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Confidence is good; too much, not so much: Exploring the effects on reward-based crowdfunding SUCCESS

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Center for Research in Economics, Management and the Arts

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Working Paper No. 2021-18

CREMA Südstrasse 11 CH - 8008 Zürich www.crema-research.ch

Confidence is good; too much, not so much: Exploring the effects on reward-based crowdfunding success

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Abstract

Self-confidence has long been regarded as one of the key qualities in determining entrepreneurial success. In markets with uncertainty, like crowdfunding, entrepreneurial confidence is an important signal that lowers the information imbalance for potential investors. However, current literature on confidence is limited in three ways; first is the limited understanding of confidence in interpersonal interactions; second is the accurate measurement of confidence and thirdly, limited insight on whether an optimal level of confidence exists. We use two novel behavioral approaches to measure self and exhibited confidence and examine their relation to entrepreneurial success in reward-based crowdfunding. Derived from *ex-ante* information (i.e., before realization of success), our measurements for confidence allow us to draw causal inferences, allowing for contributions to confidence and displays of interpersonal emotion literature. By analyzing over 70,000 Kickstarter projects, we show an optimal level of entrepreneurial confidence exists in determining funding received, popularity, and likelihood of success.

Keywords

Behavioral, crowdfunding, entrepreneur, exhibiting confidence, interpersonal confidence, success

(Paul Terrell) “You’ve got 90 days.”

“You’ll have it in 60.” (Steve Jobs)¹

Introduction

Digital crowdfunding platforms play a growing role in modern entrepreneurial ventures by allowing for direct communication with the consumer (Bruton Khavul, Siegel & Wright, 2015). They have enabled the development of the novel virtual reality headset Oculus Rift, the creation of the video game Star Citizen, and the funding of the Veronica Mars movie.² This form of entrepreneurial financing is rapidly expanding to other fields by serving venture capitalists and angel investors (e.g., Seedrs, AngelList), budding entrepreneurs (e.g., Kickstarter, Indiegogo), charities (e.g., GoFundMe), and academia (e.g., Experiment.com). In all cases, creators (who seek funds) are linked with funders (those willing to give funds) in an online setting where the creator must convey the value of their project and their confidence in project completion directly to prospective investors and consumers. Ultimately, the success of crowdfunding is dependent on this relationship.

Yet, entrepreneurs are uninformed about how to communicate in a digital pitch, especially when it comes to the level of confidence that they should exhibit within the project description. Similar to the story of Goldilocks, entrepreneurs need to know whether the level of confidence exhibited is too much, too little, or just right. The shift towards digital communication has left entrepreneurs in need of insight about how to convey emotions. For example, using the measure of confidence developed in this study, a 3D printing crowdfunding project on Kickstarter that portrayed a low

¹ From the movie *Jobs* directed by J. M. Stern. Steve Wozniak and Steve Jobs assembled the first Apple I boards and sold their first 50 system boards to Paul Terrell, who started a new computer shop in California in the mid-1970s.

² *Oculus Rift* see <https://www.kickstarter.com/projects/1523379957/oculus-rift-step-into-the-game>

Star Citizen see <https://www.kickstarter.com/projects/cig/star-citizen>

Veronica Mars movie see <https://www.kickstarter.com/projects/559914737/the-veronica-mars-movie-project>

level of confidence within the text failed to gain momentum among funders, while a 3D printer with a moderate level of confidence in the text achieved their funding goal. At the opposite end of the spectrum, several technology projects that exhibited a high level of confidence in their project descriptions failed to achieve funding success - such as an app that connects translators with international travelers. These instances suggest that textual displays of confidence can influence project success. Therefore, it is pertinent to understand how emotional displays, such as confidence in text, can communicate information to potential funders and may influence their behavior when funding projects (Van Kleef, 2009). Existing literature is inadequate in understanding emotional displays of confidence in three related ways. The first gap in knowledge is understanding the effect of social confidence displays; the second is accurately measuring displays of confidence, and thirdly, there is a lack of insight on whether there is an optimal level of confidence.

Specifically, to the first point, there is a disbalance whereby the majority of research is focused on *intrapersonal* emotions – i.e., entrepreneur emotions predicting entrepreneur behavior – and limited insight on the effect of emotions as a signal on *interpersonal* settings. The significance of interpersonal emotion in the entrepreneurial process is beginning to be recognized, however research into entrepreneurial emotion is limited (Baron, 2008; Foo, 2011). In emerging crowdfunding research, digital displays of positive and negative emotions have been found to affect outcomes (Koch & Siering, 2019; Xiang, Zhang, Tao, Wang & Ma, 2019). Yet, there are limitations with this one-dimensional (positive vs. negative) approach because pivotal discrete emotions such as confidence are neglected, and research is not up to speed with the rate of digital transformation. This gap has not been adequately addressed, in part because existing confidence measures fail to capture displays of confidence during naturally occurring interactions.

Secondly, existing approaches to the measurement of confidence are self-reported. Traditional measures of determining confidence would require a qualitative investigation (e.g., Fischhoff, Slovic & Lichtenstein, 1977; Soll & Klayman, 2004; Moore & Healy, 2008; Robinson & Marino, 2015) or lab-based experimental settings, such as interaction games (e.g., Mayselless & Kruglanski 1987; Camerer & Lovallo, 1999; Kirchler & Maciejovsky, 2002; Moore & Kim, 2003; Mobius & Rosenblat, 2006). Such measures fail to capture displays of confidence during interactions. Moreover, from a managerial perspective, in an online setting and with many participating individuals, these methods are inadequate or unachievable and fail to take advantage of new and rich data sources. It could be argued that most evidence of confidence is based on verbal statements of subjective estimates like those reported in Svenson (1981). However, survey data is especially prone to ambiguous interpretation (Hoelzl & Rustichini, 2005; Herz et al., 2014). We argue that a new behavioral-based approach is needed to investigate the effects of confidence on crowdfunding outcomes.

Thirdly, in a context where interpersonal emotions are paramount to achieving financial results, it is imperative to understand whether confidence affects crowdfunding success, and how much confidence is too much. Previous literature has found overconfidence to be beneficial in certain circumstances and detrimental in others (Weinberg, 2009), but these divergent findings have not been reconciled. If the emotional display of confidence affects whether a potential funder will contribute, then demonstrating too much or too little confidence could result in entrepreneurial failure. Nonetheless, contemporary literature has overlooked the impact of confidence on crowdfunding outcomes, which is considered particularly important in the entrepreneurial and

financial literature. Considering the significance of providing insight to funders, and the use of confidence displays when promoting a crowdfunding project, this paper aims to employ new measures for confidence using natural data and demonstrate the effect of confidence on crowdfunding projects.

Specifically, we contribute to the existing literature in three ways. First, we investigated the effect of confidence on interpersonal settings and extended the literature on emotions as social information (Van Kleef, 2009). This was achieved by examining interactions in a natural setting – a crowdfunding platform. Second, we proposed two novel behavioral proxies for confidence to investigate exhibited confidence. The first proxy was based on certainty and tentative words within the crowdfunding pitch, and the second was based on the timing of achieving the project (which is a choice made by the creator). By doing so, we contributed to the growing literature linking self-confidence to actual performance and provide an alternative measure for confidence that does not rely on self-reports. Finally, we extend knowledge by considering whether low, medium, and high levels of exhibited confidence have an impact on crowdfunding success. Thus, we determine there exists a non-linear inverted U-shaped relation between confidence and crowdfunding success. This finding thus reconciles the literature on over or under confidence, indicating that there is, in fact, a ‘sweet spot’ or a ‘just right’ Goldilocks point when exhibiting confidence.

We examine the link between confidence and success by using over 70,000 projects from the crowdfunding platform Kickstarter. One clear benefit of working with Kickstarter data is that project success or failure takes place in a very controlled setting; one that approximates a real-world laboratory by holding many things equal when generating outcomes. More specifically, all project creators perform in the same environment under the same conditions or restrictions (e.g., maximum project funding duration) using the same instrument (project description) to achieve the

same goal (funding success). This environment is also highly transparent, and the data produced are reliable because of low measurement errors and large number of data points. As a result, many factors can be held constant, allowing substantial control over the confines of the projects, similar to a laboratory experiment. However, in contrast to experiments in the lab, the Kickstarter setting comprises actual processes involving real individuals with strong incentives to be successful (e.g., idea fulfillment, monetary payoff).

Theory and Hypotheses

Confidence and how it is measured

Emotions play a role in entrepreneurial processes, and certain emotions - such as confidence - can have an impact on entrepreneurial behavior (Brundin et al., 2008; Hayward et al., 2010). Confidence is generally defined in terms of self-efficacy, which is one's own belief in their ability to execute an action (Bandurra, 1977). It can also be defined as a person's certainty of achieving a specific outcome (Barbalet, 1993). For entrepreneurs, confidence is "the emotion-laden belief that entrepreneurs have about their ability to ensure the success of their focal venture" (Hayward et al., 2010, p. 570). Typically, this feeling of confidence is what influences an entrepreneur to pursue a venture.

Commonly used methods to measure confidence include self-reported values on a Likert scale or a statement of someone's ability to complete a task (Maurer & Pierce, 1998; Zacharakis & Shepherd, 2001), but do not allow for the measurement of exhibited confidence in an interpersonal setting. One option for measuring confidence is to calculate the proportion of self-reported *anticipated* correct answers for a set of questions provided and compare it with the number of correct answers (Olsson, 2014). Other studies have used an experimental setting to demonstrate

confidence; for example, using questionnaires with numerically based answers to explore the relationship between confidence and innovative activity (Herz, Schunk & Zehnder, 2014). Moreover, several other studies have measured confidence through the development of text-based proxies (Hirshleifer, Low & Teoh, 2012; Anglin et al., 2018). Multiple measures of confidence have been used throughout the literature, and most measures are self-reported rather than allowing for the measurement of exhibited confidence in a social setting.

Confidence and the EASI model

Social emotions are distinguished by the fact that they communicate emotional states to others, and as such, can be used to affect thoughts and feelings in a social setting (Burnett et al., 2015; Blader et al., 2013). The Emotions as Social Interactions (EASI) model (van Kleef, 2009; van Kleef et al., 2012), stipulates that emotions are used to express information which can provide insight to the recipient and influence their actions. This interaction is not restricted to just physical emotional interactions, as emotional contagion has been observed in virtual text-based interactions (Cheshin, Rafaeli & Bos, 2011). Not only can emotional displays be detected in text, but interpersonal displays of emotion can be mediated by their intensity (Cheshin, Amit, van Kleef, 2018). However, due to the scarcity of literature on social displays of confidence, we extend on the literature of intrapersonal confidence to build our hypothesis. That is, we form our theorizing based on the notion that potential funders follow a heuristic whereby they judge the expected success of others' actions by using their own experiences of confidence as a benchmark.

Confidence: the good, bad, and non-linear

Exhibiting maximum confidence in an interpersonal setting may not have the desired outcome. We suggest that the optimum confidence level is situational – and non-linear – and previous literature on the positive and negative effect of confidence supports our theorizing.

Exhibiting overconfidence can have negative consequences on the entrepreneur. Despite confidence in one's own abilities being an asset, a large and consistent body of evidence demonstrates that individuals are often overconfident (see, e.g., Myers, 1998, Weinberg, 2009), which has had a varying impact on their behavior and the outcomes of the tasks linked to that overconfidence. A study on market trading found that the miscalibration of confidence, i.e., being overconfident, reduced the level of trading performance (Biais, Hilton, Mazurier & Pouget, 2005). Highly overconfident investors are more likely to choose inappropriate investment levels, which could negatively impact shareholder value (Pikulina, Renneboog & Tobler, 2017). Using an experimental setting, Camerer and Lovallo (1999) demonstrated that overconfidence in one's ability led to excess market entry and increased monetary loss.

On the other hand, the exhibition of underconfidence can be an impediment. For example, Xia, Wang and Li (2014) determine that those who are underconfident do not participate in the stock market and are likely to lose out on opportunities compared to overconfident participants. This indirectly confirms that overconfident investors trade more, which was also shown by Odean (1998). Another study found that individuals would not enter an experimental competition which included difficult tasks because they overestimated the performance of others, suggesting they were underconfident in their own abilities in comparison (Moore & Cain, 2007). Instances of underconfidence positively affecting outcomes are difficult to find. Therefore, the effects of underconfidence could be just as important as overconfidence in understanding the decision-making behaviors of individuals in an interaction.

Furthermore, evidence shows that moderate to good levels of confidence can be advantageous (Mobius & Rosenblat, 2006; for an overview see Weinberg, 2009). In Gervais and Goldstein's (2003) study, they determine that a team benefits from a member who is overconfident in their individual productivity, as the overconfident member works harder – causing the rest of the team to meet their standards. At the same time, it has been observed that overconfident CEOs are more likely to increase investments in innovative activities, such as R&D, patent applications, and patent citations (Hirshleifer, Low, & Teoh, 2012). Moreover, Koellinger, Minniti and Schade (2007) use survey data to provide evidence that entrepreneurs' overconfidence in their abilities is more likely to lead to market entry, benefiting consumers and innovators alike. Thus, this highlights that the result of confidence could be non-linear, where the observer relies on their heuristics to judge the level of confidence within the situation.

In crowdfunding, a prospective funder may thus assess the creator's confidence by using their own experiences with confidence as a benchmark. By placing themselves in the shoes of the crowdfunding creator, the funder could identify an exhibited level of confidence as a miscalibration – i.e., over or under confidence – and decide not to provide funds. It is plausible that a high level of exhibited confidence could be perceived as too much, and a low level of confidence as not enough for the funder to enter the funding pool. As such, we expect a non-linear relationship when exhibiting confidence in a social setting.

Hypothesis: There is a curvilinear relationship between the project outcome and exhibited confidence, where project outcomes are positively influenced by low exhibited confidence, and negatively affected by high exhibited confidence.

Data and Methodology

Background

Our paper extends the literature on confidence beyond the lab setting by using real-world data³ from the crowdfunding web site Kickstarter to examine how confidence affects project success. One of the most prominent crowdfunding websites, Kickstarter, follows an *all-or-nothing* funding model, where the funds are not distributed unless the funding goal is achieved within the specified timeframe. Therefore, to succeed on Kickstarter, projects need to raise a self-specified amount of funds that the creators believe to be sufficient to create their idea.

To achieve crowdfunding success, project creators need to portray or exhibit enough information about the project, along with their confidence in being able to deliver to potential contributors. Because of Kickstarter's extensive documentation of interactions and exchanges, this web site provides easy access to the communication between a wide community willing to both create and contribute to new ideas and projects (Agrawal, Catalini & Goldfarb, 2015; Mendes-Da-Silva, Rossoni, Conte, Gattaz & Francisco, 2016). This communication from creator to potential funder occurs through prominent and salient signals, such as the certainty detected within the text or the expectation of achieving fundraising success within a specified duration. In fact, several articles within the crowdfunding literature demonstrate that linguistic styles and words matter in crowdfunding (Moss et al., 2018; Parhankangas & Renko, 2017). We formulate two confidence proxies that signal the creators' self-exhibited confidence in achieving fundraising success, by using the certainty within the campaign and the chosen project duration. Any deviation from the

³ Park and Santos-Pinto (2010), for example, use field surveys to study chess and poker players, whilst Holmes and Silverstone (2010) use the quarterly business survey data from the New Zealand Institute of Economic Research.

maximum days allowed might be seen as a sign of confidence, in line with Steve Job's behavior quoted in the beginning of this paper.

Dataset

We collected detailed project information on all available Kickstarter campaigns launched between April 2009 and May 2013 (Neight-Allen, 2013) for a total of 87,265 projects across all available categories during that period. Of these, 15,493 projects were dropped, as the projects were cancelled, started within the 60 days before the data scrape, were not based in the United States of America, a project was a creator's third or more project, or had descriptive text sections of less than fifty words, which produced a final sample of 71,772 projects⁴. The final data set comprises information provided by the project creator, including scheduled duration and overall funding goal, the descriptive text on the campaign page, the project start date, geographic location, category (field), identifiers for the project creator, and outcomes such as total amount raised, number of backers (funders/contributors), and whether the funding goal was achieved. The average amount raised by each project was \$5,981.46 (SD = 66,980.06) donated by an average 80.74 (SD = 781.13) backers. Successful projects raised a combined total of more than \$375,400,000 from 5,046,183 backers, with a further \$50,641,783 pledged to unsuccessful projects.

Independent Variables

Self-confidence proxy: Tentative and certainty language

We constructed a second measure for entrepreneurial confidence by conducting a textual analysis of project creators' campaign pitches. Since Kickstarter places no constraints on project

⁴ The dataset has been made available on OSF under the project [Crowdfunding and Confidence](#)

description, project creators can freely discuss and explain both the project-related concepts and the associated risks and costs. As such, this description could reflect a creator’s confidence in the idea or project and the project’s ability to succeed. To approximate the level of confidence expressed in the text, we draw on Linguistic Inquiry and Word Count (LIWC; Pennebaker, Chung, Ireland, Gonzales & Booth, 2007), an extensively reviewed text analysis program used to capture the social and psychological state of an author within a given text. This corpus includes 80 different dictionaries linked to various emotional and cognitive categories, such as anger and causation (Tausczik & Pennebaker, 2010). As our second proxy of confidence, we utilize two cognitive mechanism categories from the LIWC2007 dictionaries; namely, certainty (e.g., never, must, always) and tentativeness (e.g., maybe, seem, hope), which are represented by a total of 191 associated words and word stems. We took these two measures because certainty can be viewed as an expression of confidence, while tentativeness signals uncertainty (Kahneman & Tversky, 1982). To construct the proxy, we first perform Porter stemming (Porter, 1980) on the description text, with all the numbers and punctuation removed. We then count the number of occurrences of the word stems of the two dictionaries in the stemmed text for each project. Finally, we compute the relative use of words in the certainty dictionary to words in the tentativeness dictionary, which is formulated as follows:

$$\text{Confidence}_{LANG,i} = \frac{C_i}{C_i + T_i} \quad (2)$$

where C_i and T_i denote the frequency word count of certain and tentative words in the description of project i , respectively. Hence, the higher the confidence score, the greater the confidence level (see Figure A3 for the distribution)⁵.

Exhibit entrepreneurial confidence proxy: Project duration

Kickstarter offers interesting ways to derive behavioral proxies that measure self-confidence *ex-ante*. Project creators on Kickstarter are free to choose the length of their project duration regardless of funding goal, category, or other project characteristics, but subject to a maximum allowable time imposed by Kickstarter (minimum is one day). Once the project is launched, the creator is no longer able to change the duration length. Since shortening the funding period reduces the project exposure to potential backers, this can be seen as a signal of high self-confidence to prospective investors, analogous to the epigraph where Steve Jobs promises early delivery even though he was given a longer deadline. Thus, we construct a proxy measure of *exhibit* entrepreneurial confidence by the deviations from the maximum allowable time:

$$\text{Confidence}_{DUR,i} = \frac{M_t - d_i}{M_t} \quad (1)$$

where M_t denotes the maximum duration allowed (in days) for period t and d_i is the duration of project i (in days). The measure ranges from 0 (duration equals to the maximum time allowed, $M_t = d_i$) to close to 1 (minimum duration). Higher values (shorter duration) thus indicate that the project creator is more confident. The reason for adding a subscript to M_t is due to a rule change Kickstarter imposed on 17 June 2011, where maximum duration allowed was reduced from 90

⁵ 1436 projects do not contain at least one word count in either dictionary; hence, the ratio has not been computed.

days to 60 days. The decision to lower the maximum amount of time was based on the observation that projects with longer durations have a lower success rate.⁶

Interestingly, prior to the rule change, an external observer demonstrated the need to consider shorter project durations, posting his findings on a personal blog on July 27, 2010 (Mod, 2010). This also resulted in a collaborative Kickstarter blog post on September 21, 2010, explaining trends in pricing and duration up until that point, and stating that projects of 30 days were more likely to succeed⁷. To account for these events in the analysis section, we consider three time periods: before the initial July 2010 blog post (*period 1*), between this blog post and the official June 2011 rule change (*period 2*), and after the rule change on 17 June 2011 (*period 3*). This setting is interesting because in *period 2* and *3*, project creators may have perceived – prior to launching their campaign – that projects with a duration of approximately 30 days are more likely to succeed. Thus, this could lead to an anchoring effect with respect to the project length (Tversky & Kahneman, 1974). Prior research shows that an anchoring effect is hard to avoid, and difficult to escape from (e.g., Strack & Mussweiler, 1997; Wilson, Houston, Etling & Brekke, 1996). This could explain the significant increase in the proportion of projects with a 29 to 31-day duration following the initial blog post (see Figure A1, panel a). Therefore, a small deviation in the proxy in *period 2* and *3* from the anchor point (i.e., 30 days) could mean a larger change to actual exhibited confidence levels compared to the same amount of change in *period 1*. Thus, a more visible effect of the proxy on the fundraised amount or number of backers may be observed in the later two periods compared to *period 1*.

⁶ See <https://www.kickstarter.com/blog/shortening-the-maximum-project-length>. The recommendation of 30 days or fewer is also featured on Kickstarter's *Creator Handbook* (<https://www.kickstarter.com/help/handbook/funding>).

⁷ See <https://www.kickstarter.com/blog/trends-in-pricing-and-duration>

Additionally, reducing the maximum duration allowed from 90 days to 60 days could mean that *positive* deviations from the anchor point (30+ days) in *period 3* might signal a stronger reduction in exhibited confidence compared to the change that occurred in *period 2*. This is because the maximum range of positive deviation from the anchor point in *period 2* (maximum of 60 days) is doubled to that of *period 3* (maximum of 30 days, see Figure A1, panel b). Thus, we propose a simple normalization strategy for these two time periods so that confidence ratios are comparable. To this end, we multiply the positive deviation in *period 2* from the anchor point by a factor 2. For example, a project duration length of 33 days in *period 3* is mapped to 36 days and 60 days is mapped to 90 days⁸. Figure A2 shows the distribution of exhibited self-confidence differs over the three periods.

The average confidence rate based on project duration is 0.53 (SD = 0.24), while self-confidence based on text analysis is 0.40 (SD = 0.22).

Control Variables

To factor in additional influences from the crowdfunding environment on the projects' outcomes, we include a series of control variables. We control for project characteristics that are consistent across Kickstarter, yet individually specific to the project, such as Kickstarter specified category (*category*), as well as provide their fundraising target ($\ln(\text{goal})$, $\ln(\text{goal})^2$), project running time (*duration* and $(\text{duration})^2$)⁹, a project description (*total word count*) and $(\text{total word count})^2$, and the number of rewards on offer (*number of reward tiers*). We also include measures for creator

⁸ We assume a linear scaling factor because of its simplicity. However, one could also consider a non-linear mapping for the positive deviation (e.g., quadratic function).

⁹ As the amount raised and number of contributors may be positively influenced by increased project duration (Burtch et al. 2013, Mendes-Da-Silva et al. 2016), *duration* is not included when $\text{Confidence}_{\text{DUR}}$ is specified in order to avoid collinearity issues.

specific characteristics, such as the project’s geographic location (*latitude, longitude*) and whether the creators are part of a team (*team*)¹⁰. In addition, the human capital and social capital of a creator have been determined to influence project success (Davies and Giovannetti, 2018; Colombo et al., 2015; Unger et al., 2011). To account for this impact, we proxy for human capital using the number of misspellings within the campaign description¹¹ (*misspelling*), the number of projects previously backed (*projects backed*) for internal social capital and whether the Kickstarter campaign was linked to a social media platform¹² (*social media network*) for the external social capital. In addition to this, because of the suspected endogeneity bias determined by Moy, Chan and Torgler (2018), an indicator is included for edits detected within the descriptive text (*general edit, reminder, and progress*). Finally, we incorporate controls for the average number of competitors (*competition*) within the same sub-category for the duration of the project and whether the project was highlighted as a staff pick by Kickstarter (*staff pick*).

In addition to providing the descriptive statistics of the variable used in Table A1, we ran a correlation matrix which demonstrated low levels of correlation for all variables, excluding the duration-based confidence proxy and project duration.

Model

Following the confidence multiplier proposed by Akerlof & Shiller (2009; p. 16), where a “... change in income results from a one unit change in confidence”, we examine the relationship between crowdfunding success and the levels of creators’ confidence. We conduct an OLS regression analysis using two dependent variables for success – namely, the amount raised and

¹⁰ Team is identified using singular and plural first-person personal pronouns, for details, see Moy et al. (2018).

¹¹ Following Mollick (2014), we use the Oxford English Dictionary’s list of common misspellings.

¹² Social media platforms: *Blogger, Blogspot, DeviantArt, Facebook, Google Plus, Instagram, Myspace, Tumblr, Twitter, WordPress, and YouTube*.

number of individuals contributing to a project – against the two confidence proxy measures. Since our hypothesis suggests there is a nonlinear confidence effect, we thus propose the following model:

$$\ln(\text{Outcome}_i) = \alpha + \beta_1 \text{Confidence}_i + \beta_2 \text{Confidence}_i^2 + \delta \text{Controls} + \varepsilon_i \quad (3)$$

where $\ln(\text{Outcome})$ is the natural-log form of the total amount raised or number of backers of project i . We apply log transformation to our two dependent variables as they are highly skewed (see Table A1). The nonlinear relationship is represented by including the linear and squared terms of the confidence measures. Our hypothesis suggests that the coefficient β_1 is positive and β_2 is negative, implying the positive confidence effect diminishes as confidence increases. As discussed above, creator and project characteristics that influence success are included as controls and ε is a random error term. In addition to the OLS regression approach, we also consider funding target achievement as the outcome variable (binary variable which takes 1 if project goal is reached, and 0 otherwise). To analyze the binary outcome variable, we employ the probit regression model with the same equation specification as (3).

To determine the validity of the inclusion of the variables, we used the variance inflation factor (VIF) to check for multicollinearity. In all combinations of equation (3), excluding the proxy confidence squared term, the VIFs for the variables do not indicate that multicollinearity is present.

Conceptualization of Confidence

It is often difficult to isolate the types of confidence portrayed using real world or behavioral data, such as the two measures developed in this paper. Specifically, the two proxies could be exhibited

as a result of the campaign creators' self-confidence (personality trait), strategic or tactical confidence – a representation of opportunity confidence (Davidsson, 2015) – or a combination of both. Confidence derived from the linguistic features of a project description may be a better indicator of a personality trait (self-confidence) compared to the one of project duration, as the latter involves a higher degree of active decision making and strategic choice. Additionally, personality is a construct of characteristics and qualities that make up a person's character (Jhangiani, Tarry & Stangor, 2014). To be able to portray this personality, a creator needs to be able to express themselves. Following this logic, we theorize that the duration proxy is a strategic choice of confidence, whereas the linguistic confidence is a result of personality confidence.

Even though we are not able to empirically test which type of confidence our proxies represent, given that Kickstarter allows the same creator (or creators) to initiate multiple projects, it may be possible to shed some light on this by examining the change between similar and different projects by the same creators. To focus on the creator's personality instead of project topic, we explore changes between the first and second project. If we were to regard confidence as an exhibition of a personality trait, we would expect to see linguistic confidence stability within same and different category projects (Table 1). On the other hand, if confidence is a strategic choice, we are more likely to observe changes (instability) between the projects related to project duration. To test such a posit we conduct several statistical hypothesis tests (t-test) on the absolute value of the difference between the confidence proxy of the first and second project.

We are indeed not able to identify statistically significant differences between projects for linguistic confidence, which could indicate that self-confidence as a personality trait matters. In contrast, duration confidence is higher in the second project, which could be linked to strategic confidence. A positive change over time could be a result of strategic choice and potential learning

effects (increased experience as a Kickstarter project creator). Such an effect is also observable for those creators who changed category in their second project.

Table 1

Change in confidence proxies between projects of the same creator

	Duration Confidence	Duration Confidence (Individual)	Linguistic Confidence	Linguistic Confidence (Individual)
Same Category	0.034***	0.042***	-0.008*	-0.011
	7.05	5.28	-1.99	-1.72
	<i>4143</i>	<i>1461</i>	<i>4054</i>	<i>1431</i>
Different Category	0.027**	0.023	-0.003	-0.024
	2.76	1.63	-0.29	-1.82
	<i>1010</i>	<i>433</i>	<i>977</i>	<i>421</i>

Notes: Mean-comparison tests on confidence level between the first and second project of the same creator.¹³ The second project is restricted to those launched after the first project has ended. *t* statistics are in parentheses. Number of observations in italics. † $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.

Results

To explore the effect of confidence on crowdfunding success, exhibited confidence is investigated in project creators first project only ($N = 65,272$). Table 2 presents a multivariate analysis of the hypothesis that differing levels of confidence affect a project's outcome. Our result demonstrates a strong non-linear relationship between success, measured by total amount of funds raised (models 1, 3, and 5) and number of backers (models 2, 4, and 6), and self-confidence, whether as a display signal (models 1 and 2) or implicitly (models 3 and 4) measured. In all cases, a low level

¹³ To control for the effect of wording (context) on the linguistic confidence, we split the sample into those whose first and second project are in the same category and those that are not. We attempt to distinguish between individual creators and team-based projects by calculating the relative use of first person singular (use of words like *I, me, my*) to first person plural (use of *we, us, our*) based on the project description, and we tag projects with a ratio lower than 0.5 as projects with an individual creator.

of exhibited confidence (linear term) has a positive relationship with success and high levels of exhibited confidence (squared term) has a negative relationship. Overall, this suggests that the increased presence of confidence, both the duration and linguistic based measures, increases the overall amount raised and the number of contributors (at a diminishing rate). We visualize the effects of confidence by plotting the outcome prediction and marginal effects of each confidence proxy on funds raised (Figure 1a and 1b) and number of contributors (Figure 1c and 1d). The effect of both confidence proxies is initially positive and significant to increasing funds and contributors. However, increasing the exhibited confidence past a point (raised turning point at 0.55 and 0.62) and self-confidence past a point (turning point raised 0.42 and 0.41 backers) causes the effect of confidence to significantly decrease the amounts raised and number of the crowd contributing; thus, confirming our hypothesis. Additionally, adding both confidence proxies in the same specification (model 5 and 6) does not result in major changes to the coefficient estimates, suggesting the two proxy measures might be capturing different dimensions of self-confidence. This motivated us to examine the interaction effect between the two self-confidence proxies (i.e., including the full interaction terms between the linear and quadratic terms of the two proxies). We present the interaction effect visually in Figure A4, which shows that funding outcome (in terms of both number backers and amount raised) is maximized when both proxies are at around 0.5.

To confirm whether this hypothesis holds across the time periods demarcated by the blog post and rule change, we conducted a separate analysis of equation (3) on $Confidence_{DUR}$ by each period (see Table A2). Excluding the first period, a similar inverted u-shape can be determined from the significant positive and negative coefficient of the low and high confidence, respectively, for both number of contributors and amount raised. As the effect of confidence is insignificant in the first period, it may indicate that an anchoring or peer learning effect is occurring.

In an additional stage, specifications for under- and over-confidence in *period 2* and *3* were examined. Each specification in Table A3 demonstrates that a relationship exists between the level of confidence exhibited and success. Increases in confidence boosts the amount raised and number of contributions up until the optimal level, after which the amount raised and the number of contributors diminishes. In the case of *period 2*, we observe a similar shape for *period 3* and the population.

As the selection of project duration could be a strategic choice, we extended the findings of Table 2 by including an interaction effect for the funding goal, as the goal of a project could be a strategic choice and proxy for the overall size of the project. In results not reported here, it indicates that there is a positive significant interaction between project goal and confidence portrayed.

Table 2

Effect of the self-confidence on funds raised, number of backers and success

	(1)	(2)	(3)	(4)	(5)	(6)
	<i>ln</i> (Raised)	<i>ln</i> (Backers)	<i>ln</i> (Raised)	<i>ln</i> (Backers)	<i>ln</i> (Raised)	<i>ln</i> (Backers)
Exhibit confidence	1.75***	1.05***			1.71***	1.04***
	(11.50)	(12.62)			(11.19)	(12.36)
(Exhibit confidence) ²	-1.58***	-0.84***			-1.54***	-0.83***
	(-8.69)	(-8.42)			(-8.47)	(-8.25)
Self-confidence			1.38***	0.67***	1.37***	0.66***
			(9.38)	(8.46)	(9.30)	(8.36)
(Self-confidence) ²			-1.66***	-0.83***	-1.64***	-0.81***
			(-10.64)	(-10.04)	(-10.51)	(-9.88)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	61009	61009	60127	60127	60127	60127
R ²	0.250	0.318	0.249	0.318	0.250	0.319
Prob. > F	0.000	0.000	0.000	0.000	0.000	0.000

Notes: Results from ordinary least squares (OLS) regressions. t-statistics in parentheses. Standard errors are robust to heteroskedasticity. † p < .1; * p < .05; ** p < .01; *** p < .001

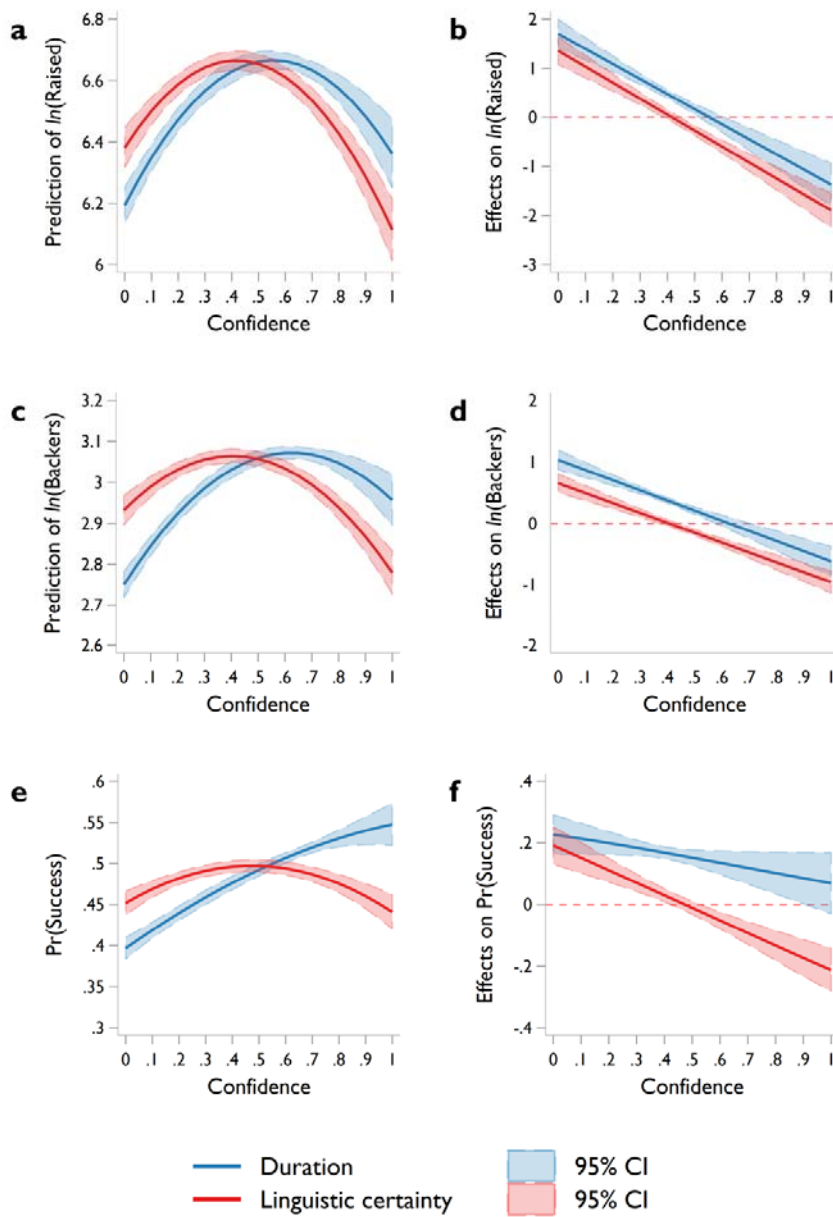


Fig. 1. Prediction and estimated effect of confidence on amount raised, number of backers, and funding success.

Finally, as an additional process we ran equation (3) following stepwise regressions by including a dummy on whether the project occurred after the duration change and including an indicator for the project creator's gender if a team did not create the project. Whilst we do not report these

models, we still observe that the coefficients are significantly positive for lower exhibited confidence and significantly negative for higher exhibited confidence.

Robustness checks

For robustness, we adjust our proxies such that they reflect the relative levels of confidence of the project creators to their peers; i.e., projects in the same category. This alternative approach attempts to capture the possibility that potential backers would show increased interest in projects that exhibit higher levels of confidence compared to others seen on Kickstarter at the time. To do this we construct a normalized score for each of the confidence proxies relative to their peers:

$$\text{Relative confidence}_{a,i} = \frac{\text{Confidence}_{a,i} - \overline{\text{Confidence}_{a,p_i}}}{\sigma(\text{Confidence}_{a,p_i})} \quad (4)$$

where $\text{Confidence}_{a,i}$ is the respective confidence proxy for project duration and linguistic certainty, we define peers (denoted p_i) to be the set of projects that are in the same category as project i and were a) active during the funding period of the focal project, or b) launched 30 days before the launch date¹⁴ of the focal project. $\overline{\text{Confidence}}$ and $\sigma(\text{Confidence})$ represent the average and standard deviation of peers' confidence, respectively. By using a time varying window to include project peers, we can separate the relative self-confidence of the creator at the time of generating the project from the perceived confidence observed by backers.

¹⁴ We exclude projects that were launched within two days before the debut of the focal project to allow for the delay due to the maximum time it takes for Kickstarter approval.

Table 3

Effect of relative confidence on funding success

Perceived confidence (Peers: active projects during focal projects' funding period)						
Duration	Relative confidence	Relative confidence ²	$\overline{\text{Confidence}}$	Control		
(1)	0.11*** (15.60)	-0.0019 (-0.33)		Yes	N	61009
	0.03	-0.00			Pseudo R2	0.233
					p. > χ^2	0.000
(2)	0.11*** (15.11)	-0.0033 (-0.55)	-0.18, \ddagger (-1.77)	Yes	N	61009
	0.03	-0.00	-0.05		Pseudo R2	0.233
					p. > χ^2	0.000
Linguistic certainty						
(3)	0.02** (2.81)	-0.02*** (-6.26)		Yes	N	60127
	0.01	-0.01			Pseudo R2	0.233
					p. > χ^2	0.000
(4)	0.02*** (2.81)	-0.02*** (-6.26)	-0.61 (-1.39)	Yes	N	60127
	0.01	-0.01	-0.18		Pseudo R2	0.233
					p. > χ^2	0.000
Relative self-confidence (Peers: projects launched within 30 Days before the focal project launch)						
Duration	Relative confidence	Relative confidence ²	$\overline{\text{Confidence}}$	Control		
(5)	0.095*** (11.81)	-0.00*** (-10.00)		Yes	N	60948
	0.03	0.03			Pseudo R2	0.232
					p. > χ^2	0.000
(6)	0.094*** (11.68)	-0.00*** (-9.93)	-0.23* (-2.24)	Yes	N	60948
	0.03	0.00	-0.07		Pseudo R2	0.232
					p. > χ^2	0.000
Linguistic certainty						
(7)	0.01 (1.35)	-0.01 (-1.60)		Yes	N	60066
	0.00	-0.00			Pseudo R2	0.232
					p. > χ^2	0.000
(8)	0.01 (1.35)	-0.01 (-1.60)	-0.59 (-1.32)	Yes	N	60066
	0.00	-0.00	-0.18		Pseudo R2	0.222
					p. > χ^2	0.000

Notes: Results from Probit regressions. Marginal effects are in italics; t-statistics are in parentheses. \ddagger p < .10; * p < .05; ** p < .01; *** p < .001.

We present the results of the probit analysis on the binary funding success outcome in Table 3, using the same set of controls analysis as Table 2. We also control for the average confidence level of the peers. Interestingly, we find that while the effect of self-confidence proxy based on linguistic certainty is similar to that of the main analysis, the finding suggests that the chance of the project achieving its set funding goal amount monotonically increases with the confidence proxy based on project duration (also see Figure 1e and 1f). In addition, we estimated the OLS regressions with funds raised and number of backers; the (unreported) results are consistent with our main findings, suggesting the results are robust.

General Discussion

By proposing two new behavioral-based methods as proxies for exhibited confidence, we contribute to the literature on social displays of emotion, confidence, and crowdfunding. Firstly, we extend on entrepreneurial literature by focusing on interpersonal emotions rather than intrapersonal emotions. We demonstrate that confidence as an emotion relays information in interpersonal settings and influences behavior, which is evident in an online and textual setting. In line with digital displays of positive and negative emotions (Koch & Siering, 2019), exhibiting an emotion such as confidence in a social setting can positively influence crowdfunding success. Secondly, there are a limited number of measures proposed for confidence beyond those used in self-reports, and the difference between what was expected and observed. This gap has not been adequately addressed, in part because existing confidence measures fail to capture displays of confidence during naturally occurring interactions. Instead, we propose measures that are based on observed behavior. We thereby minimize the subjectivity associated with measures of confidence based on verbal statements (Svenson, 1981), and capture confidence during an

interaction with consequential outcomes – e.g., funding to create a project. Finally, by examining the interactions between exhibited confidence and successful outcomes in crowdfunding, we find an optimal level of confidence exists within an interpersonal setting, which is an element that has not explicitly been considered. Our results align with that of Anglin et al. (2018) and extend their findings by establishing an optimal level of exhibited self-confidence.

In rewards-based crowdfunding, the level of exhibited confidence can reduce interactions. Highly successful interactions occur when a ‘sweet spot’ or a ‘just right’ Goldilocks level of confidence is exhibited. Both behavioral-based proxies for confidence demonstrate that a low level of exhibited confidence is associated with a reduced amount of funds contributed and number of contributors. Conversely, high levels of confidence damaged the potential success of a project, as reflected by a non-linear inverted U-shaped relationship between exhibited confidence and success, irrespective of whether it is based on project duration or linguistic expression. Moreover, the effects of the duration-based confidence proxy in *period 2* and *3* are more visible compared to that of *period 1*, as evident in the direction and significance of the coefficients (refer to Table A2). This result supports the relevance of an anchoring effect, that is, small deviations in the proxy (as seen in *period 2* and *3*) represent larger changes in the level of actual confidence. Further, we determine that these results are robust when compared to the relative confidence of peers. These findings suggest that confidence plays a role in interpersonal settings, and that emotional expressions of confidence can convey additional information.

Practical implications

Our findings provide pertinent insight into the communication of confidence within interpersonal settings, specifically when confidence is exhibited within a textual setting. For example, when entrepreneurs or business owners provide quotes or estimates of delivery times, and if those quotes

are perceived to be too good to be true, the information may not be accepted. However, by confirming the level of confidence exhibited, the information could be adjusted to improve the chances of it being funded. Other settings may reap the benefits of understanding levels of confidence exhibited; for example, online platforms, such as Airtasker, People Per Hour or Fiverr, which all have competition for each job. As we saw in the crowdfunding setting, rather than exhibiting a high level of overconfidence when proposing new ventures, entrepreneurs would be better served exhibiting a moderate level of confidence. Thus, we recommend that entrepreneurs consider the level of exhibited confidence when interacting in an interpersonal setting.

Exhibiting overconfidence or underconfidence can negatively affect the amount of funds raised and number of contributors in a crowdfunding project. Based on our self-confidence proxy using descriptive text, a 0.1 increase in the ratio of detected self-confidence below the optimum (turning point) increases funds and backers by 18% and 8.27% from the level underneath, respectively. However, a unit increase of self-confidence over the turning point decreases funds and backers by 17% and 9%, respectively. The same trend occurs for exhibited confidence based on duration: for a 0.1 increase in the ratio over the confidence turning point, funds and backers reduced by 15% and 8.6% respectively, and a 0.1 increase in confidence ratio for those below the turning point increased funds and backers by 20.5% and 12%. Overall, the average project was under the optimal point of self-confidence for both the amount raised and backers, while the average project exhibited confidence proxy based on duration was above the optimal point of confidence.

In a situation where an entrepreneur is seeking funding in a crowdfunding or investor setting, it is important to be aware of the level of confidence they can exhibit without negatively impacting their chances of receiving funding. Likewise, knowing the optimal level of confidence to exhibit would be advantageous to those in sales or marketing. Such groups would benefit from guidance

or training that incorporates optimal levels of exhibited confidence; doing so would reduce the misunderstandings experienced by individuals when exhibiting confidence. To further reduce misinterpretations, entrepreneurs could use the tools we have described to assess their project pitches and adjust the pitch accordingly.

Limitations and Avenues for Future Research

Our confidence proxies are not free of problems. Project creators could reduce project duration for strategic reasons; for example, to avoid backer procrastination, failure, forgetfulness in contributing (thereby using duration as an attention device) or the generation of social media hype (focused attention). It could also be said that, rather than being an exhibitor of confidence, creators are basing the project's duration on pre-existing external deadlines. Regardless of whether the creator is basing this decision on a pre-existing deadline or not, the duration choice is made ex-ante to the project's completion. A project creator would still need to be confident that they had the capacity to meet any deadlines.

Furthermore, some would argue that Kickstarter is not an optimal environment for investigation, as it could be used strategically as a marketing tool rather than an avenue for funding and production. It has been theorized that larger, more established firms are more likely to use such a strategy, crowding out smaller projects (Brown, Boon & Pitt, 2007). However, it is unlikely that such strategic behavior would have emerged in the beginning of Kickstarter. Additional investigation into project creator choices using an experimental laboratory setting could differentiate the strategic vs genuine exhibition of confidence.

Overall, the fact that both confidence proxies yield similar results suggests that the choice of campaign duration is not based entirely on strategic calculation. Ongoing developments in the field

of text analysis will allow future research to further test the robustness of our results. This could be complemented by data collection of project creators which would include individual difference indicators or self-reporting for their individual levels of self-confidence. As an additional avenue, there is scope within the field of crowdfunding to determine whether serial entrepreneurs (creators) exhibit higher levels of confidence compared to their non-serial entrepreneurial peers. Finally, the findings of this paper could be applied in different entrepreneurial settings, as a written proposal and project duration are required when applying for funding with traditional financiers or in other types of crowdfunding.

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Appendix

Table A1

Descriptive statistics of first projects

	N	Mean	SD	Min.	Max.
<u>Dependent Variables</u>					
Backers		78.74	752.53	0	87142
Raised (\$)		5925.49	67303.29	0	10266846
Funded					
No	35598	0.55			
Yes	29674	0.45			
<u>Independent Variables</u>					
Confidence (Duration ratio)		0.53	0.24	0	0.99
Confidence ² (Duration ratio)		0.34	0.20	0	0.98
Confidence (Certainty ratio)	64343	0.40	0.22	0	1
Confidence ² (Certainty ratio)	64343	0.21	0.21	0	1
<u>Controls</u>					
Goal (\$)		15020.55	196421.86	0.15	21474836
Duration		38.09	16.12	1	91.96
No influence	5028	53.35	22.78	1.00	90.00
First Blog Post	13691	43.73	20.01	1.49	91.96
Rule Change	46553	34.78	12.05	1	60.0
Word count		481.38	432.56	50	26305
Number of reward tiers	61009	8.24	4.66	1	138
Official category					
Art	5765	0.09			
Comics	1597	0.02			
Dance	905	0.01			
Design	2452	0.04			
Fashion	2100	0.03			
Film & video	17106	0.26			
Food	2543	0.04			
Games	2852	0.04			
Music	16017	0.25			
Photography	1910	0.03			
Publishing	7470	0.11			
Technology	1313	0.02			
Theatre	3242	0.05			
Team		0.57	0.49		
Misspelling	1103	0.01	0.12		
Social Media					
Network		0.03	0.16		
Projects Backed		1.30	4.42	0	431

Average number of competitors in sub-category	121.17	86.43	1	465.32
Staff Pick	0.09	0.28		

Notes: N is 65,272 unless otherwise stated. Latitude and longitude are excluded because they are not informative.

Table A2

Multivariate analysis: amount raised and number of backers over duration change period

	<i>ln</i> (Raised) Period 1 (A7)	<i>ln</i> (Raised) Period 2 (A8)	<i>ln</i> (Raised) Period 3 (A9)	<i>ln</i> (Backers) Period 1 (A10)	<i>ln</i> (Backers) Period 2 (A11)	<i>ln</i> (Backers) Period 3 (A12)
Confidence (duration ratio)	-0.29 (-0.62)	1.92*** (5.56)	2.04*** (11.13)	-0.09 (-0.37)	1.08*** (5.99)	1.28*** (12.51)
Confidence ² (duration ratio)	0.83 (1.40)	-1.32*** (-3.31)	-2.02*** (-9.18)	0.57, Δ † (1.81)	-0.64** (-2.98)	-1.19*** (-9.66)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
N (Obs.)	4972	13680	42357	4972	13680	42357
R ²	0.217	0.225	0.269	0.289	0.281	0.337

Notes: Results from ordinary least squares (OLS) regressions. *t*-statistics in parentheses; art, no edit are reference groups. Δ † $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.

Table A3

Multivariate analysis: amount raised and number of backers, all observations by under and over confidence.

	<i>ln</i> (Raised) Period 2 Under (A13)	<i>ln</i> (Raised) Period 2 Over (A14)	<i>ln</i> (Backers) Period 2 Under (A16)	<i>ln</i> (Backers) Period 2 Over (A17)	<i>ln</i> (Raised) Period 3 Under (A18)	<i>ln</i> (Raised) Period 3 Over (A19)	<i>ln</i> (Backers) Period 3 Under (A20)	<i>ln</i> (Backers) Period 3 Over (A21)
Confidence ((M-D_k)/M)	1.36*** (10.12)	-2.69** (-2.88)	0.83*** (11.46)	-1.48** (-2.86)	1.24*** (15.91)	-2.77*** (-6.11)	0.80*** (17.61)	-1.62*** (-6.50)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N (Obs.)	8485	1458	8485	1458	17575	7546	17575	7546
R ²	0.238	0.212	0.306	0.240	0.293	0.249	0.365	0.302

Notes: Results from ordinary least squares (OLS) regressions. *t*-statistics in parentheses; art, no edit are reference groups. Δ † $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.

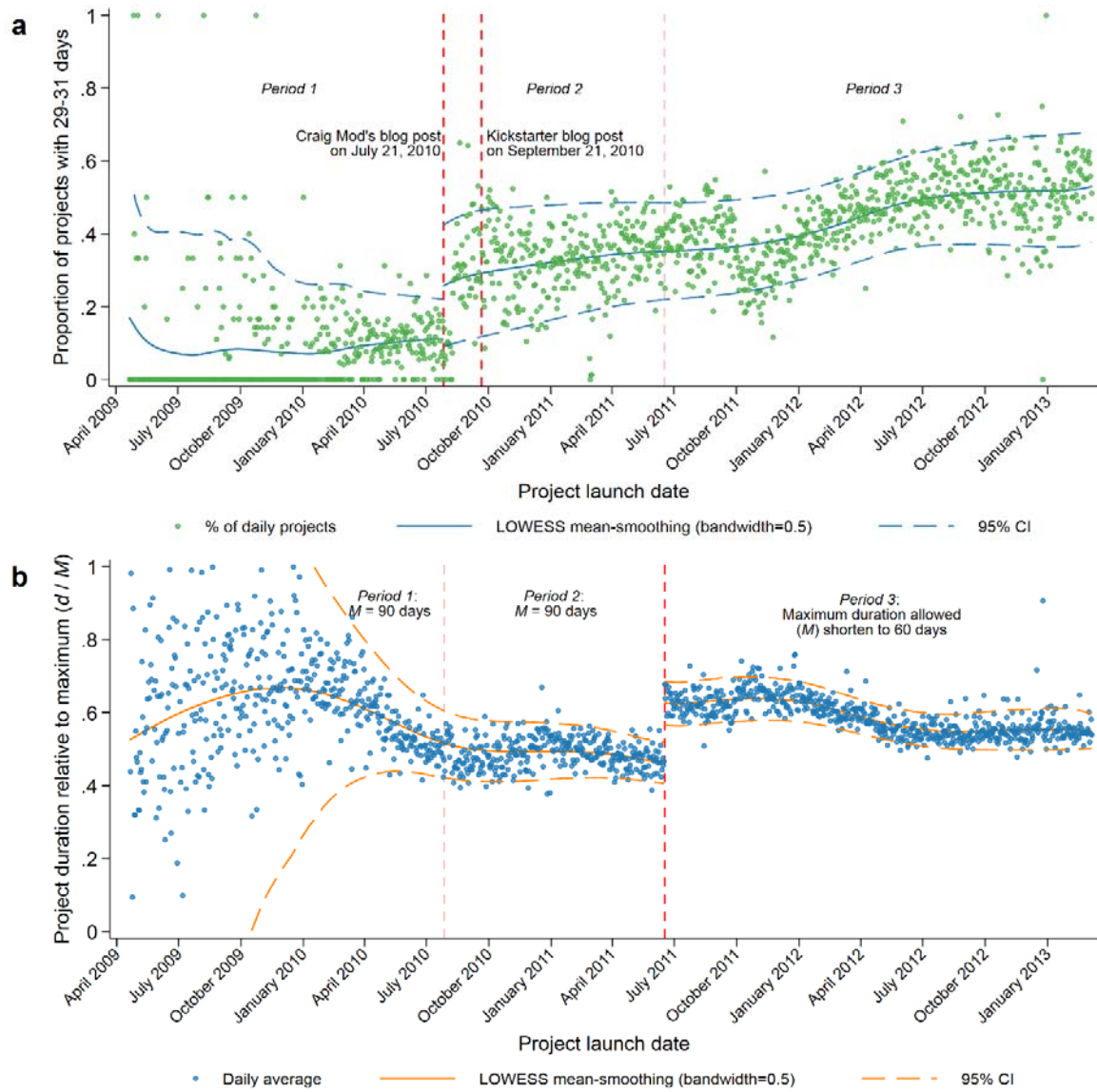


Fig. A1. Project duration recommendation and rule change: (a) Proportion of daily projects with duration of 29 to 31 days; (b) Project duration relative to maximum allowed.

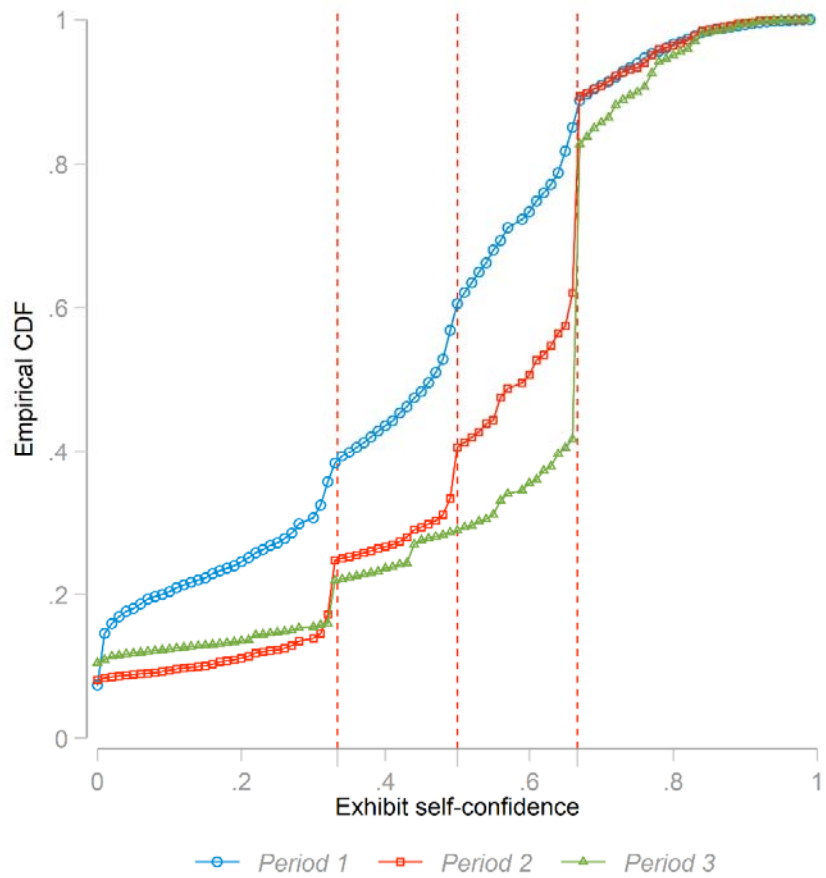


Fig. A2. Empirical cumulative distributions function (CDF) of exhibit self-confidence.

Notes: Comparison over *period 1* (base period), 2 (recommendation of 30 days), and 3 (after reduction of maximum time). Dashed lines represent 0.33, 0.5, and 0.66 cut-offs. For all three periods, cut-off of 0.66 represents project duration of 30 days. For *period 1* and 2, cut-offs of 0.33 and 0.5 corresponds to 60 and 45 days, respectively. For *period 3*, cut-offs of 0.33 and 0.5 corresponds to 45 and 37 days, respectively.

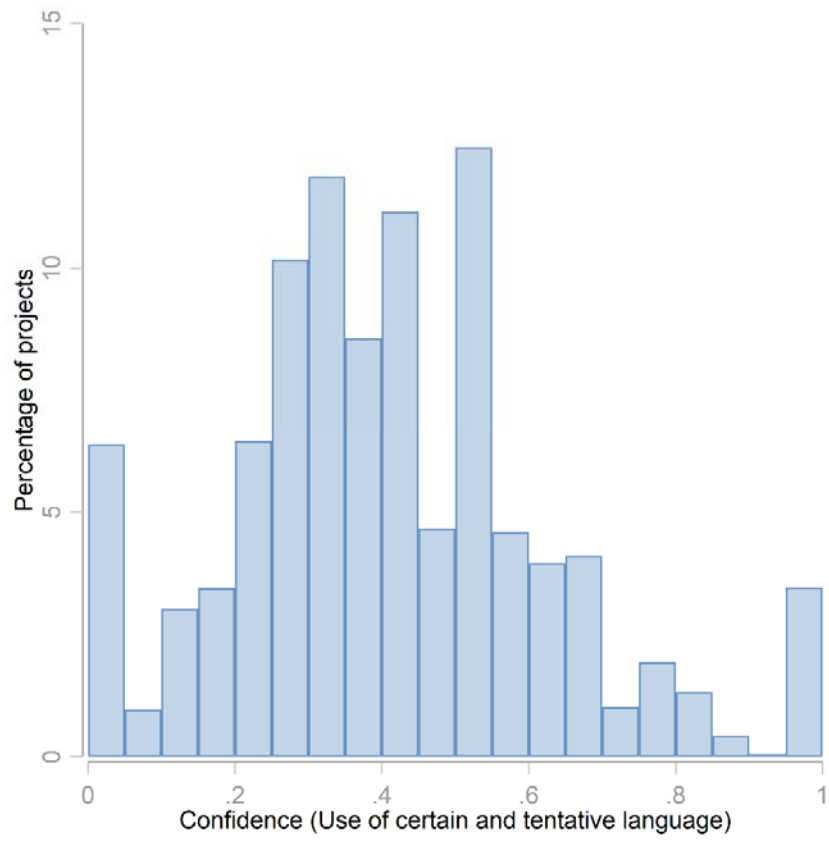


Fig. A3. Distribution of proxy of self-confidence based on the use of certain and tentative language.

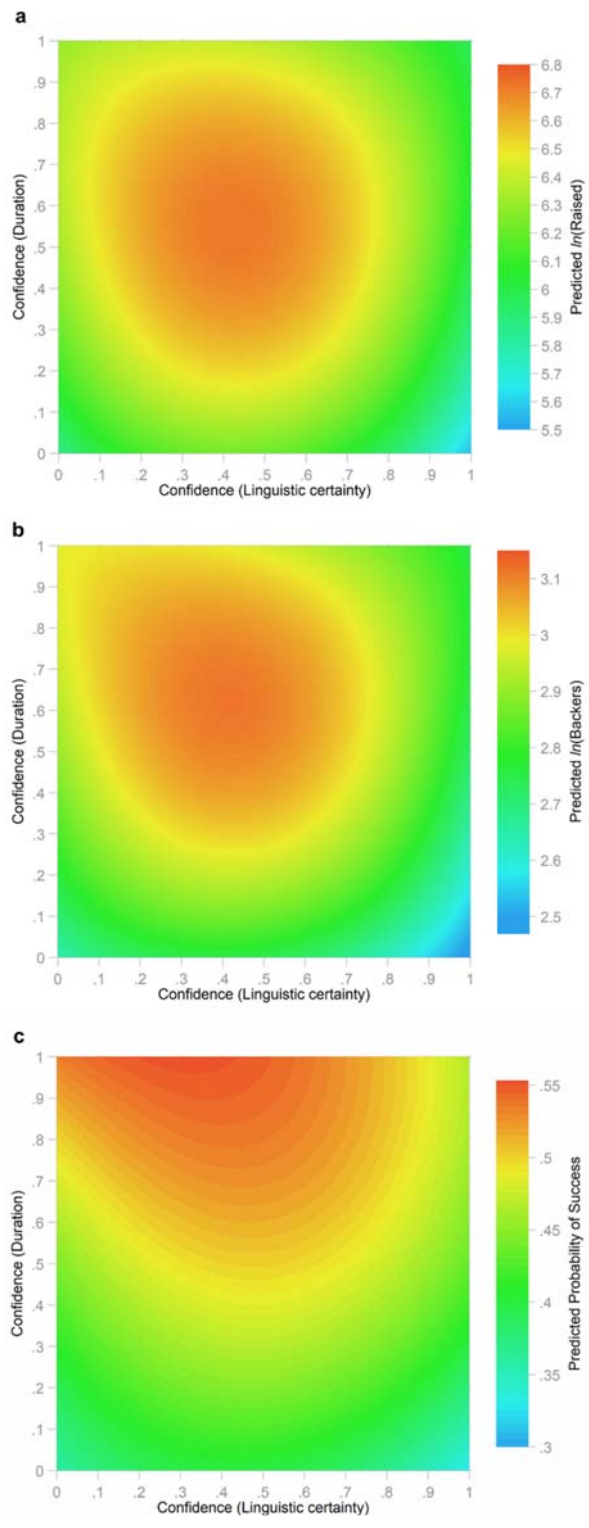


Fig. A4. Effect of entrepreneurial confidence on success: (a) Prediction of fund raised (natural log), (b) prediction of number of backers (natural log), (c) predicted probability of funding goal achieved.