❍ Exactly the same
- ❍ Less than today

Feedback:

That's correct!
OR
Let's think through the answer to that question:

Think of this as a horse race. Your horse is the interest that you earn. The competing horse is inflation. If your horse is faster than the competition, you can buy more. If the competition is faster than your horse, you can afford less.

In this question, your horse increases by 1% each year, but the competition increases by 2% each year. The competition beats your horse, which means that you can buy less with your money.

Here's how it works:

- Suppose that a fancy new shirt would cost you $100 today. You'd be able to buy it with the $100 in your savings account.
- Let's say that you decide to wait a year. In one year, you would have $101 in your savings account, earning 1% interest. But, because of the 2% inflation, that shirt would be selling for $102, which means that you can no longer afford to buy it.

Please click on CONTINUE to proceed to the next question.
OR
Please click on CONTINUE to try this question again.

Question 3:

If the interest rate falls, what should happen to bond prices?

- ❍ Rise
- ❍ Fall
- ❍ Stays the same

Feedback:

That's correct!
OR
Let's think through the answer to that question:

Bond are contracts that specify how much interest you receive over time with your purchase of the bond, in addition to receiving the stated contract amount ("face value") of the bond at the end of the contract.

Most bonds traded in markets have fixed interest rates. The amount of interest you receive over time doesn't change, even if current interest rates change. Instead, the market price of the bond will adjust when the current interest rate changes.

When the current interest rate falls, the amount of interest you can expect to earn for a given investment has dropped. However, the interest that a bond pays is constant (it's written into the contract!) - the bond interest payments didn't drop, so the bond payments are now worth MORE than they used to be, and price of the bond increases.

If you are familiar with present values, you can also think about the present value discount rate used to value the bond being equal to the current interest rate. When the current interest rate falls, the discount rate falls. Mathematically, the overall present value INCREASES because you are discounting by a lower rate.

Please click on CONTINUE to proceed to the next question.
OR
Please click on CONTINUE to try this question again.

Question 4:

Please indicate whether this statement is true or false:
Buying a single company's stock usually provides a safer return than a stock mutual fund.

- ❍ True
- ❍ False

Feedback:

That's correct!
OR
Let's think through the answer to that question:

The question asks which investment provides a safer return.

Let's say you invest in a single company's stock. Now suppose something bad happens to the company (like an earthquake demolishes all of its facilities) or to the industry the company operates in (like a new product comes out that completely replaces the current one - for example, does anyone still use a separate camera with photographic film rather than taking digital photos with your cell phone?). That company suffers and its stock price drops.

Now suppose that you invest in a stock mutual fund. Stock mutual funds invest in many different companies' stock. So, even if the mutual fund invested in that one company that suffered, only some of the stock mutual fund's investment is affected. Most of the mutual fund's stock remain stable. The price of the mutual fund may drop, but only by a small amount.

This concept is called 'diversification.' An undiversified investment is usually MORE RISKY than an diversified investment.

Please click on CONTINUE to proceed to the next question.
OR
Please click on CONTINUE to try this question again.

Question 5:

Please indicate whether this statement is true or false:
A 15-year mortgage typically requires higher monthly payments than a 30-year mortgage, but the total interest paid over the life of the loan will be less.

- ❍ True
- ❍ False

Feedback:

That's correct!
OR
Let's think through the answer to that question:

With fixed mortgages, you agree to pay a fixed monthly payment that covers both the original loan being repaid over time plus the current interest.

Let's suppose the two loans have the same annual rate of interest. The 15-year loan will have a higher monthly payment because you have to pay back the original loan in only half the time. But, you'll be paying interest on the 30-year loan for twice as long. Over the entire life of the loan, this often means that you'll pay more than double the interest to borrow the same amount.

Unfortunately, 30-year loans are more risky for banks than 15-year loans, so you'll likely be paying an even higher interest rate. This could be anywhere from a quarter of a percent to a full percent more, adding to your already higher interest costs!

Please click on CONTINUE to proceed to the next question.
OR
Please click on CONTINUE to try this question again.

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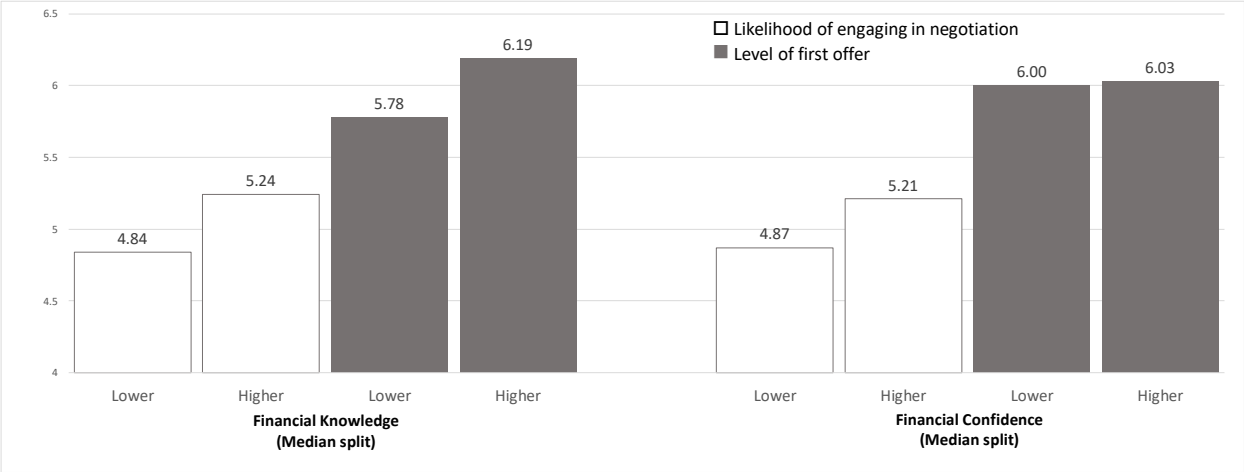

Figure 1.
Effect of higher vs. lower financial knowledge and financial confidence on likelihood of engaging in negotiation and level of first offer.

TABLE 1
Study 1 Descriptive Statistics

Panel A: Financial literacy

Variable	N	Mean	SD	Range		Correlation with Financial Knowledge		Correlation with Financial Confidence	
				Min	Max	r	p	r	p
Financial knowledge	236	0.697	0.253	0	1	—	—	0.510	<0.001
Financial confidence	236	4.660	1.320	1	7	0.510	<0.001	—	—

Panel B: Pre-negotiation dependent variables

Variable	N	Mean	SD	Range		Correlation with Financial Knowledge		Correlation with Financial Confidence	
				Min	Max	r	p	r	p
Likelihood of engaging in negotiation	236	5.068	1.469	1	7	0.122	0.030	0.180	0.003
First-offer	236	6.017	1.870	1	8	0.117	0.036	0.020	0.380

Panel C: Post-negotiation dependent variables

Variable	N	Mean	SD	Range		Correlation with Financial Knowledge				Correlation with Financial Confidence			
						Role of Employee		Role of Manager		Role of Employee		Role of Manager	
				Min	Max	r	p	r	p	r	p	r	p
Negotiated agreement (Yes=1)	92	0.500	0.503	0	1	-0.199	0.057*	-0.022	0.833*	-0.240	0.021*	-0.066	0.532*
Negotiated outcome	44	0.000	0.988	-1.918	2.289	0.349	0.010	-0.436	0.002	0.272	0.037	-0.125	0.419

Panel D: Control variables for sensitivity analyses

Variable	N	Mean	SD	Range		Correlation with Financial Knowledge		Correlation with Financial Confidence	
				Min	Max	r	p	r	p
Gender (Male=1)	236	0.407	0.492	0	1	0.283	<0.001*	0.313	<0.001*
Basic numeracy	236	0.713	0.297	0	1	0.326	<0.001	0.297	<0.001
Advanced numeracy	236	0.322	0.262	0	1	0.293	<0.001	0.239	<0.001
Analytical reasoning	236	0.263	0.306	0	1	0.364	<0.001	0.216	<0.001
General risk preferences	236	6.513	2.121	1	10	0.064	0.325	0.111	0.045
Financial risk preferences	236	1.364	0.751	0	3	0.240	<0.001	0.261	<0.001
Context (Financial=1)	236	0.534	0.50	0	1	0.015	0.825	0.026	0.688

This table presents descriptive statistics for the variables applied in analyses of Study 1, including the mean, standard deviation, minimum and maximum observed values, and univariate correlations of the variable with financial knowledge and with financial confidence. Spearman rank correlations are presented for the indicator variables (negotiated agreement, gender, and context), while Pearson correlations are provided for all other variables. Shading highlights correlations with $p<0.10$. Variables are defined as follows:

- Financial knowledge is assessed using a series of five questions previously applied in nationwide samples (FINRA Foundation 2009a, 2009b, 2012), covering fundamental concepts of interest compounding, inflation, diversification, and present value. Each question is coded as 1 if answered correctly, and 0 otherwise, then combined as a total percentage correct. See Appendix A, Panel A.
- Financial confidence is assessed using a series of four questions also previously applied in nationwide samples (FINRA Foundation 2009a, 2009b). These questions asked participants for their self-assessment of their ability in dealing with day-to-day financial matters, at math, at keeping up with economic and financial news, and their overall financial knowledge. See Appendix A, Panel B.
- Likelihood of engaging in negotiation is participants' reported likelihood of approaching their manager to engage in a negotiation, measured on a seven-point scale coded from 1 ("Very Unlikely") to 7 ("Very Likely"). See Appendix C, Panel A.
- First-offer is the level of the first offer the participant would make if negotiating with their manager, measured using a drop-down menu of eight options ranging from their current status quo (coded as 1) up to a bonus rate or number of vacation days that is ten percent higher than their co-employee in the scenario (coded as 8). See Appendix C, Panel A.
- Negotiated agreement is an indicator variable valued at 1 if both members of the negotiating dyad indicated that a final negotiated outcome was agreed upon, and 0 if both members of the negotiating dyad indicated that no final negotiated outcome was agreed upon.
- Negotiated outcome is the value of the final negotiated agreement, initially measured as a bonus rate or number of vacation days, then standardized by context to a mean of 0 and standard deviation of 1.
- Gender is an indicator variable valued at 1 if the participant indicated "male," and 0 if the participant indicated "female."
- Basic numeracy skills are measured using a series of three questions from Schwartz et al. (1997) covering simple probabilities and conversions between simple probabilities and frequencies. Each question is coded as 1 if answered correctly, and 0 otherwise, then combined as a total percentage correct. See Appendix B, Panel A.
- Advanced numeracy skills are measured using a series of four questions from Cokely et al. (2012) covering probability estimates as well as Bayes' Theorem.

Each question is coded as 1 if answered correctly, and 0 otherwise, then combined as a total percentage correct. See Appendix B, Panel B.

- Quantitative analytical reasoning is assessed using a series of three questions from Frederick (2005) in which the initial intuitive response differs from the correct response. Each question is coded as 1 if answered correctly, and 0 otherwise, then combined as a total percentage correct. See Appendix B, Panel C.
- General risk preferences are measured based on Dohmen et al. (2011) and financial risk preferences are measured based on Sages and Grable (2010). See Appendix B, Panel D.
- Context is an indicator variable valued at 1 if the participant is assigned to the "financial" scenario and 0 if the participant is assigned to the "non-financial" scenario. See Appendix C, Panel A.

TABLE 2
Study 1 Regression analyses

Panel A: Pre-negotiation dependent measures

	Likelihood of engaging in negotiation				First offer			
	Estimate	**Std Err**	**t**	**p**	**Estimate**	**Std Err**	**t**	**p**
Intercept	4.078	0.363	11.25	<0.001	5.626	0.466	12.07	<0.001
Financial Knowledge	0.240	0.435	0.55	0.291	1.070	0.559	1.91	0.028
Financial Confidence	0.177	0.083	2.12	0.018	-0.076	0.107	-0.71	0.478*

Panel B: Post-negotiation dependent measures

	Agreement				Negotiated Outcome			
	Estimate	**Std Err**	**t**	**p**	**Estimate**	**Std Err**	**t**	**p**
Intercept	1.405	0.319	4.41	<0.001	-0.038	0.833	-0.05	0.964
Financial Knowledge - Employee	-0.293	0.230	-1.28	0.205	0.788	0.582	1.35	0.092
Financial Knowledge - Manager	-0.199	0.250	-0.80	0.428	-1.522	0.650	-2.34	0.012
Financial Confidence - Employee	-0.093	0.044	-2.10	0.039	0.024	0.109	0.22	0.413
Financial Confidence - Manager	-0.027	0.047	-0.57	0.570	0.097	0.123	0.79	0.783

This table presents the results of general linear regression models of the pre-negotiation (Panel A) and post- negotiation (Panel B) dependent measures. The applied dependent and independent measures are defined in Table 1. Shading highlights independent variables that are statistically significant at $p<0.10$ in the regression model.

TABLE 3
Study 2 Descriptive Statistics

Panel A: Financial literacy

Variable	N	Mean	SD	Range		Correlation with Financial Knowledge		Correlation with Financial Confidence	
				Min	Max	r	p	r	p
Financial knowledge	986	0.713	0.233	0	1	—	—	0.304	<0.001
Financial confidence	986	4.876	1.112	1	7	0.304	<0.001	—	—

Panel B: Dependent variables

Variable	N	Mean	SD	Range		Correlation with Financial Knowledge		Correlation with Financial Confidence	
				Min	Max	r	p	r	p
Likelihood of engaging in negotiation	986	5.167	1.536	1	7	0.031	0.334	0.194	<0.001
First-offer	986	7.522	3.318	1	11	0.107	0.001	0.082	0.010

Panel C: Control variables for sensitivity analyses

Variable	N	Mean	SD	Range		Correlation with Financial Knowledge		Correlation with Financial Confidence	
				Min	Max	r	p	r	p
Gender (Male=1)	986	0.531	0.499	0	1	0.189	<0.001*	0.186	<0.001*
Basic numeracy	986	0.734	0.295	0	1	0.395	<0.001	0.130	<0.001
Advanced numeracy	986	0.335	0.279	0	1	0.352	<0.001	0.194	<0.001
Analytical reasoning	986	0.517	0.402	0	1	0.353	<0.001	0.133	<0.001
General risk preferences	986	5.276	2.291	1	10	0.072	0.024	0.265	<0.001
Financial risk preferences	986	1.168	0.767	0	3	0.215	<0.001	0.361	<0.001
Context (Financial=1)	986	0.497	0.500	0	1	-0.022	0.484*	-0.045	0.156*
Inequity (Higher=1)	986	0.498	0.500	0	1	0.038	0.234*	-0.018	0.576*
Complexity (Higher =1)	986	0.484	0.500	0	1	0.018	0.579*	-0.008	0.791*

This table presents descriptive statistics for the variables applied in analyses of Study 2, including the mean, standard deviation, minimum and maximum observed values, and univariate correlations of the variable with financial knowledge and with financial confidence. Spearman rank correlations are presented for the indicator variables (gender, context, inequity, and complexity), while Pearson correlations are provided for all other variables. Shading highlights

correlations with $p<0.10$. Variables are defined as in Study 1 and Table 1, except as follows:

- First-offer is the level of the first offer the participant would make if negotiating with their manager, measured using a drop-down menu of eleven options ranging from their current status quo (coded as 1) up to a recommendation that is 24 percent higher than their current status quo (coded as 11).
- Context, inequity, and complexity are all indicator variables. Context is an indicator variable valued at 1 if the participant is assigned to one of the two "financial" scenarios and 0 if the participant is assigned to one of the two "non-financial" scenarios. Inequity is an indicator variable valued at 1 if the participant is assigned to the "higher" inequity setting and 0 if the participant is assigned to the "lower" inequity setting. Complexity is an indicator variable valued at 1 if the participant is assigned to the "complex" setting and 0 if the participant is assigned to the "simple" setting. See Appendix D.

TABLE 4
Study 2 Regression analyses

	Likelihood of engaging in negotiation				First offer			
	Estimate	**Std Err**	**t**	**p**	**Estimate**	**Std Err**	**t**	**p**
Intercept	3.940	0.233	16.910	<0.001	5.817	0.510	11.420	<0.001
Financial Knowledge	-0.205	0.216	-0.950	0.828	1.282	0.472	2.710	0.003
Financial Confidence	0.282	0.045	6.210	<0.001	0.162	0.099	1.640	0.051

This table presents the results of general linear regression models of the dependent measures. The applied dependent and independent measures are defined in Table 3. Shading highlights independent variables that are statistically significant at $p<0.10$ in the regression model.

TABLE 5
Study 3 and Study 4 Descriptive Statistics

Panel A: Financial literacy

	Overall					No feedback group (control)					Feedback group					*Feedback*	
Variable	**N**	**Mean**	**SD**	**Min**	**Max**	**N**	**Mean**	**SD**	**Min**	**Max**	**N**	**Mean**	**SD**	**Min**	**Max**	***Difference***	***p***
STUDY 3:																	
Knowledge (pre-test)	304	0.734	0.212	0	1	207	0.733	0.208	0	1	97	0.736	0.221	0	1	*0.003*	*0.458*
Knowledge (post-test)	304	0.793	0.221	0	1	207	0.729	0.224	0	1	97	0.930	0.139	0.4	1	*0.200*	*<.001*
Change in knowledge	*304*	*0.059*	*0.195*	*-0.6*	*0.8*	*207*	*-0.004*	*0.141*	*-0.6*	*0.4*	*97*	*0.194*	*0.224*	*-0.4*	*0.8*	*0.198*	*<.001*
p		*<.001*					*0.693*					*<.001*					
Confidence (control)	304	4.266	1.060	1	6	207	4.191	1.083	1	6	97	4.428	0.994	2.25	6	*0.237*	*0.069*
STUDY 4:																	
Knowledge (pre-test)	404	0.793	0.190	0	1	203	0.780	0.190	0.2	1	201	0.805	0.189	0	1	0.025	*0.096*
Knowledge (post-test)	404	0.855	0.193	0.2	1	203	0.759	0.197	0.2	1	201	0.953	0.131	0.2	1	0.195	*<.001*
Change in knowledge	*404*	*0.063*	*0.168*	*-0.4*	*0.8*	*203*	*-0.022*	*0.107*	*-0.4*	*0.6*	*201*	*0.148*	*0.176*	*-0.2*	*0.8*	*0.170*	*<.001*
p		*<.001*					*0.004*					*<.001*					
Confidence (control)	404	4.840	1.057	1	7	203	4.776	1.046	2	7	201	4.905	1.067	1	7	0.130	*0.109*

Panel B: Pre-negotiation dependent variables

						Correlation with Knowledge		Correlation with Change in Knowledge		Correlation with Confidence	
Variable	**N**	**Mean**	**SD**	**Min**	**Max**	**r**	**p**	**r**	**p**	**r**	**p**
STUDY 3:											
Likelihood of engaging in negotiation	304	5.128	1.044	1	6	0.236	<0.001	0.034	0.278	0.317	<0.001
First-offer	304	7.115	1.719	1	8	0.144	0.006	0.141	0.007	0.071	0.107
STUDY 4:											
Likelihood of engaging in negotiation	404	5.245	1.359	1	7	0.123	0.007	-0.052	0.853	0.145	0.002
First-offer	404	7.351	1.518	1	8	0.206	<0.001	-0.065	0.905	0.137	0.006

Panel C: Post-negotiation dependent variables (Study 3 only)

						Correlation with Knowledge				Correlation with Change in Knowledge				Correlation with Confidence			
						Employee		Manager		Employee		Manager		Employee		Manager	
Variable	**N**	**Mean**	**SD**	**Min**	**Max**	**r**	**p**	**r**	**p**	**r**	**p**	**r**	**p**	**r**	**p**	**r**	**p**
Negotiated agreement (Yes =1)	125	0.504	0.502	0	1	-0.005	0.953	0.107	0.189	-0.093	0.252	0.015	0.856	-0.002	0.978	-0.045	0.586
Negotiated outcome	63	0.000	1.000	-3.019	5.381	0.060	0.320	-0.051	0.344	0.012	0.462	-0.329	0.004	0.014	0.457	-0.207	0.052

This table presents descriptive statistics for the variables applied in Studies 3 and 4, including the mean, standard deviation, minimum and maximum observed values, and univariate correlations of the variable with initial financial knowledge, with the measured change in financial knowledge, and with financial confidence. Spearman rank correlations are presented for the negotiated agreement indicator variable in Panel C, while Pearson correlations are provided for all other variables. For Panel C, post-negotiation dependent variables are only available for Study 3 because participants negotiated in dyads only in Study 3 (and not in Study 4). Shading highlights changes in knowledge and feedback differences that are significantly different from zero at $p<0.10$ in Panel A and correlations with $p<0.10$ in Panels B and C.

As noted in Panel A, for both Studies 3 and 4, participants were assigned to a feedback group or to a no-feedback (control) group. In the control condition, participants simply answered each of the financial knowledge questions, as described in Study 1 and Table 1. In the feedback condition, participants who answered a financial knowledge question incorrectly were asked to think through the answer to that question, were provided with reasoning to reach the correct answer to the question (see Appendix E), and were asked to try answering the question again (up to three times before they were allowed to proceed to the next question). When participants in the feedback condition answered a financial knowledge question correctly, they were informed that their response was correct along with a copy of the reasoning to reach the correct answer to the question. As a measure of learning, all participants completed the same set of financial knowledge questions at the end of the study without feedback to capture the change between participants' first responses to each question (pre-test) and their debriefing responses to each question (post-test). Thus, all measured variables are as defined as in Study 1 and Table 1, except as follows:

- Knowledge (pre-test) is measured at the beginning of the experiment using participants' first response to each financial knowledge question (for participants receiving feedback) or their only response to each financial knowledge question (for participants receiving no feedback). Each question is coded as 1 if answered correctly, and 0 otherwise, then combined as a total percentage correct.
- Knowledge (post-test) is measured at the end of the experiment using participants' only response to the same set of financial knowledge questions. Each question is coded as 1 if answered correctly, and 0 otherwise, then combined as a total percentage correct.
- Change in knowledge is the within-subjects difference between Knowledge (post-test) and Knowledge (pre-test).
- Feedback difference in Panel A is defined as the difference in the mean of the measured variable for the feedback group and the mean of the measured variable for the control group.

TABLE 6
Study 3 and Study 4 Regression analyses

Panel A: First offer (pre-negotiation from employee's perspective)

	Model 1: Initial knowledge, controlling for confidence				Model 2: Initial and Change in knowledge, controlling for confidence			
	Estimate	**Std Err**	**t**	**p**	**Estimate**	**Std Err**	**t**	**p**
STUDY 3 (n=304)								
Intercept	6.153	0.458	13.440	<0.001	5.590	0.469	11.910	<0.001
Financial Confidence	0.035	0.099	0.350	0.363	-0.020	0.098	-0.210	0.582
Financial Knowledge	1.109	0.498	2.230	0.013	2.023	0.539	3.760	<0.001
Change in Knowledge					2.147	0.545	3.940	<0.001
STUDY 4 (n=404)								
Intercept	5.668	0.405	14.000	<0.001	5.575	0.443	12.580	<0.001
Financial Confidence	0.112	0.074	1.510	0.066	0.113	0.074	1.520	0.064
Financial Knowledge	1.440	0.413	3.490	0.000	1.532	0.450	3.400	0.000
Change in Knowledge					0.249	0.485	0.510	0.304

Panel B: Negotiated outcome (post-negotiation)

	Model 1: Initial knowledge, controlling for confidence				Model 2: Initial and Change in knowledge, controlling for confidence			
	Estimate	**Std Err**	**t**	**p**	**Estimate**	**Std Err**	**t**	**p**
STUDY 3 ONLY (n= 63 dyads)								
Intercept	0.799	0.917	0.870	0.387	1.119	0.902	1.240	0.220
Financial Confidence - Employee	-0.064	0.147	-0.430	0.667	-0.055	0.141	-0.390	0.651
Financial Confidence - Manager	-0.200	0.119	-1.690	0.048	-0.043	0.127	-0.340	0.367
Financial Knowledge - Employee	0.541	0.671	0.810	0.212	0.454	0.690	0.660	0.257
Financial Knowledge - Manager	-0.093	0.643	-0.150	0.443	-1.181	0.732	-1.610	0.056
Change in Knowledge - Employee					-0.034	0.749	-0.050	0.518
Change in Knowledge - Manager					-2.210	0.807	-2.740	0.004

This table presents the results of general linear regression models of the pre-negotiation dependent measures for Studies 3 and 4 (Panel A) and of the post-negotiation dependent measures for Study 3 (Panel B). For Panel B, post-negotiation dependent variables are only available for Study 3 because participants negotiated in dyads only in Study 3 (and not in Study 4). The applied dependent and independent measures are defined in Table 5. Shading highlights independent variables that are statistically significant at $p<0.10$ in the regression model.