

Winter 12-2019

## The Technology Bias in Entrepreneur-Investor Negotiations

Timothy C. Dunne

Brent B. Clark

John P. Berns

Follow this and additional works at: <https://digitalcommons.unomaha.edu/mrktngmngmntfacpub>

## **The Technology Bias in Entrepreneur-Investor Negotiations**

Timothy C. Dunne  
Department of Management  
College of Business and Economics  
Boise State University  
MBEB 2205  
Boise, ID 83725  
Phone: (208) 426-5022  
Email: timothydunne@boisestate.edu

Brent B. Clark  
Department of Management  
College of Business Administration  
University of Nebraska – Omaha  
Mammel Hall 228S  
Omaha, NE 68182  
Phone: (402) 554-2643  
Email: bbclark@unomaha.edu

John P. Berns  
Department of Management  
School of Business Administration  
University of Mississippi  
249 Holman Hall  
University, MS 38677  
Phone: (662) 915-5820  
Email: jberns@bus.olemiss.edu

## **ABSTRACT**

Entrepreneur-investor negotiations are pivotal for ventures in need of funding. Yet, to date, little is known about the dynamics of these negotiations. We investigate a critical feature of this phenomenon by examining the role of technology, via cognitive heuristics, in shaping entrepreneur and investor perceptions as well as subsequent negotiation outcomes. In a controlled laboratory setting, we simulated 103 negotiations between entrepreneurs and investors. We hypothesize and find that there is a pervasive technology bias that influences the perceptions of both parties of the negotiation, and consequently negotiation outcomes. Our findings offer unique insights into the relationships of technology, cognitive heuristics, and negotiations. We discuss the implications for both practitioners and theoreticians in the areas of technology, decision making, negotiations, and entrepreneurial financing.

Keywords: entrepreneurship, investors, negotiation, technology, techno-optimism

## **1. Introduction**

The ability of entrepreneurs to secure resources is key challenge facing entrepreneurial ventures seeking to get off the ground and to grow (Sullivan & Ford, 2014). The literature has

identified several types of resources that are key to entrepreneurial ventures including human, social, financial, physical, technology, and organizational resources (Brush, Greene, & Hart, 2001; Wu, 2007). While each of these sources resources is important to entrepreneurial venture success, a great breadth of the literature has focused on financial resources (Denis, 2004; Drover, Busenitz, Matusik, Townsend, Anglin, & Dushnitsky, 2017). The importance of financial resources is derived, in part, from the ability to use funding to procure other resources needed by the venture (Cai, Hughes, & Yin, 2014). Thus, financing is a pivotal resource which entrepreneurs need to secure to succeed (Desa & Basu, 2013; Ebbers & Wijnberg, 2012; Mata, 1994) and acquiring capital is central for a venture to grow from an idea into a productive firm (Brown & Lee, 2019).

Numerous financing options exist for entrepreneurs to pursue (Angerer, Niemand, Kraus, & Thies, 2018; Burgelman & Hitt, 2007; De Clercq, Fried, Lehtonen, & Sapienza, 2006). In 2017 alone in the United States, venture capitalists (VCs) invested \$71.9B in 5,052 ventures (MoneyTree, 2018), angel investors contributed \$23.9B to 61,560 ventures (Sohl, 2018), and crowdfunding contributed \$919.3M to 177,300 ventures (Statista, 2018). Of course, not all ventures are created equal, and those which are deemed more valuable are likely to be more effective at securing financial backing (MacMillan, Seigel, & Narasimha, 1985; Robinson, 1987). If an entrepreneurial investor perceives a proposed venture to have more potential for growth, and therefore provide them a better return, the investor will likely be more eager to invest in the start-up (Ganzach, 2000; Tyebjee & Bruno, 1984). Similarly, if an entrepreneur perceives their venture to have more potential for success, they likely expect to be effective at acquiring funding (Anglin, Short, Drover, Stevenson, McKenny, & Allison, 2018). While those principles follow intuitional logic, our understanding of how entrepreneur's and investor's

negotiation behavior affects this process is incomplete. Thus, due to the critical role of resource acquisition in the success of startup ventures, in this study we seek to gain insight into whether perceptions of technology impact the negotiation between entrepreneurs and venture investors. Specifically, we posit that overoptimism about emerging technologies can influence perceptions of success potential more for some ventures than for others.

The investment decision represents a pivotal point for both the entrepreneur (seeking external funding) and the investor (seeking a profitable investment) (Eckhardt, Shane, & Delmar, 2006; Lagazio & Querci, 2018). As many entrepreneurs operate under significant resource constraints (Desa & Basu, 2013), being able to acquire outside capital is often the only way entrepreneurs can successfully get their small businesses off the ground, and has been shown to influence the likelihood of business failure (Beckman et al., 2007; Shane & Stuart, 2002). Furthermore, the entrepreneur risks the time lost during the process of seeking financing, the possibility of not receiving financing or not getting fully funded, the negative reputation of a failed venture, and possible debts that such a failure could create among other things (Ucbasaran, Shepherd, Lockett, & Lyon, 2013).

Due to the inherent uncertainty associated with early stage investment, the decision by an investor to fund a project can result in a variety of outcomes ranging from receiving a significant return to losing the entire investment (Mason & Harrison, 2002). These risks deter investment in projects deemed too risky or underdeveloped by investors (Lerner, 1995; Lerner, 1998). The risks investors face are most prominently related to the direct return of an investment (MacMillan, Seigel, & Naraimha, 1985; Robinson, 1987), but can also involve the costs of missed opportunities in alternative investments (MacMillan, Zemann, & Subbanaransimha,

1987). To understand the investment decision, the entrepreneurship literature has examined various factors that influence early stage funding decisions.

Characteristics of the project, the entrepreneur(s), and the investor(s) all factor into the venture financing decision (Rai & Lin, 2019; Schwienbacher, 2007; Shane & Cable, 2002). The decision to invest has also been found to be based on individual factors such as investor experience (Freear, Sohl, & Wetzel, 2002; Kaustia & Knüpfer, 2008; Lahti, 2011; Van Osnabrugge, 1998), investor/entrepreneur information (Gompers, 1995; Hsu, 2007), entrepreneur passion (Cardon, Sudek, & Mitteness, 2009; Mitteness, Sudek, & Cardon, 2012; Sudek, 2006/2007), venture characteristics (Fiet, 1995; Nagy & Obenberger, 1994; Ueda, 2004), investor characteristics and preferences (Khanin, Baum, Turel, & Mahto, 2009; Khanin & Turel, 2012; Mahto, Ahluwalia, & Walsh, 2018), characteristics market characteristics (Fiet, 1995; Fried & Hisrich, 1994), the entrepreneur's social network (Shane & Cable, 2002; Shane & Stuart, 2002), the business model/plan (Galbraith, et al., 2009), as well as capital structure and financing types (Cassar, 2004; Heuven & Groen, 2012). However, these characteristics only provide a partial picture of the investment decision.

Another prominent area of research that has been applied to investment decisions is the judgment and decision making literature related to cognitive heuristics. Heuristics, or biases, are miscalculated judgments that often result in decision making that is less than optimal (Tversky & Kahneman, 1974). Indeed, early stage investors often rely on subjective criteria or “gut” feelings when making decisions (Aernoudt, 1999; Baty & Sommer, 2002; Morisette, 2007). Multiple types of heuristics influence decision making by distorting information that is used in decision processing. While several venture characteristics are known to influence funding decisions, heuristics also play an important role in entrepreneurial investment decision making - an area of

the literature where our understanding of how entrepreneur's and investor's negotiation behavior affects this process is incomplete (Harrison, Mason, & Smith, 2015; Shepherd, Williams, & Patzelt, 2015). Indeed, Zider (1995) estimated that one type of entrepreneurial investor, VCs, only spend about 5% of their time negotiating on investments. Despite the small amount of time spent on this activity, it is nonetheless a crucial activity for both parties.

To explore this area, we seek to gain insight into how cognitive heuristics, specifically those regarding technology, impact the negotiation between entrepreneurs and venture investors. Specifically, we propose that technology will have a significant effect on how both entrepreneurs and investors process information during funding negotiations, as well as on the outcomes of those negotiations. To accomplish this, we utilized a laboratory study using business students from two major universities across the United States between 2016 and 2017. The approach allows us the control necessary to pinpoint the effects of technology on negotiations and test our hypotheses. Using a controlled laboratory setting, we find a significant technology bias in negotiations. We find that techno-optimism influences both value perceptions and higher negotiation outcomes for entrepreneurs with value partially mediating the relationship.

Our study makes three primary contributions. First, we contribute to the venture funding literature by further examining the relationship between entrepreneur and investor negotiations. To date, much of this literature focuses on the value proposition delivered to investors in the way of a business' potential projected success (Payne, Davis, Moore, & Bell, 2009). There is a void in the literature however, with regard to the effect of the negotiations between the parties. By examining the negotiations and their outcomes, this research adds an important element to our understanding of the capital acquisition process. Second, we add to the literature about cognition in decision making and the common judgment biases influencing decision makers by exploring

perceptual distortions in the context of financial acquisition. Specifically, we explore the role technology plays at influencing judgments about perceived venture value and the corresponding negotiations entrepreneurs engage in to acquire capital. Recent research has shown that technology invokes over-optimism (Clark, Robert, & Hampton, 2016). However, the literature has not tested this effect in specific business contexts, nor the specific mechanisms that explain how this over-optimism is actually demonstrated. Thus, we extend the decision making and judgement heuristics literature by further exploring the role technology plays on over-optimism, as well as exploring this phenomenon in an entrepreneurial financing context. Third, we contribute to the technology and innovation literature by exploring how perceptions impact negotiated outcomes regarding financing. Perceptions of technology have implications for both entrepreneurs and investors as well as researchers studying the effects of technology in decision making.

## **2. Theory and Hypotheses**

### *2.1 Technology Bias in Decision Making*

Entrepreneurial financing, at its core, involves individuals providing funds (investors) and individuals seeking funds (entrepreneurs) to reach an agreement about the terms of financing. To negotiate such a contract requires both parties to present information to the other side and to process the information that they receive. The heuristic-systematic model (Chaiken, 1980) suggests that such decisions are likely to be made in one of two ways: a high-effort and highly systematic process or a faster, more automatic (heuristic) route that bypasses extensive effort and processing. While important decisions such as investing may motivate focused logical judgements about the potential of investment in a venture (Kumar & Goyal, 2016), or what Chaiken refers to as systematic processing, an abundance of evidence suggests this is often not



the case (e.g. Poteshman & Serbin, 2003; Stroe, Parida, & Wincent, 2018). When decision makers are in situations that have at least some familiar elements, they often opt for heuristic processing because the familiar elements are taken as information that can be leveraged as a cognitive short cut. This processing often contradicts economic rationality. Nonetheless, the entrepreneurial literature is teeming with examples of how investors defer to more subjective criteria of intuition to make decisions when evaluating ventures (Aernoudt, 1999; Baty & Sommer, 2002; Morisette, 2007). Much of the evidence of such “irrational” decisions is rooted in work by Tversky and Kahneman (1973), which has established that individuals often apply judgmental heuristics to decisions as a result of limited ability or willingness to process information systematically.

One example, where the availability heuristic and salience bias operate within an increasingly important context, is the “technology effect”, which consists of a learned tendency to be overly optimistic about technology and its ability to solve problems and create value (Clark, Robert, & Hampton, 2016). Indeed, technology often seems to be celebrated above all else (Feenberg, 1991) leading to biases towards technology for both novices and experts alike (Elsbach & Stigliani, 2019). The irrational buildup leading to the .com bubble exemplifies this (Saade, 2015). Furthermore, perceptions of technology have been found to impact several phenomena such as learning modes (Linton & Walsch, 2013), investment (Lockett, Murray, & Wright, 2002; Lowe & Ziedonis, 2006), and attitudes (Mordini, 2007; Moynihan & Lavertu, 2012).

The technology effect suggests that individuals implicitly associate technology with success and are thus biased in their perceptions about the benefits of technology (Clark, Robert, & Hampton, 2016). Such implicit associations have been shown to be powerful determinants of

cognition and behaviors (Greenwald et al. 2009) and are leveraged in fast heuristic mental processes. The result is overconfidence in the merits of technology – especially in instances where there is uncertainty about a technology or an emerging technological industry as is typical for a technology venture. A lack of concrete data or an established track record creates an environment where systematic processing is less likely and heuristic processing more likely (Chaiken, 1980). In short, optimism about a new venture’s prospects is likely to permeate the thinking and behaviors of both the entrepreneur and their business partners. Due to excessive techno-optimism on both sides of the negotiation table, we expect better negotiated outcomes for technology entrepreneurs compared to similar (equally promising) low-technology entrepreneurs.

*Hypothesis 1: Technology entrepreneurs will negotiate more successfully with investors compared to non-technology entrepreneurs, ceteris paribus.*

While previous research has demonstrated that technology is generally associated with success (even amongst industry experts) (Tichy, 2004), it is not entirely clear what the mechanisms are that connect technology as a concept with perceptions of future behaviors or positive outcomes. One possible mechanism for this is individual over-optimism towards technology (Clark, Robert, & Hampton, 2016; Feenberg, 1991). In the context of negotiations for start-up financing, we suspect that technology-infused startups will be perceived as having more valuable products and services than low technology startups even when verifying evidence is lacking, thus manifesting as a form of irrational over-optimism. Further, over-optimism about

startup technologies will drive perceptions of value in at least two ways. First the technology bias will be displayed in entrepreneur-investor negotiations in part due to what is referred to as the availability heuristic (Tversky & Kahneman, 1973). This phenomenon occurs when decisions are made as a result of the ease with which individuals are able to recall information. A major factor increasing the ease with which information is recalled has to do with how much information is received and the intensity or vividness of that information (Fiske & Taylor, 1991). Common examples of vivid information are stories published in media reports; with such stories impacting various decisions from consumer purchasing (Cornelissen, Pandelaere, & Warlop, 2008), to ethical decision making (Hayibor & Wasieleski, 2009) to stock market investments (Kliger & Kudryavtsev, 2010). Thus, we see a disproportionate number of reports of technology successes relative to failures (Golder & Tellis, 1993). This unbalanced exposure to relevant information causes us to believe that technology creates more value than it actually does and is more likely to succeed than it actually is.

Second, the salience bias also drives techno-optimism. Salient events are easier to recall because they are the events that are more dramatic (Hossain & Morgan, 2006) or relevant because they change the status quo (John, Acquisti, & Loewenstein, 2009). Due to a general reluctance to publicize technology failures (Levinthal & March, 1993; McGrath, 1999) and a natural tendency to pay attention to successes, we overvalue contexts characterized by technology. As an example, consider the enthusiasm amongst media and consumers every time a new version of the iPhone is released by Apple, Inc. Additionally, we are captivated by stories of recent (e.g. Snapchat) and historic (e.g. (Apple's Mac) successes and tend to forget failures (e.g. Apple's iTunes Ping). These stories offer and reinforce reference points which influence perceptions during negotiations (Bottom, 1998; Kahneman & Tversky, 1979). According to the

availability and salience heuristics, the vividness, relevance, and ease of recalling those stories make individuals less likely to process conflicting information and instead rely on judgmental heuristics. This leads us to suggest that both entrepreneurs and the investors will experience some degree of techno-optimism, leading them to perceive more value with a technology related venture than a non-technology related venture.

*Hypothesis 2a: Entrepreneurs will overvalue technology products relative to non-technology products.*

*Hypothesis 2b: Investors will overvalue technology products relative to non-technology products.*

Perceived value is a pivotal factor in entrepreneurial negotiation as discrepancies often exist between the perceptions of entrepreneurs and investors (Artinger, Vulkan, & Shem-Tov, 2015). Following the arguments of the technology bias (Clark, Robert, & Hampton, 2016; Elsbach & Stigliani, 2019; Feenberg, 1991; Saade, 2015), placing a more optimistic value on technology than on non-technology should lead to greater negotiation leverage for technology entrepreneurs relative to their non-technology counterparts. For example, Kristensen and Garling (1997) found that value estimates strongly influence each negotiator's reservation price, or the lowest acceptable outcome (Blount et al. 1996), and that these cutoff points rise and fall in reaction to new information and new cognitive evaluation. Basic negotiation mechanics prescribe that higher reservation prices lead to higher negotiation outcomes (Huber & Neale, 1986; White & Neale, 1994).

Additionally, in an effort to remain consistent with perceptions of the value of a venture, we suggest that the higher value placed on technology ventures will impact the degree to which technology entrepreneurs succeed in achieving positive negotiation outcomes with investors. This assertion is supported by further evidence in the cognitive decision making literature – specifically what is referred to as the confirmation bias (Kahneman, Slovic, & Tversky, 1982). This bias results from an individual’s desire to avoid dissonant behavior (Jonas, Schulz-Hardt, Frey, & Thelen, 2001), thus promoting behavior that is consistent with previous perceptions. In the case of the entrepreneur-investor negotiation, the more value the investor and entrepreneur perceive in technology, the more they will act on those perceptions; thereby improving the technology entrepreneurs negotiating position. Therefore, we expect the relationship between technology and negotiation outcomes will operate via the higher perceived value of the technology related ventures.

*Hypothesis 3a: The entrepreneur’s value perception of the new venture will be positively related to the entrepreneur’s negotiated outcome.*

*Hypothesis 3b: Investor’s value perception of the new venture will be positively related to the entrepreneur’s negotiated outcome.*

As prior literature suggests, many factors, such as feelings about the negotiation process or outcomes (Curhan, Elfenbein, & Xu, 2006), perceptions of fairness (Colquitt, Conlon, Wesson, Porter, & Ng, 2001), and personal assessment of self-worth (White, Tynan, Galinsky, & Thompson, 2004) influence the perception of value and consequently negotiated outcomes

(Caputo, 2013). Therefore, we expect that perceived value is just one factor which may mediate the relationship between the presence of technology and negotiated outcomes. In other words, technology makes us optimistic about outcomes, in part due to higher product valuations (Clark, Robert, & Hampton, 2016; Elsbach & Stigliani, 2019). Since technology is a specialized and often complicated area (Farrukh, Phaal, & Probert, 2003), it is likely that the information asymmetry gap would be large and would favor the entrepreneur. Information asymmetry (Akerlof, 1970; Spence, 1973) is common in many venture financing decisions and is a known driver of negotiation outcomes (Fisher, Frederickson, & Peffer, 2002; Scholes, Wright, Westhead, Burrows, & Bruining, 2007). Therefore, without appropriate signals to offer information and lessen the information gap (Connelly, Certo, Ireland, & Reutzel, 2011), investors are left to make decisions via the heuristic processing route, often based on “gut” feelings and intuition (Aernoudt, 1999; Baty & Sommer, 2002; Morisette, 2007).

In negotiations, the party who possess more information than their counterpart tends to experience better outcomes (Rackham, 1999). Thus, the information asymmetry, which technology often presents (Gharbi, Sahut, & Teulon, 2014), should strengthen the technology entrepreneur’s position, conversely weakening the position of investors, leading to more favorable outcomes for the entrepreneur. Indeed, Balakrishnan and Koza (1993) found that investors typically have less information about a venture than the entrepreneur, and the resultant uncertainty impacts financing decisions in their favor. Therefore, we expect technology entrepreneurs to achieve greater negotiation success than their non-technology counterparts for multiple reasons, one of which is techno-optimism. Yet, because information asymmetry, and potentially other mechanisms, do not operate through perceived value, we predict that while perceived value will mediate the technology – outcome relationship, it will only do so partially.

*Hypothesis 4: The relationship between technology and higher negotiated outcomes for entrepreneurs will be partially mediated by the higher value placed on technology products relative to non-technology products.*

Taken together, our hypotheses argue that the presence of technology directly impacts negotiated outcomes between entrepreneurs and investors. Furthermore, technology is directly related to perceived value, a result of the overoptimistic biases technology promotes. Consequently, perceived value is also directly related to negotiation outcomes between entrepreneurs and investors. Thus, perceived value mediates, at least partially, the relationship between technology and negotiation outcomes. These hypothesized relationships are shown in Figure 1, with H1, H2, and H3 labelled specifically, and H4 pertaining to the collection of relationships.

-----

Insert Figure 1 about here

-----

### **3. Method**

#### *3.1 Participants and Procedure*

To assess the impact of the concept of technology on negotiations we used a laboratory experiment approach following the recommendations outlined in Hsu, Simmons, and Wieland (2016). Using 212 business school students (56% male, 79% undergraduates) across two large

public U.S. Universities (one in the Southeast and one in the West) we collected data from 106 negotiations. They were recruited through an offering of course credit for their participation. This approach follows previous work using students to assess decision making in entrepreneurial contexts (e.g. Chen, Yao, & Kotha, 2009; Davis & Peake, 2014; Sapienza & Korsgaard, 1996). Two negotiation dyads failed the manipulation check (failed to correctly identify the industry of the start-up) and one dyad did not finish the negotiation exercise, resulting in 103 usable data points. A single administrator conducted each session in order to ensure consistency across the sample. Roughly half of the negotiation dyads (52%) involved a scenario where a technology entrepreneur negotiates funding, ownership, and control terms with a VC. The other half did so for a non-technology start up. Following Clark and colleagues (Clark, Robert & Hampton, 2016), we selected Medical Devices as a high-technology context and Restaurants as a low-technology context. Some advantages of this choice are that the two industries were found to have comparable ratings for general importance, benefit to society, integrity, and ethical approval, thus ruling out potential reputation effects. Further, they found past financial returns in these industries to be comparable (Clark, et al., 2016). Importantly, respondents rated these industries as very high and very low on the range of how technology oriented they are. Examples of materials are available in Appendix A.

Participants were assigned to the role of entrepreneur or VC in the high- or low-technology context. We chose VCs in the role of the entrepreneurial investor as they are a salient and highly studied provider of early stage financing. By definition, VCs are professional investors who strive to identify, invest, and then profitably exit high growth high return ventures in need of equity injections (Burgelman & Hitt, 2007; De Clercq, Fried, Lehtonen, & Sapienza, 2006; Sohl, 2003). In each role, participants were given instructions for their negotiation task,



followed by a brief questionnaire to collect demographics and assess product value perceptions of their assigned condition. They were also provided a description of the startup company that included projected future firm performance that was identical across conditions. They then completed the negotiation, followed by a brief questionnaire to collect the negotiated outcomes and a manipulation check.

### *3.2 Dependent Variable*

Entrepreneurs and VCs were provided confidential score tables that equate negotiated terms to point amounts (see Appendix A). We measured *negotiation score* as the aggregate score of the entrepreneur across the three outcome elements: amount of capital, ownership, and control. Each of these measurements are commonly used when examining entrepreneurial success (capital (e.g. Ko & McKelvie, forthcoming), ownership (e.g. Vismara, 2016), and control (e.g. Gompers, 1995)). All three of these variables, to a greater or lesser extent, factor into entrepreneurial decision making (Shepherd, Williams, & Patzelt, 2015).

An aggregated scoring table – such as that we used here in our study – is a common means of measuring performance in negotiation research (e.g. Carnevale & De Dreu, 2005). Central to this approach is enhancing control over the study in order to avoid potentially spurious effects. The use of multiple outcomes with different scores allotted for various levels of the outcome is common practice in laboratory negotiation research, as it allows for parties to identify differences in preference for certain outcomes. This creates the ability for parties to engage in logrolling, whereby parties can trade low preference outcomes for ones that are of higher importance. Utilizing this method also helps to avoid the perception of a negotiation being a zero-sum endeavor. Moreover, aggregating subjects' scores for the three outcomes allows for a

more accurate assessment of performance, in general, and has been used in multiple contexts (e.g. Carnevale & Isen, 1986; Pruitt, 1981; Pruitt & Lewis, 1975).

### *3.3 Independent Variable*

Following prior entrepreneurship research (e.g. Mason & Harrison, 2004), *technology* was manipulated in half of our sample through our descriptions of the startup company. Participants negotiated terms either for a medical devices (tech = 1) or a restaurant consulting company (tech = 0). In both cases, negotiation materials stated five-year revenue estimates that were identical across the technology (medical devices) and non-technology (restaurant consulting) conditions. Thus, if participants considered the startup to have a promising versus bleak outlook, it would be attributable to their perceptions based on their mental model of imagined expectations rather than the stated factual outlook. Further, the technology and non-technology industries are comparable across a number of reputation and financial performance metrics (Clark et al., 2016).

### *3.4 Mediating Variable*

We hypothesized that in a negotiation context, techno-optimism is likely to operate through perceptions of product value. We measured *product value* through the pre-negotiation questions, “How much value do you think your product has?” and “How much value do you think the company's product has?” for the entrepreneur and VC, respectively. Responses were on a seven-point Likert scale ranging from extremely low (1) to extremely high (7).

### *3.5 Control Variables*

Participant *gender* (male = 1; female = 0) was used as a covariate in our analysis as past research has shown gender differences in negotiation outcomes (Mazei, Hüffmeier, Freund,

Stuhlmacher, Bilke, & Hertel, 2015; Stuhlmacher & Walters, 1999) as well as over-optimism (e.g. Barber & Odean, 2001) and general risk taking (Byrnes et al., 1999). We also controlled for *graduate* student status (graduate = 1; undergraduate = 0) and self-perception of *negotiation skill* on a seven point Likert scale (1 = extremely low; 7 = extremely high) with the question, “How confident are you in your negotiation skill?” We control for these factors as one’s perception of experience and skill has been shown to affect entrepreneurial decision making (Zacharakis & Shepherd, 2001).

#### 4. Results

Table 1 contains descriptive statistics and correlations. Consistent with prior negotiations research, perception of negotiation skill was positively correlated with one’s own negotiated outcome while the negotiation skill of the opponent is negatively correlated with one’s negotiated outcome (Maddux, Mullen, & Galinsky, 2008; Weingart, Thompson, Bazerman, & Carroll, 1990). We also observed positive correlations between the high technology condition and perceptions of product value, for both the entrepreneur and the VC. Interestingly, VC’s perceived negotiation skill was negatively correlated with the technology condition. Neither gender nor graduate status were correlated with any other variables.

-----

Insert Table 1 about here

-----

We predicted in hypothesis 1 that the general concept of technology, when invoked in a capital negotiation context would trigger more successful outcomes for the negotiating entrepreneur. This was supported ( $\beta = 1103.99, p = 0.000$ ) in our results as displayed in Model 2

of Table 2. Post hoc predictive margins show that a typical technology entrepreneur would expect to achieve a 12% higher total negotiation score than a comparable non-technology entrepreneur (10,158 to 9,054; scores are a combination of capital, equity, and control agreements). This finding provides theoretical support that individuals have an implicit bias which favors technology over non-technology.

-----

Insert Table 2 about here

-----

In hypothesis 2, we predicted a specific mechanism whereby technology, and its attendant, techno-optimism, will influence the cognitions and eventually the behavior of both entrepreneurs and VCs. We asserted and found that, indeed, both sides of the negotiating table perceived the value of a new technology startup's product to be higher than that of a new low-technology startup's product, despite being provided identical figures regarding expected firm performance across conditions. While entrepreneurs placed a higher value on their firm's products than did the VCs, both entrepreneurs ( $\beta = 0.77, p = 0.000$ ) and VCs ( $\beta = 0.65, p = 0.002$ ) valued technology products about 13% more highly than low-technology products (see Models 8 and 10 of Table 3). These findings extend literature related to availability of information, and how the ability to easily recall technological successes, make investors prone to becoming overly optimistic in the value technology will create. These results are displayed in Figure 2 in the form of post hoc predictive margins.

-----

Insert Table 3 about here

-----  
-----  
Insert Figure 2 about here  
-----

Continuing along the logical progression of our partial mediation model, we also predicted that perceptions of product value, both of the entrepreneur (Model 3) and the VC (Model 4) would influence the negotiation success of the entrepreneur. Results in the affirmative are seen in Table 2, both for the entrepreneurs ( $\beta = 273.55, p = 0.048$ ) and the VCs ( $\beta = 403.15, p = 0.002$ ). To better grasp the relative importance of the influence of the perceptions of the entrepreneur versus the VC, we also tested them jointly (Model 5), finding that the VC's value perception ( $\beta = 359.93, p = 0.007$ ) is a better predictor of the negotiated outcome than is the entrepreneur's value perception ( $\beta = 175.05, p = 0.204$ ).

Finally, in Hypothesis 4 we sought to determine whether and to what extent the effect of technology on negotiated outcomes operates through the mediating effect of product value perceptions. We found (Model 6) that VC perceptions of product value partially mediated the influence of technology on negotiated outcomes ( $\beta = 266.84, p = 0.039$ ), but entrepreneur value perceptions did not ( $\beta = 31.14, p = 0.822$ ). As hypothesized, the effect is one of partial mediation only, as technology maintained a strong independent influence ( $\beta = 907.21, p = 0.002$ ) on negotiated outcomes even with the inclusion of value perceptions as mediating variables.

## 5. Discussion

This study was designed to build on our understanding of the pivotal stage of securing startup funding. In doing so, we contribute to the literature in venture funding (e.g. Eckhardt,

Shane, & Delmar, 2006; Lagazio & Querci, 2018), biases in decision making (e.g. Poteshman & Serbin, 2003; Tversky & Kahneman, 1974), and perceptions of technology (e.g. Clark, Robert, & Hampton, 2016; Elsbach & Stigliani, 2019) in negotiations between entrepreneurs and investors. To accomplish this, we leveraged theory regarding cognitive heuristics and biases in decision making (Kahneman, Slovic, & Tversky, 1982; Tversky & Kahneman, 1974), and specifically heuristics related to over optimism about technology (Clark, Robert, & Hampton, 2016; Elsbach & Stigliani, 2019), to make predictions about the effect of technology on startup capital success. We tested our predictions in a setting which is inexorably related to capital acquisition, but one which lacks empirical understanding of its complexity – entrepreneur-investor negotiations.

In support of the predicted relationship between technology and startup capital acquisition, technology entrepreneurs negotiated more successful investment contracts for their startups. Techno-optimism was prevalent by both negotiation parties, leading to higher amount of capital negotiated, percent ownership retained, and control over decision making. Extending prior research on heuristics in decision making (Kahneman, Slovic, & Tversky, 1982; Tversky & Kahneman, 1974), our results support the suggestion that technology influences the cognitive processes involved in negotiation for start-up capital. As evidenced by popular press and media attention given to technology firms and products (Golder & Tellis, 1993), the technology effect creates an implicit bias (Clark, Robert, & Hampton, 2016; Elsbach & Stigliani, 2019), whereby successes in the technology sector are made salient through exposure. Specifically, in the context of entrepreneur-investor negotiations, these findings suggest that the judgments of investors are influenced by this heuristic. Assuming these conditions are favorable for entrepreneurs seeking funding, these results suggest that technology entrepreneurs, when compared to their non-technology counterparts, have an automatic benefit in negotiating with investors for funding.

Consistent with past work on investment decisions, we found that multiple mechanisms contributed to improved negotiation outcomes for technology entrepreneurs (Wang, Qureshi, Deeds, & Ren, 2019). In support of our predictions, both the entrepreneurs and the investors in the technology condition perceived the venture to have more value than in the non-technology condition, despite identical information about projected value being provided in both conditions. In a similar manner to the societal enthusiasm awarded to technology successes, our results suggest that technology entrepreneurs as well as the investors with whom they negotiate for startup funding award technology firms as being more valuable than non-technology entrepreneurs and their investors. We build on an expanse of past research (e.g. Caputo, 2013) which shows that the cognitive processes significantly influence the negotiation process. One particularly interesting aspect of our results, is that the overoptimism in technology is experienced in more powerfully by the investor. Technology does influence the entrepreneur to perceive their product to be more valuable than an entrepreneur who is not involved with technology, but the investor is even more prone to this irrational evaluation of value.

As we expected, perceived value of a venture was also indicative of capital negotiation success. Specifically, ventures that were perceived by entrepreneurs and investors as possessing greater value negotiated for higher amounts of capital, a greater percentage of ownership, and more decision making control. This finding adds to the literature on perceptions in negotiations (e.g. Artinger, Vulkan, & Shem-Tov, 2015). Furthermore, considering these sequential relationships simultaneously, results from our study show that entrepreneur and investor over valuation of the worth of technological products mediates the relationship between venture type and negotiated capital acquisition specifics.

### *5.1 Theoretical Contributions*

Our analyses have several important theoretical implications. By demonstrating the relevance of the technology effect in a new and important context – entrepreneur-investor negotiations, we contribute to the existing literature in several areas. We add to the judgmental heuristics literature (Kahneman, Slovic, & Tversky, 1982; Tversky & Kahneman, 1974) in an important way, by examining the role technology plays on distorting perceptions in decision making. To our knowledge, we are the first to directly test this phenomenon in the negotiation of capital. Thus, we add to what Clark et al. (2017) have labeled the technology effect and contribute to the increasing evidence that technology plays in perceptions (Elsbach & Stigliani, 2019). We also expand those literatures into the context of entrepreneurial financing, by examining the role technology has on influencing decision making within that transaction. Indeed, while the negotiation of financing is a key step in an entrepreneurial ventures growth, how perceptions impact this process has received limited attention in the literature (e.g. Anglin et al. 2018; Balakrishnan & Koza, 1993).

Integrating these perspectives, we extend our understanding of the technology effect and our understanding of its boundary conditions. Specifically, we explore one specific mechanism – perceptions of venture value – from the perspectives of both the entrepreneur and the investor. To that end, we find that the technology effect operates mainly through the investor rather than the entrepreneur in such a negotiation. However, we observe only partial mediation, so the technology effect operates either directly or through other (still unknown) mediators. Therefore, we bring together several literatures including venture funding (e.g. Eckhardt, Shane, & Delmar, 2006; Lagazio & Querci, 2018), biases in decision making (e.g. Poteshman & Serbin, 2003; Tversky & Kahneman, 1974), and perceptions of technology (e.g. Clark, Robert, & Hampton,



2016; Elsbach & Stigliani, 2019), to explore the intersection of the technology effect and perceptions of value in entrepreneurial negotiating success.

## *5.2 Practical Implications*

Not surprisingly, entrepreneurs are exceedingly optimistic about their own company (Bolger, Pulford, & Colman, 2008; Camerer & Lovallo, 1999). This is akin to the view that entrepreneurs have “rose colored glasses” about their ideas and capabilities (Simon, Houghton, & Aquino, 2000). Alternatively, this effect may, or may not, be due to the tech effect as the tech effect is strongest when decision makers lack familiarity with the technology. Thus, it is reasonable to see investors demonstrate techno-optimism – which is indeed what we see in our data. The implication is that investors need to familiarize themselves more thoroughly in order to achieve more favorable (and rational) negotiation outcomes. This is particularly true as our analyses indicate that the mediation occurs primarily through the investor rather than through the entrepreneur. At the same time, it is important for investors to understand that this irrational optimism toward technology occurs unconsciously, and that efforts should be made to question whether technology prospects are influencing value projections. Studies show (e.g. Thompson, Nadler, & Lount, 2000) that the primary means to overcoming such miscalculations is to make oneself aware of them. Thus, if investors are aware that techno-optimistic evaluations may be occurring, they may be able to become more consciously aware of how they are making valuations

While the data here may heed caution to investors, they offer implications for entrepreneurs that can be leveraged. The success of entrepreneurial startups can be dependent upon the ability to acquire external financing. The findings from our experimental study suggest that technology entrepreneurs can leverage the technology effect to highlight the value of said

technology to the investors they are negotiating with for capital. Conversely, it is just as important for entrepreneurs to understand the unconscious nature of this technology heuristic. If an entrepreneur enters negotiations for startup capital with blinders of overly inflated perception of the value of technology, he or she may underestimate the importance of other planning activities and more objective value criteria. Thus, as others have suggested, cognitive and situational awareness will improve performance for technology entrepreneurs (Cohendet & Pawlak, 2009). While, as our analyses suggests, it may be difficult to overcome these biases, entrepreneurs need to shore up other aspects of their venture (e.g. human capital, financials, market demand, etc.) without relying on technology to be a universal panacea to gain funding. In other words, while technology is a great asset to have, entrepreneurs seeking funding should have shored up other areas of potential weakness within their ventures, so that they do not need to overly rely on technology.

### *5.3 Future Research Opportunities*

According to our analyses, the observed partial mediation suggests the technology effect also influences outcomes directly and/or through still unidentified mediators. Therefore, future research should explore other possible paths through which the technology effect has either direct or indirect influence over entrepreneurs and investors. For example, does the perception of technology impact the willingness of potential entrepreneurs to pursue entrepreneurship? Pursue financing (or even types of financing)? Additionally, perceptions of dependence (e.g. Ganesan, 1994) or culture factors (e.g. Cannon, Doney, Mullen, & Petersen, 2010) are a few other possible potential mediators for future researcher to unpack and explore.

Now that we know that it is possible for the technology effect to surface, knowingly or unknowingly, during negotiations, future work should determine which real-world settings this

does and does not generalize to. While we simulated a negotiation between an entrepreneur and an investor, future research needs to confirm our findings using actual entrepreneurs and investors (versus students playing such roles). Future research could also explore other nuances in the effect of the technology effect in the negotiations between entrepreneurs and venture investors, such as whether this effect is consistent amongst differing investors (e.g. angel investors (Wetzel, 1983) or crowdfunders (Mollick, 2014)) as well as broader contexts both within and beyond entrepreneurship (e.g. Does this effect hold in M&A deals (Das & Kapil, 2012), corporate governance (Daily, Dalton, & Cannella, 2003), etc.?). Furthermore, as technology is a broad area, do certain types of technology (e.g. biomedical, telecommunications, etc.) have differing effects on negotiations? Would differing effects be a function of the investors reviewing the project?

## **6. Conclusion**

We predict and find that there is indeed a significant technology effect in entrepreneur-investor negotiations. Specifically, we test our conjectures using a controlled experimental context simulating negotiations between entrepreneurs and investors. We find that the impact of the technology effect influences not only negotiation success, but also that both parties' perceptions of the venture valuation being negotiated. We further find that these perceptions influence negotiation success, but while seemingly sequentially related, we were surprised to find that they are not strong mediators in the relationship between the technology effect and negotiation success. Our analyses offer some preliminary insights into the manner and magnitude of the impact of the technology effect on negotiations. Consequently, our findings have both practical and theoretical implications for both those engaging in such negotiations and those studying such negotiations.

## References

- Aernoudt, R. (1999). Business angels: Should they fly on their own wings? *Venture Capital: An International Journal of Entrepreneurial Finance*, 1(2), 187–195.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational behavior and human decision processes*, 50(2), 179–211.
- Akerlof, G. A. (1970). The market for “lemons”: Quality uncertainty and the market mechanism. *Quarterly Journal of Economics*, 84(3), 488–500.
- Angerer, M., Niemand, T., Kraus, S., & Thies, F. (2018). Risk-reducing options in crowdinvesting: An experimental study. *Journal of Small Business Strategy*, 28(3), 1–17.
- Anglin, A. H., Short, J. C., Drover, W., Stevenson, R. M., McKenny, A. F., & Allison, T. H. (2018). The power of positivity? The influence of positive psychological capital language on crowdfunding performance. *Journal of Business Venturing*, 33(4), 470–492.
- Artinger, S., Vulkan, N., & Shem-Tov, Y. (2015). Entrepreneurs’ negotiation behavior. *Small Business Economics*, 44(4), 737–757.
- Baker, M., & Gompers, P. A. (2003). The determinants of board structure at the initial public offering. *Journal of Law and Economics*, 46(2), 569–598.
- Balakrishnan, S., & Koza, M. P. (1993). Information asymmetry, adverse selection and joint-ventures: Theory and evidence. *Journal of Economic Behavior and Organizations*, 20(1), 99–117.
- Bandura, A. (1977). Self-efficacy: toward a unifying theory of behavioral change. *Psychological Review*, 84(2), 191.
- Baty, G., & Sommer, B. (2002). True then, true now: A 40-year perspective on the early stage investment market. *Venture Capital: An International Journal of Entrepreneurial Finance*, 4(4), 289–293.
- Beckman, C. M., Burton, M. D., & O’Reilly, C. O. (2007). Early teams: The impact of team demography on VC financing and going public. *Journal of Business Venturing*, 22(2), 147–173.
- Blount, S., Thomas-Hunt, M. C., & Neale, M. A. (1996). The price is right — or is it? A reference point model of two-party price negotiations. *Organizational Behavior and Human Decision Processes*, 68(1), 1–12.
- Bolger, F., Pulford, B. D., & Colman, A. M. (2008). Market entry decisions: effects of absolute and relative confidence. *Experimental Psychology*, 55(2), 113–120.
- Bottom, W. P. (1998). Negotiator risk: Sources of uncertainty and the impact of reference points on negotiated agreements. *Organizational Behavior and Human Decision Processes*, 76(2), 89–112.
- Brown, R., & Lee, N. (2019). Strapped for cash? Funding for UK high growth SMEs since the global financial crisis. *Journal of Business Research*, 99, 37-45.
- Brush, C. G., Greene, P. G., & Hart, M. M. (2001). From initial idea to unique advantage: The entrepreneurial challenge of constructing a resource base. *Academy of Management Executive*, 15(1), 64–78.
- Burgelman, R. A., & Hitt, M. A. (2007). Entrepreneurial actions, innovation, and appropriability. *Strategic Entrepreneurship Journal*, 1(3–4), 349–352.
- Cable, D. M., & Shane, S. (1997). A prisoner's dilemma approach to entrepreneur-venture capitalist relationships. *Academy of Management Review*, 22(1), 142–176.

- Cai, L., Hughes, M., & Yin, M. (2014). The relationship between resource allocation methods and firm performance in Chinese new ventures: The intermediate effect of learning capability. *Journal of Small Business Management*, 52(3), 365–389.
- Camerer, C., & Lovallo, D. (1999). Overconfidence and excess entry: An experimental approach. *American Economic Review*, 89(1), 306–318.
- Cannon, J. P., Doney, P. M., Mullen, M. R., & Petersen, K. J. (2010). Building long-term orientation in buyer-supplier relationships: The moderating role of culture. *Journal of Operations Management*, 28(6), 506–521.
- Caputo, A. (2013). A literature review of cognitive biases in negotiation processes. *International Journal of Conflict Management*, 24(4), 374–398.
- Cardon, M. S., Sudek, R., & Mitteness, C. (2009). The impact of perceived entrepreneurial passion on angel investing. *Frontiers of Entrepreneurship Research*, 29(2), 1–15.
- Carnevale, P. J., & De Dreu, C. K. W. (2005). Laboratory experiments on negotiation and social conflict. *International Negotiation*, 10(1), 51–66.
- Carnevale, P. J., & Isen, A. M. (1986). The influence of positive affect and visual access on the discovery of integrative solutions in bilateral negotiation. *Organizational Behavior and Human Decision Processes*, 37(1), 1-13.
- Cassar, G. (2004). The financing of business start-ups. *Journal of Business Venturing*, 19(2), 261–283.
- Chen, X. P., Yao, X., & Kotha, S. (2009). Entrepreneur passion and preparedness in business plan presentations: A persuasion analysis of venture capitalists' funding decisions. *Academy of Management Journal*, 52(1), 199–214.
- Clark, B. B., Robert, C., & Hampton, S. A. (2016). The technology effect: How perceptions of technology drive excessive optimism. *Journal of Business and Psychology*, 31(1), 87–102.
- Cohendet, P., & Pawlak, E. (2009). Diversity of entrepreneurs and diversity of clusters in nanotechnologies. *International Journal of Technology Management*, 46(3–4), 386–403.
- Colquitt, J. A., Conlon, D. E., Wesson, M. J., Porter, C. O., & Ng, K. Y. (2001). Justice at the millennium: A meta-analytic review of 25 years of organizational justice research. *Journal of Applied Psychology*, 86(3), 425.
- Connelly, B. L., Certo, S. T., Ireland, R. D., & Reutzel, C. R. (2011). Signaling theory: A review and assessment. *Journal of Management*, 37(1), 39–67.
- Cornelissen, G., Pandelaere, M., Warlop, L., & Dewitte, S. (2008). Positive cueing: Promoting sustainable consumer behavior by cueing common environmental behaviors as environmental. *International Journal of Research in Marketing*, 25(1), 46–55.
- Curhan, J. R., Elfenbein, H. A., & Xu, H. (2006). What do people value when they negotiate? Mapping the domain of subjective value in negotiation. *Journal of Personality and Social Psychology*, 91(3), 493-512.
- Daily, C. M., Dalton, D. R., & Cannella, A. A. (2003). Corporate governance: Decades of dialogue and data. *Academy of Management Review*, 28(3), 371–382.
- Davis, P. E., & Peake, W. O. (2014). The influence of political skill and emotional intelligence on student entrepreneurial intentions: An empirical analysis. *Small Business Institute Journal*, 10(2), 19–34.
- Das, A., & Kapil, S. (2012). Explaining M&A performance: A review of empirical research. *Journal of Strategy and Management*, 5(3), 284–330.

- De Clercq, D., Fried, V. H., Lehtonen, O., & Sapienza, H. J. (2006). An entrepreneur's guide to the venture capital galaxy. *Academy of Management Perspectives*, 20(3), 90–112.
- Denis, D. J. (2004). Entrepreneurial finance: An overview of the issues and evidence. *Journal of Corporate Finance*, 10(2), 301–326.
- Desa G., & Basu S. (2013). Optimization or bricolage? Overcoming resource constraints in global social entrepreneurship. *Strategic Entrepreneurship Journal*, 7(1), 26–49.
- Drover, W., Busenitz, L., Matusik, S., Townsend, D., Anglin, A., & Dushnitsky, G. (2017). A review and road map of entrepreneurial equity financing research: Venture capital, corporate venture capital, angel investment, crowdfunding, and accelerators. *Journal of Management*, 43(6), 1820–1853.
- Ebbers J. J., & Wijnberg N. M. (2012). Nascent ventures competing for start-up capital: Matching reputations and investors. *Journal of Business Venturing*, 27(3), 372–384.
- Eckhardt, J. T., Shane, S., & Delmar, F. (2006). Multistage selection and the financing of new ventures. *Management Science*, 52(2), 220–232.
- Elsbach, K., & Stigliani, I. (2019). New information technology and implicit bias. *Academy of Management Perspectives*, 33(2), 185–206.
- Farrukh, C., Phaal, R., & Probert, D. (2003). Technology roadmapping: Linking technology resources into business planning. *International Journal of Technology Management*, 26(1), 2–19.
- Feenberg, A. (1991). *Critical theory of technology*. New York: Oxford University Press.
- Fiet, J. O. (1995). Risk avoidance strategies I venture capital markets. *Journal of Management Studies*, 32(4), 551–574.
- Fiske, S. T., & Taylor, S. E. (1991). *Social cognition*. New York: Random House.
- Fisher, J., Frederickson, J. R., & Peffer, S. A. (2002). The effect of information asymmetry on negotiated budgets: An empirical investigation. *Accounting, Organizations and Society*, 27(1–2), 27–43.
- Fried, V. H., & Hisrich, R. D. (1994). Toward a model of venture capital investment decision making. *Financial Management*, 23(3), 28–37.
- Galbraith, C. S., DeNoble, A. F., & Ehrlich, S. B. (2009). The use and content of formal rating systems in angel group investment initial screening stages. *Journal of Small Business Strategy*, 20(2), 61–79.
- Ganesan, S. (1994). Determinants of long-term orientation in buyer-seller relationships. *Journal of Marketing*, 58(2), 1–19.
- Ganzach, Y. (2000). Judging risk and return of financial assets. *Organizational Behavior and Human Decision Processes*, 83(2), 353–370.
- Gharbi, S., Sahut, J. M., & Teulon, F. (2014). R&D investments and high-tech firms' stock return volatility. *Technological Forecasting & Social Change*, 88, 306–312.
- Golder, P. N., & Tellis, G. J. (1993). Pioneer advantage: Marketing logic or marketing legend? *Journal of Marketing Research*, 30(2), 158–170.
- Gompers, P. A. (1995). Optimal investment, monitoring, and the staging of venture capital. *Journal of Finance*, 50(5), 1461–1489.
- Greenwald, A. G., Poelman, T. A., Ulmann, E. L., & Banaji, M. R. (2009). Understanding and using the implicit association test: III. Meta-analysis of predictive validity. *Journal of Personality and Social Psychology*, 97(1), 17–41.

- Harrison, R. T., Mason, C., & Smith, D. (2015). Heuristics, learning and the business angel investment decision-making process. *Entrepreneurship & Regional Development*, 27(9–10), 527–554.
- Hayibor, S., & Wasieleski, D. M. (2009). Effects of the use of the availability heuristic on ethical decision-making in organizations. *Journal of Business Ethics*, 84(1), 151–165.
- Heuven, J., & Groen, A. (2012). The role of social networks in financing technology-based ventures: An empirical exploration. *Venture Capital: An International Journal of Entrepreneurial Finance*, 14(2–3), 131–149.
- Hoffman, H., & Blakely, J. (1987). You can negotiate with venture capitalists. *Harvard Business Review*, 65(2), 16–24.
- Hossain, T., & Morgan, J. (2006). ... plus shipping and handling: Revenue (non) equivalence in field experiments on ebay. *The B.E. Journal of Economic Analysis & Policy*, 5(2), 1–27.
- Hsu, D. H. (2007). Experienced entrepreneurial founders, organizational capital, and venture capital funding. *Research Policy*, 36(5), 722–741.
- Hsu, D. K., Simmons, S. A., & Wieland, A. M. (2016). Designing entrepreneurship experiments: A review, typology, and research agenda. *Organization Research Methods*, 20(3), 379–412.
- Huber, V. L., & Neale, M. A. (1986). Effects of cognitive heuristics and goals on negotiator performance and subsequent goal setting. *Organizational Behavior and Human Decision Processes*, 38(3), 342–365.
- John, L. K., Acquisti, A., & Loewenstein, G. (2010). Strangers on a plane: Context-dependent willingness to divulge sensitive information. *Journal of Consumer Research*, 37(5), 858–873.
- Jonas, E., Schulz-Hardt, S., Frey, D., & Thelen, N. (2001). Confirmation bias in sequential information search after preliminary decisions: An expansion of dissonance theoretical research on selective exposure to information. *Journal of Personality and Social Psychology*, 80(4), 557.
- Kahneman, D., Slovic, P., & Tversky, A. (1982). *Judgment Under Uncertainty: Heuristics and Biases*. Cambridge, MA: Cambridge Press.
- Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica*, 47(2), 263–291.
- Kaustia, M., & Knüpfer, S. (2008). Do investors overweight personal experience? Evidence from IPO subscriptions. *Journal of Finance*, 63(6), 2679–2702.
- Khanin, D., Baum, J. R., Turel, O., & Mahto, R. V. (2009). Are some venture capitalists more likely than others to replace founder-CEOs. *The Journal of Private Equity*, 12(2), 19–29.
- Khanin, D., & Turel, O. (2012). Short-termism, long-termism, and regulatory focus in venture capitalists' investment decisions. *Venture Capital*, 14(1), 61–76.
- Kliger, D., & Kudryavtsev, A. (2010). The availability heuristic and investors' reaction to company-specific events. *Journal of Behavioral Finance*, 11(1), 50–65.
- Ko, E. J., & McKelvie, A. (2018). Signaling for more money: The roles of founders' human capital and investor prominence in resource acquisition across different stages of firm development. *Journal of Business Venturing*, 33(4), 438–454.
- Kristensen, H., & Gärling, T. (1997). Determinants of buyers' aspiration and reservation price. *Journal of Economic Psychology*, 18(5), 487–503.
- Kumar, S., & Goyal, N. (2016). Evidence on rationality and behavioural biases in investment decision making. *Qualitative Research in Financial Markets*, 8(4), 270–287.

- Lagazio, C., & Querci, F. (2018). Exploring the multi-sided nature of crowdfunding campaign success. *Journal of Business Research*, *90*, 318–324.
- Lahti, T. (2011). Angel investing: An examination of the evolution of the Finnish market. *Venture Capital: An International Journal of Entrepreneurial Finance*, *13*(2), 147–173.
- Lerner, J. (1995). Venture capitalists and the oversight of private firms. *Journal of Finance*, *50*(1), 301–318.
- Lerner, J. (1998). “Angel” financing and public policy: An overview. *Journal of Banking & Finance*, *22*(6–8), 773–783.
- Linton, J., & Walsh, S. (2013). The effect of technology on learning during the acquisition and development of competencies in technology-intensive small firms. *International Journal of Entrepreneurial Behavior & Research*, *19*(2), 165–186.
- Lockett, A., Murray, G., & Wright, M. (2002). Do UK venture capitalists still have a bias against investment in new technology ventures. *Research Policy*, *31*(6), 1009–1030.
- Lowe, R. A., & Ziedonis, A. A. (2006). Overoptimism and the performance of entrepreneurial firms. *Management Science*, *52*(2), 173–186.
- MacMillan, I. C., Seigel, R., & Narasimha, P. N. S. (1985). Criteria used by venture capitalists to evaluate new venture proposals. *Journal of Business Venturing*, *1*(1), 119–128.
- MacMillan, I. C., Zemann, L., & Narasimha, P. N. S. (1987). Criteria distinguishing successful from unsuccessful venture in the venture screening process. *Journal of Business Venturing*, *2*(2), 123–137.
- Maddux, W. W., Mullen, E., & Galinsky, A. D. (2008). Chamelions back bigger pies and take bigger pieces: Strategic behavioral mimicry facilitates negotiation outcomes. *Journal of Experimental Social Psychology*, *44*(2), 461–468.
- Mahto, R. V., Ahluwalia, S., & Walsh, S. T. (2018). The diminishing effect of VC reputation: Is it hypercompetition? *Technological Forecasting & Social Change*, *133*, 229–237.
- Mason, C. M., & Harrison, R. T. (2002). Is it worth it? The rates of return from informal venture capital investments. *Journal of Business Venturing*, *17*(3), 211–236.
- Mason, C. M., & Harrison, R. T. (2004). Does investing in technology-based firms involve higher risk? An exploratory study of the performance of technology and non-technology investments by business angels. *Venture Capital: An International Journal of Entrepreneurial Finance*, *6*(4), 313–332.
- Mata, J. (1994). Firm growth during infancy. *Small Business Economics*, *6*(1), 29–39.
- Mazei, J., Hüffmeier, J., Freund, P. A., Stuhlmacher, A. F., Bilke, L., & Hertel, G. (2015). A meta-analysis on gender differences in negotiation outcomes and their moderators. *Psychological Bulletin*, *141*(1), 85–104.
- McGrath, R. G. (1999). Falling forward: Real options reasoning and entrepreneurial failure. *Academy of Management Review*, *24*(1), 13–30.
- Mittens, C., Sudek, R., & Cardon, M. S. (2012). Angel investor characteristics that determine whether perceived passion leads to higher evaluations of funding potential. *Journal of Business Venturing*, *27*(5), 592–606.
- Mollick, E. (2014). The dynamics of crowdfunding: An exploratory study. *Journal of Business Venturing*, *29*(1), 1–16.
- MoneyTree Report. (2018). Q4 2017. [https://www.pwc.com/us/en/moneytree-report/assets/MoneyTree\\_Report\\_Q4\\_2017\\_FINAL\\_1\\_10\\_18.pdf](https://www.pwc.com/us/en/moneytree-report/assets/MoneyTree_Report_Q4_2017_FINAL_1_10_18.pdf). Accessed 2/23/2018.
- Mordini, E. (2007). Technology and fear: Is wonder the key? *Trends in Biotechnology*, *25*(12), 544–546.



- Morrisette, S. G. (2007). A profile of angel investors. *The Journal of Private Equity*, 10(3), 52–66.
- Moynihan, D. P., & Lavertu, S. (2012). Cognitive biases in governing: Technology preferences in election administration. *Public Administration Review*, 72(1), 68–77.
- Nagy, R. A., & Obenberger, R. W. (1994). Factors influencing individual investor behavior. *Financial Analysts Journal*, 50(4), 63–68.
- Payne, G. T., Davis, J. L., Moore, C. B., & Bell, R. G. (2009). The deal structuring stage of the venture capitalist decision-making process: Exploring confidence and control. *Journal of Small Business Management*, 47(2), 154–179.
- Pirinsky, C., & Wang, Q. (2006). Does corporate headquarters location matter for stock returns? *Journal of Finance*, 61(4), 1991–2015.
- Poteshman, A. M., & Serbin, V. (2003). Clearly irrational financial market behavior: Evidence from the early exercise of exchange traded stock options. *Journal of Finance*, 58(1), 37–70.
- Pruitt, D. G. (1991). Strategy in negotiation. *International Negotiation: Analysis, Approaches, Issues*, 78–89.
- Pruitt, D. G., & Lewis, S. A. (1975). Development of integrative solutions in bilateral negotiation. *Journal of Personality and Social Psychology*, 31(4), 621.
- Rackman, N. (1999). The behavior of successful negotiators. *Negotiation: Readings, Exercises, and Cases*. Burr Ridge, Illinois: Irwin.
- Rai, D., & Lin, C. W. W. (2019). The influence of implicit self-theories on consumer financial decision making. *Journal of Business Research*, 95, 316–325.
- Robinson, R. B. (1987). Emerging strategies in the venture capital industry. *Journal of Business Venturing*, 2(1), 53–77.
- Saade, S. (2015). Investor sentiment and the underperformance of technology firms initial public offerings. *Research in International Business and Finance*, 34, 205–232.
- Sapienza, H. J., & Korsgaard, M. A. (1996). Procedural justice in entrepreneur-investor relations. *Academy of Management Journal*, 39(3), 544–574.
- Scholes, M. L., Wright, M., Westhead, P., Burrows, A., & Bruining, H. (2007). Information sharing, price negotiation and management buy-outs of private family-owned firms. *Small Business Economics*, 29(3), 329–349.
- Schwienbacher, A. (2007). A theoretical analysis of optimal financing strategies for different types of capital-constrained entrepreneurs. *Journal of Business Venturing*, 22(6), 753–781.
- Shane, S., & Cable, D. (2002). Network ties, reputation, and the financing of new ventures. *Management Science*, 48(3), 364–381.
- Shane, S., & Stuart, T. (2002). Organizational endowments and the performance of university startups. *Management Science*, 48(1), 154–170.
- Shepherd, D. A., Williams, T. A., & Patzelt, H. (2015). Thinking about entrepreneurial decision making: Review and research agenda. *Journal of Management*, 41(1), 11–46.
- Simon, M., Houghton, S. M., & Aquino, K. (2000). Cognitive biases, risk perception, and venture formation: How individuals decide to start companies. *Journal of Business Venturing*, 15(2), 113–134.
- Sohl, J. E. (2003). The U. S. angel and venture capital market: Recent trends and developments. *Journal of Private Equity*, 6(2), 7–17.

- Sohl, J. E. (2018). The angel market in 2017: Angels remain bullish for seed and start-up investing. *Center for Venture Research*.
- Sorenson O., & Stuart T. E. (2001). Syndication networks and the spatial distribution of venture capital investments. *American Journal of Sociology*, 106(6), 1546–1588.
- Spence, M. (1973). Job market signaling, *Quarterly Journal of Economics*, 87(3), 355–374.
- Stroe, S., Parida, V., & Wincent, J. (2018). Effectuation or causation: An fsQCA analysis of entrepreneurial passion, risk perception, and self-efficacy. *Journal of Business Research*, 89, 265-272.
- Sullivan, D. M., & Ford, C. M. (2014). How entrepreneurs use networks to address changing resource requirements during early venture development. *Entrepreneurship Theory & Practice*, 38(3), 551–574.
- Statista, (2018). Crowdfunding – United States. <https://www.statista.com/outlook/335/109/crowdfunding/united-states>. Accessed 8/16/2018.
- Stuhlmacher, A. F., & Walters, A. E. (1999). Gender differences in negotiation outcome: A meta-analysis. *Personnel Psychology*, 52(3), 653–677.
- Thompson, L., Nadler, J., & Lount Jr, R. B. (2000). Judgmental biases in conflict resolution and how to overcome them. *The handbook of conflict resolution: Theory and practice*, 213-235.
- Tichy, G. (2004). The over-optimism among experts in assessment and foresight. *Technological Forecasting & Social Change*, 71(4), 341–363.
- Tversky, A., & Kahneman, D. (1973). Availability: A heuristic for judging frequency and probability. *Cognitive Psychology*, 5(2), 207–232.
- Tyebjee, T. T., & Bruno, A. V. (1984). A model of venture capitalist investment activity. *Management Science*, 30(9), 1051–1066.
- Ucbasaran, D., Shepherd, D. A., Lockett, A., & Lyon, S. J. (2013). Life after business failure: The process and consequences of business failure for entrepreneurs. *Journal of Management*, 39(1), 163–202.
- Ueda, M. (2004). Banks versus venture capital: Project evaluation, screening, and expropriation. *Journal of Finance*, 59(2), 601–621.
- Van Osnabrugge, M. (1998). Do serial and non-serial investors behave differently?: An empirical and theoretical analysis. *Entrepreneurship Theory & Practice*, 22(4), 23–42.
- Vismara, S. (2016). Equity retention and social network theory in equity crowdfunding. *Small Business Economics*, 46(4), 579–590.
- Wang, T., Qureshi, I., Deeds, D., & Ren, Y. (2019). How do technology ventures signal IPO quality? A configurational approach. *Journal of Business Research*, 99, 105–114.
- Weingart, L. R., Thompson, L. L., Bazerman, M. H., & Carroll, J. S. (1990). Tactical behavior and negotiation outcomes. *International Journal of Conflict Management*, 1(1), 7–31.
- Wetzel, W. E. (1983). Angels and informal risk. *Sloan Management Review*, 24(4), 23–34.
- White, J. B., Tynan, R., Galinsky, A. D., & Thompson, L. (2004). Face threat sensitivity in negotiation: Roadblock to agreement and joint gain. *Organizational Behavior and Human Decision Processes*, 94(2), 102-124.
- White, S. B., & Neale, M. A. (1984). The role of negotiator aspirations and settlement expectancies on bargaining outcomes. *Organizational Behavior and Human Decision Processes*, 57(2), 303–317.
- Wu, L. Y. (2007). Entrepreneurial resources, dynamic capabilities and start-up performance of Taiwan's high-tech firms. *Journal of Business Research*, 60(5), 549–555.

- Zacharakis, A. L., & Shepherd, D. A. (2001). The nature of information and overconfidence on venture capitalists' decision making. *Journal of Business Venturing*, 16(4), 311–332.
- Zider, B. (1998). How venture capital works. *Harvard Business Review*, 76(6), 131–139.

## TABLES AND FIGURES

**Table 1** Descriptive Statistics and Correlations

Variables	Mean	SD	1	2	3	4	5	6	7
1 Technology	0.53	0.50							
2 Gender of Ent	0.56	0.50	-0.04						
3 Gender of VC	0.53	0.50	-0.21	0.28					
4 Graduate Student	0.20	0.40	0.13	-0.14	-0.11				
5 Value Perception of Ent	6.23	0.99	0.42	0.03	-0.06	0.12			
6 Value Perception of VC	5.28	1.03	0.29	-0.04	-0.10	-0.14	0.24		
7 Negotiation Skill of Ent	5.24	1.35	0.17	0.13	0.01	0.02	0.16	0.05	
8 Negotiation Skill of VC	5.37	1.23	-0.20	-0.04	0.15	-0.07	-0.15	-0.01	-0.10

Note: Technology = 1 for high-tech condition and 0 for low-tech; Gender = 1 for male and 0 for female; Correlations of 0.20 or greater are significant at  $p < .05$

**Table 2** Negotiated Outcomes (of the Entrepreneur) Regressions (H1, H3, and H4)

Variables	Controls		H1		H3		H4
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	
Technology		1103.99 *** (259.93)					907.21 ** (284.56)
Gender of Ent	-135.38 (284.20)	-134.23 (262.11)	-152.18 (280.02)	-99.39 (271.79)	-114.00 (271.14)		-112.52 (258.94)
Gender of VC	-171.65 (281.99)	23.96 (264.12)	-153.11 (277.88)	-80.33 (270.96)	-78.25 (270.07)		51.65 (261.12)
Graduate Student	71.26 (334.95)	-68.48 (310.66)	-5.02 (332.08)	232.68 (324.01)	166.57 (327.06)		54.60 (314.31)
Value Perception of Ent			273.55 * (136.73)		175.05 (136.93)		31.14 (138.34)
Value Perception of VC				403.15 ** (126.00)	359.93 ** (130.06)		266.84 * (127.59)
Negotiation Skill of Ent	315.68 ** (100.55)	251.83 ** (93.94)	286.38 ** (100.10)	297.54 ** (96.24)	280.74 ** (96.82)		247.87 ** (93.04)
Negotiation Skill of VC	-411.93 *** (111.14)	-346.25 ** (103.66)	-384.81 *** (110.30)	-413.28 *** (106.20)	-395.78 *** (106.73)		-355.77 *** (102.70)
Constant	10353.66 *** (847.82)	9669.65 *** (798.34)	8671.77 *** (1184.91)	8224.82 *** (1048.34)	7376.71 *** (1237.70)		8191.05 *** (1209.29)
<i>N</i>	103	103	103	103	103		103
<i>R</i> <sup>2</sup>	0.22	0.35	0.26	0.30	0.31		0.38

Note: Technology = 1 for high-tech condition and 0 for low-tech; Gender = 1 for male and 0 for female; Standard errors in parentheses;

† $p < .1$

\* $p < .05$

\*\* $p < .01$

\*\*\* $p < .001$

**Table 3** Value Perception Regressions (H2)

Variables	Controls: Ent	H2: Ent	Controls: VC	H2: VC
	Model 7	Model 8	Model 9	Model 10
Technology		0.77 *** (0.19)		0.65 ** (0.21)
Gender of Ent	0.06 (0.21)	0.06 (0.19)	-0.09 (0.22)	-0.09 (0.21)
Gender of VC	-0.07 (0.21)	0.07 (0.19)	-0.23 (0.22)	-0.11 (0.21)
Graduate Student	0.28 (0.24)	0.18 (0.23)	-0.40 (0.26)	-0.48 † (0.25)
Negotiation Skill of Ent	0.11 (0.07)	0.06 (0.07)	0.04 (0.08)	0.01 (0.08)
Negotiation Skill of VC	-0.10 (0.08)	-0.05 (0.08)	0.00 (0.09)	0.04 (0.08)
Constant	6.15 *** (0.62)	5.67 *** (0.59)	5.28 *** (0.65)	4.88 *** (0.64)
<i>N</i>	103	103	103	103
<i>R</i> <sup>2</sup>	0.06	0.35	0.04	0.13

Note: Technology = 1 for high-tech condition and 0 for low-tech; Gender = 1 for male and 0 for female;  
Standard errors in parentheses

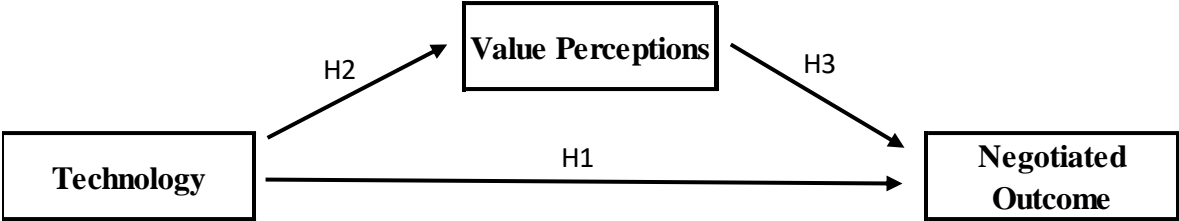
†*p* < .1

\**p* < .05

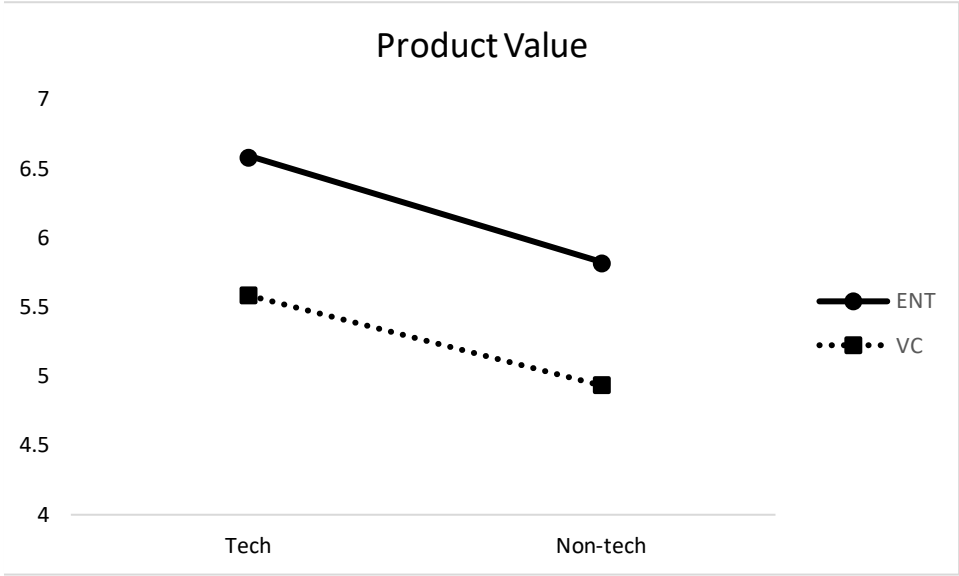
\*\**p* < .01

\*\*\**p* < .001

**Fig. 1** Partial Mediation Model of Technology's Impact on Venture Finance Negotiations



**Fig. 2** Perceptions of Product Value for Entrepreneurs and VCs



## APPENDIX A

MedTech, Inc.

### Background

You are an entrepreneur who recently founded MedTech, Inc., a U.S.-based medical technology company that specializes in medical devices. After receiving your MBA, you started working on a prototype of a new nanorobot that will improve numerous medical procedures and treatments. You are in the final stages of creating the prototype and are now ready to start producing it for commercial use. You have pitched the idea to medical doctors and believe there will be enough demand for the product to justify mass-production. In order to begin production, you require significant outside capital.

You have scheduled to meet with an associate at Divvy Out Capital, to negotiate for the seed money to get you started. To prepare for your meeting, you have done some market analysis to produce the following estimates:

You estimate revenues the first 5 years to be:

Year 1 =	- \$100,000
Year 2 =	\$100,000
Year 3 =	\$250,000
Year 4 =	\$1,000,000
Year 5 =	\$2,000,000

You have learned that negotiating over multiple issues is the best way to achieve a favorable outcome. Thus, you have determined that the following matters should be considered:

1. Amount of Capital
2. Percentage of Ownership Retained
3. Amount of Control you will have on decision making (i.e. how “hands-off” the VC will be)

### Negotiation

You will notice that issues differ in point values. You have determined that most important to you is getting the necessary capital, since you are confident that once up and running, the product will be successful. You are not as concerned about the ownership you retain or the control over decision making, but achieving a favorable outcome is still important. You want to achieve the best outcome you can, but realize you are dependent upon this outside capital in order to pursue

this venture. Therefore, you are motivated to reach an agreement with this venture capital company.

Confidential Success Table for **MedTech, Inc.**

<u>Issue</u>	<u>Terms in Contract</u>	<u>Points</u>
Amount of Capital	\$1,500,000	6000
	\$1,250,000	5000
	\$1,000,000	4000
	\$750,000	2000
	\$500,000	1000
Ownership Retained (MedTech)	80%	4000
	60%	3500
	50%	2500
	40%	2000
	35%	1500
Amount of Control	MedTech, Inc.	
	5	4000
	4	3000
	3	2500
	2	2000
	1	1500
	Divvy Out Capital	



## Divvy Out Capital

### Background

You are an associate at Divvy Out Capital, a venture capital firm who invests in new ventures. You are meeting with the founder of MedTech, Inc., a technology company that specializes in medical devices. You know that the founder, who recently completed an MBA, is in the final stages of creating the prototype of a new nanorobot that will improve numerous medical procedures and treatments, and is ready to start producing it on a larger scale.

You have scheduled to meet with the founder of MedTech, to decide whether Divvy Out will provide venture capital. In preparation of the meeting, MedTech offered the following performance estimates, which seem realistic.

Estimated revenues for MedTech for the first 5 years:

Year 1 =	- \$100,000
Year 2 =	\$100,000
Year 3 =	\$250,000
Year 4 =	\$1,000,000
Year 5 =	\$2,000,000

You know that in addition to determining whether and how much capital to invest, that you will also be determining matters of ownership and decision making control.

Issues to consider

1. Amount of Capital
2. Percentage of Ownership Retained by MedTech
3. Amount of Control you will have on decision making (i.e. how “hands-on” Divvy Out will be)

### Negotiation

You will notice that issues differ in point values. You have determined that the most important issues to you are the amount of capital you will agree to pay and the amount of ownership you will secure. You are less concerned about control over decision making, but realize it is wise if you have some oversight of those processes. You want to achieve the best outcome you can, but realize there is tremendous potential upside in this venture. Therefore, you are motivated to reach an agreement with MedTech.

**Confidential Success Table for Divvy Out Capital**

<b><u>Issue</u></b>	<b><u>Terms in Contract</u></b>	<b><u>Points</u></b>
Amount of Capital	\$1,500,000	1000
	\$1,250,000	2000
	\$1,000,000	4000
	\$750,000	5000
	\$500,000	6000
Ownership Retained (MedTech, Inc.)	80%	1000
	60%	2000
	50%	3500
	40%	4000
	35%	5000
Amount of Control	MedTech, Inc.	
	5	1500
	4	2000
	3	2500
	2	3000
	1	4000
	Divvy Out Capital	