Understanding the Role of Goals in Competitive Crowdsourcing Project Selection

Completed Research Paper

Dorit Nevo
Lally School of Management,
Rensselaer Polytechnic Institute
110 8th St., Troy, NY 12180
nevod@rpi.edu

Hamed Tajedin
Center in Digital Business
ESSEC Business School
3 Avenue Bernard Hirsch
CS 50105 Cergy
95021 Cergy Pontoise Cedex, France
hamed.tajedin@essec.edu

Abstract

Tournament based crowdsourcing, in which multiple individuals or teams compete on given tasks and compensation is based on winning submissions, requires crowd members to carefully consider their choice of task and allocation of resources. In this paper we explore two factors that potentially impact crowdsourcing task selection, namely perceived ability and perceived competition. We further explore a moderating effect of goal orientation on task participation intention. Our results show a positive link between perceived ability and participation intention, and a negative link between perceived competition and participation intention. Both effects were found to be stronger for those with performance orientation than for those with mastery orientation. Our results provide an important insight for crowdsourcing platforms in terms of balancing demand and submissions for competition to ensure all tasks are fulfilled.

Keywords: Tournament based crowdsourcing, Perceived Behavioral Controls, Goal Orientation, Field Experiments

Introduction

Tournament-based crowdsourcing is common in fields such as software development and analytics. In tournament-based crowdsourcing, crowd members compete on a specific challenge and compensation is based on one's relative rank in the completion of tasks (Hutter et al, 2011; Morgan and Wang, 2010). An example of this mechanism is the software development context practiced by TopCoder.com, in which clients post software development tasks to the crowdsourcing platform. The requirements of a piece of code are then announced to the crowd and individuals have a limited time to come up with the best code to submit. Upon submission, codes are ranked based on how well they satisfy the requirements, and the top ranks receive a monetary prize.

In this setting, an important decision facing members of the crowd is whether or not to take on a specific project. Crowd members face a multi-attribute decision scenario that requires them to weigh the costs and benefits of specific projects vis-à-vis their own skills, as well as the alternative cost of those projects not selected. This decision, of whether or not to participate in a given project, also has important implications to the crowdsourcing platform as a whole. Specifically, the success of the platform depends on its ability to draw and manage skilled crowd members toward the successful completion of a client's task. Therefore, it is important for the platform to understand how crowd members choose one project over the other in order to properly design terms of tournaments to ensure sufficient participation in tasks.

In this paper we focus on the project selection decision of crowd members. To study this decision, we propose a model that incorporates crowd members' perceptions of ability and competition as well as their goal orientation, within the unique crowdsourcing context. We focus on understanding the factors that contribute to the intention to participate in one crowdsourcing project over others.

Within the growing literature on crowdsourcing and related areas (such as open innovation), much literature has focused on the general *motivation* of individuals to participate in such initiatives. In open source software, for example, Roberts et al. (2006) looked at intrinsic and extrinsic motivation to participate. Similarly, within the crowdsourcing context, research has shown that crowd members are motivated by the opportunity to make money (Brabham, 2010; Geisler et al, 2011; Lakhani and Wolf, 2005), the anticipation of learning new skills (Leimeister et al, 2009; Brabham, 2010) or the chance to enjoy social rewards, such as the feeling of being part of a community or gaining recognition (Cook, 2008; Horton and Chilton, 2010; Rogstadiusa et al, 2011), being able to meet new people (Brabham, 2008), or simply choosing tasks that are found to be fun and enjoyable per se (Brabham, 2008, 2010; Proulx et al, 2011; Jeppesen and frederiksen, 2006). This literature, however, does not fully articulate the *choice of a specific task*. That is, once an individual joins a crowdsourcing community (motivated by the above studied factors) he or she becomes an active member of that community, selecting specific contests to participate in. The focus of the current study is to investigate the nature of and the way, cognitive factors drive the participation decision. In doing so, we aim to extend our understanding of why motivated crowd members may chose one project over another.

Among such factors that have been explored in past literature, external factors such as communal structure of crowdsourcing may be considered as a facilitating factor. For example, members of the crowd may subconsciously adopt norms and values from the crowdsourcing platform community (Lakhani and Wolf, 2005) or develop a sense of belonging to the community (Wasko and Faraj, 2005), thus gravitating towards tasks that are emphasized from the community side. In this paper we take a different approach. Acknowledging the facilitating role that different factors may play in the decision making process of individuals, we try to account for the interpretation of situational factors in light of goal orientation. That means, we aim to explain how people who are driven by different goal orientations may perceive the same factor as prohibitive or facilitating.

Accordingly, we take into consideration the achievement goals of crowd members as well as their perceptions concerning their ability to complete the task successfully, especially in the fact of competition. Thus, we are interested in better understanding the important role of crowd members' achievement goals in making the project selection decision, and specifically, their goal orientation. Goal orientation refers to an individual's disposition toward developing or validating one's ability in an achievement setting (VandeWalle, 1997). Typically, individuals hold one of two types of goal orientation during task performance: performance or mastery (Nicholls, 1984), and these orientations may change under different contexts (Payne et al. 2007).

The paper makes an important contribution to the crowdsourcing literature, by elaborating the role of goals in project selection and providing an avenue for crowdsourcing platforms to better manage the flow of participants in projects. In what follows, we briefly review the crowdsourcing phenomenon before we develop our research model. We then empirically test our model using an experiment. We conclude with a discussion of the results and implications of the paper.

Literature Review

Firms use crowdsourcing for a diverse set of purposes, from problem solving (Sieg et al. 2010) to accomplishing part of their operation (Brabham, 2010, Jouret, 2009), to harnessing the knowledge of individuals beyond their boundaries in order to come up with new ideas for business development (Jouret, 2009). Software development applications of crowdsourcing are especially relevant for IS scholars, however, as an emerging phenomenon, successful development of software through crowdsourcing is a challenge for practitioners for various reasons.

Crowdsourcing can happen directly, i.e. when a firm reaches out to the crowd of individuals through an open call, or it can happen indirectly through an intermediary that connects the crowd and the firm. The latter is often conducted through tournament-based crowdsourcing (Morgan and Wang, 2010), in which compensation is based on relative rank in completion of tasks (Hutter et al. 2011). In these tournaments,

participants compete with each other by submitting their solution to the problem posed by the crowdsourcing organization. Tournament-based crowdsourcing can be applied to various kinds of tasks that are inventive in nature (Pénin and Burger-Helmchen, 2011) including, but not limited to, problem-solving (Afuah and Tucci, 2012) for R&D (Huston and Sakkab, 2006), idea-generation (Poetz and Schreier, 2010) for business development (Jouret, 2009) and innovation (Leimeister et al., 2009), digital design (Brabham, 2010), knowledge-sharing (Yang et al. 2008), and software development (Bonabeau, 2009).

As an emerging phenomenon, many studies on crowdsourcing are descriptive and try to explain the phenomenon by showing successful cases (e.g., Huston and Sakkab, 2006, Brabham, 2008, Jouret, 2009; Greengard, 2011) or classifying existing models (e.g., Cook, 2008, Haythornthwaite, 2009, Bonabeau, 2009, Doan et al. 2011). Conceptual work to date has focused on the sociological impact of crowdsourcing on members of the crowd (Proulx et al. 2011, Wexler, 2011), on the ability of organizations to leverage crowdsourcing to expand organizational boundaries (Afuah and Tucci, 2012), and on the reward structure of crowdsourcing. The latter includes work on the effect of an award structure on efficiency and performance-gain in innovation contests (Terwiesch and Xu, 2008) as well as the optimal award scheme for crowdsourcing tournaments (Archak and Sundararajan, 2009). Kittur et al. (2013) draw on organizational behavior and distributed computing literature to frame major challenges of improving crowd platforms, workers' skills, and requesters' assignments. In addition, our knowledge of crowdsourcing phenomenon has been enriched by empirical studies. Feller et al. (2012) studied intellectual property exchange that takes place in open-innovation platforms and argue that value-added services are needed to for organizations to utilize their service to acquire intellectual property from crowd members with no prior relationships. Erickson et al. (2012) provide an empirically based framework matching organizational needs to key characteristics of the crowd. Finally, as firms gain experience with crowdsourcing, recent studies have focused on practical issues and the challenges firms face in utilizing this mode of production. In this vein, pricing mechanisms (Singer and Mittal, 2013), task allocation (Karger et al, 2014), quality control (Allahbakhsh et al, 2013), and the nature of idea generation process (Bayus, 2013), are among the topics that have been studied.

In this paper we add to the growing literature on crowdsourcing by developing and testing a model linking perceptions, goals, and project selection. We focus on tournament-based crowdsourcing for software development. Tajedin and Nevo (2014) identify a key role of tournament-based platforms in ensuring sufficient participation in projects that will guarantee desired results for the client organization. Specifically, the platform is tasked with balancing demand in tournaments so that enough, but not too many, crowd members opt to participate in any given competition. Building on this work, the phenomenon of interest to us is the selection of projects by crowd members, as we explain next.

Research Model

Decision making in dynamic environments, such as that of crowdsourcing, depends to a large extent on one's evaluation of ability and the extent of controllability of the environment (Bandura and Wood, 1989). Ability refers to the perceived ease or difficulty of performing a specific behavior, whereas controllability represents beliefs about the extent to which performing the behavior is up to the actor (Ajzen 2002). Both ability and controllability are seen as two dimensions of the concept of *perceived behavioral control* in the theory of planned behavior (TPB) (Ajzen, 1991). TPB, which is an extension of the theory of reasoned action (TRA) (Ajzen and Fishbein, 1980; Fishbein and Ajzen, 1973), suggests that the proximal determinant of behavior is one's intention to engage in that behavior. Intentions represent a person's motivation in the sense of her or his conscious plan or decision to exert effort to enact the behavior. TRA is concerned with rational, volitational, and systematic behavior (Fishbein and Ajzen, 1975; Chang, 1998) where people are considered to have complete volitional control over the course of behavior. TPB extends this boundary condition of pure volitional control with the idea that behavioral achievement depends jointly on motivation and ability. It is this latter concept of TPB that we highlight in this paper.

As mentioned above, perceived behavioral control refers to the perceived ease or difficulty of performing a behavior, and is assumed to reflect past experience as well as anticipated impediments and obstacles. It denotes the subjective degree of control over performance of the behavior (Ajzen 2002). Early challenges in conceptualizing and operationalizing perceived behavioral control (e.g. Armitage and Conner, 1999; Sparks et al. 1997) have led to a recent view of the construct as a dichotomy of external and internal

factors (Kidwell and Jewel, 2003). The internal dimension of perceived behavioral control is similar in nature to the concept of self-efficacy (Bandura, 1986; 1997), as originally conceptualized by Ajzen (see Ajzen 2002), and measures one's confidence in their ability to perform the behavior. The external dimension touches on the ease with which the behavior can be performed and considers external influences that can prohibit performance (Kidwell and Jewel, 2003). Examples of *internal control* factors include ability, skill, and information whereas *external control* includes factors such as the availability of resources and support as well as autonomy and overload (Elie-Dit-Cosaque et al. 2011). Mixed evidence with respect to the link between different conceptualizations of perceived behavioral control and behavioral intentions (Armitage and Conner, 2001) provides additional support for the use of the dichotomous conceptualization (Kidwell and Jewel, 2003).

While the decision to participate in a given crowdsourcing context (the focal behavior) is typically volitional, the underlying dimensions of perceived behavioral control - ability and controllability – have also been shown to play a role in achievement situations, where the *outcome expectations* depend on action control and situational control expectancies (Pekrun 2006). In this paper we therefore build on the internal and external dimensions of perceived behavioral control to shed light on the crowdsourcing project selection. We focus on perceived ability as the internal dimension of control and perceived competition as the external dimension, as we explain below.

Perceived Ability and Perceived Competition

Building on the above, and returning to the crowdsourcing context, we study the *perceived ability* of a person to complete a crowdsourcing task in a given contest. In line with prior literature, perceived ability includes an evaluation of the complexity of the task vis-à-vis one's skills. Prior crowdsourcing work has shown that individuals typically assess the complexity of tasks and do not engage in tasks that are perceived as too complex (e.g. Afuah and Tucci, 2012; Kittur, 2011). In addition, it has been reported that even if the individual chooses a task to work on, once they doubt their ability to fulfill the requirements of the task, they quit the job (Horton and Chilton, 2010). Even in the broader open-source setting, Lakhani and Wolf (2005) found that when tasks are self-assigned, individuals tend to match their skill levels with task difficulty.

A person's perceived ability to complete a crowdsourcing task therefore refers to the perceived ease or difficulty of carrying out the requirement of the crowdsourcing contest. Building on prior literature, we hypothesize that:

H1: *There is a positive link from perceived ability and participation intention*

In the context of crowdsourcing we define the external dimension of controllability as *perceived competition* within a given contest. Prior work has shown that the presence of known experts can deter entry of opponents in competitive crowdsourcing (Archak, 2010) or attract peers to learn via interactions in collaborative crowdsourcing (Leimeister et al., 2009). In forming their participation intentions, individuals also rely on their assessment of external factors such as opportunities and threats posed by other competitors. This means that individuals not only compare their own skills and abilities against the requirements of the contest but also they consider the probability of winning the contests in a competitive environment. This process is akin to rational gambling where individuals make a consideration of the probability that their targeted outcome will be achieved (see Steel and Konig, 2006). Prior work also shows that individuals in crowdsourcing platform may pursue a task selection strategy where they choose tasks with fewer competitors in order to increase the chance of winning (Yang et al, 2008).

Based on the above, we expect a negative relationship between perceived competition and participation intention:

H2: *There is a negative link from perceived competition and participation intention*

Goal Orientation

Behavioral intentions are a cognitive structure including both goals (ends) and plans (means), with goals typically crystallizing in subjects' minds prior to plans about how to reach these goals (Krueger and Carsud, 1993; Ajzen, 1987; Tubbs and Ekeberg, 1991). Accordingly, the goals that individuals pursue should also be considered in explaining the differences in participation intention. We therefore

incorporate goal orientation as an important moderator of the relationship between perceptions and intentions to participate in a specific contest.

Goal orientation influences how individuals approach, interpret, and respond to achievement situations (Dweck and Leggett, 1988; Elliot and Church, 1997). Individuals with a *performance* goal orientation aim to demonstrate competence with respect to others and to obtain positive outcomes (Barron and Harackiewicz, 2000; Grant and Dweck, 2003). These individuals focus on the end result, have apprehensions of failure, and focus on the consequences of their poor performance, especially the disapproval of others (Seijts et al, 2004). Individuals with a *mastery* goal orientation, on the other hand, focus on ways to master tasks so as to develop their competence, acquire new skills, and learn from experience (Brett and VandeWalle, 1999; Vandewalle et al., 1999). Accordingly, individuals with a mastery orientation are prone to show challenge-seeking and risk-taking behavior (Elliott and Dweck, 1988).

Goal theory states that individuals' evaluations of situations can be affected by their goal orientation. Specifically, Knight et al. (2001) found that goals affect the degree of risk people take when making decisions. Compared with those with a mastery goal orientation, individuals with a high performance goal orientation view their capacities as fixed and approach tasks with the sole intention of performing well (Dweck and Leggett, 1988; Farr et al., 1993). For these individuals the purpose of accomplishing tasks is to demonstrate competence relative to others (Barron and Harackiewicz, 2001; Harackiewicz and Elliott, 1998) and their orientation has been viewed as the channel through which achievement motivation and fear of failure flow (Elliot and Church, 1997).

Hence, we posit that individuals with performance orientations will be prone to show strong relationship between ability perception and intention to participate; if they face projects for which their assessment of ability is high, they will aim for achievement and neglect the chance of failure, and if their assessment of ability is low, their intention to participate will be severely hampered. Prior studies have shown that specifically in cases where perceptions of ability are low, performance goals produce debilitation after a setback (e.g. Elliott and Dweck, 1988; Jagacinski and Nicholls, 1987), meaning that if these individuals do not believe they can validate their ability, their motivation and performance tend to suffer (Grant and Dweck, 2003).

A mastery orientation, on the other hand, stems from the belief that one's attributes are dynamic and changeable and that exerting effort leads to performance improvement (Janssen and Van Yperen, 2004). Individuals with mastery goal orientation are concerned with developing their ability over time and can be seen as posing the question "How can I best acquire this skill or master this task?" (Elliott and Dweck, 1988). As such, mastery orientation is associated with engaging in deeper, more self-regulated learning strategies, having higher intrinsic motivation, and performing better, particularly in the face of challenge or setbacks (Grant and Dweck, 2003). When mastery-oriented people face a situation for which their assessment of required skills or abilities are low, they do not give up and push to deal with the challenges by investing additional effort to develop and master new skills (Dweck, 1999; VandeWalle et al, 2001). This implies that in contrast to people with performance orientation, having a mastery orientation makes individuals more likely to gravitate towards projects for which they presumably lack required skills or abilities. This can be explained as an act in pursuit of opportunity to develop new skills (see Grant and Dweck, 2003).

The above implies that the positive association between perception of ability and intention to participate in a crowdsourcing project are likely to be moderated by crowd members' goal orientation, such that the positive association is stronger for performance-oriented people than mastery-oriented:

> ***H3:*** *The positive association between perceived ability to complete a contest and participation intention is stronger for those with performance goals than mastery goals*

As previously outlined, Individuals with a performance goal orientation are primarily motivated by the external outcomes associated with performance. These people seek to maximize rewards and minimize potential punishments, using environmental cues to decide which behaviors are appropriate (Hirst et al, 2009). In tournament-based crowdsourcing, individuals who choose a contest to work on face an opportunity cost in terms of time and energy that could be invested in other contests. Accordingly, for people with performance orientation, this opportunity cost increases the pressure they feel to achieve their goals. This means that we expect the negative association between perceived competition and intention to participate to be stronger for people with performance orientation than mastery orientation.

In this vein, for individuals with mastery orientation, a low assessment of competition may decrease their intention to participate as they may look for opportunities to learn from their peers. Prior works have shown that interactions in forums of crowdsourcing platforms may provide the crowd members with a learning opportunity that explains the incentives of some members as they join contests (Tajedin and Nevo, 2014). Hence we predict that:

> ***H4:*** *The negative association between perceived competition and participation intention is stronger for individuals with performance orientation than mastery orientation.*

Research Method

The hypotheses were tested in an experiment in which each participant responded to a hypothetical scenario about a crowdsourcing contest. A 2×2×2 factorial design was used. The treatments were (1) perceived competition (low versus high), (2) perceived ability (low versus high), and (3) goal orientation (performance versus mastery).

Experimental Procedure

We used Amazon Mechanical Turk (AMT) to run the experiment. AMT, in itself a crowdsourcing platform, provides access to a scalable, on-demand workforce. Requesters (clients) post tasks, known as Human Intelligence Tasks (HITs), to the platform and define the workers' qualifications required. Workers (also known as Turkers) can select tasks to complete based on their qualifications. AMT services include mostly simple tasks such as data cleansing, tagging, survey responses, categorization and more. We chose AMT for this study because it is, in itself, a crowdsourcing community (albeit not a tournament-based one) and thus workers are familiar with crowdsourcing concepts and culture. Because employers can define the qualifications of workers we ensured that only highly qualified workers were allowed to participate, as we explain below in the section that discusses participants in the study.

Following provision of informed consent, participants were required to read an introductory statement and were primed by accepting a role according to their goal orientation manipulation. Manipulations of ability and competition perceptions followed goal orientation. Following the manipulations, the respondents reported their decision about the contest regarding their participation intention. They then reported their perceptions regarding their perceptions of ability and competition, as well as their goal orientation. Since the whole procedure would take a short time to finish, we left all the manipulation checks for the end of procedure to insure reactivity of the subjects (Singleton and Straits, 2009). We conducted four pilot studies to make sure our manipulations work well. The scenarios as well as the scales were tweaked after each study.

Goal Orientation Manipulation

Goal orientation can be conceptualized as situational and context dependent, therefore can be manipulated in experimental settings (Payne et al. 2007). Goal orientation was manipulated using task instructions and based on Elliot and Harackiewicz (1996) as well as Elliot et al. (2005). In these prior studies, the manipulation focused on defining success parameters and task expectations. Adapting these manipulations to the crowdsourcing context we provided the following instructions to participants. First, on both conditions participants were asked to imagine joining a new crowdsourcing platform on which software development projects are posted for crowd members to compete on. In line with the literature previously reviewed, those in the performance goals condition received the following set of instructions:

> The community of developers on this platform has a unique ranking approach for its members, which is based on past contests' participation. Your objective is to be ranked as high as possible within this community. This community values results. As a new participant, you will be evaluated based on how you compare with others and based on your ability to deliver successful solutions. Although most participants would be able to complete contests, some will stand out because they do exceptionally well. Your ranking is primarily based on how you compare with others in a given contest and whether you can outperform them.

Those in the mastery goals condition received this second set of instructions, in line with the characteristics of mastery goals orientation:

> Your objective in joining this community is to learn and to gain experience and new skills so that you can become a better developer. You want to constantly challenge yourself in order to get the most out of this experience. As a member of the community you can choose which contest to participate in. The contests you select should be ones that provide you with the opportunity to challenge yourself, to learn new skills, and to solve new problems. Don't worry about how you compare with others in a given contest, you are here to learn.

Perceived Ability Manipulation

Perceived ability should be assessed in light of a specific task and contest. It requires perceptions that obstacles are surmountable and that resources are available (Krueger and Brazeal, 1994). In our manipulation of ability perception, from the sources of information from which people drive their notions about their situational competence (Bandura, 1986), we focused on vicarious experiences coupled with verbal persuasion. Those in the high ability conditions thus received the following information:

> You begin to browse the available contests on the platform. Looking at one specific contest, you can see that the requirements of the task match your current skills perfectly. You believe you are capable of performing the task successfully as you have experienced similar contests in the past.

Those in the low ability conditions received the following information:

> You begin to browse the available contests on the platform. Looking at one specific contest, you can see that the requirements of the task do not match your current skills very well. It would be difficult for you to perform the task successfully as you have not experienced similar tasks in the past.

Perceived Competition Manipulation

Prior studies in related area that we found had manipulated perception of competitiveness in organizational setting rather than competition (e.g. Connelly et al, 2009). We needed the perception regarding competition existing in a contest. Therefore, we developed our own manipulations that we then tested repeatedly in the pilot studies. Respondents in the high competition condition received the following information:

> In this contest, only the best three submissions will be recognized as winners. You look at others who have signed up for this contest: there are at least 10 other highly qualified community members participating. It will be difficult to win this contest.

Correspondingly, the low competition groups were instructed as:

> In this contest, only the best three submissions will be recognized as winners. You look at others who have signed up for this contest: there are only a handful of other participants in this contest, and they are not highly qualified. Winning should not be difficult as long as you complete the task.

Measures

Where possible we used existing items from prior studies and adapted them to the context of this study. We developed items for two of our independent variables, perceived ability and perceived competition, from scratch. Table 1 summarizes our measures in this study and their source. For all items, participants responded on a 5-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree).

Table 1: Constructs and Measures		
Construct	**Measure**	**Source**
Performance goal orientation	It was important to me to do better than the other participants My goal was to perform better than most other participants I was striving to demonstrate my ability relative to others I was motivated by the thought of outperforming my competitors It was not at all important to me to do well compared to others I wanted to do well in this contest to show my ability to other community members	Adapted from Elliot and Church (1997)
Mastery goal orientation	I wanted to learn as much as possible from this contest It was not at all important for me to learn the skills used in this contest as thoroughly as possible I hoped to gain a broader and deeper knowledge of this domain I desired to completely master the skills used in this contest I wanted a challenge that aroused my curiosity, even if it was difficult to learn I preferred a task that really challenged me so I could learn new things	Adapted from Elliot and Church (1997)
Perceived ability	It is feasible for me to win this contest I think the contest would be hard for me Successfully completing this contest is possible for me I know enough to participate in this contest	Developed
Perceived competition	This contest is highly competitive I expect to face intense competition to finish at the top of the submission ranking There are many participants who can win this contest There are many qualified competitors in this contest	Developed
Intention to participate	I intend to participate in this contest. I predict I will participate in this contest. I don't think I will participate in this contest (Reverse coded) I think I will skip this contest and continue to browse for others. (Added item)	Adapted from Venkatesh et al (2003)

Table 1. Constructs and Measures

Validity and Reliability

Table 2 presents information on the validity and reliability of the scales in this study. Following initial factor analysis, we dropped two reverse coded items that did not load properly for goal orientations ("It was not at all important for me to learn the skills used in this contest as thoroughly as possible" and "It was not at all important to me to do well compared to others"). The remaining items loaded together on their respective constructs. To verify the internal consistency of the scales we calculated Cronbach's alpha or items used. All scales displayed high reliability with alpha values well above the 0.8 threshold.

Participants

Data were collected in January of 2016 from AMT workers. We set the 8 surveys on AMT as a Human Intelligence Task (HIT) accepting 30 respondents per survey (for a total of 240 responses). Each respondent was paid $1 to take the job, i.e. fill out the survey (which was around the average payment for academic surveys on AMT). As a crowdsourcing platform, tasks on amazon are open to public and therefore, to insure quality of data, we limited access to our surveys by setting two sets of qualifications for workers: 1) HIT approval and 2) Total number of HITs. We set the qualification to HIT approval of

greater than 98% and Total number of HITs to be greater than 5000. In addition, we programmatically prevented those who had participated in our previous pilot studies to contribute to our final round of data collection, and we checked worker IDs to confirm that there were no duplicate workers in our data collection. The average age of participants in our study was 35 years. Participants had an average of 24.5 months of experience on AMT and participated in an average 1.47 non-AMT tournament-based crowdsourcing contests. 57% of respondents were male. 50% had a graduate from college.

Table 2: Factor Loadings and Cronbach's Alpha Values

Construct	Cronbach's Alpha	Items	1	2	3	4	5
Intention To Participate	0.963	I1	.168	**.905**	.153	-.017	.264
		I2	.158	**.894**	.123	-.052	.266
		I3	.136	**.876**	.151	-.069	.264
		I4	.180	**.863**	.116	.005	.290
Perceived Ability	0.884	F1	.113	.338	.198	-.124	**.719**
		F2	.042	.209	.017	-.270	**.770**
		F3	.162	.301	.234	-.115	**.796**
		F4	.112	.297	.130	-.077	**.831**
Perceived Competition	0.909	C1	-.007	.000	.120	**.892**	-.167
		C2	.007	-.014	.146	**.873**	-.169
		C3	-.044	-.028	.103	**.909**	-.126
		C4	.044	-.066	.045	**.810**	-.016
Performance Goal Orientation	0.935	P1	.901	.065	-.124	-.020	.052
		P2	**.908**	.117	-.089	.008	.017
		P3	**.849**	.197	-.070	.032	.088
		P4	**.830**	.145	-.070	-.071	.255
		P5	**.873**	.093	.005	.035	.030
Mastery Goal Orientation	0.884	M1	-.129	.094	**.844**	.167	.097
		M2	-.058	.083	**.860**	.046	.032
		M3	.306	.217	**.638**	.093	.009
		M4	-.157	.073	**.816**	.063	.213
		M5	-.253	.099	**.847**	.115	.181

Table 2. Factor Loadings and Cronbach's Alpha Values

Manipulation tests

After four pilot studies and the modifications we made to our procedure, in our final data collection our manipulations were successful for all three IVs. The respondents were successfully induced with two different goal orientations. Those induced with performance orientation reported a higher mean on the performance goal scale than those induced with the mastery orientation (performance group: M=4.21, SD=0.750; mastery group: M=3.30, SD=1.150, $t_{(250)}$=7.462, p < 0.000). The reverse was true for those induced with mastery orientation, who reported a higher mean on the mastery goal scale than those induced with the performance orientation (performance group: M=3.39, SD=0.841; mastery group: M=4.09, SD=0.758, $t_{(250)}$=-7.008, p < 0.000). Participants also perceived the two ability scenarios to have two different levels: high ability (M=4.18, SD=0.728) versus low ability (M=3.08, SD=0.982), $t_{(250)}$=9.996, p < 0.000. In addition, the participants perceived the two competition situations to be significantly different: high competition (M=4.303, SD=0.680) versus low competition (M=2.732, SD=1.109), $t_{(250)}$=13.607, p < 0.000.

Results

We conducted a 3-way ANOVA to test the treatment effects on intention to participate along with the moderation of goal orientation. Only hypothesized interactions were included in the mode. Table 3 shows the results of this analysis.

Table 3: ANOVA Results			
	df	**F-value**	**p-value**
Perceived competition	1	12.082	<0.000
Perceived ability	1	24.966	<0.000
Goal orientation	1	0.616	0.433
Perceived completion * Goal orientation	1	12.302	<0.000
Perceived ability * Goal orientation	1	21.343	<0.000

Table 3. ANOVA Results

As shown in Table 3, the main treatment effect is statistically significant, both on perceived competition and on perceived ability. Intention to participate is significantly higher under high ability perception than under low ability, $F_{(1, 246)}$=12.82, p < 0.000. Hence we find empirical support for H1: individuals tend to choose contests for which they find themselves more equipped with the skills to accomplish the requirements of the given task. Our data also supports H2, $F_{(1, 246)}$=24.966, p < 0.000. That is, participants exposed to low competition scenario reported significantly higher measures of intention to participate in the contest. These results should be interpreted in light of the moderation of goal orientation. The ability relationship was significantly moderated by goal orientation supporting H3 ($F_{(1,246)}$=12.302, p < 0.000). This interaction effect for ability indicates that while subjects in the performance condition become reluctant towards contests for which they find themselves not highly competent, leading to significant decline in intention to participate, the intention to participate of those primed by mastery goal orientation is relatively constant across ability levels. This interaction effect is illustrated in figure 1. Similarly, as predicted in H4, the effect of competition perception was also moderated by goal orientation, ($F_{(1,246)}$=21.343, p < 0.000). As shown in figure 2, contests with high competition were evaluated more favorably by individuals with a mastery orientation than with a performance orientation, where as the reverse case was true for contests with low competition.

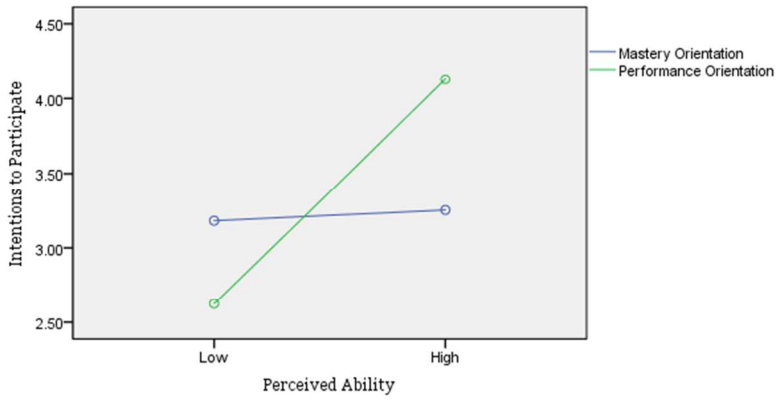

Figure 1. Interaction Effect: Ability and Goals

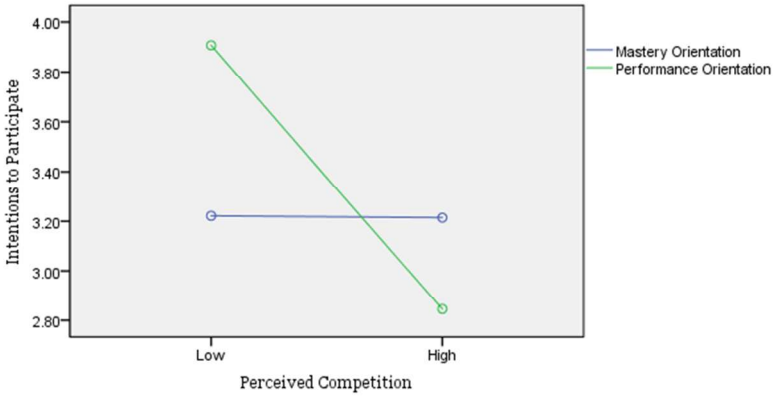

Figure 2. Interaction Effect: Competition and Goals

Discussion

In this study we investigated the relationship between perceived ability and competition on intentions to participate in crowdsourcing contests. We further examined the moderating effect of goal orientation on participation intentions. Using AMT, we tested the model in an experimental design and all hypotheses were supported. As we predicted there is a positive relationship between perceived ability and intention to participate. This is in line with our prediction that individuals who perceive higher levels of ability are more likely to perform a behavior (Kidwell and Jewel 2003). This result is also supported by some prior studies of crowdsourcing that examined the role of task requirements in shaping crowd members' motivation (e.g. Afuah and Tucci, 2012; Kittur 2011). However, this result shoul not be misinterpreted as the crowdsourced tasks need to be 'easy'. As prior works have highlighted, the type of the problem and the characteristics of contributions from the crowd can substantially differ across platforms (Geiger et al, 2011).

The results also indicate that the concept we introduced for tournament-based crowdsourcing, as perception of competition, has a negative impact on the choice of contest. Competition perception can reflect how much individuals find themselves as agents of control due to situational conditions. In this sense, perception of competition refers to perceived controllability over targeted behavior (Ajzen, 2002), which in our case was winning a contest. In our study, participants made their behavioral decision based on consideration of available information regarding competition in a contest. The negative impact of competition on intention to participate is in line with prior findings of crowdsourcing studies that suggest individuals pursue a winning strategy (Yang et al, 2008) and do not risk the presence of known experts (Archak, 2010).

The more interesting findings of our study draw the attention of information system scholars to the role played by goals. Although ability showed to be a determinant of intention to participate, the effect of ability is significantly higher for performance-oriented individuals. Performance orientation makes people result-oriented as these individuals aim to demonstrate and take advantage of their abilities (Grant and Dweck 2003). When tasks are self-selected, as in a crowdsourcing setting, this goal orientation redirects individuals towards higher assessment of 'matching' between self-efficacy and task requirement. Mastery orientation, on the other hand, makes individuals seek opportunities to increase their competence and acquire knowledge and skills (Barron and Harackiewicz 2001). For these individuals, contests that are not the best fit to their skills and abilities, are still interpreted as an opportunity for personal growth and learning as this orientation stems from the belief that one's attributes are dynamic and changeable (Dweck, 1999; Janssen and Van Yperen, 2004).

Similarly, the negative impact of competition perception on participation intention is reduced by having a mastery orientation. Existence of highly qualified contestants may be perceived as an obstacle towards winning the contest, but mastery orientation is conducive to challenge-seeking behavior (Bandura and Dweck, 1985). In the face of obstacles mastery oriented individuals increase effort and adjust plans and strategies while maintaining their commitment to the task (Grant and Dweck 2003). Our results show that these individuals' decision to partake in contests is significantly less sensitive to high competition situation compared to performance-driven individuals. For this latter group of individuals, the goal is to validate ability or to avoid demonstrating a lack of ability (Dweck and Elliott, 1983). Accordingly, an assessment of intense competition lowers the prediction of accomplishing this goal. Contrary to their counterparts in the mastery group, rather than committing to the contest and seeking creative ways to accomplish the task, performance-oriented individuals hold the belief that that attributes are fixed, concrete, and internal entities (Dweck, 1999; Janssen and Van Yperen, 2004). Thus, fixated on this belief these individuals are less likely to activate the motivational pattern of their mastery counterparts to increase effort and to develop creative solutions, with which they may be able to outperform others. Rather, these individuals tend to redirect their efforts into finding the 'best' match, and to keep looking for less competitive contests.

Limitation

Our work is not without limitations. First, studies conducted on AMT share the same advantages and disadvantages as any online studies. Further, the unique characteristics of AMT workers who typically focus on tasks that are small, fast, and often repetitive (Chandler et al. 2014) may limit the generalizability of our results. In future work we will expand the respondents' base to include crowd members from software development platforms. Second, our experiment used verbal manipulations and we did not measure actual behavior, rather we focused on intention. This limitation of our study will be addressed in future research whereby actual behavior of crowd members who are actively participating in contests on a crowdsourcing platform is measured as the dependent variable. It is possible that part of our results can be attributed to demand characteristics bias, if our manipulation intuited participants of our study's hypotheses. Future work can address this issue by using different manipulations or a survey method that elicits respondents' own goal orientation.

Contributions and Future Work

Our study makes several important contributions. First, our work stands among the first attempts in understanding the decision making process of the crowd members. So far, studies have focused on different aspects of motivation for crowd members (e.g. Brabham, 2010, Zheng, et al, 2011), or in similar settings (e.g. Roberts et al. 2006), focusing on what can explain the contribution of individuals to crowdsourcing in general. Our study takes a step further by studying in depth how these incentives are translated into subjective individual assessment of gravitation towards a contest, and are manifested in partaking in a specific contest. We introduce the notion of goal orientation and how individuals pursuing different goals may respond differently to the same contest. We thus offer a strong understanding of why individuals choose one contest over another, and what characteristics of the contest, the crowd, and the individual play a role in this decision. Future work can further investigate additional factors that affect project selection, as well as employ different research methods to study this phenomenon. Future work can also focus on what makes specific projects stand out from the crowd. Finally, while the direct implication of such work applies to tournament-based crowdsourcing it can be extended to investigate other crowd-based settings such as crowd funding and open innovation.

Because achievement goals can be viewed as situational and context dependent, our work provides important insights to crowdsourcing platforms. As crowdsourcing differs from traditional modes of organizing in assignment of individuals to tasks in hand, managers who pursue a crowdsourcing strategy can utilize the results of our study to consider ways with which they can increase their reach and attraction. Although it may seem that the key leverage to attract individuals to specific tasks is the price, our study highlights the importance of goals in determining the value of a given contest. Specifically, for those individuals with mastery orientation an important value of the competition is in their ability to learn and gain new skills. This is a new form of incentive that can be explored by crowdsourcing platforms and organizations. In addition, managers need to be cognizant that whereas competition may increase the

prospect of getting various submissions from the crowd, it has a negative impact on intention to participation for performance driven individuals. Hence, striking the balance between ramifications of perceived high level of competition and advantages of having multiple submissions per task is the important decision that is left for managers. Future research can take a different theoretical angle to examine the expectancy of success and the perceived value of tasks and these are affected by perceptions and goals.

Finally, our work contributes to the goal orientation literature by highlighting the link between goals and controllability. While this link has been broadly discussed in the literature, our work is the first to provide strong empirical support for the interplay between goals and perceptions of control. Future work can further elaborate on this link and how goals manifest themselves under different levels of controllability. Further investigation into the different effect of controllability on performance versus mastery goals can shed more light on the phenomenon.

Conclusion

This study used responses collected from 240 workers on a crowdsourcing platform in order to examine the roles that perception of competition and ability play in shaping the intention to participate in crowdsourcing contests. In addition, the critical role of goal orientation on this decision making process was investigated. The results reveal that goals play a moderating role on the effect of ability and competition perceptions on intention. The theoretical contributions and practical implications of this study were discussed and we believe this study can be the starting point of interesting research projects on crowd members' decision making.

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