Small Bus Econ (2020) 55:57–76
https://doi.org/10.1007/s11187-019-00145-w

The narcissism of crowdfunding entrepreneurs

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Accepted: 6 February 2019 / Published online: 22 February 2019

Abstract Social networks and personality traits of the entrepreneur affect investors' willingness to finance start-ups, particularly in reward-based crowdfunding where observable individual characteristics are paramount. We study the impact of crowdfunding entrepreneurs' narcissism on campaign design and campaign outcome. We distinguish between the ego-defensive behavior and grandiose/arrogant behavior of narcissists in the hypotheses for campaign design. We find that more narcissistic crowdfunding entrepreneurs set less ambitious goals and longer campaign durations, consistent with ego-defensive behavior. We further document that more narcissistic entrepreneurs are less successful than other entrepreneurs, suggesting that crowdfunders recognize the narcissistic tendencies of entrepreneurs and are more reluctant to support them. Our results are consistent with recent conceptual research, suggesting that there are specific effects of narcissism in the early-stage entrepreneurial context.

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Keywords Entrepreneurial finance · Crowdfunding · Narcissism

JEL classifications G30 · G40 · L26 · M13

1 Introduction

Social networks, personality traits of the entrepreneur, and proper communication with the crowd are important to a successful crowdfunding campaign (Colombo et al. 2015; Dorfleitner et al. 2018; Obschonka and Stuetzer 2017; Vismara 2016). This is especially important for crowdfunded entrepreneurs who are typically unknown to most of their funders and cannot therefore rely on any established reputation, as most of them only run a campaign once (Butticè et al. 2017). In addition, reward-based crowdfunders pledge not for a financial return but for a product and to help the entrepreneur as a person (Gerber et al. 2012; Giudici et al. 2018). It follows that investors (or crowdfunders) base their decision to support projects on observable characteristics of newcomers, rather than on their previous performance or reputation.

We choose to focus on narcissism to capture the contribution of the crowdfunding entrepreneurs' personality traits to the design and success of the campaign. First, there is empirical evidence that narcissism is important at other stages of the entrepreneurial venture. Hmieleski and Lerner (2016) show that narcissism is a determinant of entrepreneurial intention and is positively associated with both productive and

unproductive entrepreneurial motives. Mathieu and St-Jean (2013) show that student entrepreneurs are more likely to be narcissistic than their non-entrepreneur counterparts. Second, conceptual papers predict positive or negative effects of narcissism at different stages of the entrepreneurial project. Tucker et al. (2016) posit that in the opportunity exploitation stage of the project, narcissists are more likely to succeed because they are visionary and are able to inspire others to contribute to the venture. However, narcissists are less likely to succeed at the early stages of the venture (Haynes et al. 2015; Tucker et al. 2016). Third, narcissists are motivated by ego-benefits rather than the material gains sought by individuals with other dark triad traits such as Machiavellianism or psychopathy (Tucker et al. 2016). This is particularly relevant to the reward-based crowdfunding context in which material gains are typically limited but ego-benefits brought about by project visibility are potentially high. Finally, empirical evidence shows that narcissism is discernable in online contexts (Clifton 2011), lending credibility to the idea that narcissism may affect campaign success.

We examine whether narcissistic entrepreneurs design their crowdfunding campaigns differently, and whether these differences affect campaign outcomes. The effects of narcissism may be particularly important in the context of reward-based crowdfunding. First, crowdfunded projects are typically small and under the direct control of the crowdfunding entrepreneur. That the success of the project hinges on the entrepreneur is therefore beyond dispute. This leaves him or her more exposed to the risk of being stigmatized by a failure (Burchell and Hughes 2006; Simmons et al. 2014) and thus more concerned by how he/she is perceived by others. Second, perceptions of contributors are likely to be more important in reward-based crowdfunding projects, because campaign supporters are not interested in a monetary return on investment but on the warm glow that comes with helping the underdog and other pro-social motivations, as evidenced in various consumption and funding contexts (Andreoni 1990; McGinnis and Gentry 2009; Lin et al. 2014; Davis et al. 2017; Polzin et al. 2018). Third, projects are typically unfiltered in reward-based crowdfunding so potential backers are able to select among a broad range of entrepreneur personality types, which may be unobservable on other types of crowdfunding platform. Finally, the entire campaign is conducted on the internet, affording opportunities for potential backers to assess the characteristics of the founder. It also makes the project visible to everyone, enabling access to a crowd that goes well beyond the traditional group of family, friends, and fans.

We define narcissism in the personality psychology tradition, which considers it to be a normal part of an individual's psychological makeup.[1] Consistent with the prevailing view, we assume narcissism is a continuously distributed personality trait (Campbell and Foster 2007). Narcissism is usually associated with grandiose behaviors (American Psychiatric Association 2013; Emmons 1987). However, narcissists may also suffer from fragile self-esteem which causes them to engage in ego-defensive behaviors, consistent with approach-avoidance motivations (Foster and Brennan 2011). We formulate alternative hypotheses for the effect of narcissism on campaign design. If grandiose behavior is on average more prevalent among narcissistic crowdfunding entrepreneurs, we expect higher goals, a greater probability of choosing the all-or-nothing (AON) funding model and shorter campaign duration. If ego-defensive behavior is prevalent on average, we would predict lower goals, a greater probability of the keep-it-all (KIA) funding model and a longer campaign duration. Previous research suggests that more narcissistic entrepreneurs are less successful (Navis and Ozbek 2016; Klotz and Neubaum 2016). Crowdfunding campaigns are often entrepreneurial projects that cannot be pursued if the campaign is unsuccessful, so narcissism can particularly damaging (Tucker et al. 2016). We therefore posit that higher levels of narcissism are associated with less successful crowdfunding campaigns.

To test our hypotheses, we collect data on crowdfunding campaigns set up on Indiegogo, an internationally active reward-based platform. We capture narcissism using patterns in first-person pronoun usage. Prior research in psychology shows a positive (negative) correlation between first-person singular (plural) pronouns and the Narcissistic Personality Inventory (NPI) scores. Following Chatterjee and Hambrick (2007) and Aktas et al. (2016), we estimate a narcissism score as the

[1] The Oxford English Dictionary defines narcissism as "extreme selfishness, with a grandiose view of one's own talents and a craving for admiration, as characterizing a personality type." The academic literature offers different views. As discussed below, it is at times considered either as a personality disorder (American Psychiatric Association 2013)—leading to impairments in personality and interpersonal functioning due to grandiosity, attention seeking, and self-centeredness—or simply as a personality trait (Emmons 1984, 1987). We take the second approach.

ratio of first-person singular pronouns to total first-person pronouns. We are able to estimate the score for crowdfunding entrepreneurs using the descriptive texts provided on Indiegogo. We restrict the sample to projects with at least two team members to ensure that the entrepreneur has a real choice between singular and plural pronouns. This leaves us with a final sample of 14,968 unique campaigns from the very beginning of the platform launch until November 2013, covering a range of project categories and countries.

Our empirical analysis shows that narcissistic entrepreneurs set lower funding goals and longer campaign durations, consistent with ego-defensive behavior. This reduces the exposure of the entrepreneur. A lower goal helps the entrepreneur to reach the stated objective and obtain funds, minimizing his/her risk of damaging his/her ego. Similarly, by allowing the crowd to pledge for longer, the entrepreneur reduces his/her risk of not getting enough attention early on in the campaign. More narcissistic entrepreneurs are also less successful in their campaign, despite the fact that they set lower funding goals. They are less likely to collect sufficient funds to achieve their set goal, attract fewer backers, and raise less funds in dollars. This finding supports the idea that more narcissistic entrepreneurs tend to be less successful than less narcissistic entrepreneurs and that narcissism is a negative characteristic for nascent entrepreneurs. In robustness checks, we control for the overconfidence of entrepreneurs, as the grandiose dimension of narcissism may be correlated with the cognitive bias of overconfidence (Adomdza et al. 2016; Cassar 2010; Forbes 2005; Hayward et al. 2010; Townsend et al. 2010). While overconfidence also affects campaign design, it does not alter our results on narcissism.

Our paper makes two main contributions to the existing literature. First, we contribute to the burgeoning literature on crowdfunding by examining how the personality traits of crowdfunding entrepreneurs affect campaign design and outcome. Some studies investigate other aspects such as gender, geographical distance, and social capital (Agrawal et al. 2015; Colombo et al. 2015; Mohammadi and Shafi 2018; Mollick 2014). Others examine the impact of signals and certification as well as funding dynamics (Ahlers et al. 2015; Hornuf and Schwienbacher 2018; Kuppuswamy and Bayus 2018; Mollick 2014; Ralcheva and Roosenboom 2016; Vismara 2018; Signori and Vismara 2018). To the best of our knowledge, our study is the first to investigate how narcissism affects the design of reward-based crowdfunding campaigns. Anglin et al. (2018) show that extreme levels of narcissism are detrimental to campaign success, but offers little insight into the leading effects of campaign design. Most important, our analysis focuses on the fundraising phase of entrepreneurship, where the impact is likely to be different from the management phase where the entrepreneur plays a model role in the start-up. Second, from the theoretical perspective, we provide novel evidence for the effects of narcissism in very early-stage ventures, lending support for the theoretical conclusions of Haynes et al. (2015) and Navis and Ozbek (2016).

The remainder of this paper is structured as follows. The next section presents relevant literature and sets out our hypotheses. Section 3 describes the data and provides the main summary statistics of our sample of crowdfunding campaigns. Section 4 presents results. Finally, Section 5 concludes.

2 Literature and hypotheses

2.1 Crowdfunding

Different forms of crowdfunding coexist (Mollick 2014; Schwienbacher and Larralde 2012). However, they are generally studied separately, since the way they operate affects the type of compensation obtained by participants and thereby the type of crowd participating in the campaigns. In reward-based crowdfunding, backers donate a small amount of money in exchange for a predetermined reward. The latter is often either a t-shirt (or any other type of goody) or the product resulting from the project. The crowd does not therefore base its decision on whether the entrepreneurial project is profitable per se, but rather whether they wish to sponsor the entrepreneur's project and "pre-purchase" the product. For instance, McGinnis and Gentry (2009) argue that warm glow consumers may support a project out of empathy for the entrepreneur, as a way to help an underdog against market-dominant firms. While their study is not specific to crowdfunding but to consumption behavior more generally, this effect may still apply to reward-based crowdfunding. Since the sponsoring component is important in any crowdfunding campaign, the crowd's perception of the entrepreneur, including his or her personality traits, is important. Other important pro-social motivations are provided by Davis et al. (2017), Lin et al. (2014), and Giudici et al. (2018).

Social networks are extensively used in crowdfunding campaigns (Agrawal et al. 2015; Colombo et al. 2015; Mollick 2014; Vismara 2016)—entrepreneurs need to interact with the crowd to attract backers and the entire campaign is run on the Internet. Colombo et al. (2015) find that entrepreneurs' social capital (i.e., the extent of the social network on Facebook and LinkedIn) is crucial to attract the first backers, who affect the behavior of follow-up individuals during the campaign. Social networks further help alleviate geographical distance between backers and entrepreneurs (Agrawal et al. 2015) and help reduce information asymmetries (Lin et al. 2013). Vismara (2016) finds that entrepreneurs with higher levels of social capital are more successful at raising the required funds, because those with a more extensive initial social network are more widely known, creating rapid hype for the campaign and generating more early contributions.

Research in social psychology examines narcissism in the context of online social networks and, more broadly, the Internet. More narcissistic individuals tend to post more online material and their social network content enables observers to identify them as more narcissistic (Clifton 2011). They use the Internet as a self-promotion tool and use online communities to explicitly and implicitly regulate their inflated self-concept (Buffardi 2011). These findings are important to our study because they show that real world narcissistic behaviors, such as those documented in Buss and Chiodo (1991), transfer readily to the virtual world. In addition, Buffardi (2011) cites evidence that web users are able to accurately identify narcissism from the online content posted by individuals.

2.2 The narcissism concept

Klotz and Neubaum (2016) underline the importance of using properly defined concepts and credible measures in research on dark side personality traits and entrepreneurship. The narcissism concept meets these criteria. It is theoretically grounded, tracing its origins to Freud (1914/1986). Following Freud's original work, the concept has been defined as a pathology (American Psychiatric Association 2013) and as a personality trait (see e.g., Raskin and Hall 1979). Both the pathological and trait-based approaches describe grandiose behaviors, with a strong sense of entitlement and attention-seeking behaviors. However, in the trait-based approach, narcissism is not necessarily pathological and describes the degree to which an individual has a grandiose sense of self-importance, requires constant admiration and attention, displays a sense of entitlement, fantasizes about unlimited power and success, and is interpersonally exploitative. Trait narcissism can be captured in the general population using questionnaires such as the Narcissistic Personality Inventory or NPI (Emmons 1987). Considering narcissism as a normal personality trait implies that "narcissism should be thought of as neither entirely healthy nor unhealthy" (Campbell and Foster 2007, p. 133). In our study, we follow the second approach to narcissism and define it as a continuously distributed normal personality trait, consistent with Campbell and Foster (2007).

Another aspect of narcissism making it relevant for our study is that it characterizes both cognition and behavior: "Narcissism is a quality of the self that has significant implications for thinking, feeling and behaving" (Campbell and Foster 2007; p. 12). It implies that individuals are compelled to act in certain ways to enhance their ego (Buss and Chiodo 1991; Campbell et al. 2004). It leads highly narcissistic individuals to engage in the seemingly risky behaviors (Foster et al. 2009). Vazire and Funder (2006) underline impulsivity as a characteristic of narcissism, as narcissists find it difficult to delay gratification. On the other hand, narcissists may suffer from fragile self-esteem (Ziegler-Hill and Jordan 2011). They may take pre-emptive action and lower their sights if they detect a potential threat to their ego. This forms part of a self-regulatory strategy to protect their fragile self-esteem—"… narcissists seem to defuse potential harms to the self even when these are only potential and before they have had a chance to materialize" (Morf et al. 2011; p. 62).

An additional advantage of the narcissism concept is that prior empirical work in psychology has provided measures which can be credibly implemented in large samples of individuals. Raskin and Shaw (1988) demonstrate a positive (negative) correlation between first-person singular (plural) pronouns and narcissism scores from the NPI. The study shows that these correlations are robust to the inclusion of controls for age, gender, and the content of the material analyzed. They also persist once the big five personality traits[2] are controlled for. Finally, there is no correlation between second- and third-person pronouns and NPI scores in their study. We

[2] Openness, conscientiousness, extraversion, agreeableness, neuroticism

are able to use the findings of the Raskin and Shaw (1988) study to implement a measure of narcissism based on first-person pronoun usage, which has already been employed in large samples (see Aktas et al. 2016 and Chatterjee and Hambrick 2007).

2.3 Narcissism in the entrepreneurial context

There are a number of reasons for relying on narcissism to capture the individual psychological characteristics of crowdfunding entrepreneurs. The existing literature suggests that the individual characteristics of entrepreneurs have different effects at successive stages of the entrepreneurial project. Markman and Baron (2003) develop a conceptual framework describing person-entrepreneurship fit and its link to entrepreneurial success. Although their framework does not consider psychological characteristics explicitly, it does make a strong case for the importance of the entrepreneurs' individual characteristics in the success of projects. Frese and Gielnik (2014) identify the three phases of the entrepreneurial project: (1) opportunity identification, (2) refinement of the business plan and resource acquisition, and (3) survival and growth. The authors posit that individual psychological characteristics are relevant predictors of success in the three stages, with the effects being strongest during the early stages of the venture.

Conceptual studies in entrepreneurship highlight the potential importance of narcissism as a determinant of entrepreneurial intention. Navis and Ozbek (2016) suggest that narcissistic individuals are more likely to enter novel venture contexts. Previous research also makes predictions about the effect of narcissism on entrepreneurial success. More narcissistic entrepreneurs are less likely to succeed because their narcissism prevents them from accepting feedback and therefore from learning (Navis and Ozbek 2016). Haynes et al. (2015) make the case for different effects of narcissism at the different stages of the venture. Hubristic entrepreneurs are more likely to fail in the early stages because they underestimate the resources required. Tucker et al. (2016) describe the effects of the dark triad traits (Machiavellianism, narcissism, and psychopathy) on the entrepreneurial process. They suggest that narcissism is different to the other dark triad traits because narcissists are essentially motivated by ego-reinforcement, while Machiavellianists and psychopaths are motivated by material gains. This makes narcissism particularly relevant to the reward-based crowdfunding context—it is difficult to argue that the material gains would be sufficient to satisfy other dark-trait individuals, but ego-benefits would certainly accrue to narcissists. Focusing on narcissism specifically, Tucker et al. (2016) add that narcissists are more likely to make mistakes in opportunity recognition and opportunity evaluation, either missing good opportunities or taking bad ones. A review of the different conceptual papers leads Grijalva and Harms (2014) to wonder whether high narcissism increases the risk of venture failure.

The available empirical evidence tends to support the suggestion that narcissism affects entrepreneurial intention and success. Grijalva and Harms (2014) cite a number of results showing the association between entrepreneurial intention and narcissism. More narcissistic individuals are more likely to display narcissistic intention (Hmieleski and Lerner 2016) and are more likely to start an entrepreneurial venture (Mathieu and St-Jean 2013). Anglin et al. (2018) show that very high and very low levels of narcissism are detrimental to the success of the entrepreneurial venture. These studies are important because they provide evidence for the relevance of narcissism in entrepreneurial projects. However, to the best of our knowledge, the theoretical predictions about the effect of narcissism on early-stage project design have not been tested empirically.

Although narcissism is generally viewed as a negative characteristic, we can observe both positive and negative effects. Rosenthal and Pittinsky (2006) point out that in some circumstances, narcissistic leaders can be a force for good because they are able to motivate followers through their vision and determination. In the entrepreneurship setting, dark side traits may also have positive sides (Klotz and Neubaum 2016). It is likely that the effects of narcissism or other dark side traits are neither universally good nor universally bad—they are context dependent (Tucker et al. 2016). A number of other conceptual and empirical papers incite us to consider the effects of dark side traits in the entrepreneurial context. Miller (2014) underlines the importance of considering negative aspects of the entrepreneur's personality, which may have positive and negative sides. Wiklund et al. (2018) go as far as to consider the effect of mental disorders on entrepreneurship, suggesting that even pathological narcissism could have different effects at different times or in different contexts.

2.4 Hypotheses development

Campaign design choices by crowdfunding entrepreneurs are likely to be affected differently depending on whether we observe, on average, grandiose/arrogant narcissism (American Psychiatric Association 2013; Emmons 1987) or ego-defensive narcissistic behaviors, as described in Ziegler-Hill and Jordan (2011). In the former case, we would expect a higher goal to be set and an all-or-nothing campaign type—the arrogant narcissist would enhance his or her ego by taking more risk in the campaign, thereby showing off his/her higher expectations of success. In the latter case, we would expect a lower goal and a keep-it-all campaign type. This would protect the individual from a damaging shock to the ego, by increasing the probability of reaching the stated goal and enabling him/her to keep the funds raised, thereby providing something to show for his/her crowdfunding efforts, even if the project needs to be scaled down. We also expect the crowdfunding entrepreneur's narcissism to affect campaign duration. Arrogant narcissists are impulsive (Vazire and Funder 2006), in which case we would expect shorter campaign durations. However, ego-defensive narcissism may cause longer campaign durations, as more narcissistic crowdfunding entrepreneurs take steps to increase the likelihood that they reach their goals, consistent with the self-regulatory mechanisms described in Morf et al. (2011) and Ziegler-Hill and Jordan (2011). We summarize these predictions as follows when narcissism takes the form of grandiose/arrogant behavior:

> Hypothesis 1A (funding goal): *more narcissistic entrepreneurs set a higher funding goal.*
> Hypothesis 2A (funding model): *more narcissistic entrepreneurs are more likely to choose AON.*
> Hypothesis 3A (campaign duration): *more narcissistic entrepreneurs set shorter campaign durations.*

Similarly, Hypotheses 1B, 2B, and 3B summarize our predictions when narcissism takes the form of ego-defensive behavior:

> Hypothesis 1B (funding goal): *more narcissistic entrepreneurs set a lower funding goal.*
> Hypothesis 2B (funding model): *more narcissistic entrepreneurs are more likely to choose KIA.*
> Hypothesis 3B (campaign duration): *more narcissistic entrepreneurs set longer campaign durations.*

The effect of narcissism on campaign success appears less equivocal. Both arrogant narcissism and ego-defensive narcissism describe a trait in which individuals' behavior is affected by the needs of their ego rather than by objective observation and assessment. Conceptual papers on the effect of narcissism on early-stage projects predict that more narcissistic entrepreneurs are less successful (Grijalva and Harms 2014). Tucker et al. (2016) attribute this to narcissists' failure to properly assess projects, leading them to mistakenly invest in bad projects and miss good ones. We therefore formulate the following hypothesis:

> Hypothesis 4 (campaign success): *more narcissistic entrepreneurs' campaigns are less successful.*

We summarize the different hypotheses in Table 1.

3 Data and summary statistics

3.1 Narcissism measure

We choose to measure narcissism using first-person pronoun usage, estimated as the ratio of first-person singular pronouns (I, me, my, mine, myself) to total first-person pronouns (first-person singular pronouns plus we, us, our, ours, ourselves). This measure is based on a study by Raskin and Shaw (1988), demonstrating a positive correlation between first-person singular pronouns and narcissism, and a negative correlation between first-person plural pronouns and narcissism.

The first-person pronoun measure has four main advantages, both theoretical and empirical. First, its ancestry can be mapped back to founding works in psychology. Freud (1914/1986) defined narcissism following his observations in clinical practice. Over the following decades, a full clinical pattern emerged, now formalized in its latest incarnation in the DSM V (American Psychiatric Association 2013). In the 1970s and 1980s, researchers developed a survey instrument, the NPI, to capture narcissism in the general population (see, e.g., Raskin and Hall 1979; Emmons 1987). Finally, NPI scores were found to be correlated with observable characteristics such as speech patterns (Raskin and

Table 1 Summary of hypotheses

	Campaign design			Campaign success
	Goal	Keep-it-all versus all-or-nothing	Campaign duration	
Grandiose/arrogant behavior	Hypothesis 1A: more narcissistic entrepreneurs set a higher funding goal	Hypothesis 2A: more narcissistic entrepreneurs are more likely to choose AON	Hypothesis 3A: more narcissistic entrepreneurs are more likely to set shorter campaign durations	Hypothesis 4: more narcissistic entrepreneurs' campaigns are less successful
Ego-defensive behavior	Hypothesis 1B: more narcissistic entrepreneurs et a lower funding goal	Hypothesis 2B: more narcissistic entrepreneurs are more likely to choose KIA	Hypothesis 3B: more narcissistic entrepreneurs are more likely to set longer campaign durations	

Shaw 1988). Second, the measure relies on patterns in first-person pronoun usage, which can be readily obtained from the texts that crowdfunding entrepreneurs post on their project webpage. Third, the first-person pronoun measure is continuous, consistent with the prevailing view in psychology (Campbell and Foster 2007). Finally, it is possible to estimate the first-person pronoun measure using secondary data from the crowdfunding website, which obviates the need to administer questionnaires with the attendant advantages—mainly our ability to estimate the measure for a large number of crowdfunding projects (more than 14,000 observations). While the number of observations does not ensure empirical quality per se, we can reasonably assume that our findings are fully representative of crowdfunding entrepreneurs on our source website, and are not an artifact of a small sample size or a low response rate.

The first-person pronoun indicator has already been used in samples of CEOs in the finance and strategic management literatures (see Aktas et al. 2016; Chatterjee and Hambrick 2007, respectively).[3] It has, however, recently been cast into doubt by Carey et al. (2015) who claim they fail to replicate the original Raskin and Shaw (1988) study. Closer reading of the Carey et al. (2015) study reveals that they focus only on first-person singular pronouns, which is not the same as the first-person singular and first-person plural measure applied in the existing finance and management literature based on the findings in Raskin and Shaw (1988): "The focus of this paper is on first-person singular only given the strong lay perceptions about I-talk (but not we-talk) indicating narcissism and given that researchers have used I-talk (but not we-talk) as an operationalization of narcissism" (p. e8). In research on narcissism and Internet usage, Buffardi (2011) cites a study which is consistent with Raskin and Shaw (1988). This evidence is particularly relevant to our research because we use texts from a crowdfunding platform to estimate our measure of narcissism.

The way we implement the first-person pronoun measure implicitly assumes that the team leader has a dominant influence in writing the campaign description. It is impossible to test the reasonableness of this

[3] Chatterjee and Hambrick (2007) also use other indicators, which cannot be calculated in our context. The other indicators in Chatterjee and Hambrick are as follows: the size of the CEO's photo in the annual report, the prominence of the CEO in corporate press releases, and CEO relative pay. However, the first pronoun indicator is shown in their study to be highly correlated with the other indicators, justifying the fact that we use it as our main and only indicator.

assumption because we cannot observe the writing process. However, the dominant influence of the team leader is consistent with the existence of a lead entrepreneur, as documented in Ensley et al. (2000).

We address concerns that the narcissism indicator could also be capturing the cognitive bias of overconfidence by including an overconfidence indicator in robustness tests. Although narcissism and overconfidence are theoretically distinct concepts from different psychology traditions, Campbell et al. (2004) document a positive correlation between the two. For robustness tests, we construct an overconfidence indicator based on the "confident" keywords used in Malmendier and Tate (2008).

Project descriptions may also contain videos and pictures, which we do not use as a basis for our narcissism indicator. The reasons are twofold. First, no empirically validated measures are available, unlike for text. This makes it difficult to choose a proper classification based on videos and pictures. Second, videos and pictures are no longer available for many of the projects, which may introduce sample selection bias. However, we explore the correlation between the entrepreneur's relative presence in videos and pictures and the text-based narcissism indicator in a small number of campaigns. Our findings (unreported) show a positive and significant correlation between the first-person pronoun measure of narcissism based on campaign descriptions and the relative presence measure based on photos and videos. More details are available upon request.

3.2 Sample

The initial dataset used in this study is composed of 48,535 completed crowdfunding campaigns collected from Indiegogo, covering the period from June 2008 to November 2013. We apply some data screens to remain consistent with the existing literature and to avoid extreme values which may bias our analysis. Since we use English language textual analysis, we drop the 7419 observations outside the USA, the UK, Canada, and Australia and 599 projects with either a very short descriptive text (less than 400 characters at the 1st percentile) or very large quantity of text (more than 14,270 characters, at the 99th percentile). We further exclude all social- and community-centered campaigns (8691 projects), which include the following categories on Indiegogo: health, community, animals, politics, and religion. These types of projects are not centered on a product but on a person or on a group. The project description will therefore likely use pronouns in a specific way which could bias our measure of narcissism. For instance, in campaigns centered on the illness of a person, which is a typical campaign in the "health" category, the individual describes his/her illness or his/her life experience in a highly personal way.

Following previous papers on reward-based crowdfunding (Mollick 2014; Cumming et al. 2018), we also exclude campaigns with a funding goal higher than $200,000 (which corresponds to the 99th percentile in our sample, or 319 projects), since they are generally atypical.[4] Our narcissism measure implies that crowdfunding entrepreneurs must effectively be able to choose whether to speak in the first-person singular or plural. For solo campaigns, it seems difficult to imagine that the entrepreneur would choose to speak in the first-person plural. We therefore limit our sample to team projects, which we define as including at least two entrepreneurs (reducing the sample by 16,350 projects). After removing the projects for which no first-person pronouns were used at all (189 projects), this leaves us with a final sample of 14,968 observations. All currency amounts (the variables *Goal* and *Pledged*) not initially set in US dollars are converted using the semester average currency exchange rate. Variable descriptions are provided in Appendix Table 7 here and further discussed in the next subsection.

3.3 Variables

For each entrepreneurial project, we extract a number of details about campaign design and outcomes. These include the goal, the campaign type (keep-it-all or KIA versus all-or-nothing or AON), the length of the campaign, the number of team members, the nature of the rewards, non-profit status, funds pledged, and the number of backers. We are also able to extract soft information, such as texts describing the project, the number of photos, the presence of a video pitch, and links to social networks.

[4] Mollick (2014) examined Kickstarter campaigns with very large funding goals and concluded that they all had unrealistic expectations, and (as a result) none of them got funded.

3.3.1 Dependent variables

We test hypotheses 1A/1B, 2A/2B, and 3A/3B on campaign design by focusing on three important decisions the entrepreneur makes on the Indiegogo platform: the funding goal, measured by *Ln*(*Goal*); the funding model, captured by the dummy variable *AON Dummy*; and the campaign duration (the variable *Duration*), defined as the number of days the campaign is open. These decisions affect the extent to which the entrepreneur bears risk in the campaign (Cumming et al. 2018). A high funding goal makes success more difficult to achieve, as the entrepreneur needs to attract more backers. Predictions for the impact of narcissism on the funding goal are provided in hypotheses H1A and H1B. The AON funding model shifts the risk to the entrepreneur, away from the crowd. In an AON campaign, the crowd does not bear the risk of pledging money to a potentially underfunded project, which could be an outcome under the alternative KIA funding model. Predictions for the impact of narcissism on the funding model are provided in hypotheses H2A and H2B. Finally, a longer campaign duration allows the entrepreneur to depend less on a short period of time to attract enough people. Predictions on campaign duration are provided in hypotheses H3A and H3B.

We test hypothesis H4 on campaign outcomes in three different ways: achievement of the funding goal (the binary variable *Success Dummy*), the total number of backers (the variable *Backers*), and the total amount of money pledged by backers (*Pledged*) at the end of the campaign.

3.3.2 Variable of interest

We use texts to estimate a continuous measure of narcissism for team projects. We count the number of first-person singular and plural pronouns in texts describing each project and estimate the crowdfunding entrepreneur's narcissism score as the ratio between first-person singular pronouns and total first-person pronouns in the text. This variable is labeled *narcissism* and takes (by construction) values between 0 and 1. We base our measure on the findings of Raskin and Shaw (1988), who document a correlation between first-person pronoun usage and narcissism. By focusing on the descriptions of team projects, we seek to identify cases where we would expect the use of first-person plural pronouns but instead find first-person singular pronouns. The use of first-person singular pronouns to describe a team project is an indicator of the narcissism of the individual leading the project. It reveals the tendency of the individual to identify personally with a group endeavor, through the mechanisms leading to narcissistic organizational identification as described in Galvin et al. (2015).

As a robustness check, we create a dummy variable *high narcissism*, which is equal to one if the narcissism score is greater than 0.5, and zero otherwise. The chosen cutoff of 0.5 has an intuitive interpretation. A value higher (lower) than 0.5 means that, on average, the entrepreneur uses first-person singular pronouns more often (less often) than first-person plural pronouns.

3.3.3 Control variables

We add a series of control variables which are known to impact crowd behavior and project outcome. These control variables are classified into three categories: project characteristics, soft information, and fixed effects.

The first category includes all measurable project characteristics available. We control for the size of the campaign team as the size of the group may impact the way the leader puts him- or herself forward in the project description. Projects by non-profit organizations tend to influence the behavior of backers, due to the associated tax deductions and an enhanced warm glow effect (Andreoni 1990; McGinnis and Gentry 2009). Previous research shows that the number of reward levels offered to backers affects the funding process (Mollick 2014), leading us to include a control variable to capture this campaign characteristic.

The second category consists in measures related to the quantity of soft information provided by the entrepreneur to describe his or her campaign. Soft information reflects the effort that the entrepreneur makes to encourage the participation of potential backers and reduces information asymmetry with the participants. The information can be in the form of a video (*Video Pitch*), pictures (*Gallery*), and a textual description of the project (*Full Text Length* and *Catch Phrase Length*). We also capture the readability of the text using the Automated Readability Index (A.R.I.; Senter and Smith 1967), as a proxy for the ability of a larger crowd to understand the text. A higher *A.R.I.* value means that a higher level of education is needed to fully comprehend the text. Details of the estimation are provided in Appendix Table 7.

For the third category, we include country, semester, and category fixed effects. As the crowdfunding market

evolves rapidly, the inclusion of semester fixed effects is more appropriate than year fixed effects.

To test our hypotheses, we use either OLS regression or probit models depending on whether the left-hand side variable is a continuous or a binary variable. Robust standard errors are used throughout the analyses.

3.4 Descriptive statistics

Summary statistics are presented in Table 2 for the full sample and for the subsamples of high and low values of narcissism, based on the cutoff value of a score of 0.5 in our *High Narc.* variable. The final column shows the result of a difference-in-means test between the two subsamples and provides some initial clues about differences between the campaigns of more and less narcissistic entrepreneurs. The mean narcissism score in the full sample is 0.199, meaning that on average there is about one first-person singular pronoun used in the project description for five first-person plural pronouns. This figure is close to the average narcissism score estimated using the same method in Chatterjee and Hambrick (2007) and Aktas et al. (2016). The range of values is also very broad, with a maximum of 1 and a minimum of 0. At the minimum value, the team leader only uses first-person plural pronouns and does not self-reference. On the other hand, the maximum value of 1 means that the team leader only self-references and does not reference the team. The median is 0, which means that in most of the cases, the entrepreneur only uses the first-person plural pronouns, consistent with the view that most entrepreneurs are not narcissistic.

The average funding goal in the full sample is $13,420, with a median of $6,000. Consistent with our hypothesis H1A, more narcissistic entrepreneurs set lower goals than less narcissistic ones ($11,198 versus $13,867), and the difference is statistically significant. Consistent with hypothesis H1B, more narcissistic entrepreneurs are more likely to select the AON funding model (4.51% of the campaigns as opposed to 3.69% for less narcissistic entrepreneurs), although the difference is only significant at the 10% level. As for our third dimension, we find no statistical difference in campaign duration. More narcissistic entrepreneurs' campaigns are less likely to be non-profit oriented and project teams are smaller on average.

The last three rows in Table 2 show statistics for campaign outcome. The average success rate for meeting the funding goal is 32.8% in the full sample. There is no statistically nor economically meaningful difference between more and less narcissistic entrepreneurs (32.8%). However, more narcissistic entrepreneurs raise less money ($3829 as opposed to $5414) and attract fewer backers (50.9 as opposed to 67.4). Both of these differences are statistically significant and economically meaningful, lending preliminary support for hypothesis H4.

Correlations between the variables used in our analysis are presented in Table 3. In line with hypothesis H1B on ego-defensive behavior, there is a negative and statistically significant correlation between our narcissism measures and the size of the crowdfunding campaign (*Goal*). While we observe a positive correlation between our continuous measure of narcissism and the AON funding model, it is only marginally significant for the high narcissism dummy. There is no significant correlation between *Success Dummy* and *narcissism*, but a negative and significant correlation exists when we look at the number of backers (*Backers*) and at the total money pledged in the project (*Pledged*), providing support for hypothesis H4.

4 Results

4.1 Main results

In this section, we formally test our hypotheses. Table 4 shows the results for hypotheses 1, 2, and 3 on campaign design. We report results for the continuous measure *narcissism* and the dummy variable *High Narc.*

Consistent with hypothesis H1B, more narcissistic entrepreneurs set a lower goal, estimated as the natural log of the dollar goal, than less narcissistic ones (models 1 and 4). Unreported results for the dollar value of the funding goal give similar results. Our findings suggest that, on average, narcissistic crowdfunding entrepreneurs are more concerned with defending their egos. A lower goal preemptively reduces the risk of campaign failure, thereby protecting self-esteem, consistent with Morf et al. (2011). Based on model 3, the difference between high and low levels of narcissism translates, ceteris paribus, into a difference in funding goals of $375.

Models 2 and 5 show results for the effect of narcissism on the choice of the funding model. Narcissism is not a significant predictor of the choice between AON and KIA. While model 8 shows a significant result for the continuous measure of narcissism when soft information controls are excluded, this is not confirmed in model 11 for the high narcissism dummy.

Table 2 Summary statistics. This table shows summary statistics for variables included in our database. All the variables are defined in Appendix Table 7. We provide means, standard deviations, minimum, median, and maximum for the full sample of 14,968 campaigns and for the two subsamples based on the level of narcissism. The last column provides a difference-in-means test between the two subsamples. Significance levels (p value): *$p < 0.1$, **$p < 0.05$, and ***$p < 0.01$

	Full sample (14,968 obs.)					High narcissism (> 0.5) (2508 obs.)					Low narcissism (≤ 0.5) (12,460 obs.)					
	Mean	Std. dev.	Min.	Median	Max.	Mean	Std. dev.	Min.	Median	Max.	Mean	Std. dev.	Min.	Median	Max.	Mean diff. test
Narcissism	0.199	0.301	0	0	1	0.798	0.157	0.507	0.821	1	0.079	0.133	0	0	0.5	−0.719***
Project characteristics																
Goal	13,420	20,845	321	6000	197,000	11,198	16,389	321	5000	150,000	13,867	21,604	321	6000	197,000	2669***
AON Dummy	0.0383	0.192	0	0	1	0.0451	0.207	0	0	1	0.0369	0.189	0	0	1	−0.00814*
Team size	3.54	2	2	3	10	3.1	1.7	2	2	10	3.63	2.04	2	3	10	0.534***
Rewards offered	7.76	3.22	0	8	30	7.59	3.22	0	7	24	7.79	3.23	0	8	30	0.208***
Duration	45.8	22.8	1	42	120	46	22.5	1	43	120	45.7	22.9	1	42	120	−0.229
Verified non-profit	0.113	0.317	0	0	1	0.0642	0.245	0	0	1	0.123	0.329	0	0	1	0.0589***
Soft information																
Catch Phrase Length	107	42	0	115	172	109	41.3	0	119	172	107	42.1	0	115	167	−2.53***
Full Text Length	4223	2445	411	3621	14,233	4338	2493	454	3709	14,128	4200	2435	411	3602	14,233	−138***
Gallery	6.9	10.5	0	4	350	6.72	10.1	0	3	166	6.93	10.6	0	4	350	0.214
Video Pitch	0.808	0.394	0	1	1	0.79	0.407	0	1	1	0.812	0.391	0	1	1	0.0222***
Social networks	3.02	2.03	0	3	27	3.03	2.09	0	3	19	3.02	2.01	0	3	27	−0.00423
A.R.I.	15.2	3.08	−1.03	14.9	98.9	14.3	3.14	6.36	14.1	67	15.4	3.04	−1.03	15.2	98.9	1.06***
Outcome																
Success Dummy	0.328	0.469	0	0	1	0.328	0.469	0	0	1	0.328	0.469	0	0	1	−0.00006
Backers	64.6	303	0	31	15,310	50.9	112	1	30	4340	67.4	328	0	32	15,310	16.4**
Pledged	5148	22,038	0	2132	1,140,975	3829	9157	500	1940	352,288	5414	23,794	0	2171	1,140,975	1584***

Table 3 Correlation matrix of main variables. This table shows pair-wise correlations between the main variables. All the variables are defined in Appendix Table 7. Significance levels (p value): *$p < 0.1$, **$p < 0.05$, and ***$p < 0.01$

	Narcissism	High Narc. (> 0.5)	Goal	AON Dummy	Team size	Verified non-profit	Rewards offered	Duration
Narcissism	1.00							
High Narc. (> 0.5)	0.89***	1.00						
Goal	− 0.03***	− 0.05***	1.00					
AON Dummy	0.02***	0.01*	0.12***	1.00				
Team size	− 0.1***	− 0.1***	0.1***	− 0.01	1.00			
Verified non-profit	− 0.08***	− 0.07***	0.03***	− 0.07***	0.06***	1.00		
Rewards offered	− 0.01	− 0.03***	0.25***	0.06***	0.13***	− 0.01	1.00	
Duration	0.00	0.00	0.15***	− 0.07***	0.05***	0.05***	0.01	1.00
Catch Phrase Length	0.03**	0.02***	0.09***	0.04***	− 0.01	0.02*	0.1***	− 0.14***
Full Text Length	0.07**	0.02***	0.28***	0.09***	0.12***	0.01	0.32***	0.04***
Gallery	0.01	− 0.01	0.12***	0.02***	0.17***	− 0.00	0.18***	0.09***
Video Pitch	− 0.02**	− 0.02***	0.12***	0.03***	0.07***	0.04***	0.23***	0.02***
Social networks	0.02*	0.00	0.17***	0.03***	0.11***	0.07***	0.26***	0.06***
A.R.I.	− 0.16***	− 0.13***	0.04***	− 0.02***	0.05***	0.15***	− 0.05***	0.04***
Success Dummy	− 0.01	− 0.00	− 0.24***	0.08***	0.02*	− 0.02***	− 0.09***	− 0.17***
Backers	− 0.02**	− 0.02**	0.16***	0.07***	0.06***	0.00	0.1***	− 0.01
Pledged	− 0.02***	− 0.03***	0.22***	0.09***	0.07***	0.01	0.1***	0.01
	Catch Phrase Length	Full Text Length	Gallery	Video Pitch	Social networks	A.R.I.	Success Dummy	Backers
Catch Phrase Length	1.00							
Full Text Length	0.13***	1.00						
Gallery	0.05***	0.2***	1.00					
Video Pitch	0.06***	0.13***	0.12***	1.00				
Social networks	0.13***	0.2***	0.21***	0.19***	1.00			
A.R.I.	0.06***	0.13***	− 0.00	− 0.00	0.00	1.00		
Success Dummy	− 0.02***	− 0.08***	− 0.02**	− 0.05***	− 0.09***	− 0.03***	1.00	
Backers	0.03***	0.1***	0.08***	0.05***	0.04***	− 0.01	0.12***	1.00
Pledged	0.04***	0.13***	0.12***	0.05***	0.05***	0.01	0.14***	0.78***

Results for campaign duration in models 3 and 6 are consistent with hypothesis 3B. Higher levels of narcissism are associated with longer campaign duration, consistent with the idea that concerns for their ego drive more narcissistic entrepreneurs to choose a longer campaign duration, so as to maximize their chances of obtaining the required funds.

Regarding our control variables, the soft information variables all have a positive and highly significant impact on funding goal, which is consistent with expectations (Michels 2012). Entrepreneurs with more advanced projects, for which it is possible to disclose more information and to show more pictures, request higher funds to pursue their project. Backers are reassured by the effort made by the entrepreneur, who can therefore reasonably expect to attain a higher goal. The more reward levels the entrepreneur is able to offer, the higher the possible funding goal. The number of reward levels can be interpreted as a signal of a more advanced project and/or the willingness to broaden the targeted crowd by offering multiple support levels (Gerber et al. 2012). Finally, consistent with Giudici et al.'s (2018) finding that bigger teams have larger network opportunities, the impact of team size on funding goal is positive and significant.

Table 5 provides results for hypothesis 4 on the campaign outcome. Consistent with hypothesis 4, campaigns of narcissistic crowdfunding entrepreneurs are

Table 4 Crowdfunding campaign design. This table shows the impact of narcissism of the entrepreneur on the design of the crowdfunding campaign. The dependent variable is the natural log of the dollar goal (models 1, 4, 7, and 10), a binary variable equal to one if the funding model is all-or-nothing (AON) (models 2, 5, 8, and 11) and the duration of the campaign in number of days (models 3, 6, 9, and 12). Models 1, 2, 3, 7, 8, and 9 use the continuous measure of narcissism as variable of interest and models 4, 5, 6, 10, 11, and 12 use a dummy variable equal to 1 if the narcissism measure is higher than 0.5 and 0 otherwise (high narcissism). Models 1 to 6 include control variables for soft information. All models include sub-category, semester, and country fixed effects. Standard errors are robust to heteroscedasticity. Significance levels (p value): $*p < 0.1$, $**p < 0.05$, and $***p < 0.01$

	(1) Ln(Goal)	(2) AON Dummy	(3) Duration	(4) Ln(Goal)	(5) AON Dummy	(6) Duration	(7) Ln(Goal)	(8) AON Dummy	(9) Duration	(10) Ln(Goal)	(11) AON Dummy	(12) Duration
Narcissism	−0.083***	0.008	1.387***				−0.032	0.012**	1.469**			
High Narc. (> 0.5)				−0.059***	0.004	1.234***				−0.044*	0.006	1.182***
Project characteristics												
Team size	0.027***	−0.000	−0.016	0.027***	−0.000	−0.017	0.049***	0.000	0.219**	0.049***	0.000	0.217***
Rewards offered	0.091***	0.002***	−0.257***	0.091***	0.002***	0.257***	0.129***	0.003***	0.542***	0.129***	0.003***	0.544***
Verified non-profit	0.399***		4.851***	0.400***		4.858***	0.485***		5.257***	0.484***		5.725***
Soft information												
Catch Phrase Length	0.001***	0.000	−0.018***	0.001***	0.000	−0.018***						
Full Text Length (× 1000)	0.089***	0.003***	0.440***	0.088***	0.003***	0.447***						
Gallery	0.005***	−0.0002	0.137***	0.005***	−0.000	0.137***						
Video Pitch	0.295***	0.009*	1.542***	0.295***	0.009*	1.540***						
Social networks	0.059***	−0.002**	0.670***	0.058***	−0.002**	0.672***						
A.R.I.	0.015***	−0.001**	0.265***	0.016***	−0.002**	0.262***						
Subcat./semester/country F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	14,968	12,195	14,968	14,968	12,195	14,968	14,968	12,195	14,968	14,968	12,195	14,968
Adj./pseudo R^2	0.309	0.145	0.147	0.308	0.147	0.147	0.247	0.140	0.134	0.247	0.139	0.133

less successful. First, they are less likely to achieve their desired goal (models 1 and 2, and 5 and 6). Consistent with our findings in Table 4 for the effect of narcissism on campaign design, the result is only significant when we control for *Ln*(*Goal*), the funding model, and campaign duration (models 2 and 6). Second, our results are confirmed when we refine our analysis to more specific performance variables. We find that more narcissistic entrepreneurs attract fewer backers and less funds. Our results for campaign outcome are consistent with prior studies on entrepreneurship and personality traits, which predict lower levels of success for narcissistic entrepreneurs, especially in the early stages of a project (Tucker et al. 2016; Navis and Ozbek 2016). Our findings also echo those of Murnieks et al. (2015)—it appears that the crowd, like angel investors, avoids entrepreneurs with narcissistic tendencies. In terms of economic significance, an entrepreneur classified as highly narcissistic attracts 13.8 fewer backers and $1,111.84 less funds than a low-level narcissist. These values are economically meaningful, given that the average campaign seeks to attract $13,420 (mean *Goal* in the full sample; see Table 2).

4.2 Robustness tests

In this section, we present the results of different robustness checks. One potential concern is that narcissistic entrepreneurs may also be prone to overconfidence (Hayward et al. 2010), especially when arrogant-narcissistic. Our narcissism measure may therefore be correlated with overconfidence. To alleviate this concern, we include the keyword-based measure of overconfidence developed by Malmendier and Tate (2008). We use the same keywords and count one point each time a "confident" word is used by the entrepreneur in the project description (see Appendix Table 7 for the full list of words). We then scale the number of occurrences by the variable *Full Text Length* (following Singhal et al. 1996). Table 6 shows the results of the robustness tests. The results for narcissism are unaffected by the inclusion of the overconfidence indicator (panels B and C) although the two indicators show a weak positive correlation (panel A), consistent with Campbell et al. (2004).

Additional robustness checks address other concerns. First, many reward-based crowdfunding projects involve artists rather than entrepreneurs, as evidenced by the different categories of projects on these platforms, including on Indiegogo. The existing literature does not enable us to state categorically whether artists should be excluded from our sample (artists are likely to be subject to narcissistic behavior just like entrepreneurs), but we design a robustness test to ensure that our results are not driven by artists. We carry out our analyses on the "innovative" category only (which mainly covers high-tech projects but excludes social and creative/artistic projects), and obtain similar results to the full sample. In an additional robustness check, we use an alternative measure of success (*Success Dummy*). We follow the discussion and methodology in Cumming et al. (2018), which is relevant to our situation as the authors also use Indiegogo data. While a threshold of 100% is a good definition of success under the AON funding model because the entrepreneur gets nothing below that threshold, taking the same value for KIA is debatable. This is because the entrepreneur still gets funds even if the funding goal is not achieved. We re-run the analyses with the lower threshold of 0.8 for projects using the KIA funding model while leaving the threshold at 1 for AON projects. Our conclusions remain unaffected.

We carry out three final robustness tests. The first is to check our results for projects with larger funding goals, as many of the projects have low goals and therefore may not be truly entrepreneurial projects. The second pertains to serial entrepreneurs, who may be known to backers (Butticè et al. 2017). Many of the backers of the second campaign may be the same as for the first, so they can better assess the entrepreneur than someone who is running his or her first campaign. All backers can obtain the same information by consulting the web page of the previous crowdfunding campaign on Indiegogo. In order to control for this effect, we include a dummy variable that equals 1 for serial entrepreneurs. The third robustness check considers the possibility that the level of delegation may vary with team size, which in turn may affect the degree to which the team leader considers the project to be collective. While we are not able to directly measure the level of delegation to the team leader, we re-run the analysis on the reduced sample of projects with a maximum of five team members. We consider that the degree of delegation is lower for smaller teams. In all the three cases, we obtain similar results to those presented in our main analyses for both measures of narcissism.

Table 5 Crowdfunding campaign outcome. This table shows the impact of the narcissism of the entrepreneur on the outcome of the crowdfunding campaign. The dependent variable is a dummy equal to one if the goal is reached (models 1, 2, 5, and 6), the number of backers (models 3 and 7), and the total amount pledged in dollars (models 4 and 8). Models 1 to 4 use the continuous measure of narcissism as variable of interest and models 5 to 8 use a dummy variable equal to 1 if the narcissism measure is higher than 0.5 and 0 otherwise (high narcissism level). Standard errors are robust to heteroscedasticity. Significance levels (p value): *$p < 0.1$, **$p < 0.05$, and ***$p < 0.01$

	(1) Success Dummy	(2) Success Dummy	(3) Backers	(4) Pledged	(5) Success Dummy	(6) Success Dummy	(7) Backers	(8) Pledged
Narcissism	− 0.011	− 0.029**	− 20.407***	− 1617.008***				
High Narc. (> 0.5)					− 0.008	− 0.019**	− 13.809***	− 1111.840***
Project characteristics								
Ln(Goal)		− 0.187***	25.658***	2667.642***		− 0.186***	25.700***	2670.814***
AON Dummy		0.256***	47.901	5441.823**		0.256***	47.756	5430.714**
Duration		− 0.001***	− 0.404**	− 24.970***		− 0.001***	− 0.405**	− 25.029***
Team size	0.011***	0.016***	4.876***	395.152***	0.011***	0.017***	4.949***	400.698***
Rewards offered	− 0.010***	0.008***	2.415	28.448	− 0.010***	0.008***	2.436	30.008
Verified non-profit	− 0.058***	0.032***	1.550	682.331**	− 0.058***	0.032***	1.659	690.084**
Soft information								
Catch Phrase Length	− 0.000***	− 0.000	0.048	2.589	− 0.000**	− 0.000	0.047	2.472
Full Text Length (× 1000)	− 0.006***	0.010***	4.817**	414.855***	− 0.006***	0.010***	0.004*	0.403***
Gallery	0.001***	0.002***	1.220***	159.492**	0.001***	0.002***	1.218***	159.357**
Video Pitch	− 0.020**	0.039***	3.971	− 46.621	− 0.020**	0.039***	4.034	− 41.817
Social networks	− 0.016***	− 0.005**	− 3.122**	− 253.256***	− 0.016***	− 0.005**	− 3.150**	− 255.532***
A.R.I.	− 0.004**	− 0.0004	− 1.678*	− 67.237	− 0.003**	− 0.0003	− 1.568*	− 58.769
Subcat./semester/country F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	14,968	14,968	14,968	14,968	14,968	14,968	14,968	14,968
Adj./pseudo R^2	0.032	0.191	0.038	0.069	0.032	0.191	0.037	0.068

Table 6 These tables present robustness checks by including a measure of overconfidence. Panel A shows correlation between narcissism and overconfidence. Panels B and C reproduce respectively Tables 4 and 5 including the overconfidence measure as control variable

Panel A: correlation between narcissism and overconfidence						
	Narcissism			High Narc. (> 0.5)		
Narcissism	1					
High Narc. (> 0.5)	0.89***			1		
Overconfidence	0.04***			0.03***		
Panel B: crowdfunding campaign design						
	(1)	(2)	(3)	(4)	(5)	(6)
	Ln(Goal)	AON Dummy	Duration	Ln(Goal)	AON Dummy	Duration
Narcissism	− 0.085***	0.008	1.390**			
High Narc. (> 0.5)				− 0.060**	0.004	1.237***
Overconfidence	0.194	0.015	− 0.409	0.192	0.015	− 0.414
Project characteristics						
Team size	0.027***	− 0.000	− 0.016	0.027***	− 0.000	− 0.017
Rewards offered	0.091***	0.002***	0.257***	0.091***	0.002***	0.257***
Verified non-profit	0.398***		4.852***	0.399***		4.860***
Soft information						
Catch Phrase Length	0.001***	0.000	− 0.018***	0.001***	0.000	− 0.018***
Full Text Length (× 1000)	0.089***	0.003***	0.440***	0.088***	0.003***	0.447***
Gallery	0.005***	− 0.000	0.137***	0.005***	− 0.000	0.137***
Video Pitch	0.295***	0.009*	1.541***	0.295***	0.009*	1.540***
Social networks	0.058***	− 0.002**	0.670***	0.058***	− 0.002**	0.672***
A.R.I.	0.015***	− 0.002**	0.265***	0.016***	− 0.002**	0.263***
Cat./sem./country F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Observations	14,968	12,195	14,968	14,968	12,195	14,968
Adj./pseudo R^2	0.309	0.146	0.147	0.309	0.145	0.147
Panel C: crowdfunding campaign outcome						
	(1)	(2)	(3)	(4)	(5)	(6)
	Success Dummy	Backers	Pledged	Success Dummy	Backers	Pledged
Narcissism	− 0.027**	− 19.104***	− 1610.780***			
High Narc. (> 0.5)				− 0.018*	− 13.579***	− 1128.863***
Overconfidence	0.018	− 20.824	1721.717	0.017	− 21.334	1675.982
Project characteristics						
Ln(Goal)	− 0.186***	26.045***	2656.504***	− 0.185***	26.076***	2659.275***
AON Dummy	0.260***	68.499**	6202.709**	0.260***	68.351**	6189.941**
Duration	− 0.001***	− 0.416***	− 25.910***	− 0.001***	− 0.417***	− 25.956***
Team size	0.017***	4.762***	371.126***	0.017***	4.823***	376.495***
Rewards offered	0.007***	2.791*	38.515	0.007***	2.809*	40.054
Verified non-profit	0.031***	2.171	702.257**	0.032***	2.245	709.439**
Soft information						
Catch Phrase Length	− 0.000	0.043	1.917	− 0.000	0.042	1.796
Full Text Length (× 1000)	0.010***	4.817**	429.798***	0.010***	4.684**	418.359***
Gallery	0.002***	1.170***	156.787**	0.002***	1.168***	156.612**
Video Pitch	0.038***	3.371	− 50.469	0.038***	3.420	− 46.261
Social networks	− 0.004**	− 3.022**	− 235.628***	− 0.004**	− 3.050**	− 237.943***
A.R.I.	− 0.000	− 1.696**	− 70.004	− 0.000	− 1.605*	− 62.076
Cat./sem./country F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Observations	14,968	14,968	14,968	14,968	14,968	14,968
Adj./pseudo R^2	0.191	0.082	0.119	0.191	0.082	0.119

5 Discussion and concluding remarks

This study sheds light on how the entrepreneur's personality affects the design and outcome of crowdfunding initiatives. It extends the entrepreneurship literature on how the entrepreneur's personality affects campaign choices and how the crowd's perception of the entrepreneur and the campaign affects its willingness to pledge during the campaign. The results are consistent with the fact that reward-based crowdfunding projects are small and under the full control of the project leader so that perceptions of backers are highly important. In addition, reward-based projects draw potential backers for whom the feel-good factor is important, leading them to focus on the entrepreneur's personality.

We find that more narcissistic entrepreneurs who launch a reward-based crowdfunding campaign set lower funding goals and a longer campaign duration. These results are consistent with the proposed hypothesis that more narcissistic entrepreneurs seek to defend their ego, rather than engaging in grandiose actions one might more frequently associate with narcissism, consistent with an avoidance motivation described in Foster and Brennan (2011). Although more narcissistic crowdfunding entrepreneurs set more modest targets and a longer campaign duration, they are less likely to achieve their goals. The lower performance generated by more narcissistic project leaders is consistent with work in the entrepreneurship literature documenting the negative effects of narcissism in early-stage entrepreneurial projects (Tucker et al. 2016).

Recent conceptual papers show that the effect of narcissism or other negative personality traits may be context dependent. Navis and Ozbek (2016) differentiate the effects of narcissism observed in novel and familiar venture contexts. Haynes et al. (2015) suggest that the effects of negative personality traits are different in start-ups, family firms, and corporate ventures. According to Tucker et al. (2016), the impact of the dark triad traits is more or less positive/negative depending on the stage of the entrepreneurial process. Our current project opens the door to a series of comparative projects by providing convincing evidence for the effect of narcissism on early-stage entrepreneurial ventures.

Our study leads to several implications for entrepreneurs, crowdfunders, and platform managers. First, entrepreneurs may benefit from using professional editing of their project description, an extra service that some platforms are now providing to entrepreneurs as a way to avoid the negative effect of an unsuitable project description on campaign outcome. From the perspective of platform managers, they have an incentive to identify narcissistic entrepreneurs through project descriptions to improve platform success. Indeed, overall platform success is likely to be a crucial piece of information for entrepreneurs in the selection of which platform to use for their campaign launch. Second, our study highlights the importance for crowdfunders of collecting information not only on the project itself but also the team members (and especially the team leader) supporting the project. This provides feedback on their personality, which—as shown in this study—affects campaign outcome. While our study is restricted to the campaign itself, it is reasonable to assume that it will also affect the project outcome if funded.

As for any other crowdfunding study, the question of generalizability is important, since studies are done on a specific type of crowdfunding (here, reward-based crowdfunding) but there are others. In particular, an interesting question is whether our results can be extended to equity crowdfunding, which has gained significant interest recently (Dorfleitner et al. 2018; Hornuf and Schwienbacher 2018; Signori and Vismara 2018; Vismara 2016, 2018). Our understanding is that the effects we observe may be less apparent, as the underlying assumption of the crowd deciding based on warm glow is less applicable. Equity crowd investors focus more on financial returns (Vismara 2018). Moreover, equity crowdfunding platforms filter heavily, so that many of the projects run by narcissistic entrepreneurs may be blocked by platform operators. This may make such effects less observable on equity crowdfunding platforms. A conclusive answer to this question of generalizability however requires additional research on the topic with data on equity crowdfunding campaigns. We leave this idea for future research.

Acknowledgements The authors thank Thomas Åstebro, Riccardo Calcagno, Raghavendra Rau, Scott Seibert, Silvio Vismara (the Editor), Peter Wirtz, three anonymous referees, and seminar and conference participants at Lyon II University, Aix-Marseille University, University of Regensburg, AFFI 34th International Conference (University Grenoble Alpes Valence), the Second Annual Cambridge Conference for Alternative Finance (University of Cambridge Judge Business School), and the 6th HEC Workshop on Entrepreneurship (HEC Paris) for their thoughtful comments and suggestions.

Appendix

Table 7 Definition of variables

Narcissism	Ratio of the number of first-person singular pronouns (I, me, my, mine, myself) to first-person pronouns (first-person singular pronouns *plus* the pronouns we, us, our, ours, ourselves) used in the project description (following Raskin and Shaw 1988)
High Narc. (> 0.5)	Dummy variable equal to 1 if the *narcissism* variable is greater than 0.5, and 0 otherwise
Overconfidence	Following Malmendier and Tate (2008), this measure counts the number of times a marker of overconfidence is used in the text describing the project. The markers are the words: confident, confidence, optimist, optimistic, and optimism. We then normalize our measure for the text length (following Singhal et al. 1996) by dividing the value by the variable "Full Text Length"
Goal	Funding goal in USD, set by the entrepreneur at the beginning of the crowdfunding campaign. If the funding goal was in another currency, the value is converted to USD using the semester average currency exchange rate
Ln(Goal)	Natural logarithm of *Goal*
AON Dummy	Dummy variable equal to 1 if the funding model of the campaign is all-or-nothing, and 0 if the funding model is keep-it-all (following Cumming et al. 2018)
Duration	Duration of the crowdfunding campaign, in days
Team size	Number of persons running the crowdfunding campaign
Verified non-profit	Dummy variable equal to 1 if the campaign is set up by a US-registered 501(c) non-profit organization, and 0 otherwise
Rewards offered	Number of reward levels offered by the entrepreneur to backers. Each level corresponds to a different, pre-defined reward associated with a pre-defined pledge
Catch Phrase Length	Length (in number of characters) of the project short description presented on the index page
Full Text Length	Length (in number of characters) of the project full description presented on the project page
Gallery	Number of items (pictures, graphics, figures …) presented in the project gallery
Video Pitch	Dummy variable equal to 1 if the project page shows a video introducing the project, and 0 otherwise
Social networks	Number of social network platforms or external websites where the project is also present (e.g., Facebook, Twitter, and Instagram) and mentioned on the project description website
A.R.I.	"Automated Readability Index" score of the project full description, as defined in Senter and Smith (1967). This score is computed as A.R.I. = 4.71 × (total characters/total words) + 0.5 × (total words/total sentences) − 21.43. It aims to represent the US grade level needed to comprehend the text. A higher value of the index means the text is more difficult to understand
Pledged	Total amount (in USD) pledged by the project backers at the end of the campaign
Success Dummy	Dummy variable equal to 1 if the total amount pledged by all the backers is greater than or equal to the campaign goal (i.e., *Pledged*/*Goal* ≥ 1), and 0 otherwise
Backers	Number of backers participating in the project

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