Vicarious Goal Pursuit Outweighs Herding in Crowdfunding: Evidence from Kickstarter.com

Hengchen Dai*

Anderson School of Management, University of California, Los Angeles, hengchen.dai@anderson.ucla.edu

Dennis J. Zhang*

Olin Business School, Washington University in St. Louis, denniszhang@wustl.edu

Reward-based crowdfunding is a popular fundraising mechanism whereby creators of entrepreneurial projects solicit capital from backers to reach a funding goal and offer future products/services in return. We examine backers' contribution patterns using a novel dataset of $26,516$ projects collected at 30-minute resolution from Kickstarter.com, the world's largest crowdfunding website. Past research drawing on standard utility-based theory has largely focused on economic factors as drivers of backers' contributions, concluding that backers are more likely to fund a project when they observe greater contributions to the project from other backers (i.e., herding) or when they are not concerned about the project failing to meet its funding goal. We propose that social preferences should also matter such that backers have prosocial motives to help creators reach their funding goals. Indeed, we find that backers are nearly three times as likely to fund a project right before it meets its funding goal as they are right after. This "vicarious goal pursuit" effect is amplified when the nature of a project tends to evoke backers' altruistic motives as well as when a project's creator is a single person (as opposed to multiple people or an organization). These results suggest that backers' prosocial motives not only play a role in the reward-based crowdfunding context but also can outweigh the opposing effects of economic factors including herding and certainty about crowdfunding campaign success. Altogether, this research advances the field's understanding of backers' decision making processes and extends prior work in management and psychology about goals and prosocial behavior.

Key words: Goal, Social Preferences, Prosocial Motivation, Herding, Crowdfunding

1. Introduction

Reward-based crowdfunding has grown into a popular fundraising mechanism via which creators of entrepreneurial projects solicit capital from backers and offer presales of products/services or other rewards in return. Crowdsourcing.org, the industry's professional association, estimates that over \$2.5 billion was raised worldwide via reward-based crowdfunding in 2015 (Massolution 2015).

Understanding what shapes backers' decisions about whether and when to fund a project is important to both academia and practitioners interested in the psychology involved in this economically meaningful online context. Using seven-month data collected at 30-minute resolution from Kickstarter.com (hereafter, "Kickstarter"), the world's largest reward-based crowdfunding website,[1] we show that backers' prosocial motives to help creators reach their funding goals, a previously overlooked non-economic factor, influence funding activities on reward-based crowdfunding platforms and can outweigh the economic considerations emphasized by past research.

Existing research in economics and and marketing has largely focused on economic considerations as drivers of backers' funding activities, such as signals of project quality and the likelihood that a creator will deliver the promised rewards (e.g., Agrawal et al. 2011, Freedman and Jin 2011, Zhang and Liu 2012, Mollick 2014, Van de Rijt et al. 2014). However, given the abundant evidence that people have social preferences and are willing to incur a financial cost to bring economic benefits to others (Charness and Rabin 2002, Fehr and Fischbacher 2003, Bénabou and Tirole 2006), we expect that in addition to their financial motives of receiving rewards, backers also have prosocial motives and care about helping creators make their entrepreneurial ideas come true.

To test the existence of social preferences in this context, we leverage the importance of funding goals on crowdfunding platforms. Kickstarter has an all-or-nothing policy, such that only if a project reaches its funding goal by the end of its campaign will the creator receive the funding committed by backers and the backers obtain their rewards. Kickstarter allows backers to contribute to a project after its funding goal has been reached, and backers often do so (as shown in Section 3.1) because it is generally cheaper to obtain a product or service during a Kickstarter campaign than to purchase it in the future at its full retailing price.

Standard utility-based theory suggests that a project should collect funds more quickly after rather than before it meets its funding goal for at least two reasons. First, any project should have been funded by more backers and accumulated more funds after it collects 100% of its funding goal than before it collects 100% of its funding goal. Since the greater number of backers and the greater amount of accumulated funds send a more positive signal about project quality (Banerjee 1992, Bikhchandani et al. 1998, Zhang and Liu 2012), herd mentality should cause potential backers to fund a project at a higher rate after it has passed 100% than before it has passed 100%. Second, when backing a project below 100% of its goal, backers risk wasting their time without receiving any rewards because the project may not meet its goal in the end. This concern is eliminated once a project exceeds 100% of its funding goal.

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[1] According to Kickstarter statistics (https://www.kickstarter.com/help/stats), more than 380,000 projects have been launched since 2009, and more than 14 million backers have contributed a total of $3.46 billion. Kickstarter reports that since 2009, 35.93% of the launched projects have met their funding goals, capturing an investment volume of $3.06 billion.

We challenge this prediction that is solely based on economic considerations. Past research has robustly documented that people treat their own goals as reference points and work harder when they are below their goals than when they are above their goals (Locke and Latham 1990, Heath et al. 1999). Combining this literature about how goals dynamically change motivation with the literature on social preferences, we expect that creators' funding goals serve as salient reference points to backers such that backers are more willing to fund a project before it meets its funding goal than after it meets its funding goal. If we see that funding arrives faster before projects reach their funding goals than after projects reach their funding goals, this observation would suggest that not only backers' prosocial motives exist in the reward-based crowdfunding context but also backers' "vicarious goal pursuit" tendency can trump the aforementioned opposite effects of herding and certainty about getting rewards within the region around goal attainment.

We collected detailed information every 30 minutes on all projects launched on Kickstarter from September 10, 2016 to April 10, 2017. We employ an analytical approach similar to the regression discontinuity design to test whether and how the attainment of a creator's funding goal influences backers' decision to fund the project. We focus on all projects that were successfully funded on Kickstarter during our study period and compare how quickly a project collected a given amount of funding (e.g., 5% of its funding goal) right before versus right after it reached its funding goal.

We find that projects progress from 95% to 100% much more quickly than from 100% to 105% of their funding goals: on average, the time spent from 100% to 105% for a project is three times as large as the time spent from 95% to 100%. This effect is robust to different ranges surrounding the goal (e.g., 99% to 101%; 90% to 110%). Consistent with our theorizing that this effect is attributable to backers' prosocial motives, we further find that this effect grows stronger when the nature of a project tends to evoke backers' intentions to help the creator (as opposed to backers' interest in obtaining rewards); and the effect is stronger when a creator is a single person than when a creator represents multiple people or an organization, which is in line with the "identifiable victim effect" documented by prior work about charitable decision making (e.g., Jenni and Loewenstein 1997, Small and Loewenstein 2003, Kogut and Ritov 2005a,b).

Our results make several contributions to existing literature about goals, prosocial behavior, and crowdfunding. First, we contribute to the large body of prior work about goals that has focused on how individuals strive to achieve their personal goals or collaborate to achieve group goals (e.g., Locke and Latham 1990, Heath et al. 1999, Soman and Cheema 2004, Kivetz et al. 2006, Fishbach et al. 2011, Tu and Soman 2014, Fishbach et al. 2016, Allen et al. 2016). We demonstrate that others' goals, even online strangers' goals, can influence individuals' effort in an economically meaningful field setting in a way that is similar to how individuals adjust effort before versus after reaching their own goals. Extending prior work in the traditional giving setting that examines how

a charity's progress towards its fundraising goal influences people's willingness to donate (Koo and Fishbach 2008, Fishbach et al. 2011, Cryder et al. 2013b), we test the existence of vicarious goal pursuit in a very different setting where backers give funds in exchange for future rewards and are likely to make decisions in a calculative manner.

Second, we contribute to the literature about prosocial behavior by providing field evidence for the identifiable victim effect, which has been primarily documented in the lab (e.g., Jenni and Loewenstein 1997, Small and Loewenstein 2003, Kogut and Ritov 2005a,b) with the exception of Galak et al. (2011). Galak et al. (2011) examine the context of prosocial lending where individuals lend money to others in need without expecting interest payments as a financial reward, whereas we study a field setting that involves financial incentives and expectations for rewards. Such expectations for economic exchanges might elicit a deliberative decision mode and mitigate the effects of emotional reactions to identifiable victims (Small et al. 2007). However, interestingly, our findings suggest that the identifiable victim effect manifests in the reward-based crowdfunding context whereby backers are more likely to treat creators' funding goals as reference points and adjust their contribution rates based on goal attainment when creators represent a single person (as opposed to multiple people or an organization).

Third, we contribute to the economics and marketing literature about online crowdfunding platforms involving economic exchanges (e.g., Agrawal et al. 2011, Freedman and Jin 2011, Zhang and Liu 2012, Mollick 2014, Van de Rijt et al. 2014, Hu et al. 2015, Du et al. 2017) by identifying a psychological driver of backers' funding activities. We demonstrate that backers' prosocial motives to help creators can significantly affect their actions and, in the region around goals that we empirically examine, even trump the opposing force of economic factors including herding and likelihood of campaign success.

2.   Literature Review and Hypothesis Development

An emerging economics and marketing literature has begun to examine drivers of participation in crowdfunding platforms, and has largely relied on the assumption that backers base their funding decisions on the prospects of success of projects (see Kuppuswamy and Bayus 2017 for a review). In particular, prior work drawing on standard utility-based theory suggests that herding and campaign success likelihood matter to backers' decisions about whether and when to contribute (Agrawal et al. 2011, Freedman and Jin 2011, Zhang and Liu 2012, Mollick 2014, Van de Rijt et al. 2014).

Backers look for and respond to signals of project quality (Mollick 2014). In the face of uncertainty about project quality, potential backers may observe and act on other backers' decisions, a phenomenon called herding (Banerjee 1992, Bikhchandani et al. 1992). The amount of funds that a project has collected and the number of prior backers who have contributed to the project may send

signals to potential backers about its quality, which further affects the likelihood that potential backers will fund the project. Indeed, recent research has documented strong empirical evidence for herding behavior caused by asymmetric quality information and observational learning from early contributions in crowdfunding settings. For example, Zhang and Liu (2012) show that lenders on a lending-based crowdfunding website infer the creditworthiness of borrowers from the amount of funds they have received. More relevant to our research, Van de Rijt et al. (2014) use field experiments to provide causal evidence for herding in reward-based crowdfunding: they find that Kickstarter projects that are randomly selected to receive initial funds receive more subsequent support as compared to projects in the control group.

Another factor that should influence backers' decisions is whether or not a project has reached its funding goal. On platforms that employ an all-or-nothing policy based on goal attainment (e.g., Kickstarter, fixed funding mechanism on Indiegogo.com), if projects do not meet the funding goal, creators cannot obtain any funding and backers won't receive any products or services. Thus, backing a project that has not met its funding goal involves the risk of spending time and effort in vain. In contrast, backing a project that has met its funding goal eliminates uncertainty about whether the campaign can succeed. In this vein, if backers' funding decisions are primarily based on their expectations for obtaining rewards, backers should prefer projects that have just reached their funding goals over projects that slightly fall short of their funding goals, especially given that people tend to underweight probable gains in comparison with sure gains and are more willing to eliminate risk than to reduce it (Kahneman and Tversky 1979).

From the perspectives of both herding and the likelihood of campaign success, standard utility-based theory suggests that backers should be more likely to fund a project after it has reached its funding goal than right before it has reached the goal. However, beyond these economic considerations, psychological factors may affect backers' decisions as well. In particular, the literature on social preferences has robustly shown that people care about others' utility and are willing to perform costly actions in order to provide economic benefits to others (Andreoni 1989, Andreoni 1990, Charness and Rabin 2002, Fehr and Fischbacher 2003).

We propose that social preferences exist in the reward-based crowdfunding context, with one manifestation being that backers are willing to help creators reach their funding goals.[2] It is well-established that goals stimulate effort provision from individuals who have the goals. Goal-setting theory contends that individuals who set more specific, relevant, and achievable goals are more motivated to make progress and end up achieving better performance outcomes (for a review, see

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[2] Our theorizing and results are agnostic about whether prosocial motivation in the reward-based crowdfunding context reflects pure altruism–that backers purely care about whether creators receive the help needed–or impure altruism–that backers additionally experience a selfish, private benefit, or warm glow, from giving to creators (Andreoni 1989, 1990, Bénabou and Tirole 2006).

Locke and Latham 1990). Also, empirical evidence for the goal-gradient effect shows that people work harder when they feel they are closer to their goals, even when the objective distance to the goals remains the same (Kivetz et al. 2006, Nunes and Drèze 2006, Bonezzi et al. 2011, Koo and Fishbach 2012). One mechanism behind the motivating effects of goals is that they are salient reference points and follow the same value function proposed by the Prospect Theory (Heath et al. 1999), which has several implications. First, as individuals move towards their goals, the perceived marginal impact of actions on reducing the gap between the current state and goals increases, which can explain why motivation increases with proximity to a goal (Bonezzi et al. 2011, Koo and Fishbach 2012). Second, people who are below their goals perceive their current performance as a loss relative to their goals, whereas people who are above their goals encode their current performance as a gain. Because of loss aversion (Kahneman and Tversky 1979), people work harder to increase their performance by a given increment when they are below their goals (so that they can meet the goals) than when they are above their goals (Heath et al. 1999). Further, people may respond to externally imposed or internally generated goals by strategically adjusting their effort and resources so that they exceed their goals by a small margin. Such a pattern can emerge when goal attainment is associated with financial rewards (Bennett et al. 2017) as well as when symbolic goals do not bear any economic consequences (Allen et al. 2016).

We argue that in a social context where people can and are willing to contribute to others' goal progress, others' goals may serve as reference points and influence backers' contribution rates. Past research suggests that people are more willing to behave pro-socially when they believe that their actions have a greater impact (Grant 2007, Grant and Campbell 2007, Karlan and List 2007, Cryder et al. 2013a, Touré-Tillery and Fishbach 2017). For example, people donate more money to a cause when they are informed that their donation will be matched by a third party, which could be because matching increases the actual impact people can make via donation (Karlan and List 2007). Beyond individuals' actual impact, as measured by economic values, *perceived* impact as a psychological factor influences individuals' willingness to help as well. For example, donors are more willing to support specific charitable interventions (e.g., interventions that provide clean water to villagers in West Africa) than general charitable interventions (e.g., interventions that provide various forms of aid to people around the world) because they perceive their donations to be more effective when donating to specific charitable interventions (Cryder et al. 2013a). Also, people perceive their donations to have a bigger impact and thus are more willing to donate if their donations target recipients who are geographically closer to them rather than geographically farther away (Touré-Tillery and Fishbach 2017). In the reward-based crowdfunding context, backers may believe that the same amount of funds can make a bigger impact on a creator's entrepreneurial

endeavor if the project has not yet met its funding goal than if it has reached its goal.[3] This psychological process, if sufficiently strong, can trump the countervailing effects of herding and certainty about campaign success and drive backers to contribute more to a project before rather than after it meets the funding goal. Formally, we hypothesize that:

HYPOTHESIS 1. *Projects collect funding faster right before they have reached their funding goals than right after they have reached their funding goals.*

The present research is related to Cryder et al. (2013b), which tested the existence of goal gradient in helping behavior by examining the relationship between the percentage of funding goal a project has collected and backers' willingness to contribute to the project. Specifically, Cryder et al. (2013b) shows that contribution rates to charitable campaigns increase as charitable campaigns get closer to their fundraising goals. However, Cryder et al. (2013b) potentially confounds the motivating effect of getting closer to charity recipients' fundraising goals with the positive effects of herding. That is because a smaller distance to a funding goal indicates that a greater percentage of the goal has been collected, which can encourage herding via observational learning. Our research adopts a different analytical approach and provides a cleaner test of vicarious goal pursuit by focusing on the region around funding goals. If we observe greater contribution rates before rather than after creators reach their funding goals, then we provide evidence that vicarious goal pursuit not only exists in the reward-based crowdfunding context but dominates the opposite effects of herding and likelihood of campaign success in the region around funding goals.

Beyond predicting a main effect of vicarious goal pursuit (Hypothesis 1), we expect that the weight that backers give to economic and non-economic considerations should vary across projects depending on the extent to which the nature of a project tends to elicit participants' prosocial motivation. People may be attracted to the rewards of certain types of projects and thus back those projects primarily out of financial incentives, or they may support other types of projects primarily out of their altruistic motives to help the creators.

To explore whether there is variation in the degree at which projects elicit prosocial motivation, we recruited 129 participants from Amazon's Mechanical Turk (MTurk) who had experienced with Kickstarter to complete a survey.[4] These participants (31% females, mean age = 32) had backed at

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[3] We acknowledge that this is equivalent to saying that potential backers may reduce motivation when they perceive their contributions as less valuable to creators after funding goals are met. Also, we are agnostic about whether backers' perceived impact of their actions accurately reflects their actual impact. Our theory holds regardless of whether backing a project before its goal attainment is indeed more useful to creators than backing a project after its goal attainment. We are interested in testing whether and to what extent backers have prosocial motivation and care about helping creators in the first place.

[4] We had a target of 150 participants, and our recruitment message specified that we were only looking for people who had backed projects on Kickstarter. On the first page of our survey, we reminded participants of our recruitment

least one project on Kickstarter prior to taking our survey and visit Kickstarter once a month, on average. Each participant was presented with five project categories that were randomly selected from the 10 most popular categories on Kickstarter, and the five categories were presented in a random order. We asked participants to indicate, for each category, the extent to which they would back a project in that category because they wanted to help the creator of the project reach his/her funding goal or because they were interested in the product or service offered by the project (1 = "definitely because I want to help the creator" and 7 = "definitely because I am interested in the product/service"; Ryu and Kim 2016). We reverse coded participants' responses, such that higher values signal stronger prosocial motivation elicited by a given project category. We calculated average responses for each category and observed a meaningful variation across categories: the categories with the highest prosocial motivation ratings are arts ($M = 4.07$) and comics ($M = 4.02$), whereas the categories with the lowest prosocial motivation ratings are technology ($M = 2.42$) and game ($M = 2.98$). This pattern may arise because projects in the technology and game categories tend to offer concrete products as rewards (e.g., software, consumer products, board or video games) and treat backers as early customers who can get products at an earlier date at a better price (Mollick 2014), which may highlight the norm of economic exchanges and expectations for financial return. We predict that our proposed vicarious goal pursuit will be stronger when backers' intentions to contribute to a project is driven more by their altruistic motives and less by economic incentives associated with obtaining rewards. Formally, we hypothesize that:

HYPOTHESIS 2. *The difference in funding collection rates before and after a project reaches its goal will be bigger when the project's category tends to elicit stronger prosocial motivation than when the project's category tends to elicit weaker prosocial motivation.*

Furthermore, certain types of creators may be more likely to trigger backers' help intentions than other types of creators. The literature on helping behavior has documented robust evidence for the identifiable victim effect. Specifically, identified victims tend to draw more attention and support than equal numbers of unidentified, statistical victims (Jenni and Loewenstein 1997, Small and Loewenstein 2003). Also, a single victim tends to evoke stronger empathy and thus elicit greater willingness to make personal sacrifices to provide help, as compared to a group of victims, particularly when victims are identified with information such as name and picture (Kogut and Ritov 2005a,b). Relatedly, Galak et al. (2011) find that in the domain of prosocial lending (where

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criterion and asked them to indicate whether or not they had backed any projects on Kickstarter. To elicit as truthful responses from them as possible, we told participants that if they mistakenly entered the survey and had not backed any projects, they would still get paid for the same amount at the end of the survey. Thus, participants had no economic incentives to lie about their Kickstarter experiences. Among the 150 participants who completed the survey, 129 participants self-identified as having backed at least one project and were included in our analysis.

people lend money to others in need without getting interest payments in return), lenders are less likely to lend money as the number of loan recipients in a group increases.

In our setting, potential backers can readily see the creator's name and profile photo on each Kickstarter campaign webpage. Name and profile photo allow backers to assess whether the creator represents a single person (usually with one human name and one person in the profile photo), multiple people (usually with multiple human names or a family name such as "Lauren and Wayne Harvey" or "The Edison Family" and multiple people in the profile photo), or an organization (usually with a company name such as "Talking Toes" and "BUG films" and a logo or nonhuman picture as the profile photo). When creators are a single person, specific beneficiaries of backers' funds are clearly identified and the number of funding recipients is one. Compared to single-person creators, organization creators may be perceived as more statistical, and multi-people creators involve a larger number of funding recipients. Thus, building on past research about the identifiable victim effect (Jenni and Loewenstein 1997, Small and Loewenstein 2003, Kogut and Ritov 2005a,b, Galak et al. 2011), we predict that people are more likely to care about creators' funding goals and engage in vicarious goal pursuit when creators are a single person than when creators have more than one person or when creators are an organization. Formally, we hypothesize that:

HYPOTHESIS 3. *The difference in funding collection rates before and after a project reaches its goal will be bigger when the project's creator is a single person than when when the creator is not a single person.*

3. Field Setting and Data
3.1. Field Setting

We investigate our hypotheses with data from Kickstarter, a leading reward-based crowdfunding platform established in 2009. Kickstarter can be used to raise funds for one-off projects in one of 15 product categories. To launch a fundraising campaign, creators set up a project page on Kickstarter about their entrepreneurial venture. Creators decide the length of the campaign (ranging from 1 to 60 days), the funding goal, and reward incentives (including the rewards that creators offer in exchange for backers' funding, the minimum funding backers need to provide to be eligible for a given reward tier, and the number of backers each reward tier allows for). If a project fails to meet its funding goal by the end of its campaign, the creator receives no funding, and backers who have committed their funds are not charged. If the funding goal is met during the campaign, creators receive the total funding committed by backers and are obliged to deliver rewards to backers, based on an estimated delivery date pre-specified for each reward tier. Backers can continue to back a project during its campaign after its funding goal has been reached. During our study period, 81.3% of projects that met their funding goals collected more than 105% of their funding goals, with the median being 121%.

3.2.   Data

We collected data on 26,516 projects that were launched on Kickstarter from September 10, 2016 to April 10, 2017. On a daily basis, our script scanned Kickstarter, added newly launched projects to our database, and collected information about all live projects from their Kickstarter campaign pages (e.g., funding goal, launch time, deadline, project category, rewards provided). For each live project, our script visited its campaign page once every 30 minutes to record information that was critical to our research question and that could change at a high frequency, including the total funding that had been collected, the number of backers who had contributed to the project, the number of comments backers left, and the number of updates made by creators. For our main analyses, we identify 3,142 projects whose progress from 95% to 105% was observed by us. For each project in this sample, we construct two observations: one indicates the project's status as it progressed from 95% to 100% of its funding goal, and the other indicates the project's status as it progressed from 100% to 105% of its funding goal.

3.3.   Variables

3.3.1.   Dependent Variable. We use *hours elapsed* to indicate how long (in hours) it took each project to collect funds from X% to Y% of its funding goal, where X and Y vary across our regressions. For example, our primary test of Hypothesis 1 compares the time a project took to progress from 95% (slightly below 100%) to 100% with the time it took to progress from 100% to 105% (slightly above 100%) of its funding goal. For the observation that occurred before the project reached its funding goal, X and Y equal 95% and 100%, respectively; for the other observation that occurred after the project reached its funding goal, X and Y equal 100% and 105%, respectively. For all regressions reported in this paper, we take a log-transformation of the number of hours elapsed to adjust for the right skewed nature of this variable. Our results are robust if we rely on the raw duration data.

3.3.2.   Independent Variables. Our primary independent variable, *post goal*, equals one if an observation occurred after the corresponding project reached its funding goal and zero, otherwise.

To test Hypothesis 2, we used the responses from MTurk participants in the survey described in Section 2 to assess the extent to which backers tend to fund projects in a given category because of their prosocial motivation versus their interest in acquiring the goods or services provided. Participants' responses regarding each category were averaged to create the variable, *Prosocial Motivation.*

To test Hypothesis 3, we assessed whether or not the creator of each project was a single person. Specifically, we recruited $2,054$ participants from MTurk to identify creators' status for $4,958$ projects that met their funding goals during our observation period. Each participant was presented

Table 1   **Summary Statistics for Projects within 95% and 105%**

Statistic	N	Mean	St. Dev.	Min	Max
Hours Elapsed	6,284	72.624	161.826	0.209	1,444.909
Post Goal	6,284	0.500	0.500	0	1
Prosocial Motivation	6,284	3.461	0.476	2.417	4.065
Single-Person Creator	6,284	0.548	0.498	0	1
Comments Per Hour	6,284	0.108	0.549	0.000	20.259
Updates Per Hour	6,284	0.138	0.685	0.000	24.901
Staff Pick	6,284	0.456	0.641	0	1
Webpage Change	6,284	0.028	0.164	0	1

with the name and picture of the creators of five randomly selected projects. Participants were informed that a creator representing a single person generally has one human name and one person in the profile photo; a creator representing multiple people generally has multiple human names or a family name and multiple people in the profile photo; and a creator representing an organization generally has a company name and a logo or nonhuman picture as its photo. Then participants indicated whether each creator was a single person vs. multiple people vs. an organization. Each creator was rated by at least two participants. For the 280 creators that were rated by more than two participants (because they had more than one project that reached its funding goal), we used the responses from the first two participants who coded their status. The two participants rated the same creator agreed in 90.58% of the cases. When both participants identified a creator as a single person, we assigned a value of one to the binary variable, *single-person creator*, and zero, otherwise. Among the 3,142 projects included in our main analysis, 1,721 projects had a creator that was a single person. Our results are robust if we treat a creator as a single person when at least one participant coded him or her as a single person.

3.3.3. Control Variables. We include a host of control variables. First, to address the concern that our effects are driven by creators who actively promote their projects as they get close to their funding goals and reduce their interaction with potential backers post goal attainment, we control for *updates per hour*–the number of updates each creator made on his/her Kickstarter project page during the period of interest (e.g., as the project progressed from 95% to 100% of its pledged goal) divided by the length of the period in hours. Kickstarter project updates provide one main means of creator-to-backer communications, and creators are encouraged to post updates during and after their campaign to signal their effort to reach out to backers (Mollick 2014). Second, we control for *comments per hour*–the number of comments backers who had contributed to a project left on a project's campaign page during the period of interest divided by the length of the period in hours–as a proxy for existing backers' interest in interacting with creators. On Kickstarter, only existing backers of a project can leave comments, but comments are visible to everyone including potential backers. Third, Kickstarter's system constantly tracks whether each project's campaign

webpage has any non-trivial changes. We are able to collect such information, and we create a dummy variable (*webpage change*) to indicate whether each project's campaign webpage had any non-trivial changes, according to Kickstarter's definition, during a given period of interest.

Also, we note that Kickstarter's staff select certain high-quality projects and ascribe them a "Project We Love" badge, which may happen at various stages of a campaign. To control for potential changes that may be brought about by Kickstarter's decision to endorse a project, we create a dummy variable, *staff pick*, to indicate whether or not each project had received a "Project We Love" badge at the beginning of a given period of interest (i.e., at 95% for the observation corresponding to the 95%-100% region and 100% for the observation corresponding to the 100%-105% region of each project). Furthermore, we include project fixed effects, which allows us to control for *all time-invariant project characteristics* (e.g., a project's launch time, campaign duration, funding goal, location, and category) and explore the variation within the same project before versus after goal attainment in the amount of time needed to collect a certain amount of funds. Table 1 provides summary statistics for all aforementioned variables for projects in the Main Analysis.

4. Results
4.1. Average Treatment Effect of Vicarious Goal Pursuit on Backer Contributions

To examine Hypothesis 1, regarding the difference in backer contributions before and after projects reach funding goals, we begin with tests relying on raw data and summary statistics. First, using a paired t-test comparing the two observations of each project, we find that Kickstarter projects on average take significantly less time to progress from 95% to 100% ($M = 27.61$ hours, $SD = 61.72$) than to progress from 100% to 105% ($M = 117.64$ hours, $SD = 211.06$), $t(3,141) = 24.73$, p-value $< .0001$. Second, a non-parametric Wilcoxon test confirms that progressing from 95% to 100% is on average faster than progressing from 100% to 105%, $V = 798,520$, p-value $< .0001$. These results are described in Table 2 and Figure 1. Also, to examine how prevalent the vicarious goal pursuit effect is, we calculate the difference in the number of hours taken by each project to progress from 95% to 100% and the number of hours taken by it to progress from 100% to 105%. A positive value indicates that a project took longer to progress from 100% to 105%. We find that 71.61% of projects had a positive value, and the median difference was 11.63 hours. Altogether, our analysis based on summary statistics provides initial evidence for Hypothesis 1 and suggests that our effect is not just driven by a small number of projects with a large difference.

Next, we conduct regression analyses to determine whether this effect is robust to controlling for other variables that may affect backer contributions. Specifically, we use the following ordinary

Figure 1   Time Elapse from 95% to 100% and from 100% to 105%
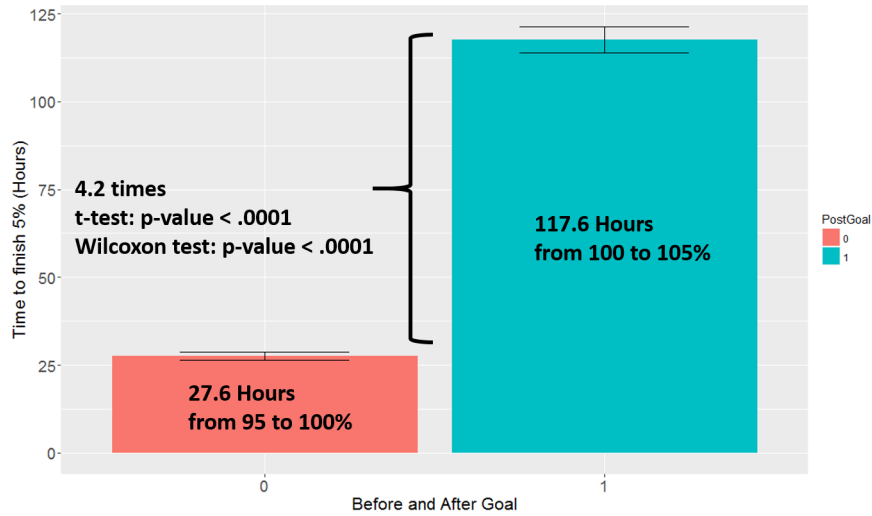
Table 2   Paired Tests of Pre Goal (95-100%) and Post Goal (100-105%) Observations

Statistic	Hours Elapsed		Comments Per Hour		Updates Per Hour		Staff Pick		Webpage Change	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
N	3,142	3,142	3,142	3,142	3,142	3,142	3,142	3,142	3,142	3,142
Mean	27.639	117.624	0.099	0.116	0.187	0.078	0.454	0.457	0.025	0.030
Difference	-90.0287		0.0098		0.1086		-0.0029		-0.0045	
T-test P-value	$< 2.2*10^{-16}$		0.2091		$8.001*10^{-6}$		0.8485		0.2597	
Wilcoxon P-value	$< 2.2*10^{-16}$		0.4008		$8.664*10^{-12}$		0.8548		0.2593	

least squares regression model:

$$Log(\text{hours elapsed from X to Y})_{it} = \alpha_0 + \alpha_1 * \text{post goal}_{it} + \alpha_2 * \text{updates per hour}_{it} +$$

$$\alpha_3 * \text{comments per hour}_{it} + \alpha_4 * \text{staff pick}_{it} + \quad (1)$$

$$\alpha_5 * \text{webpage change}_{it} + \gamma_i + \epsilon_{it},$$

where the dependent variable indicates the log-transformed number of hours a project took to progress from 95% to 100% as well as from 100% to 105%, post goal indicates whether an observation represents a project's 100%-105% interval, and γ_i represents project fixed effects. We cluster standard errors at the project level to address the non-independent nature of the two observations associated with each project.

By focusing on a small region around the 100% point, our regression framework is similar to the regression discontinuity design. One assumption of such a design is that there does not exist differences between the 95-100% region and 100-105% region in other aspects that may lead contributions to be lower in the 100-105% region, apart from goal attainment.[5] If we had compared

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[5] Table 2 shows that all control variables are comparable during the small region around the 100% goal-attainment point, except that updates per hour are higher during 95-100% than 100-105%. Importantly, our results are robust to controlling for updates per hour (Column 2 in Table 3). Also, we confirm that updates per hour do not statistically

Table 3   Average Effect of Vicarious Goal Pursuit on Backers' Contribution

	Dependent Variable: Log(Hours Elapsed)					
	Region					
	(1) 95-105%	(2) 95-105%	(3) 90-110%	(4) 90-110%	(5) 99-101%	(6) 99-101%
Post Goal	1.078***	1.020***	1.186***	1.131***	0.538***	0.490***
	(0.038)	(0.029)	(0.033)	(0.026)	(0.063)	(0.034)
Comments Per Hour		−0.387***		−0.469***		−0.095
		(0.067)		(0.070)		(0.080)
Updates Per Hour		−0.569***		−0.893***		−0.512***
		(0.036)		(0.052)		(0.038)
Staff Pick		0.009		−0.052		0.123
		(0.069)		(0.050)		(0.143)
Webpage Change		−0.260		−0.033		−0.585
		(0.207)		(0.169)		(0.446)
Constant	2.406***		3.016***		1.893***	
	(0.027)		(0.024)		(0.044)	
Observations	6,284	6,284	7,978	7,978	2,408	2,408
R^2	0.112	0.746	0.136	0.747	0.030	0.859

Note: *$p<0.05$; **$p<0.01$; ***$p<0.001$; Project-level robust standard errors.

95%-100% with the complete period (as opposed to a small period) post goal attainment, the smaller contribution rates post goal attainment can be attributed to other factors, such as backers' concerns that projects with too much funding have too much commitment and demand and may not deliver rewards on time due to capacity constraints (Gerber and Hui 2013).

Table 3 presents the results of regressions based on specification (1): Column 1 does not include control variables, whereas Column 2 includes all control variables mentioned in the regression specification. In both models, post goal is a significant and positive predictor (both p-values < .001), indicating that projects on average take longer to progress from 100% to 105% than from 95% to 100%. Specifically, Column 2 estimates that when everything else is held constant, the number of hours projects take to progress from 100% to 105% is 2.77 (i.e., $e^{1.02}$) times as large as the number of hours projects take to progress from 95% to 100%.

To confirm that our effect is not limited to the 95%-105% region around each project's funding goal, we identify 3,989 projects whose progress from 90% to 110% of their funding goals was observed by us as well as 1,204 projects whose progress from 99% to 101% was observed. We use regression specification (1) to model how long each project took to progress from 90% (or 99%) to 100% and from 100% to 110% (or 101%). As shown in Columns 3-6 in Table 3, regardless of whether we examine a wider (90%-110%) or narrower (99%-101%) region and whether we include control variables, post goal is a positive and significant predictor (*all* p-values < .001).

significantly differ between 99-100% and 100-101%, but we observe significantly higher contribution rates during 99-100% than 100-101% (Columns 5-6 in Table 3), suggesting that differences in creators' project updates before versus after goal attainment are unlikely to explain all of our findings.

4.2. The Amplifying Effect of Prosocial Motivation

So far, we have established the basic phenomenon that backers more enthusiastically push projects to move forward by a given increment if the projects are below their funding goals than if the projects are above the funding goals. We next test if this effect grows stronger when backers have stronger prosocial motivation and weaker financial incentives to support a project category (Hypothesis 2). For ease of explication, we standardize prosocial motivation ratings before using this variable as a moderator. We add an interaction between our (standardized) prosocial motivation measure and the indicator of the post-goal period to regression specification (1).[6]

Consistent with Hypothesis 2, the positive and significant interaction between prosocial motivation and post goal (p-value < .001) in Column 1 in Table 4 reveals that the difference in the time taken by a project to collect 5% of its funding goal before and after its goal attainment is greater if backers fund the project more out of prosocial motivation and less out of personal interest in obtaining the goods or service. For example, for projects with an average rating of prosocial motivation, the number of hours these projects took to progress from 100% to 105% of their funding goal was 2.72 (i.e., $e^{1.00}$) times as large as the number of hours these projects took to progress from 95% to 100%. As prosocial motivation rating increases by one standard deviation, the number of hours projects took to progress from 100% to 105% was 3.38 (i.e., $e^{1.00+0.22}$) times as large as the number of hours the projects took to progress from 95% to 100%.

4.3. The Amplifying Effect of Creator's Single-Person Status

We next test if the difference in backer contributions right before versus right after a project hits its funding goal is larger when the creator is a single person than when the creator is not a single person (Hypothesis 3). We add an interaction between the binary indicator of single-person creator and the indicator of the post-goal period to regression specification (1). Consistent with Hypothesis 3, the positive and significant interaction between creator's single-person status and post goal (p-value < .001) in Column 2 in Table 4 reveals that the difference in the time taken by a project to collect 5% of its funding goal before and after its goal attainment is greater if its creator is clearly one person than if its creator does not represent one person. Specifically, for projects whose creator was not one person, the number of hours these projects took to progress from 100% to 105% of their funding goal was 2.32 (i.e., $e^{0.84}$) times as large as the number of hours these projects took to progress from 95% to 100%. For projects whose creator had only one person, the number of hours

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[6] In this regression, where we control for project fixed effects, the coefficient on prosocial motivation cannot be estimated because prosocial motivation has the same value for both observations of each project (and, in fact, for all observations within the same project category) and prosocial motivation is absorbed by project fixed effects. Similarly, when we test Hypothesis 3 as described below, the coefficient on the indicator for single-person creator also cannot be estimated because the single-person creator indicator has the same value for both observations of each project. When we exclude project fixed effects, the results reported in Table 4 are robust.

projects took to progress from 100% to 105% was 3.25 (i.e., $e^{0.84+0.34}$) times as large as the number of hours the projects took to progress from 95% to 100%.

Furthermore, Column 3 in Table 4 indicates that the interaction between creator's single-person status and post goal remains positive and significant (p-value = .004) when we control for the interaction between prosocial motivation and post-goal (p-value < .001). Thus, the amplifying effect of creator's single-person status on various goal pursuit exists over and beyond the effect of prosocial motivation that a project's category tends to elicit.

Having confirmed that our observed vicarious goal pursuit effect is stronger for single-person creators than other types of creators on average, we next separate out creators involving multiple people versus organization creators. Similar to how we coded creator's single-person status, when two MTurk participants who rated the same creator both coded the creator as consisting of multiple people (or representing an organization), we treated the creator as a multi-people creator (or an organization creator). We separately run regression specification (1) for projects with a single-person creator (n = 1,721) vs. projects with a multi-people creator (n = 166) vs. projects with an organization creator (n = 969). We find that the ratio of the number of hours projects took to progress from 100% to 105% to the number of hours the projects took to progress from 95% to 100% is 3.16 (i.e., $e^{1.15}$, p-value < .001) for single-person creators, 2.41 (i.e., $e^{0.88}$, p-value < .001) for multi-people creators, and 2.16 (i.e., $e^{0.77}$, p-value < .001) for organization creators, respectively. This is consistent with our theorizing drawing on the identifiable victim effect that backers care more about creators' funding goals for single-person creators than for both multi-people creators (because they represent a larger number of funding recipients than single-person creators; Kogut and Ritov 2005a,b, Galak et al. 2011) and organization creators (because they are more statistical than single-person creators; Jenni and Loewenstein 1997, Small and Loewenstein 2003).

4.4. Alternative Explanations

Our results in support of Hypotheses 2 and 3 are consistent with our theory that the faster speed at funding collection before (vs. after) goal attainment is attributable to backers' prosocial motives to help creators make their entrepreneurial ideas come true. Next, we address a number of potential alternative explanations.

4.4.1. Time Since Campaign Launch. Our analysis compares the short period before versus after a project reaches its funding goal. For each project, the observation post goal attainment always happens after the observation prior to goal attainment, is further away from its launch, and is closer to its campaign deadline. Such differences between the two observations of each project may lead to alternative explanations for our findings. For example, if potential backers generally become less and less interested in a project as its campaign goes on, or if potential backers tend

Table 4   Project and Creator Characteristics that Amplify Vicarious Goal Pursuit

	Dependent Variable: Log(Hours Elapsed)			
	Region: 95%-105%			
	(1)	(2)	(3)	(4)
Post Goal	0.998***	0.836***	0.862***	0.860***
	(0.044)	(0.057)	(0.061)	(0.061)
Post Goal ×	0.217***		0.177***	0.194***
Prosocial Motivation (Standardized)	(0.045)		(0.047)	(0.053)
Post Goal ×		0.336***	0.248**	0.257**
Single-Person Creator		(0.082)	(0.086)	(0.086)
Post Goal ×				0.010
Gambling (Standardized)				(0.048)
Post Goal ×				−0.052
Ownership (Standardized)				(0.052)
Observations	5,804	6,284	5,804	5,804
R^2	0.754	0.748	0.755	0.755

Note: MTurk participants rated prosocial motivation, gambling, and ownership for the 10 most popular Kickstarter categories. Thus, projects in five uncommon categories are not included in Columns 1, 3, and 4 that involve these moderators. All regressions reported in this table include the same set of controls as regression specification (1). *p<0.05; **p<0.01; ***p<0.001; We calculate robust standard errors clustered at the project level.

to sort live projects by their launch time, our findings may be accounted by the decrease in backers' interest and attention overtime (as opposed to a decrease in backers' motivation due to goal attainment).

To address this concern, we conduct a placebo test (Pierce et al. 2013) and examine whether a similar drop in backer contributions happens at other points. Specifically, instead of using the 100% goal-attainment point as the cut-off threshold, we use three different placebo thresholds (85%, 90%, and 95%). In each regression, we identify projects whose progress from Z-5% to Z and from Z to Z+5% was observed by us, and compare the time these projects took to progress from Z-5% to Z vs. from Z to Z+5%, with Z representing a placebo threshold. The key independent variable is *post threshold*, a binary variable indicating whether or not a given observation represents the corresponding project's status after the project passed the threshold Z. If our findings are unique to the 100% goal-attainment point according to our theorizing about backers' prosocial motivation, we should not expect to see that funds are collected faster before rather than after projects reach other thresholds (85%, 90%, or 95%). Indeed, as shown in Table 5, the coefficient on the post threshold indicator is negative for all three thresholds and is statistically significant for the 90% and 95% thresholds. These results indicate that projects on average take less time to collect 5% of their funding goals after as compared to before reaching these placebo thresholds. These results confirm that our findings cannot be simply explained by the difference between pre- and post-goal-attainment observations in how far along a project is in its campaign when each observation happens.

Table 5   Placebo Test of the Main Effect

	Dependent Variable: Log(Hours Elapsed)		
	Placebo Threshold		
	(1) 85%	(2) 90%	(3) 95%
Post Threshold	-0.014	-0.049^*	-0.209^{***}
	(0.024)	(0.023)	(0.024)
Observations	5,086	5,246	4,966
R^2	0.778	0.782	0.779

Note: $^*p<0.05$; $^{**}p<0.01$; $^{***}p<0.001$
Project-level robust standard errors.

4.4.2.   Friends' and Families' Feelings of Obligations. One concern is that our effect may be concentrated on projects which primarily benefit from the contributions of the creators' friends and family because friends and family feel obligated to help creators reach their funding goals but stop contributing once funding goals are met. To address this concern, we test whether our results hold among projects with substantial funding goals. Projects with small funding goals (e.g., < 1000) target family and friends (Qiu 2013; Mollick 2014), but projects with large funding goals are unlikely to succeed by only relying on contributions from family and friends, and have to reach a broad community of backers. Therefore, we focus on projects whose goals are above \$8,000 (N = 1,230; top 50%) or \$20,000 (N = 454; top 10%) and demonstrate that our results are robust. Columns 1 and 2 of Table 6 show the results. For projects with funding goals larger than \$8,000 and \$20,000, we observe that our results are robust.

4.4.3.   Creators' Accurate Predictions about Demands. Creators may be able to set funding goals based on their quite accurate predictions about how much funds they can collect, which means that they basically exhaust their targeted market by the time they meet funding goals and can only slowly collect some additional funding. To explore this alternative hypothesis, we focus on sub-samples of projects that ended up collecting funds way above their funding goals. Table 6 indicates that the coefficient on the post goal indicator is still positive and significant when we focus on projects whose total funds collected was more than 120% (Column 3) or 200% (Column 4) of their funding goals. These results suggest our observed difference in funding collection speed before vs. after goal attainment cannot simply be explained by the alternative explanation about the depletion of the backer pool.

4.4.4.   Creators' Marketing Effort. Creators may promote their products more aggressively before than after goal attainment. As explained in the Control Variables section (section 3.3.3), our regressions control for the number of updates creators made per hour as well as whether they made non-trivial webpage changes as proxies for how actively creators reached out to backers during a give period. Since creators may also promote their projects and communicate with potential

Table 6   **Average Effect of Vicarious Goal Pursuit on Backer Contributions Among Sub-Samples of Projects**

	Dependent Variable: Log(Hours Elapsed)					
	Sub-Sample					
	(1) Goal $\geq \$8,000$	(2) Goal $\geq \$20,000$	(3) Final Progress $\geq 120\%$	(4) Final Progress $\geq 200\%$	(5) All Tweets	(6) Creators' Tweets
Post Goal	0.968***	0.826***	0.458***	0.257***	1.020***	1.022***
	(0.045)	(0.071)	(0.031)	(0.045)	(0.045)	(0.045)
Comments Per Hour	−0.291***	−0.348***	−0.259***	−0.176***	−0.383**	−0.383**
	(0.072)	(0.091)	(0.054)	(0.055)	(0.124)	(0.124)
Updates Per Hour	−0.721***	−0.953***	−0.361***	−0.564***	−0.567**	−0.567**
	(0.059)	(0.096)	(0.039)	(0.096)	(0.187)	(0.187)
Staff Pick	0.042	0.109	−0.024	0.033	−0.015	−0.016
	(0.096)	(0.137)	(0.077)	(0.138)	(0.095)	(0.095)
Webpage Change	0.156	0.014	0.086	0.279	−0.210	−0.210
	(0.271)	(0.376)	(0.228)	(0.401)	(0.265)	(0.265)
Tweets Per Hour					0.013*	4.835*
					(0.161)	(2.102)
Observations	2,460	908	3,168	1,070	6,284	6,284
R^2	0.751	0.766	0.800	0.806	0.745	0.746

Note: *p<0.05; **p<0.01; ***p<0.001; Project-level robust standard errors.

backers via other channels outside of Kickstarter, we collected additional information from Twitter which Kickstarter creators often use to spread the word about their projects (Kuppuswamy and Bayus 2016). Specifically, for each project in our sample, we collected all tweets that mentioned the project's name and the word "Kickstarter" during its campaign period.[7] Next, we differentiate whether a tweet was posted by a project's creator or other people (e.g., friends, fans, existing backers). Project creators can list external websites (e.g., their own or their organization's website and their Twitter, Facebook, and Instagram webpages) on their Kickstarter profile page. Similar to prior work (Kuppuswamy and Bayus 2016), we collected creators' Twitter handles if they linked their Twitter account to their Kickstarter profile page. To be more comprehensive, we also collected names associated with other websites listed on each creator's Kickstarter profile page (e.g., personal website, Facebook, or Instagram). If the Twitter account that created a tweet matches a creator's name, the creator's Twitter handle, or any of the names associated with the creator's other external websites linked to the creator's Kickstarter profile page, we assume that the tweet was posted by the project creator. For each project, we calculated the number of all tweets (from its creator or others) as well as the number of tweets from its creator that were posted per hour as the project progressed from 95% to 100% versus from 100% to 105%. We add these variables as controls in our regression specification (1). Table 6 shows that the post-goal indicator remains a positive and significant predictor when we control for all tweets that mentioned a project's name (Column

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[7] Twitter's official API only allows users to access tweets posted within a week. We used a python package called GetOldTweets (available at https://github.com/Jefferson-Henrique/GetOldTweets-python) to access Twitter's entire tweet archive.

5) or only tweets that, as far as we can tell, were posted by creators (Column 6). These results suggest that the faster funding collection speed before (vs. after) goal attainment cannot be easily explained by creators' or other supporters' increased effort in promoting a project prior to its goal completion.

4.4.5. Kickstarter's Promotions. Next, we address the concern that our finding may be driven by Kickstarter more heavily promoting projects that are slightly below their funding goals. We rule out this alternative explanation in several ways. First, when browsing projects on Kickstarter, potential backers cannot sort projects based on their proximity to funding goals. During our study period, backers can only sort projects based on the number of backers who have backed each project ("most backed"), the total amount of funding each project has collected ("most funded"), distance to each project's campaign deadline ("end date"), distance to each project's launch time ("newest"), the popularity of each project ("popularity"), and the "magic" index of each project determined by Kickstarter. By definition, searching by "most backed," "most funded," "end date," and "newest" should not give greater attention to projects that are slightly below their funding goals than projects that are slightly above their funding goals. Though Kickstarter has kept its determinants of popularity and magic secret, the Kickstarter community's common wisdom is that a project's popularity increases with (a) the average number of backers who fund the project per day, (b) its total funding so far, and (c) the percentage of its funding goal that has been collected.[8] Through our personal communication with the support team of Kickstarter, we learn that the "magic" sorting method–the default search method during our study period–displays a rotating cross section of compelling projects by surfacing a mixture of projects that are popular and have received the "Project We Love" badge from Kickstarter. If the Kickstarter community's common wisdom is correct, Kickstarter's popularity and magic algorithm does not prioritize projects close to funding goals.

To further attest that sorting by "popularity" and "magic" does not promote projects below their funding goals more than projects above their funding goals, we sorted live projects on Kickstarter by popularity and by magic in January, 2017. Following each search, we recorded the first 200 projects and, for each project, we coded its funding goal, the percentage of its goal that had been collected at the time of the search, and the number of its position on Kickstarter (ranging from 1 to 200, with a lower number indicating a more prominent position). Among the top 200 projects, we do not see more projects in the region of 95%-100% goal completion (n = 1 by popularity or magic) than projects in the 100%-105% region (n = 4 by popularity or magic). Also, when

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[8] http://prefundia.com/blog/hacking-kickstarters-popular-algorithm-how-to-become-most-popular;
http://www.kickstarterforum.org/hacking-the-kickstarter-popularity-algorithm-t6076.html

sorting by popularity and magic, we do not find evidence that Kickstarter places projects with less goal progress at a more prominent position. Specifically, we predict each project's position number using the ratio of its accumulated funding to its funding goal. A smaller position number indicates a more prominent position. Since the ratio of the top 200 live projects ranged from 0% to 28,967% (for popularity) to 31,717% (for magic), we zoom in on projects whose ratio was between 0% and 200%, a reasonable range symmetric around 100% (n = 111 for popularity and n = 134 for magic). The ratio of accumulated funding to funding goal is a negative predictor of projects' position number (p = .32 for popularity and p = .034 for magic). This suggests that among the top 200 live projects that had a goal progress of 0%-200% and were selected by popularity (or magic), the more progress a project had made, the more prominent a position it may be placed in. Therefore, based on our observations and the Kickstarter community's common wisdom, we do not find evidence that Kickstarter's sorting algorithm promotes projects that are slightly below their funding goals or reduces attention to projects that have just reached their funding goals.[9]

4.4.6.   Other Non-Economic Drivers. Finally, it is plausible that non-economic drivers other than backers' prosocial motives cause the difference in contribution rates before versus after goal completion. One such alternative explanation is that some backers enjoy betting on the success of Kickstarter projects and thus derive more utility from supporting a project before rather than after it reaches its funding goal. These backers may obtain additional utility from resolving the uncertainty about whether they have made a right bet–an information gap that is pleasant to think about (Golman et al. 2015)–or from demonstrating their competence (in this case, via making a right bet), a fundamental human motive (Dweck 1986). Another alternative explanation is that backers may feel a greater sense of agency and ownership toward a project if they contribute to the project before rather than after it reaches its funding goal. Anecdotally, writers of tech blogs

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[9] Though Kickstarter allows backers to filter projects based on whether they have collected less than 75% versus 75-100% versus more than 100% of their funding goals, backers cannot perform more refined searches to focus on projects that are slightly below (or above) their funding goals or sort projects based on goal proximity. Also, we coded all of the 128 live projects that had collected 75-100% of their funding goals by January 24, 2017 and sorted them by popularity. Similarly, we coded all of the 130 live projects that had collected 75-100% of their funding goal by January 25, 2017 and sorted them by magic. We see that the number of projects in the 95-100% region (n = 13 by popularity and n = 25 by magic) was comparable to or even smaller than the number of projects in other regions from 75% to 95% at 5% intervals (i.e., 75-80%, 80-85%, 85-90%, and 90-95%; the minimum number of projects across these regions was 21 for both searches). Furthermore, among these projects we coded whose progress was between 75% and 100% of the funding goal, the ratio of a project's accumulated funding to its funding goal is a positive predictor of the project's position number (p = .004 for popularity and p = .62 for magic). That is, among these projects with a 75-100% progress, the more progress a project had made, the less prominent a position it may be placed in. These observations further suggest that Kickstarter does not give special attention to projects that are getting close to their funding goals. That said, on the backer's side, it is possible that backers are more likely to filter in projects that have collected 75%-100% of their funding goals than projects that have collected more than 100% of their funding goals; however, such a tendency to more actively search for projects that are below their goal than projects that are above their goal would be consistent with our theory about backers' prosocial motives to help creators and inconsistent with past research about herding and certainty about campaign success.

speculate that one psychological factor behind backer contributions is a feeling of power and a sense of making things happen (Savage 2013, Atkinson-Bonasio n.d.).

To address these alternative explanations, we recruited 102 participants from MTurk using the same method and criteria as described in Section 2.[10] Each participant was presented with five project categories that were randomly selected from the 10 most popular categories on Kickstarter. For each category, participants answered two questions. First, they indicated the extent to which they would back a project in that category because they would be interested in the product or service offered by the project or because they would enjoy betting on the success of the project (1 = "definitely because I am interested in the product/service" and 7 = "definitely because I enjoy betting on its success"). Second, for each category, participants indicated the extent to which they would back a project in that category because they would like to receive the promised product or service or because they would enjoy feeling a sense of ownership toward the success of the project (1 = "definitely because I am interested in the product/service" and 7 = "definitely because I enjoy feeling a sense of ownership toward its success"). We create two measures *Gambling* (M = 3.10, SD = 0.23) and *Ownership* (M = 3.04, SD = 0.25) based on participants' responses to these two questions such that a higher value indicates a stronger desire to bet on or have ownership of the success of a project, respectively. We examine the alternative explanations by testing whether our observed difference in contribution rates before versus after goal completion is amplified when the desire to bet on or have ownership of the success of a project is strong. We add (standardized) gambling and ownership ratings as moderators to Column 3 in Table 4 and report the results in Column 4 of Table 4. Neither the interaction between post goal and gambling nor the interaction between post goal and ownership is statistically significant. Furthermore, when we control for gambling and ownership, the magnitude and direction of the interaction between category-level prosocial motivation and post goal as well as the interaction between a creator's single-person status and post goal remain meaningfully unchanged. Thus, these results do not support the alternative explanations based on the enjoyment of gambling and the sense of ownership.

5.   Connection with Past Research Examining Vicarious Goal Pursuit

Cryder et al. (2013b) examine how individuals' donation intentions vary as charity recipients progress towards their fundraising goals, and use a different analytical approach from ours to shed light on vicarious goal pursuit. Specifically, Cryder et al. (2013b) focus on the period prior to goal attainment and show that as the percentage of charitable campaigns' funding goals collected increases (i.e., as charitable campaigns get closer to their funding goals), people are more likely

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[10] Participants (32% females, mean age = 35) had backed at least one project on Kickstarter prior to taking our survey and on average visit Kickstarter once a month.

to pitch in. However, this method cannot differentiate the influence of goal proximity with that of herding. This is because for any given charitable campaign, a greater percentage of its funding goal being collected may send more positive signals about prior donors' judgments of the charity's quality and produce stronger herding behavior. The same problem applies to the reward-based crowdfunding context, making it impossible to identify the causal effect of goals on backer contributions by only examining observations prior to goal attainment.

Nevertheless, we use a similar approach as Cryder et al. (2013b) to examine the relationship between goal proximity and backer contributions, and contrast this alternative method with our prior identification of the vicarious goal pursuit effect. We identify 957 projects whose progress from 10% to 100% was observed by us.[11] For each project in this sample, we construct nine observations, tracking the project's status at 10% intervals as it progressed from 10-20%, 20-30%, up to 90-100% of its funding goal. We use the following specification to identify the effect of goal progress on backer contributions:

$$
\begin{aligned}
Log(\text{hours elapsed from X to Y})_{it} = {} & \alpha_0 + \alpha_1 * \text{goal progress level}_{it} + \alpha_2 * \text{number of backers}_{it} + \\
& \alpha_3 * Log(\text{funds collected so far})_{it} + \alpha_4 * \text{updates per hour}_{it} + \\
& \alpha_5 * \text{comments per hour}_{it} + \alpha_6 * \text{staff pick}_{it} + \\
& \alpha_7 * \text{webpage change}_{it} + \gamma_i + \epsilon_{it},
\end{aligned}
$$

$$(2)$$

where the dependent variable is the log-transformed number of hours project i took to progress from X to Y, with X equaling to the lower bound of each region (i.e., 10%, 20%, up to 90%) and Y equaling to the higher bound of the same region (i.e., 20%, 30%, up to 100%). Goal progress level takes values from $\{1, 2, .., 9\}$, with 10% having a value of 1 and 90% having a value of 9. Past research about herding suggests that both the number of unique individuals who have taken an action and the amount of effort exerted by individuals produce positive effects of social influence (Bikhchandani et al. 1998). Thus, we control for the number of backers who had already funded the project (*number of backers*) and the log-transformed amount of funds that had been collected by the time the project reached the lower bound of a given region (*funds collected so far*). Further, we include project fixed effects to rule out alternative explanations caused by time-invariant omitted variables. For example, popular projects are more likely to have observations close to funding goals and also collect funding more quickly.

As shown in Column 1 of Table 7, when we control for factors that may produce herding effects along with project fixed effects, goal progress level is not a significant predictor of how quickly

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[11] As explained later, we examine the speed at which these projects collected funds during each of nine 10% intervals from 10% to 100%. The reduction in sample size is due to the fact that some projects have big instantaneous contributions, which prevent them from having observations at all of the nine 10% intervals.

Table 7   Effects of Herding and Vicarious Goal Pursuit on Backers' Contribution

	Dependent variable:		
	Log(Hours Elapsed)		
	(1)	(2)	(3)
Goal Progress Level	0.0001	−0.003**	0.008***
	(0.001)	(0.001)	(0.002)
Number of Backers	−0.0001	−0.0001	−0.0001
	(0.0001)	(0.0002)	(0.0002)
Log(Funds Collected So Far)	0.107***		0.453***
	(0.010)		(0.063)
Comments Per Hour	0.0004	0.001	0.001
	(0.001)	(0.001)	(0.001)
Updates Per Hour	−1.034***	−1.229***	−1.207***
	(0.054)	(0.053)	(0.053)
Staff Pick	0.168***	0.089***	0.081***
	(0.022)	(0.024)	(0.024)
Webpage Change	−0.057	−0.037	−0.055
	(0.088)	(0.087)	(0.087)
Constant	2.538***		
	(0.092)		
Observations	8,613	8,613	8,613
R^2	0.358	0.343	0.347

Note: *p<0.05; **p<0.01; ***p<0.001
Project-level robust standard errors.

projects collect 10% of funding goals. We note that since we control for project fixed effects, funds collected so far are, by construction, highly correlated with the percentage of funding goal completed across nine observations of the same project. If we remove funds collected so far as a predictor (Column 2 in Table 7), goal progress level becomes a significant and negative predictor (p < .001), consistent with Cryder et al. (2013b). However, such a regression specification fails to control for herding effects that may be driven by the increased amount of collected funds. Thus, in Column 3 of Table 7, we drop project fixed effects and add back funds collected so far as a control, and find that goal progress level becomes a positive and significant predictor. That is, when the number of backers and funds collected so far are held constant along with other control variables, projects on average take significantly *more* time to collect 10% of funding goals as they get closer to funding goal, contrary to the findings in Cryder et al. (2013b).

To summarize, the evidence for whether projects collect funds more quickly as they get closer to their funding goals is mixed, depending on whether and how factors that influence the herding effect are controlled for. Using the relationship between goal proximity and backer contributions in the period prior to goal attainment cannot convincingly test the effects of goals as reference points on backers, and our approach, which focuses on a small region around the goal-attainment point, provides the cleanest test of vicarious goal pursuit based on observational data.

6. General Discussion

Reward-based crowdfunding is a fast-growing platform where entrepreneurs solicit initial capital from an online community of backers and offer rewards in exchange. Using seven-month detailed data from Kickstarter, we show that funding accumulates nearly three times as fast when projects are slightly below their funding goals as when projects are slightly above their funding goals. This effect is amplified among project categories that elicit stronger prosocial motivation as well as among projects whose creators are a single person, which supports our theorizing that the difference in funding collection speed before versus after goal attainment is attributable to backers' altruistic motives to help creators pursue their entrepreneurial ideas. We also address a number of alternative explanations. Altogether, our findings suggest that backers care about creators' goals, a force that can dominate the opposite effects of herding and certainty about obtaining rewards, at least within the region around each project's funding goal.

By showing the vicarious goal pursuit effect in an economically meaningful field context involving economic exchange among online strangers, we add to the large body of literature on goals, which has mostly focused on how individuals adjust their efforts in the pursuit of their personal or shared group goals (e.g., Locke and Latham 1990, Heath et al. 1999, Soman and Cheema 2004, Kivetz et al. 2006, Fishbach et al. 2011, Tu and Soman 2014, Fishbach et al. 2016), except research about people contributing to charity recipients' goals in traditional giving settings (e.g., Koo and Fishbach 2008, Fishbach et al. 2011, Cryder et al. 2013b). Also, by uncovering vicarious goal pursuit in crowdfunding settings, our findings extend past laboratory-based research on vicarious decision making (e.g., Kouchaki 2011, Gino and Galinsky 2012). Furthermore, we contribute to existing research on social preferences by documenting one way in which altruistic motives affect individuals' decisions and providing evidence for the identifiable victim effect (Jenni and Loewenstein 1997, Small and Loewenstein 2003, Kogut and Ritov 2005a,b) in a context where expectations for economic exchanges are prevalent. Moreover, by empirically demonstrating the role of backers' altruistic motives, we contribute to the extant crowdfunding literature that has focused on economic considerations underlying backers' funding decisions (e.g., Agrawal et al. 2011, Freedman and Jin 2011, Zhang and Liu 2012, Mollick 2014, Van de Rijt et al. 2014, Hu et al. 2015, Du et al. 2017). Lastly, we use an empirical approach similar to the regression discontinuity design, which allows us to identify the effects of goals as causally as possible from crowdfunding observational data, apart from herding. Similar designs can be leveraged to disentangle the effects of goals and herding in other social contexts.

This paper provides implications for entrepreneurs interested in collecting capital on reward-based crowdfunding platforms as well as for crowdfunding platform managers. First, our results suggest that creators may gain support by capitalizing on backers' altruistic motives. Even though

reward-based crowdfunding platforms have a for-profit orientation, our findings suggest that backers care about not only the products they can obtain from a project but also how big an impact they can make on the project. Thus, creators may appeal to backers, especially those with strong altruistic motives, by highlighting on their campaign page how backers' contributions benefit their projects. In a traditional retailing context, operational transparency and virtual progress have been shown to increase customers' perceptions of service value (Soman and Shi 2003, Buell et al. 2016). In the reward-crowdfunding context, transparency about fund usage may also motivate backers to contribute since such transparency can help backers visualize their potential impact on the project and creator.

Furthermore, our finding suggest that managers of crowdfunding platforms should take into account backers' altruistic motives when designing platform features. For example, Kickstarter currently displays the progress each project has made but does not allow backers to search or sort projects based on proximity to funding goals. To attract backers who are eager to make an impact on projects close to funding goals, Kickstarter may consider enabling advance search based on goal proximity. In addition, from a project scheduling perspective, crowdfunding platforms should pay attention to the progress of all projects within the same category and dynamically decide when to launch new projects in order to reduce competition between projects close to funding goals and new projects. For example, Kickstarter currently reviews projects before they launch to ensure that they meet requirements, a review process that can take up to three days. Kickstarter may consider temporarily holding off on projects or advising creators to delay the launch of their projects when many projects of a similar type are close to their funding goals.

There are a number of interesting avenues for future research. First, our analysis focuses on the narrow region around each project's funding goal, which allows us to provide, to the best of our knowledge, the cleanest evidence for backers' altruistic concerns about creators' goal progress, apart from herding. However, this identification strategy is limited in its ability to draw causal inferences about backer contributions at points far away from funding goals. Future research that causally examines how backer contributions dynamically change under the joint influence of social preferences, herding, and uncertainty about obtaining rewards would be valuable. Second, we have focused on data from Kickstarter where funding goals may be particularly salient to backers because of the all-or-nothing policy. An interesting future direction is to examine whether the vicarious goal pursuit effect exists in other crowdfunding platforms where creators receive funds committed by backers regardless of whether creators' funding goals are met (e.g., flexible funding mechanism on IndieGoGo.com). Third, this research shows that the strength of the vicarious goal pursuit effect varies with project category's prosocial nature and creator's single-person status. It would be valuable for future research to examine project and creator characteristics that are emotionally

evocative and can trigger backers' altruistic motives. Connecting these characteristics with project and creator characteristics that backers use to assess project quality may not only provide a more comprehensive view of the decision making process in crowdfunding settings but also advance our understanding of how altruistic motives and self-interest interact to shape behavior (e.g., Gino et al. 2013, Berman et al. forthcoming).

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