TRAINING ASPIRING ENTREPENEURS TO PITCH EXPERIENCED INVESTORS: EVIDENCE FROM A FIELD EXPERIMENT *

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Abstract

We develop an explanation of how training aspiring entrepreneurs in the "best practice" of pitching affects their odds of continuing funding discussions with accredited investors. We model accredited investors' decision to continue investigation of new ventures as a function of their prior beliefs about new ventures and the information contained in the entrepreneurs' pitches. We derive five hypotheses from the model, which we test through a field experiment that randomly assigns pitch training at four elevator pitch competition. The data support all five hypotheses, and are inconsistent with alternative explanations for how training aspiring entrepreneurs to pitch increases their probability of continued funding interaction with investors.

1.0 INTRODUCTION

Why are some entrepreneurs more successful than others at obtaining financing from external investors? The answer to this question is of great importance for researchers seeking to understand the operation of venture finance markets, for entrepreneurs seeking to raise capital for new companies, and for investors seeking to finance them.

Venture capitalists and business angels together provide more than $50 billion in funding to more than 75,000 U.S. businesses every year. However, hundreds of thousands more entrepreneurs seek hundreds of billions of dollars in capital annually without success (Lerner et al, 2012). Explaining the determinants of funding success is an important task for economists.

Many factors undoubtedly affect the probability that an entrepreneur obtains financing for a new venture. One important, but under investigated, factor is the entrepreneur's "pitch" to investors. Pitches—or short presentations about new businesses—play a role in almost all efforts to raise money, and, in many cases, are an entry point with investors (Clark, 2008). Moreover, the role of the pitch appears to be growing as the venture finance market changes. Pitches matter more for companies that enter business accelerators that seek money through equity crowdfunding portals, and that raise money from angel groups than those that pursue venture capital. Business accelerators, crowdfunding portals, and angel groups are all institutions are growing in importance in the venture finance market.

Successful pitching is not a sufficient condition for obtaining capital, but it is a necessary one. Given its importance, the process of pitching investors has become an important component of entrepreneurship education. A robust practitioner literature discusses the "best practice" of pitching, i.e. the way that practitioners collectively believe pitching should occur (Coughter 2012; Getty, 2014; Klaff, 2011; McGowen, 2015; and Soorjoo, 2012), and pitching is taught in entrepreneurship classes from the high school through the MBA level.

Given the importance of pitching to venture finance, and to entrepreneurship education, one might think that academic research would have identified the key dimensions of effective pitching and provided insight into how best to teach those things. However, that appears not to be the case for at least three reasons.

First, researchers lack knowledge of the true causal effects of the factors that affect pitch performance. Although numerous publications discuss "best practice" for both the content and style of pitches (e.g., Mason and Harrison 2003, Grégoire et al 2008, Chen et al 2009, Maxwell et al 2011, Nagy et al 2012, Brooks et al 2014, Parhankangas and Ehrlich 2014; Coughter 2012, McGowan 2014; Clark, 2008; Martins, Jennings and Jennings, 2007), virtually no studies have explored the question using experimental research designs, which can address causality. Most of our knowledge of pitching comes from anecdotal studies of practitioners or observational research designs (e.g., Mason and Harrison 2003, Grégoire et al 2008, Chen et al 2009, Maxwell et al 2011, Nagy et al 2012, Parhankangas and Ehrlich 2014; Coughter 2012, McGowan 2014; Clark, 2008). The factors that these studies have found to be associated with pitch performance might be artifacts of the approach used to research them rather than true causal factors.

Second, the practitioner literature is making incorrect assumptions about the effect of pitch training. The practitioner literature generally argues that pitch training is welfare-enhancing to the entrepreneur because it improves the underlying quality of venture ideas themselves, thereby increasing the odds that the venture will receive funding (Mason and Harrison 2003, Grégoire et al 2008, Chen et al 2009, Maxwell et al 2011, Nagy et al 2012, Parhankangas and Ehrlich 2014; Coughter 2012, McGowan 2014; Clark, 2008).

However, the assumption that pitch training improves the quality of new ventures is unlikely to be accurate. Pitch training focuses on the delivery of information about the venture idea, not efforts to develop the idea itself.

An alternative view is that pitch training helps entrepreneurs to convey that underlying quality more accurately, leaving the underlying quality of venture ideas unchanged. Pitch training allows investors to more efficiently distinguish between good and bad ideas. It is therefore welfare-enhancing to investors and entrepreneurs with high quality venture ideas, but, at least in the short run, not to entrepreneurs with low quality venture ideas.

Third, prior research on pitching does not consider how an important investor characteristic—experience—influences the effectiveness of efforts to pitch them. The practitioner literature (e.g., Rose, 2014) has long noted that experienced and inexperienced[3] early stage investors behave very differently, colloquially referred to as "smart" and "dumb" money. If the value of pitch training is to help investors to more efficiently distinguish between high and low quality venture ideas, then training entrepreneurs on "best practice" pitching may be more valuable to experienced investors ("smart money") than to inexperienced ones ("dumb money"), and more valuable to entrepreneurs with high quality ideas than those with low quality ones.

In this paper, we provide and test a model of how training "best practice" in pitching affects the performance of entrepreneurs at pitching investors. As will be shown in more detail below, our model begins with the assumption that pitch training is valuable because it makes entrepreneurs better at conveying information about their ventures, not because it alters their underlying quality. Our model recognizes that investor experience influences the effectiveness of "best practice" in pitching because inexperienced investors depend more on public information in forming their prior expectations ("priors") about ventures, and that information is biased towards more successful ventures.

We test these predictions with a field experiment in which we randomly assigned participants in four elevator pitch competitions to either an elevator pitch training treatment or a null treatment. Our results show that pitch training affects pitch performance in ways consistent with our model, but are inconsistent with alternative explanations. Our findings have normative implications for how to train aspiring entrepreneurs to pitch experience investors successfully.

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[3] We will describe how we measure experienced and inexperienced investors in the methodology section of the paper. However, our conceptual definition is as follows: Experienced investors are ones that make enough early stage investments to have private information about the distribution of quality of early stage companies, while inexperienced investors are ones that do not make enough early stage investments to have private information about the distribution of quality of early stage investments.

2.0 THEORY

The venture investor’s decision process has been likened to finding a needle in a haystack. Early stage investment provides the possibility of receiving enormous profits from successful choices (Huang and Pearce, 2015), but even after winnowing out the vast majority of opportunities presented to them, 90 percent of the companies that investors actually fund result in complete losses of their capital (Rose, 2014). Therefore, in making their decisions, investors seek to balance the opportunity to make enormous profits from backing a “homerun” with the likelihood that any given venture they fund will do little more than lose their capital (Huang and Pearce, 2015).

This problem is far from trivial. Investors will back a handful of the ventures that are initially pitched to them, and will do so only after considerable time spent investigating those investment opportunities. At the same time, the practitioner literature is rife with examples of investors who saw pitches for companies like Facebook, Google, and Apple Computer, but chose to pass on further investigation.

Because only a tiny fraction of new venture ideas result in funded businesses with successful exits, the process of gaining financing from investors typically takes the form of a funnel (Rose, 2014). Investors evaluate ventures at a series of stages, allowing a larger number of entrepreneurs to initially make brief presentations to them, but seeking subsequent meetings to gather additional information from only a small fraction of them (Carpentier and Suret, 2015). At each stage of the investigation process, ventures are sorted into those deserving more evaluation and for which the investor will devote an increasing amount of time to investigate, and those that are winnowed out (Clark, 2008).

At the very beginning of the process, a given venture has very low odds of continuing discussions with an investor, let alone receiving financing. These low initial odds mean that investors limit the amount of time they will spend hearing about the venture idea. Typically, an investor will listen only to a very short pitch (or read a very short description of the venture) before making a first decision about whether to continue or terminate investigation. If the initial reaction is negative, the entrepreneur will have lost his or her opportunity to raise money with that investor.

We focus our attention on this very first stage of entrepreneurs' fund raising efforts, colloquially called "the elevator pitch." This is a short (less than two minute) oral introduction to a venture and entrepreneur (Getty, 2005).

Because the elevator pitch must be very short, it rarely provides a complete account of a venture idea. Investors rarely choose to invest in a new business solely on the basis of this pitch. The purpose of an elevator pitch is to motivate investors to continue the discussion in a more substantial way, such as through a further meeting or through the investor's review of a business plan or "pitch deck" (Clark, 2008). After listening to an elevator pitch, investors make a decision to either seek more information about the venture or cease consideration of the idea.[4]

When deciding whether to proceed further or abandon consideration, investors always have limited information on the entrepreneur and venture (Kaplan and Stromberg, 2001). Entrepreneurs decide what information to include or not include in these presentations to investors (Huang and Pearce, 2015). After listening to an elevator pitch, investor knowledge is generally limited to what the entrepreneurs have told them and what they know of other ventures they have evaluated in the past. The decision to progress or not is generally made without the investor conducting independent research (Clark, 2008).

2.1 The Investor's Elevator Pitch Decision

Suppose that we can characterize each new venture idea along a single latent dimension of quality q. The higher the latent quality of an idea, the greater chance it has of succeeding as a real business.

When listening to an elevator pitch, an investor is trying to figure out where the venture idea falls on the quality distribution of all venture ideas, from an extremely competent company founder with a great idea to an incompetent founder with a terrible idea. The investigation of new ventures by investors is thus an attempt to estimate q.

[4] We use the term "idea" here to refer to the entrepreneur-business concept combination. Because investors must consider the package of the team and the business concept together (they cannot pick one team and another concept), we treat them as a singular unit in our study and refer to the combination using the term "idea".

Latent quality has a skewed distribution, as suggested by Figure 1 (Rose, 2014; Shepherd, Williams and Paltzet, 2014; Huang and Pierce, 2015; Kirsch et al, 2009). A few ventures are very good, with quality far above the median, and thus worth further examination. Most new venture ideas are of poor quality and not worthy of additional investigation. [5]

2.2 Experience and the Investor's Prior Beliefs

All investors seek to finance ventures that fall at the top end of the quality distribution of new ventures. And all investors assess where the quality of a prospective portfolio company falls on the distribution of all new ventures.

Because the decision to continue or terminate discussions with an entrepreneur upon hearing an elevator pitch is undertaken without the opportunity conduct independent research, investors explicitly or implicitly evaluate the focal venture in comparison to their prior beliefs about the distribution of new venture quality. Thus, how investors respond to an elevator pitch depends in part on their prior beliefs about the average quality of new ventures. This difference becomes important in understanding the differences in how experienced an inexperienced entrepreneurs evaluate pitches (Mittenes et al, 2012).

Each new venture that an investor considers represents a draw from the quality distribution. Suppose that ventures whose latent quality is above the threshold τ in Figure 1 are the ones that are both funded and become widely known. Only a small fraction of new venture ideas, the ones with the highest expected latent quality, will get funded. An even smaller fraction of those initial ideas, a small fraction of those that get funded, will be successful enough that information about them will become widely known through the business press, through information providers on the Internet, or through social networks.

Publicly available information is dominated by ventures that have been funded and/or have had successful exits. Evaluations of venture capitalist and angel decision making reveals that those investors

[5] While the distribution of the quality of new venture ideas is difficult to observe, support for assuming it has a fat right tail comes from the size distribution of operating firms, which follows the Pareto distribution in the right tail (Axtell 2001; Luttmer 2007; Gabaix and Landier 2008). Also, information on outcome of venture capital and angel investments suggests this distribution (Rose, 2014; Huang and Pierce, 2015; Kirsch et al, 2009).

tend to invest in less than five percent of the deals that they see (Rose, 2014; Kirsch et al, 2009). Higher quality ventures are more likely to be financed and succeed, and such successful ventures are far more likely to be covered in the business media. As a result, the quality of the typical venture for which information is publicly available information is far above the median of all those ventures that seek funding.

An inexperienced investor has been exposed to relatively few poor or good ideas. Because the inexperienced investor has been exposed to few venture ideas, either good or bad, he or she formulates priors from publicly available information. This patterns implies that the knowledge that inexperienced investors have of new venture ideas, which comes through the information they acquire through means other than their personal experience of investigating new ventures, will be based primarily on ideas drawn from the far right tail of the distribution.

As the investor gains experience by hearing pitches and conducting investigations of many new ventures, his or her prior belief about the quality of a random draw from the distribution of new ventures will approach the expected value E(q). While gaining experience, the investor also learns supporting information, such as the facts that only a very small percentage of ventures seeking early stage equity investment are of high enough quality to succeed in obtaining that capital (McKaskell, 2008); and that only a small minority of new businesses in which they invest will even return the capital invested in them (Kirsch et al, 2009).

Let us suppose that inexperienced investors begin their work as investors with prior beliefs about the quality of new business ideas based on their exposure to these highest quality ideas. Their initial prior about a random draw from the distribution of new venture quality is thus more likely than that of experienced investors to be $E(q|q > \tau)$. As investors gain experience by investigating ideas that are drawn from the full distribution, they will adjust their prior beliefs about the expected quality of a venture down toward $E(q)$. We can therefore expect experienced investors to have more negative prior beliefs about the average quality of unknown ventures than less experienced investors.

2.3 Prior Beliefs, Information, and the Evaluation of Pitches

We will now develop a model of about how pitch training will affect investor interest through the mechanism of increasing the information content of a pitch. We begin by considering a single investor j who listens to a pitch by entrepreneur i. Let q_i denote the natural log of the quality of entrepreneur i's idea. The investor relies on the pitch to make an inference about q_i, which cannot be directly observed. The pitch sends a noisy signal whose precision depends on the quantity of information contained in the pitch.

Let the natural log of the pitch signal be s_i and the information contained in the pitch be e_i. Both s_i and e_i are observed by the investor. Let $h(s_i, e_i)$ be the investor's interest in further investigating entrepreneur i's venture after observing the pitch. This interest is based on the investor's belief about the quality of the idea after hearing the pitch. We therefore let $h(s_i, e_i)$ by a simple multiple λ of the investor's posterior expectation about q_i.

$$h(s_i, e_i) = \lambda E(q_i | s_i, e_i) \tag{1}$$

Next, we assume that s_i is normally distributed with a mean of true quality q_i and precision $p(e_i)$ and that $q_i \perp e_i$. We assume that information increases the precision of the pitch signal, so that $p'(e_i) > 0$. This is a critical assumption for the model.

$$s_i \sim N\left(q_i, \frac{1}{p(e_i)}\right)$$

The more information is contained in the pitch, the more reliable a measure it is of underlying pitch quality and the more precise the signal sent by the pitch. However, information does not affect the quality of the underlying idea.

The investor combines the pitch signal s_i with his or her prior beliefs about pitch quality. We assume the investor believes the natural logarithm of new venture quality q_i is normally distributed with mean μ and precision π.

$$q_i \sim N\left(\mu, \frac{1}{\pi}\right)$$

We can find the posterior distribution of q_i given the pitch signal s_i and information e_i by applying Bayes Rule.

$$q_i | s_i, e_i \sim N\left(\frac{\pi}{\pi + p(e_i)}\mu + \frac{p(e_i)}{\pi + p(e_i)}s_i, \frac{1}{\pi + p(e_i)}\right)$$

We can use the posterior mean to rewrite equation 1 as

$$h(s_i, e_i) = \lambda\left(\frac{\pi}{\pi + p(e_i)}\mu + \frac{p(e_i)}{\pi + p(e_i)}s_i\right). \tag{2}$$

The investor's interest is thus a multiple of the precision-weighted average of the prior mean μ and the signal s_i, where the precision of the signal is increasing in the information contained in the pitch e_i. The more information in the signal, the more the investor will rely on the signal relative to his or her prior beliefs.

The key comparative static from this model is the effect of the level of information in the pitch on investor interest $h(s_i, e_i)$. Since training increases information, this comparative static also shows us the effect of training.

$$\frac{\partial h}{\partial e_i} = \frac{\lambda \pi p'(e_i)}{\left(\pi + p(e_i)\right)^2}(s_i - \mu) \tag{3}$$

The fractional term is positive. This means the sign of the effect of additional information on investor interest depends on whether the signal s_i is greater or less than the prior mean μ. Figure 2 illustrates this result. More information increases the degree to which the investor relies on the signal from the pitch relative to the prior mean. When the pitch signal is below the prior mean, or $s_i < \mu$, increasing the information content of the pitch reduces investor interest. When $s_i > \mu$, increasing information increases investor interest.

In contrast, an improvement in the pitch signal s_i always has a positive effect on investor interest.

$$\frac{\partial h}{\partial s_i} = \frac{\lambda p(e_i)}{\pi + p(e_i)} \tag{4}$$

From this equation we can also see that the pitch signal effect on investor interest depends on the precision of the signal relative to the prior. The more precise the pitch signal, the more a given increase in the signal affects investor interest.

This model suggests a set of hypotheses about how pitch training will affect investor interest in our experiment by increasing the information contained in pitches. Since investors express their interest in the experiment through the scores they give to participants about their interest in continued investigation of the ventures, our hypotheses will refer to scores. Our first hypothesis is that the assumption that pitch training increases the information in pitches is correct.[6]

Hypothesis 1: *Training increases the information contained in pitches.*

Our second hypothesis concerns the priors of different types of investors, the mean quality of the competitors, and pitch training. Consider a group of *2M* investors who serve as judges in a pitch competition in which *N* entrepreneurs pitch their ideas. We divide the investors into two groups of size *M* based on their experience in evaluating new venture ideas. Group *E* is experienced while group *N* are novices. Following our earlier discussion about experience, the two groups differ in their priors about the mean of the distribution of new venture quality. The experienced investors have a lower prior than the inexperienced: $\mu_E < \mu_N$.

[6] The remaining hypotheses take a positive relationship between training and information as given.

This statement follows from taking the partial derivative of investor interest with respect to the prior mean:

$$\frac{\partial h(s_i, e_i)}{\partial \mu} = \frac{\lambda \pi}{\pi + p(e_i)}.$$

Since the terms in the fraction are all positive, investor interest and hence score is always increasing in the prior mean.

Hypothesis 2: Experienced investors will give lower scores to a given pitch than inexperienced investors.

The next two hypothesis concern the effect of pitch training on the mean score and the distribution of scores. Let the mean of log quality q_i of the N ventures in the competition be μ_C. We assume that both the priors of experienced investors and the quality of the competition participants are representative of new ventures as a whole, so $\mu_C = \mu_E$. This implies that $\mu_C < \mu_N$, or that the quality of the average pitch made by the participants will be below the average prior of the inexperienced judges.

Equation 3 implies that training will, on average, raise the scores of those ventures whose pitch quality is above μ_E and lower the scores of those whose quality is below μ_E. Since the average quality of pitches in the competition is equal to the prior mean of experienced judges, training will have no effect on average scores for these judges. Since the average quality of pitches is below the prior mean of inexperienced judges, the average effect of training on the evaluations of these judges will be negative.

Hypothesis 3: *Training has no effect on average scores of experienced investors and reduces average scores of inexperienced investors.*

By having more positive effects on scores of the high-quality participants than low quality ones, training has the effect of spreading the distribution of scores. Taking expectations over s_i on equation 2, using the fact that $E(s_i) = q_i$, and taking the cross-partial derivative with respect to e_i and q_i gives us

$$\frac{\partial h}{\partial e_i \partial q_i} = \frac{\lambda \pi p'(e_i)}{\left(\pi + p(e_i)\right)^2}.$$

This expression is always positive, meaning that the effect of increases in information are more positive for higher levels of q_i than lower levels.

Hypothesis 4: *Training will have a more positive effect on upper quantiles of the quality distribution than lower quantiles and will therefore increase the variance of scores.*

The final hypothesis involves the differential effect of training by the prior mean of the investor. We take the cross-partial derivative of investor interest with respect to information e_i and prior mean μ.

$$\frac{\partial h}{\partial e_i \partial \mu} = -\frac{\lambda \pi p'(e_i)}{\left(\pi + p(e_i)\right)^2}$$

This equation shows that the effect of training will always be more positive for investors with a lower prior mean at all levels of quality.

Hypothesis 5: *Training will have a more positive effect on investors with a lower prior mean at all levels of quality.*

3.0 METHODS

We conducted a field experiment at elevator pitch competitions to test our hypotheses. In elevator pitch competitions, entrepreneurs deliver short pitches to judges to win prize money. Pitch competitions are a popular way for younger entrepreneurs to gain experience at pitching, and hundreds are held annually across the United States (Brooks et al, 2014). We ran four competitions at Northeast Ohio universities in the fall of 2015. Participants had 90 seconds to present their own original business idea. The competitions ran from 9 a.m. to 4 p.m. on a Saturday. Each of the competitions had identical prize money: first place was $2,500, second place was $1,000, and third place was $500.

3.1 Experimental Design and Procedures

Participants signed up in advance using an online tool. They agreed to be randomly assigned to five different training treatments. The training was delivered by video. Random assignment to treatment was stratified by gender and prior experience pitching. Information on these variables was collected at sign-up.

All five treatments explained the purpose of an elevator pitch.[7] Four of treatments provided detailed training on how to pitch to investors.[8] We call these treatments *pitch training*. The *pitch training* treatments varied in the aspects of pitching emphasized and the use of illustrative examples. The fifth treatment provided training on venture finance without any information on pitching. We call this treatment the *null*. Table 1 shows the types of training. In this study, we have collapsed the treatments into two categories: *pitch training* and *null*. Participants in the *null* category were given minimal training about pitching, while those in the *pitch training* category were given detailed training about pitching.

Participants were also randomly assigned to a panel of judges to whom they would give their pitch and to a place in the order of pitching for that panel.

When they arrived at competition, participants checked in and were directed into a holding room where they completed a demographic survey. Once check-in was complete, each participant was randomly assigned a treatment group, judge panel, and place in the pitch order. Each treatment group had a facilitator that stayed with the group throughout the day. The facilitator assembled the participants in his or her group and led them to a separate training room.

Once in the training room and settled, the participants wrote a first draft of their elevator pitch. They were reminded that pitches were limited to 90 seconds and were to be delivered without props, notes, or slides. Participants had 15 minutes to write their draft. The drafts were collected for copying.

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[7] We explained the basic purpose of an elevator pitch to all participants because we expected some participants to have no experience with the process of funding a business venture.

[8] We have a separate paper which examines the effect of different types of training. In this paper we pool the training because each type of pitch training in one dimension of best practices should improve the performance of entrepreneurs at pitching relative to no training in any of the dimensions of "best practice."

The participants then received 30 minutes of video-based training. Each training video was presented by the same actor. Six main topics, covering either pitch content or pitch style, were covered in each of the *pitch training* treatments. The treatments that used examples had actor demonstrating key points using a pitch for a hypothetical business called *Cup Ad*. While the video was playing, we copied the first draft pitches to use for analysis. The originals were returned after the video was completed.

After viewing the video, participants were given a short bulleted summary of the main points covered and were asked to write a final draft of their pitch. Participants had 45 minutes to write their final draft. At the end of this period, we collected the final drafts for copying while the participants were provided with lunch. The final drafts were then returned to participants.

The final step was to deliver the 90 second elevator pitch to a randomly assigned panel of three to four judges. Each panel was seated in a separate room. Participants were called from their training rooms in their randomly assigned order to pitch to the panel. The pitches were limited to 90 seconds using a timer. The panel asked one question of each presenter, which the presenter then answered. Upon completion of the pitch and question and answer period, the judges scored the pitch immediately. The participant was then asked to leave the area of the experiment and return later to learn the results of the competition.

The judges scored the pitches using 7-point Likert-scale questions from “strongly disagree” to “strongly agree”. There were four questions: (1) “I would pursue a follow-up meeting to learn more about the venture,” (2) “I would be interested in seeing the business plan for this venture,” (3) “I would recommend this opportunity to a co-investor,” and (4) “I would initiate due diligence on this venture.” Responses were aggregated into a score that ranges from 4 to 28.

The judges were also asked to rate the content and style of the pitches with two 7 point Likert-scale questions from “very poor” to “excellent”. The two items were: (1) “The content of this elevator pitch was...” and (2) “The presentation style of this elevator pitch was …”

Judges were recruited from the Northeast Ohio entrepreneurship ecosystem. All judges were accredited investors,[9] but they varied in their early stage venture finance activity. We used this information to identify those who were venture capitalists, business angels, members of investment support organizations (what we call mentors), entrepreneurs, and senior managers of large companies.

3.2 Pitch Information and Idea Quality

To measure the information contained in the pitches, we had six undergraduate students code both the initial (pre-training) and final (post-training) drafts of the pitches. The coders did not know the identity of the participants, what treatment they had received, or whether a particular draft was an initial or final draft. The coders were asked to identify the presence or absence of six dimensions of content (identification of a customer need; provision of a value proposition; evidence of a large market; indication of the entrepreneur's expertise in this domain; identification of a competitive advantage; and presentation of a valuable deal for investors), six dimensions of style (evidence of telling a story; indication of engaging the audience; demonstration of an attractive framing of ideas; evidence of preparation; indication of clarity and evidence of proper communication style), and three basic elements (expression of a key message; idea that might compel someone to care; request for support). We refer to these fifteen dimensions as pitch elements and compute the average number present across all coders for each participant's first and final draft. The evaluations of the presence or absence of elements was quite similar across the coders. The intraclass correlation of the average number of elements measured by the six coders was 0.82.

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[9] The Securities and Exchange Commission (SEC) defines an accredited investor as an individual with a net worth of at least $1 million excluding his or her home or a single person with an annual income of at least $200,000 in each of the past three years or a married couple with an annual income of at least $300,000 in each of the past three years. The SEC defines an organization as an accredited investor if it is a bank, savings and loan association, broker dealer, insurance company, investment company, or private business development company. Most of the investors were accredited investors by virtue of this individual definition. A few were accredited investors by virtue of the venture capital firm, family office, or angel fund they represented.

To measure the overall quality of the business ideas participants chose to pitch, we had three undergraduate students who had taken and received a grade of "A" in an upper-level entrepreneurial finance class evaluate the "quality" of the ventures. The students in this class (which involved having venture capitalists, business angels, members of business accelerators, and other members of the entrepreneurship ecosystem around the country speak to them about entrepreneurial finance via telepresence) had learned from prominent angels (members of the Angel Capital Association Board) and prominent venture capitalists (partners at firms like Greylock and Sequoia Capital) the dimensions of start-up companies that are appealing to investors.

The three students each read each of the first-draft pitches and coded them for the quality of the business described using a 10-point Likert scale. In conducting their evaluation, the students were asked to apply the concepts that they had learned from prominent practitioners about what makes an attractive start-up venture and then form their own subjective evaluation.

The quality measure used in our analysis was the sum of the three evaluators' quality scores. The intraclass correlation of the average evaluations of quality of the three coders was 0.73.

3.3 Participant and Judge Characteristics

We relied primarily on the survey completed by participants to obtain information about their characteristics to use in the analysis. These characteristics are described in Table 2. We additionally used internet searches to determine whether participants had been involved in an entrepreneurial venture before the competition. The sources for the additional information search included LinkedIn, company websites, and the state of Ohio's database of legal entities.

It is important to note that these measures are used largely to check our efforts to achieve randomization. The training was randomly assigned across the participants.

We developed measures of judge characteristics primarily through their LinkedIn profiles and the entrepreneurial information aggregator CrunchBase. We developed two primary measures of experience evaluating new ventures. The first measure is whether the judge has seen a high volume of early stage deals.

To implement this measure, we identified the number of early-stage deals each judge had been involved in, as measured by CrunchBase, and created a dummy equal to one for those at or above the median. The second measure was whether the judge indicates being a venture capitalist, business angel, or a start-up mentor as part of their professional identity, as indicated by their LinkedIn profile.

3.4 Data Analysis

This section describes the regressions we use to analyze the data collected in the experiment. We measure the effect of pitch training on the information participants include in their pitches using a regression at the participant level. Let i index the participants and p index the panel of judges to which a participant was assigned. The information included in the final draft is y_{ip}. In the specification

$$y_{ip} = \mu_p + \delta PT_i + X_i'\theta + \varepsilon_{ip}, \tag{5}$$

the coefficient δ measures the effect of pitch training PT_i on information in the final draft. The term μ_p is a judge panel fixed effect. We include this fixed effect only to improve the precision of our estimates. Since participants are randomly assigned to panels, including it does not affect the estimate of δ in expectation. The vector X_i contains participant level control variables, , including dummy variables for the randomly assigned pitch order, and ε_{ip} is an error term.

We measure the effect of pitch training on judges' scores using a regression at the judge-participant level. Let s_{ij} be a score assigned by judge j to the pitch delivered by participant i. In the following specification, the coefficient β measures the effect of pitch training on score.

$$s_{ij} = \alpha_j + \beta PT_i + X_i'\theta + \varepsilon_{ij} \tag{6}$$

The term α_j is a fixed effect that captures judge-specific variation in scoring. The vector X_i contains participant-level control variables, including dummy variables for the randomly assigned pitch order. The term ε_{ij} represents unexplained variation in scores. When we compute standard deviations for this regression, we allow for arbitrary correlation of the ε_{ij} at the participant level as variation in our variable of interest PT_i occurs at that level (Moulton 1990).

When testing whether there is a difference in the effect of training for judges by experience level, we modify equation 6 to include an interaction between PT_i and an experience dummy E_j. The coefficient β_E in the following regression measures the differential effect of pitch training on for experienced judges.

$$s_{ij} = \alpha_j + \beta_E(PT_i \times E_j) + \beta PT_i + X_i'\theta + \varepsilon_{ij}$$

Note that since the indicator E_j is a linear combination of the fixed effects α_j, a main effect for E_j does not appear in the regression.

4.0 RESULTS

A total of 271 entrepreneurs from ten Northeast Ohio universities and 50 judges participated in the competitions. Table 2 provides descriptive statistics for both participants and judges. The average age of participants was 23. Most were males (68%) and studied at the undergraduate level (74%). More than half had taken courses in business or entrepreneurship. A third had given a pitch before. The average judge was in his late forties. Only 14% of judges were female. More than half were active venture capitalists, business angels, or mentors. All were accredited investors.

Random assignment of participants to the *pitch training* or *null* treatments ensures that the expected value of any participant characteristic will be the same, or balanced, across treatments. We stratified random assignment by gender and prior experience to mechanically ensure balance there. However, it is possible that random assignment could be unbalanced across other characteristics that might be correlated with our variables of interest. To check this possibility, Table 2 also presents means of participant's characteristics for the *pitch training* group and the *null* group and the p-value for a t-test of the null hypothesis that the mean characteristics are identical across groups. We additionally show that the pitch training balanced across judge experience characteristics for selected variables in Appendix Table A2.

We will now analyze the experiment to test the hypotheses developed in Section 2. The first two hypotheses relate to assumptions regarding the effect of training and the priors of judges that drive our interpretation of the model in developing the subsequent hypotheses.

Our first hypothesis is that pitch training will increase the information contained in pitches. There is strong support for this hypothesis in the data. Table 3 shows the effect of training on the number of pitch elements present in the participants' final drafts. The average participant had 9.3 of 15 elements present. Pitch training increases the number of elements by about 0.6 (column 1). Adding dummy variables for the randomly assigned pitch panel and pitch order does not affect the coefficient (column 2), nor does adding a set of controls for participant characteristics (column 3). The effect is statistically significant at the 5 percent level in all three specifications.

We explore the effects of pitch training on quantiles of the distribution of number of pitch elements in the final drafts in Figure 3. The size of the effect is similar at the 20th, 40th, 60th, and 80th percentiles. This shows that pitch training has similar effects across the distribution, in the manner of a mean shift.[10]

Our second hypothesis is that experienced investors will give a lower score to a given pitch than inexperienced investors. Recall that this hypothesis reflects a lower prior mean for experienced investors in the model. As Table 4 shows, we restrict our attention to participants who received the null treatment and regress the judge's score on a dummy variable for whether they are experienced. We first define experience by early-stage deal volume. Experienced judges gave scores that were 2.3 points lower on average unconditionally (column 1, $p<0.01$) and 1.8 points lower with controls and order dummies included (column 2, $p<0.05$). When experience is defined as those who are a VC, angel investor, or mentor, the effects are slightly larger (columns 3 and 4). These results support the hypothesis that experienced judges, by either of the definitions we use, have more negative prior beliefs about the quality of new venture ideas.

[10] Note that while pitch training does induce random variation in final draft elements, we cannot use pitch training as an instrument for final draft elements in a regression to measure their effect on score. Although our training targeted changes to pitch elements, we cannot rule out that training also affected outcomes correlated with information but for which we do not have measures. Those outcomes would be part of the residual in a regression of score on final draft elements, which would violate the exclusion restriction for use of pitch training as an instrument.

The third hypothesis concerns the average effects of training on experienced and inexperienced investors. For experienced investors, there will be no net effect. Because the priors of experienced investors will be close to the actual mean quality of pitches, the negative effects of training on worse-than-prior pitches will be balanced by positive effects on better-than-prior pitches. In contrast, for inexperienced investors, the prior mean will be above actual mean quality, leading to a net negative effect of training.

Table 6 presents separate regressions of pitch training on score for experienced and inexperienced investors including order and judge dummies as well as participant controls. Results using the early-stage deal volume measure of experience are shown first. Pitch training reduces the average score by 1.7 points for inexperienced investors (columns 1, $p<0.01$) but has no statistically significant effect for experienced investors (column 2). The results are the same using the VC/angel/mentor definition of experience (columns 3 and 4). Tests using interacted regressions show that the more positive effect of training on experienced judges is statistically significant at 1 percent for the deal-volume definition and at 5 percent for the VC/angel/mentor definition (Appendix Table A2).

The model predicts that the effect of training on score will be proportional to the difference between the prior mean and the pitch signal. Our fourth hypothesis, following from this prediction, is that the effects of pitch training will be more positive for higher quantiles of the venture idea quality distribution than lower quantiles and that training will thereby increase the variance of scores.

Figure 4 presents pitch training effects from quantile regressions that include order and judge effects as well as participant controls. The effects of training at the 20^{th} and 40^{th} quantiles are negative and statistically significant, with magnitudes of -1.5 and -1. The effect at the 60^{th} percentile is -0.5 but is not statistically distinguishable from zero. The effect at the 80^{th} percentile is -0.05 and is also not statistically distinguishable from zero. A test using simultaneous bootstrap estimation fails to reject the null that the 80^{th} percentile effect is greater than the 20^{th} percentile effect with $p=0.04$.

Figure 5 examines this hypothesis by taking the residuals of a regression of score on judge and order dummies and participant characteristics and plotting the distribution separately for those in the null treatment and those who had pitch training. The figure clearly shows a broader distribution for the trained participants. Levene's (1960) robust test rejects the null of equal variance with *p=0.02*.

Finally, our fifth hypothesis states that the effects of training on experienced investors will be greater than the effect on inexperienced investors at any quantile of the distribution of scores. We compute the quantile effects of pitch training for experienced and inexperienced investors using interacted specifications that include order and judge dummies and controls. The results are shown in Figure 6. Panel A uses the early-stage deal volume definition of experience. The estimates for experienced (high volume) judges are greater at all quantiles. The differences are statistically significant. The same pattern of point estimates holds for the VC/judge/mentor definition of experience in panel B, though the differences are statistically significant only for the 40^{th} and 80^{th} quantiles.

Results are robust to different specifications of pitch performance, and different statistical techniques. The results were also qualitatively the same when the regressions predicting these measures were ordered probits. The results were qualitatively the same when we dropped mentors, angels or VCs from experienced-judge measure, and were qualitatively the same when we measured experienced investors as venture capitalists or angels only.

4.1 ALTERNATIVE MECHANISMS

We have argued that pitch training changes judge scores via the information participants put in their pitches. For experienced judges, training leads to positive effects on the upper quantiles of the score distribution and negative effects on the lower quantiles. For inexperienced judges, the effects are all negative. This pattern is consistent with training increasing the precision of pitches and the experienced judges having lower priors than the inexperienced.

For a different mechanism to be a convincing alternative to information as the channel through which training affects scores, it would need to produce the observed results. We consider and reject several alternative mechanisms below.

4.1.1 Training improves venture idea quality

An alternative mechanism for the effect of training is that training improves the quality of the participants' venture ideas. However, if training improved the quality of the participant's ideas, it would increase the pitch signal s_i. According to equation 4, training would then have a positive effect on score at all quantiles of the distribution of scores.

In Table 5, we show the effect of training on score unconditionally (column 1) and with judge and order dummies (column 2) and participant controls added (column 3). In all specifications, the point estimate is negative but is not statistically significant. Moreover, Figure 4 shows that pitch training has zero effect at the 60th and 80th percentiles and a negative effect at the 20th and 40th percentiles.

Furthermore, if training improves venture idea quality, we would also expect the effect of training to be independent of the priors of the judges. Therefore, we would not the expect differential training effects for experienced and inexperienced judges shown in Table 6 and Figure 6.

Finally, a positive effect on quality also fails to explain why pitch training increases the variance of the distribution of scores. One might counter that perhaps training is only effective for the most talented participants, whose ideas would naturally fall in the upper quantiles of the score distribution and which could explain why effects are only positive at higher quantiles. However, this would still not explain why we get any negative effects, nor would it explain differential effects on experienced and inexperienced judges.

4.1.2 Pitch elements measure quality rather than information

One might argue that the mechanism through which pitch training operates is not to provide greater information about the venture, but to improve venture quality in ways that only experienced investors can see. Several aspects of our study design and results suggest that this is a much less plausable explanation than the theory we presented. First, we instructed our coders to explicitly code for the presence of information of a particular type and not to evaluate that information. Therefore, for our measure of elements to capture dimensions of idea quality rather than dimensions of information, our coders would have had to code for something other than what we asked them to identify.

Second, the measures of the elements identified by our coders had high inter-rater reliability. To measure dimensions of venture quality in similar ways, the coders would have to see those dimensions similarly. But these dimensions of venture quality could not be easy for everyone to observe. Otherwise, inexperienced investors would have to be able to see those same dimensions of quality. It seems difficult to account for why the coders could identify hard-to-notice dimensions in quality in similar ways, while accounting for why inexperienced investors could not see these same dimensions of quality.

Third, if our measures of pitch elements were just proxies for unobserved quality, we should not observe a wide range of quality levels for each level of information. Figure 7 plots our measures of idea quality and pitch information from the first draft. While we see that while better quality ideas are associated with more information overall, the correlation is quite weak. There are a wide range of quality levels for each level of information.

4.1.3 Training makes participants better adhere to norms of pitching

Another alternative mechanism is that training shows participants what the norms of pitching are. By helping participants adhere to norms, they are more likely to receive high scores from judges.

This explanation is not consistent with the data. If the mechanism at work was adherence to norms, we would not expect there to be negative effects of training, which we observe for participants with low quality venture ideas. Moreover, we would expect experienced judges to be better than inexperienced judges at discounting norm adherence since the goal of evaluating a pitch is to discern the quality of the business idea and not adherence to norms. If norm adherence were the mechanism, we would expect to see more positive effects of training on inexperienced judges relative to experienced one, when in fact we see the opposite.

Finally, to explore the norm hypothesis, we coded the videos of participant's pitches for two norms of professional behavior: whether they shake hands with the judges and whether they introduced themselves to the judges. Pitch training had no effect on either of these behaviors.

4.1.4. Training makes participants more "likable" or confident

A further alternative mechanism through which training might affect scores is by changing the participants or the judges' view of them. For instance, the training could make the participants more appealing to judges or more confident in their efforts, independent of the quality of their ideas. We rule out these alternative explanations in several ways.

First, the pitch training was not designed to affect likability or presenter confidence but rather effective communication of ideas. Therefore, if pitch training affected likability or presenter confidence rather than information, its effects had to operate on something it was not intended to do and not affect something it was intended to do, an uncommon way for treatments to operate.

Second, if pitch training did change participant likability or confidence, we would expect that effect to be consistently positive across participants. We would not expect increased likability or confidence to lead to a negative effect on score for part of the distribution, which we observe. Moreover, we would not expect a differentially positive effect on the upper quantiles of the score distribution, which we also observe. Finally, we would expect inexperienced investors to be more swayed by extraneous factors such as likability or presenter confidence than experienced investors. But, in fact the effects of training on the scoring of inexperienced investors was more negative.

Third, we coded videos of the participants for five behaviors that the prior psychological research shows are related to confidence: a comfortable pace of speaking, appearing comfortable, making eye contact, showing enthusiasm, not getting upset, and not forgetting the pitch. We sum these behaviors into an index and show that pitch training does not affect them (Table 7, column 3).

4.1.5 Investors with less deal volume are more time constrained

We use deal volume as one of our measures of investor experience. One might argue that lower deal volume does not represent investor experience, but rather the person's time commitment to investment activity. They have less volume because they choose to spend time on other activities than venture investing. If this were true, we would expect people with lesser deal volume to be less interested in pursuing venture opportunities that are pitched to them.

However, as we showed in Table 4 and discussed above, the opposite is true. Investors who are less experienced tend to express a greater interest in pursuing new ventures pitched to them than investors who are more experienced.

4.1.6 Inexperienced investors are less diversified

One might argue that inexperienced investors are more interested in pursuing venture opportunities than experienced investors because they are less diversified. If investors are risk averse, having less diversification would lead each additional venture to be more valuable to inexperienced investors than experienced ones. As a result, inexperienced investors would be more motivated to pursue further investigation of ventures – and score ventures higher in our experiment – than experienced investors, which is what we have shown in Table 4.

While the results shown in Table 4 could be interpreted as support for either our theory or the alternative explanation of desire for diversification, the desire for diversification explanation is not consistent with other empirical results. For instance, the desire for diversification cannot account for the effects of training being more negative for inexperienced investors than for more experienced investors, which Figure 6 indicates. This evidence fits naturally, however, with the interpretation of Table 4 as representing different priors of experienced and inexperienced investors.

5.0 DISCUSSION

In this study, we examined the effects of pitch training on the willingess of accredited investors to pursue investigation of early stage ventures after seeing an elevator pitch. We developed a model to show that pitch training helps in the evaluation of new venture ideas because it induces entrepreneurs to provide more information about their ventures.

Our model predicts that the additional information will tend to improve the evaluation of investors to the degree that the perceived quality of the idea is above the investor's prior belief about the average quality of new venture ideas and will worsen their evaluation to the degree perceived quality is below the mean. The model therefore posits that pitch training will increase the variance of investor evaluations, improving their ability to discriminate between good and bad ideas. Since experienced investors have lower priors than inexperienced investors, the model predicts pitch training will tend to have a more positive effect on experienced investors than inexperienced ones. However, the model predicts that training will only raise the evaluations of those venture ideas whose perceived quality is above the investor's prior mean.

We examined whether pitch training affects the investor evaluation of young entrepreneurs' pitches in the manner predicted by the model by conducting a field experiment that randomly assigned 271 participants in four elevator pitch competitions in Northeast Ohio to pitch training or a null treatment.

The empirical results were consistent with our model. We found that (1) training increases the information contained in pitches; (2) experienced investors will give lower scores to a given pitch than inexperienced investors; (3) training has no effect on average scores of experienced investors and reduces average scores of inexperienced investors; (4) training will have a more positive effect on upper quantiles of the quality distribution than lower quantiles and will therefore increase the variance of scores and (5) training will have a more positive effect on investors with a lower prior mean at all levels of quality.

Our results are conservative. They show that even training delivered by video in a short time without the opportunity to engage in much practice yields results.

The empirical results were inconsistent with several alternative explanations for the effect of pitch training on the willingness of accredited investors to pursue investigation of an early stage venture. The mechanism through which training works appears not to be improved venture idea quality; greater adherence to the norms of pitching; or greater entrepreneur likeability.

Our results have several implications for further research. Our study provides insight into the true causal factors that affect pitch performance, and in doing so challenges the core assumptions of the practitioner literature about the value of pitch training. The practitioner literature generally argues that pitch training is valuable because it improves the underlying quality of new ventures, increasing the odds that they will receive funding and improving the entrepreneurs' welfare. However, our experiment shows that the value of pitch training lies its effects on the quality of information contained in pitches. By making pitches more informative, training allows experienced investors to more efficiently distinguish between good and bad venture ideas.

Our theory may have value in other settings. Because the theory examines how experience affects the way investors interpret information that entrepreneurs are trained to provide, it may also affect decision making in other settings in which experienced and inexperienced decision makers make decisions under conditions of uncertainty and incomplete information. Thus, our theory may help future researchers develop more general explanations for decision making by investors under such conditions.

Our results also have implications for the practice of entrepreneurship. Many would-be entrepreneurs seek investment from external investors every year. Their elevator pitches are often a first point of entry with those financiers. Because effective pitching is necessary to continue the conversation with investors who may provide funding, effective pitching is important for both entrepreneurs and investors. Our results show that entrepreneurs can be trained in ways that improve the functioning of venture finance markets.

However, our results also show that pitch training is not a substitute for venture quality. Good pitching is important to investors who can better differentiate high and low quality ventures. Learning what content to include in a pitch and what style to use to deliver it is therefore valuable because it provides investors with more clarity about the venture the entrepreneur is pitching. Because pitch training does not affect the quality of the underlying venture idea, it is more valuable to entrepreneurs with high quality venture ideas than low quality ones.

Our study also points out that pitch training only works at increasing the interest of experienced investors in the better ideas. Learning to provide more information in pitches does not benefit entrepreneurs on average, and, in fact, reduces the odds of success. That finding has important practical implications for entrepreneurs seeking financing from investors. If entrepreneurs pitch inexperienced investors, best practice pitching may be counterproductive. Instead entrepreneurs might want to provide as little infformation as possible.

This last point has pedagogical implications. Because pitch training has a positive effect on performance with experienced judges and a negative effect on performance inexperienced judges, would-be entrepreneurs who want to learn how to pitch experienced judges effectively need to pitch to, and receive feedback from, experienced judges.

Given the difficulty of finding practitioners willing to help train students, academic institutions may be tempted to substitute inexperienced judges for experienced ones for pitch competitions. Our results suggest that such a strategy will undermine the benefit of pitch training by leading would-be entrepreneurs to learn lessons that will not benefit them later when they pitch experienced investors.

Our study is not without limitations. We examine only one particular type of pitch, the elevator pitch, which is typically delivered only in the very beginning of the fund raising process. Our findings may not generalize to other types of pitches delivered later in the process.

In addition, our sample consists not of experienced entrepreneurs but would-be company founders. Our findings may not generalize to experienced entrepreneurs who are pitching similar types of investors. The value of rudimentary pitch training might exist primarily for aspiring entrepreneurs rather than those who have done this before.

Our study is undertaken in Northeast Ohio, a region not known for having large numbers of would-be entrepreneurs or experienced investors. The average level of investor experience and quality of entrepreneurial efforts in our sample may be below that of other regions. As a result, the findings might not generalize to locales where investor experience and entrepreneurial effort quality is higher.

Nevertheless, our findings, however limited in generalizability, provide evidence that pitch training causes aspiring entrepreneurs to have better success with their elevator pitches when they are delivered to experienced investors. Those findings have value to both explaining why pitch training works and to helping would-be entrepreneurs succeed at raising money from accredited investors.

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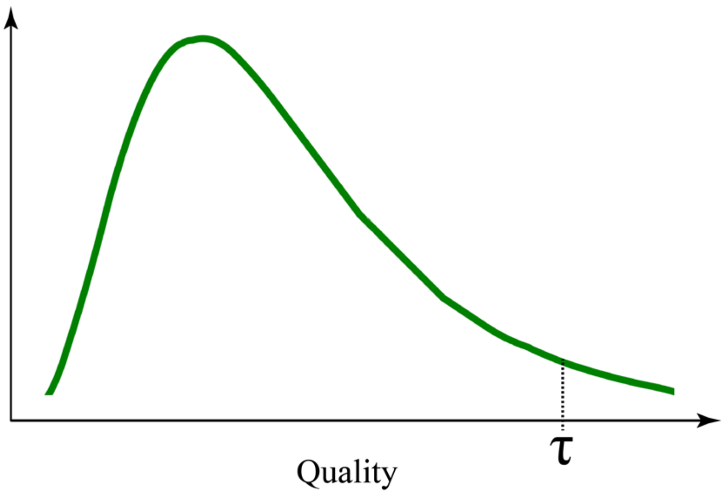
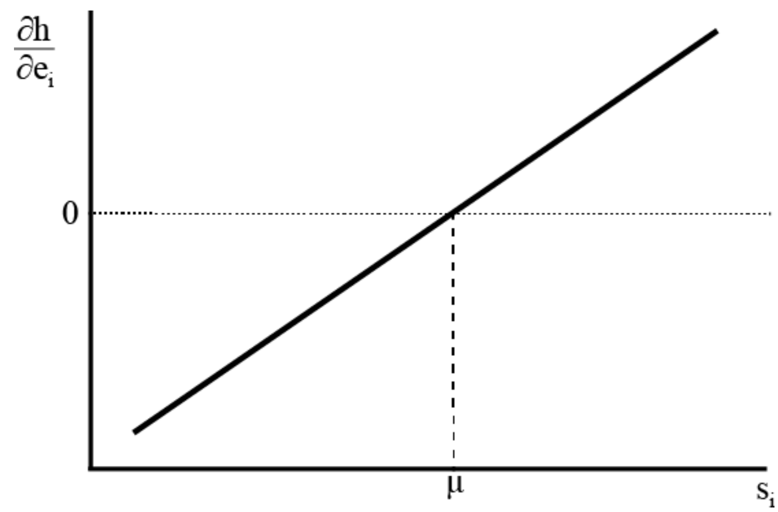
Figure 1: Assumed Latent Quality Distribution of Business Ideas Seeking Funding



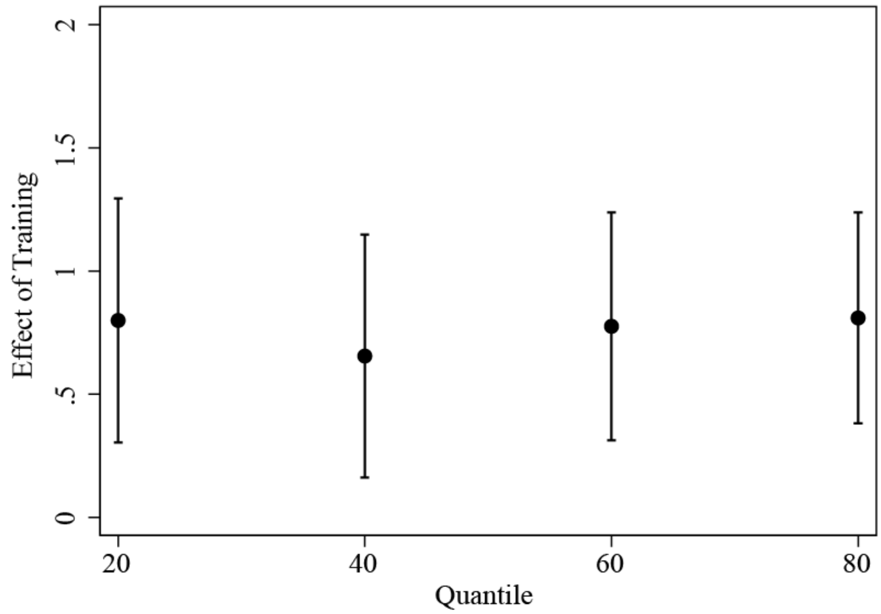
Notes: Most business ideas for which entrepreneurs seek funding are of low quality and are rejected for that reason. Without funding, low quality business ideas are abandoned and are therefore unknown outside the small group of professional investors whom the entrepreneur approached for funding. By contrast, some of the high-quality ideas that are funded grow and receive publicity, thus becoming widely known to the broader population interested in new ventures. We assume that only ideas that exceed the quality threshold τ are ever widely known.

Figure 2: Model Prediction of the Effect of Information on Investor Interest



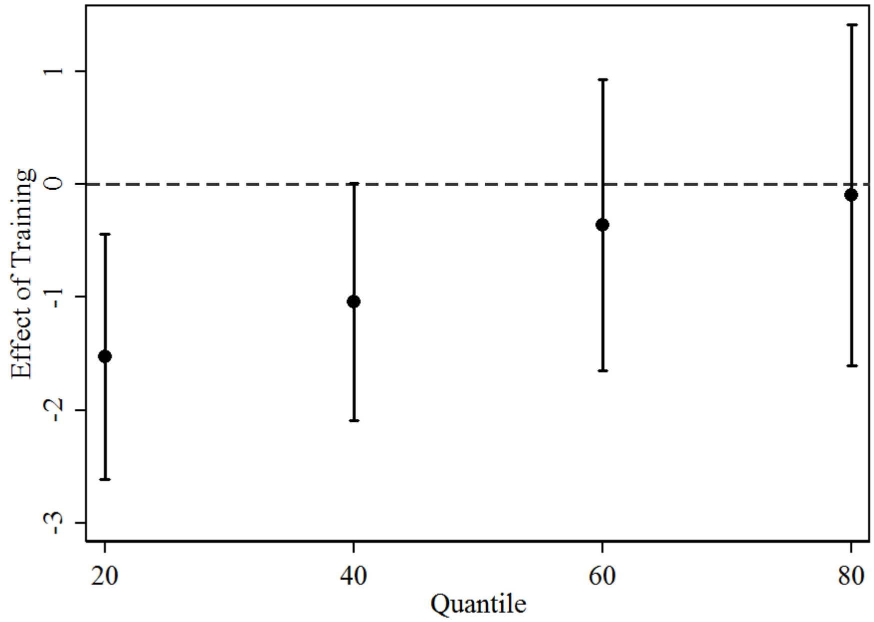
Notes: This figure illustrates equation 3 from the model. The horizontal axis shows the pitch signal s_i. The investor's prior mean is μ. The effect of an increase in pitch information e_i on the investor's interest $h(s_i, e_i)$ can be seen to be positive when $s_i > \mu$ and negative when $s_i < \mu$.

Figure 3: Effects of Pitch Training on Final Draft Information by Quantile



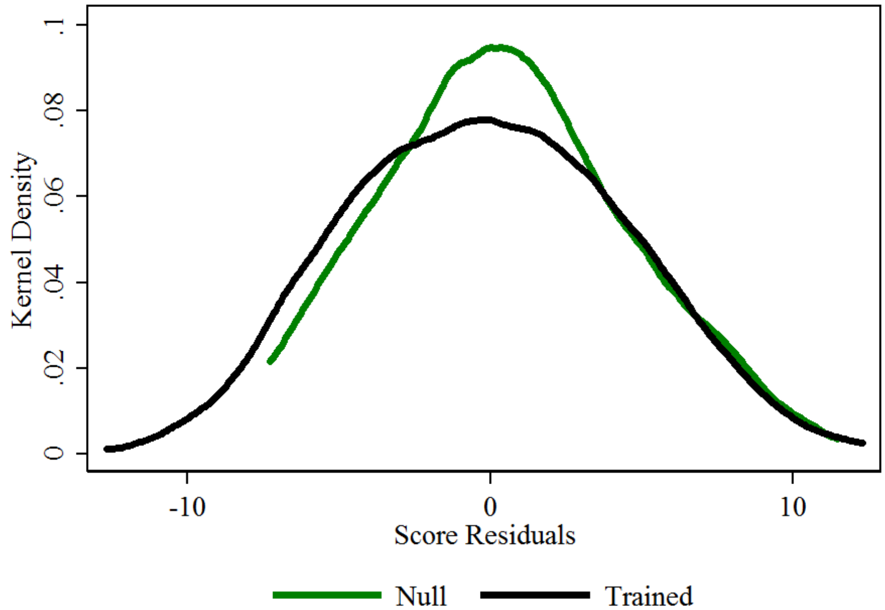
Notes: The graph show treatment effects on quantiles of the score distribution with 95% confidence intervals. The effects are estimated using quantile regressions of score on pitch training, controls, and judge and order dummies. Controls include first draft information, whether pitched before, experience operating a business, gender, whether a graduate student, and university affiliation. Panel dummies indicate the panel of judges to which a participant pitched. Order dummies indicate randomly assigned pitch order.

Figure 4: Effects of Pitch Training on Score by Quantile



Notes: The graph show treatment effects on quantiles of the score distribution with 95% confidence intervals. The effects are estimated using quantile regressions of score on pitch training, controls, and judge and order dummies. Controls include first draft information, whether pitched before, experience operating a business, gender, whether a graduate student, and university affiliation. Panel dummies indicate the panel of judges to which a participant pitched. Order dummies indicate randomly assigned pitch order.

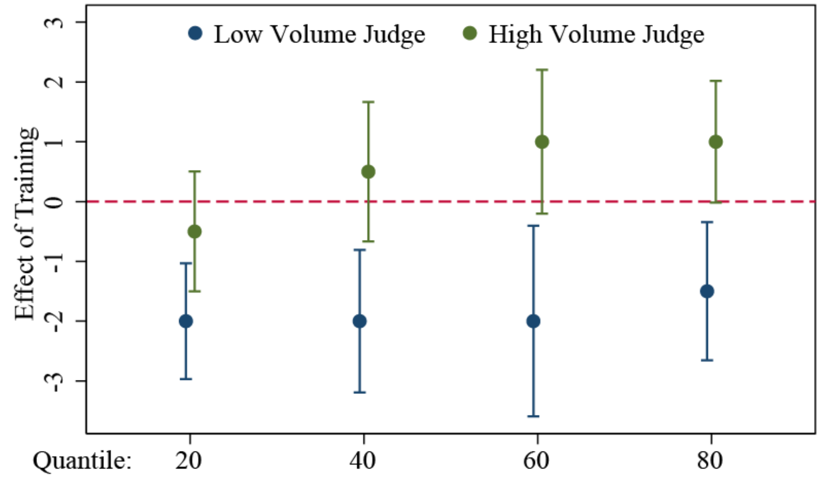
Figure 5: Distribution of Score Residuals by Pitch Training



Notes: The graph show kernel denisty estimates of the residuals of score regressed on controls, judge dummies, and pitch order dummies. Estimates used the Epanechnikov kernel with bandwidth of 1.3. Levene's (1960) robust test rejects the null hypothesis of equal variances between the null and trained groups with *p=0.02*.

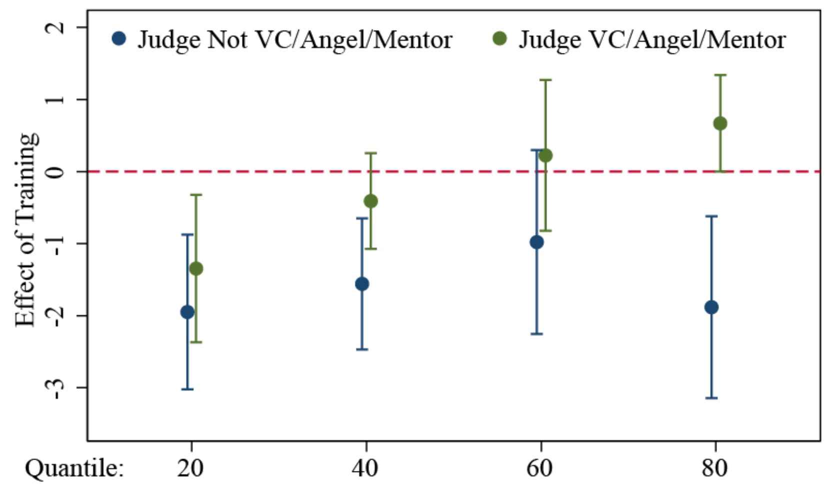
Figure 6: Effects of Pitch Training on Score by Quantile and Judge Experience

Panel A: Experience Defined As High Early-Stage Deal Volume



P-Value, H_0 Equal Effects:	0.03	<0.01	<0.01	<0.01

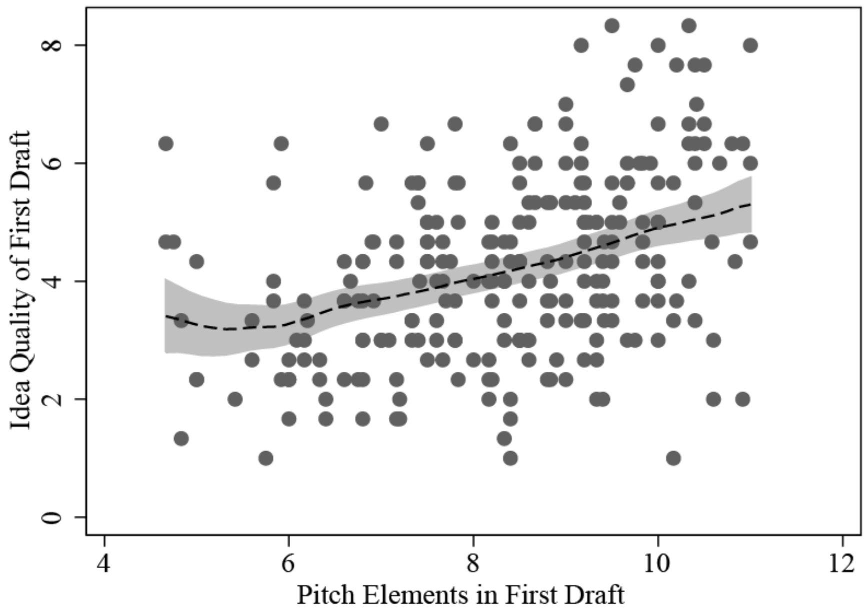
Panel B: Experience Defined As Being a VC, Angel Investor, or Mentor



P-Value, H_0 Equal Effects:	0.43	0.05	0.16	<0.01

Notes: Graphs show treatment effects on quantiles of the score distribution with 95% confidence intervals. The effects are estimated using quantile regressions of score on pitch training, and interaction between pitch training and experience, controls, and judge and order dummies. Controls include first draft information, whether pitched before, experience operating a business, gender, whether a graduate student, and university affiliation. Panel dummies indicate the panel of judges to which a participant pitched. Order dummies indicate randomly assigned pitch order.

Figure 7: Idea Quality and Pitch Elements



Notes: The plot shows pitch elements and idea quality based on participants' first drafts The line is a local-linear regression and the shaded region shows 95% confidence intervals for the predicted value. Results are similar using residuals from regressions of the variables on controls and panel and order dummies.

Table 1. Treatments and Training Groups

Treatment	Training Group	Pitch Concepts Covered	Training Methods
NULL	1	Basic	
PITCH TRAINING	2	Basic + Content	Theory
	3	Basic + Style	Theory + Example
	4	Basic + Content	Theory
	5	Basic + Style	Theory + Example

Table 2. Descriptive Statistics

Participants, N=271	Mean	SD	Mean| $PT_i = 1$ (N=216)	Mean| $PT_i = 0$ (N=55)	Equality of Means, *P-value*
Age	22.7	5.8	22.5	23.6	0.26
Female	0.32		0.32	0.33	0.95
White	0.56		0.57	0.55	0.78
Asian	0.25		0.24	0.26	0.88
Pitched Before	0.29		0.29	0.29	0.99
Has Existing Business	0.17		0.16	0.20	0.52
Idea Quality in First Draft	4.22	1.66	4.24	4.16	0.73
Pitch Elements in First Draft	8.25	1.91	8.25	8.27	0.93
Graduate Student	0.26		0.26	0.27	0.83
Studies STEM Field	0.36		0.36	0.33	0.65
One or More Entrepreneurship Classes	0.50		0.50	0.47	0.70
One or More Business Classes	0.63		0.63	0.64	0.90
CWRU Student	0.49		0.49	0.49	0.98
Kent Student	0.18		0.18	0.16	0.72
JCU Student	0.20		0.19	0.24	0.46

Judges, N=50	Mean	SD
Years Since College	26.8	12.0
Female	0.14	
MBA	0.40	
Lawyer	0.18	
Venture Capitalist	0.18	
Angel Investor	0.22	
Mentor	0.28	
VC/Angel/Mentor	0.54	
Active Entrepreneur	0.16	
Listed as Investor in Crunch Base	0.36	
Positive Exit in CrunchBase	0.26	
High Volume of Early Stage Deals	0.52	
Interacts With Students	0.18	
Biomedical Operating Exp.	0.22	
Software Operating Exp.	0.18	
CWRU Affiliate	0.26	

Notes: Equality of means p-values are from two-sample t-tests.

Table 3: Final Draft Information on Pitch Training

	(1)	(2)	(3)
Pitch Training	0.57**	0.59**	0.56**
	(0.26)	(0.27)	(0.22)
Constant	8.80***		
	(0.24)		
N	0.01	0.01	0.32
Adjusted R^2	271	271	271
Controls	N	N	Y
Pitch Panel, Order Dummies	N	Y	Y
DV Mean	9.25	9.25	9.25

Notes: Standard errors are robust. Stars indicate statistical significance of tests of the null hypothesis that the coefficient is zero: * mean $p<0.10$; ** means $p<0.05$; and *** means $p<0.01$. Controls include first draft information, whether pitched before, experience operating a business, gender, whether a graduate student, and university affiliation. Panel dummies indicate the panel of judges to which a participant pitched. Order dummies indicate randomly assigned pitch order.

Table 4: Score on Experienced Judge in the Null Treatment

	Experience Defined As High Early-Stage Deal Volume		Experience Defined As Being a VC, Angel Investor, or Mentor	
	(1)	(2)	(3)	(4)
Experienced Judge	-2.29***	-1.84**	-3.31***	-2.37***
	(0.84)	(0.81)	(0.83)	(0.88)
Constant	16.07***		16.69***	
	(0.71)		(0.70)	
N	182	182	182	182
Adjusted R^2	0.04	0.24	0.08	0.26
Controls	N	Y	N	Y
Order Dummies	N	Y	N	Y
DV Mean	14.88	14.88	14.88	14.88

Notes: Standard errors are corrected for clustering at the participant level. Stars indicate statistical significance of tests of the null hypothesis that the coefficient is zero: * mean $p<0.10$; ** means $p<0.05$; and *** means $p<0.01$. Controls include first draft information, whether pitched before, experience operating a business, gender, whether a graduate student, and university affiliation. Order dummies indicate randomly assigned pitch order.

Table 5: Score on Pitch Training

	(1)	(2)	(3)
Pitch Training	-0.43	-0.56	-0.61
	(0.66)	(0.54)	(0.47)
Constant	14.88***		
	(0.59)		
N	897	897	897
Adjusted R^2	-0.00	0.24	0.33
Controls	N	N	Y
Order, Judge Dummies	N	Y	Y
DV Mean	14.54	14.54	14.54

Notes: Standard errors are corrected for clustering at the participant level. Stars indicate statistical significance of tests of the null hypothesis that the coefficient is zero: * mean p<0.10; ** means p<0.05; and *** means p<0.01. Controls include first draft information, whether pitched before, experience operating a business, gender, whether a graduate student, and university affiliation. Judge dummies indicate identity of randomly assigned judge. Order dummies indicate randomly assigned pitch order.

Table 6: Score on Pitch Training By Judge Experience

	Experience Defined As High Early-Stage Deal Volume		Experience Defined As Being a VC, Angel Investor, or Mentor	
	Inexperienced	Experienced	Inexperienced	Experienced
	(1)	(2)	(3)	(4)
Pitch Training	-1.72***	0.44	-1.72***	0.40
	(0.58)	(0.60)	(0.57)	(0.62)
N	438	459	414	483
Adjusted R^2	0.35	0.31	0.37	0.29
Controls	Y	Y	Y	Y
Order, Judge Dummies	Y	Y	Y	Y
DV Mean	14.87	14.24	15.29	13.91

Notes: Standard errors are corrected for clustering at the participant level. Stars indicate statistical significance of tests of the null hypothesis that the coefficient is zero: * mean $p<0.10$; ** means $p<0.05$; and *** means $p<0.01$. Controls include first draft information, whether pitched before, experience operating a business, gender, whether a graduate student, and university affiliation. Judge dummies indicate identity of randomly assigned judge. Order dummies indicate randomly assigned pitch order. See Appendix Table A2 for interacted regressions.

Table 7: Alternative Mechanisms

	Shake Hands (1)	Introduced Self (2)	Confident (3)
Pitch Training	0.01	-0.02	-0.19
	(0.04)	(0.06)	(0.14)
N	270	270	270
Adjusted R^2	0.03	0.13	0.04
Controls	Y	Y	Y
Pitch Panel, Order Dummies	Y	Y	Y
DV Mean	0.09	0.76	3.43

Notes: Standard errors are robust. Stars indicate statistical significance of tests of the null hypothesis that the coefficient is zero: * mean p<0.10; ** means p<0.05; and *** means p<0.01. Controls include first draft information, whether pitched before, experience operating a business, gender, whether a graduate student, and university affiliation Panel dummies indicate identity of randomly assigned panel. Order dummies indicate randomly assigned pitch order.

Online Appendix for *Training Aspiring Entrepreneurs to Pitch Experienced Investors*

Table A1: Effects of Training on Information Elements

Panel A: General Elements

	Convey Key Message (1)	Something Compelling (2)	Request to Continue Conversation (3)
Pitch Training	-0.02	0.02	-0.05
	(0.02)	(0.02)	(0.03)
N	271	271	271
Adjusted R^2	0.12	0.10	0.10
DV Mean	0.95	0.87	0.06

Panel B: Content Elements

	State Customer Need (1)	Statement of Value Proposition (2)	Market Size (3)	Team Qualifs. (4)	Comp. Advantage (5)	Deal For Investors (6)
Pitch Training	0.02	0.01	0.09	0.05	0.03	0.09***
	(0.03)	(0.02)	(0.06)	(0.05)	(0.04)	(0.03)
N	271	271	271	271	271	271
Adjusted R2	0.17	0.08	0.08	0.02	0.08	0.04
DV Mean	0.53	0.96	0.40	0.30	0.66	0.14

Panel C: Style Elements

	Tells A Story (1)	Use Engaging Language (2)	Attractive Framing (3)	Evidence of Prep. (4)	Evidence of Energy/ Enthus. (5)	Clear Comm. (6)
Pitch Training	0.07	0.05	0.07***	0.03	0.05*	0.05*
	(0.05)	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)
N	271	271	271	271	271	271
Adjusted R^2	0.05	0.14	0.18	0.27	0.09	0.12
DV Mean	0.65	0.54	0.69	0.76	0.89	0.86

Notes: All regressions include controls and dummy variables for pitch panel and pitch order.

Table A2: Effect of Pitch Training Interacted with Judge Experience

	(1)	(2)
Pitch Training	-1.54***	-1.55***
	(0.58)	(0.58)
Training X Judge High Early Stage Deal Volume	1.83***	
	(0.69)	
Training X Judge VC/Angel/Mentor		1.75**
		(0.75)
N	897	897
Adjusted R^2	0.34	0.34
Controls	Y	Y
Order, Judge Dummies	Y	Y
DV Mean	14.54	14.54

Notes: Standard errors are corrected for clustering at the participant level. Stars indicate statistical significance of tests of the null hypothesis that the coefficient is zero: * mean $p<0.10$; ** means $p<0.05$; and *** means $p<0.01$. Controls include first draft information, whether pitched before, experience operating a business, gender, whether a graduate student, and university affiliation. Judge dummies indicate identity of randomly assigned judge. Order dummies indicate randomly assigned pitch order. Main effects for judge experience variables not included because they are collinear with judge fixed effects.

Table A3: Randomization Check on Judge Experience Interactions

	Information in First Draft (1)	Idea Quality (2)	Information in First Draft (3)	Idea Quality (4)
Pitch Training	-0.04	-0.08	-0.22	-0.14
	(0.28)	(0.23)	(0.31)	(0.24)
Training X Judge High Volume	0.13	0.25		
	(0.24)	(0.19)		
Training X Judge VC/Angel/Mentor			0.47	0.34
			(0.29)	(0.22)
Adjusted R^2	0.14	0.24	0.14	0.24
Controls	Y	Y	Y	Y
Judge, Order Dummies	Y	Y	Y	Y

Notes: Standard errors are corrected for clustering at the participant level. Stars indicate statistical significance of tests of the null hypothesis that the coefficient is zero: * mean $p<0.10$; ** means $p<0.05$; and *** means $p<0.01$. Controls include first draft information, whether pitched before, experience operating a business, gender, whether a graduate student, and university affiliation. Judge dummies indicate identity of randomly assigned judge. Order dummies indicate randomly assigned pitch order. Main effects for judge experience variables not included because they are collinear with judge fixed effects.

Table A4: Interactions Between Pitch Training and Judge Characteristics

	Judge Characteristic	Pitch Training Main Effect	Interaction of Training with Characteristic
(1)	-	-0.62	
		(0.46)	
(2)	Crunchbase Record	-1.13**	1.17
		(0.53)	(0.73)
(3)	Investor in Crunchbase	-0.96*	0.96
		(0.52)	(0.77)
(4)	Positive Exit in Crunchbase	-0.88*	1.00
		(0.49)	(0.84)
(5)	High Volume of Early Stage Investments	-1.46***	1.65**
		(0.55)	(0.67)
(6)	Board Member of at Least One Portfolio Company	-0.84*	0.71
		(0.50)	(0.76)
(7)	Venture Capitalist	-1.01**	2.01**
		(0.51)	(0.94)
(8)	Angel Investor	-0.75	0.65
		(0.49)	(0.93)
(9)	Mentor	-1.01**	1.47*
		(0.49)	(0.81)
(10)	VC/Angel/Mentor	-1.49***	1.62**
		(0.56)	(0.72)
(11)	Entrepreneur	-0.26	-2.23**
		(0.49)	(0.93)
(12)	Female	-0.64	0.19
		(0.50)	(0.81)
(13)	Student Interaction	-0.69	0.43
		(0.51)	(0.92)
(14)	Lawyer	-0.69	-1.01
		(0.51)	(0.87)
(15)	MBA	-0.86	0.61
		(0.54)	(0.70)
(16)	Biomedical Industry Experience	-0.58	-0.19
		(0.53)	(0.87)
(17)	Software Industry Experience	-0.65	0.16
		(0.47)	(0.91)

Notes: Each row reports coefficients from a regression of score on pitch training and, in rows 2 through 17, and interaction between pitch training and the judge characteristic listed. All regressions include pitch order dummies, judge effects, and controls. The main effect of a judge characteristic is captured by the judge dummies. Standard errors are clustered at the participant level.