In-Group Identification on Motivation Crowding

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Abstract

The crowding out of intrinsic motivation is a fairly well-documented phenomenon in the realm of experimental economics, causing individuals to make decisions that are counter-intuitive to the standard set of neoclassical preferences. Although it has been tested and replicated in many settings, not all precursors that affect motivation crowding have been identified. Our field test finds that the subgroup of individuals that strongly identify with the community likely cause the recapture of intrinsic motivation to contribute at low incentive levels. Even though leading theory predicts high levels of motivation crowding in our environment, results show that none is observed at every level of financial incentive and that the subgroup of individuals who identify strongly with the community are 27% more likely to contribute.

Introduction

Communities exist in nearly every social gathering space, culture, and subculture; they exist to create strong bonds between individuals, promoting sharing of resources, inclusivity, and unity. Although there is a lot that we understand about community interactions and in-group mentality, there is a considerable amount of gray area in the space of financial incentivization within a community. Understanding how individuals react to different levels of financial stimuli within a community can allow for more robust incentivization schemes in the realm of labor economics and intra-community market theory.

We proposed to observe the interactions and responses to financial incentivization within a tightly-knit group of individuals in California's Central Coast (Santa Maria, Santa Barbara, San Luis Obispo). This group is unified over a dedication to a video game, emphasizing friendly interactions and competitive spirit equivalently. Notably, we can observe specific behavior in the tournaments that take place to consistently reward players for their dedication to the game and community. To run the events efficiently, individual players are encouraged to temporarily contribute their own video game consoles to the event, allowing for more matches to be played at any given moment. For background, this is generally volunteer work that can be inconvenient to individuals in the time required to take down and setup the console on every trip. Additionally, there is the imputed risk of other individuals mistreating or damaging their equipment. In order to incentivize this behavior, we usually offer an entry-fee reimbursement, ranging from zero to five dollars.

The primary motivation for this paper was purely anecdotal; with lots of time spent in and around the community, we recognized a distinct disconnect between contribution and incentive level. It appeared that regardless of incentive strength, attendance number, or predisposition about other individuals' level of contribution, individual contribution is and has been very consistent. The level of this incentive naturally lends itself toward experimentation and is the main device used during the field test. By measuring the difference in contribution to the public good with various levels of extrinsic motivation, we can observe whether or not crowding out exists in the given environment.

Our findings suggest that in this environment, individuals' motivation is not "crowded out" at especially low levels of incentive and that contribution is indeed consistent across financial motivation strength. Additionally, we find that even though individuals are generally strongly connected in the community, there is a subgroup of individuals who identify very strongly with the community. Using the survey data, we were able to isolate them and find out that their contribution rate was significantly higher than their contemporaries. It is very likely that the lack of crowding out can be attributed to this strong core of dedicated individuals that are not affected by financial incentives in the same way that other members of the community are.

Literature Review

Although common microeconomic theory suggests the standard labor/leisure trade-off curve where individuals substitute toward their scarcer resource, many believe that there exists a third good in the system. Intrinsic motivation, the natural foil to external (fiscal) motivation, deals with internal motives such as altruism, enjoyment, and social capital. The classical definition is reiterated in Ryan and Deci (2000), in which they defined it as the motivation behind inherent satisfactions instead of those that fuel separable consequences. They proceed by bringing up a meta-analysis of research into intrinsic motivation, claiming that the definition has been operationalized in research to refer to interest in an activity. They claim that intrinsic motivation exists mainly to fuel psychological needs such as competence, autonomy, and relatedness, a key distinction to be made when researching the topic. For our purpose, we will be using a holistic analysis of both psychological necessities and interest in the activity as it specifically relates to motivation crowding.

The capture and existence of intrinsic motivation has been a hot topic, leading to the discovery of "crowding out" of intrinsic motivation, popularized by Frey and Oberholzer-Gee (1997). Frey et al. (1997) explores the introduction of compensation to tasks that involve civic duty and community support. In particular, their experiment observed support for a close-proximity nuclear repository; when survey respondents were provided with financial incentives for housing the repository in their community, support for the facility dropped significantly. Individuals were observed to generally react irrationally, basing their position largely on emotions and less so on cost-benefit analysis. Communities that had a larger proportion of "civic-minded" individuals appeared to be prepared to bear the cost for the vast benefits from nuclear energy. The concept of payment interfering with civic duty to a community works as a strong analog when looking into intra-community sentiment on con-

tribution. It would seem that payment for contribution should hinder the capture of intrinsic civic duty, a result that should predict crowding out in our experiment.

Prendergast (2008) researches the phenomenon of firms hiring agents that don't share the unique interests of the firm as a whole. He explains intrinsic motivation's effects in the workplace, claiming that heavy-handed attempts by firms to financially motivate workers to act in the interest of their employers is a fruitless task. He continues to show many instances in which we observe a backfire of monetary incentives in the workplace due to unaligned interests. In essence, trying too hard to align the views of agents with the firms leads to a complete reversal of sentiment; it follows that interests likely need to be aligned organically and without compensation.

The primary inspiration for our paper comes from Gneezy and Rustichini (2000), where they used a combination of both laboratory and field experiments to explore the subject of motivation crowding. In one test, they paid individuals to take an IQ test, in which they found that individuals who were not given financial rewards for performance scored significantly better than those that were given ten cents per question answered correctly. This seems to fall in line with the theory, especially with performance shooting back up for higher levels of compensation. We can use this as the primary vehicle for our experiment, measuring the existence of motivation crowding as the "U-curve" in contribution that exists when incentive moves from 0 to a small positive value. The second experiment involved measuring motivation for social work; they looked at the effect of paying individuals for door-to-door donation drives. In the experiment, volunteers were promised either nothing, one percent of collected donations, or ten percent. In both cases where individuals were financially motivated, the amount of money collected was lower than that of the group which received no financial incentive. Both cases appear to attack different facets of intrinsic motivation, corroborating the holistic analysis that includes psychological necessity, civic duty, and interest in the activity.

The system in our video game community very closely resembles a public goods game, for which the interactions with intrinsic motivation are well defined by (Kyriacou 2010). Kyriacou expands on previous work in the topic to describe application of selected incentive schemes to public good contribution. He classifies five main factors that engender motivation crowding in contribution, using various literature on the topic to compile methodology. His indicators of motivation crowding are: interest in the collective activity, active participation in decision processes, low recognition for contributions, negative reinforcement, and the aforementioned negative reinforcement being strongly monetized. For interest in the collective activity, Frey (1997) claims there is psychological evidence that interest in an activity is a necessary and sufficient condition for intrinsic motivation and the crowding-out thereof. As for active participation in decisions, it is found that tax collection processes in direct democracies receive more negative sentiment as opposed to in a representative democracy. However, Kyriacou appears to dismiss this result as it doesn't control for group size. It is claimed that recognition plays a large part into the level of motivation crowding, as it fosters and breeds intrinsic motivation in individuals; this appears to be especially true in small number settings. As for looking at the direction of incentives, Kyriacou references Schmitt

and Marwell (1970) in which they find that there is a clear asymmetry in the effects of negative and positive incentives, suggesting that individuals respond more effectively to the latter.

Kyriacou recites Frey (1997) along with Ryan and Deci (2000) to back up most of these claims, which our anecdotal evidence appears to be in clear contention with. Another of these explanations claims that the strength of the personal bonds between the agent and principal(s) is positively correlated with the probability of motivation crowding. The second states that there is an inverse relationship between group size and level of motivation crowding. Third, there is the belief that contingent rewards increase the chance of crowding as opposed to unannounced rewards for voluntary positive behavior.

Methodology

Following directly from Kyriacou's model, we propose that there is a missing factor in that involves identification with the given in-group/community. Although the goal was to find consistent contribution among various levels of financial incentivization, if we couldn't specifically elicit the belief that the community was the source of motivation recapture, the test would present fairly low explanatory power. In order to properly elicit the belief that this is the case, we suggested a two-fold approach. We first collected data on tournaments with various levels of monetary incentivization, looking at percentage of contribution based on entrants and number of consoles brought. Then we administered an exit survey to test for the factors in Kyriacou's model and the level of identification that tournament attendees had with the community. Due to the high presumed interest in the activity, active participation, and limited recognition, we should expect to observe some level of crowding out according to the models compiled by Kyriacou. As mentioned in the literature review, we will be measuring crowding out by attempting a quadratic fit through our plot of contribution vs. incentive level. If we observe a linear trend or an arch-shaped curve, we can reject our null hypothesis that crowding out exists in our community.

For the first step of the process, members of the community received a post in the community social media page five days before the event, informing them of the location, time, entry fee and reward for bringing their console. In every post, it was strongly emphasized that a healthy amount of consoles are important for the integrity of an efficiently run tournament. This process was repeated on the day before the event as well, making sure to keep all information consistent. At the tournament, we counted attendees who paid entry fee and only reported console contribution for those that were used during the event.

For the second step, we crafted a survey using an interval Likert scale without labels; it was important that each discrete step carry similar weight[1] (e.g. the difference between 3 and 4 should be the same as the difference between 4 and 5). We used a scale of 1-7[2], crafting the questions to maximize belief elicitation for the main factors that should indicate motivation crowding. After conducting the experiment, it was obvious that the question about active

[1]This is mostly so that we can rely on our quantitative analysis being accurate without recoding.

[2]The initial motivation for a 1-7 scale as opposed to the more popular 1-5 was the increased granularity we could get to directly isolate individuals that identified strongly with the in-group.

participation in the decision process was unclear, so we decided to throw it out. Considering that this was the weakest factor in the literature and that community members essentially have little say in the decision process of how their console was used, the loss of this question was fairly inconsequential. The survey was administered to a random selection of 14-15 members of the community at the end of various events. Individuals that attended multiple events were not surveyed twice, and every survey conducted was anonymous.

For the statistics on our event data comparing incentive and contribution, we need to fit a function to our data points that either proves or disproves the existence of motivation crowding. We can do this by tracking the different curve shapes and seeing if our function exhibits some predefined behavior that predicts crowding. However, defining the true function that exhibits motivation crowding is very hard to create. The contribution function C would exhibit a jump discontinuity at 0, where it would return some positive real value at 0 and very low values directly after 0, eventually catching up to $C(0)$. In practice, this behavior is tedious to construct, whereas a simple "U-shape" would demonstrate the same behavior while being much more simple to fit. Additionally, because the U-shape is a stronger condition than the true function with the discontinuity, disproving it will provide a necessary and sufficient condition for the lack of motivation crowding. We will try to fit a second order polynomial through our points; if the result is a significant U-shape, we would have failed to reject our null hypothesis that there is motivation crowding in our community. If the fit is insignificant, linear, or "arch-shaped," we will reject our null hypothesis.

For our survey metrics, we used a probit model to estimate the probability of contribution given our independent variables from our survey results. For all of our ordinal survey results that are scored between 1 and 7, we will use the following recoding separations: [1-3], [4-5], [6-7]. To generate the in-group identification dummy variable, we will require that the survey responder answered 6 or 7 for both both questions involving community interaction. Because the survey was administered to about one-fourth of the population, we can safely assume that our data points are independently and identically distributed. Additionally, we will be doing a simple population means test to try and show the effect at a very basic level, a useful tool especially if our regression models appear to be too noisy. Our model is as follows:

$$P(contribute|X) = \Phi(X\beta) = \Phi(\beta_0 + \beta_1\iota + \beta_2\gamma + \beta_3\kappa + \beta_4 C + \epsilon)$$

Where:

Φ = CDF of the Standard Normal Distribution
ι = Interest in the game
γ = The level to which the player feels positively incentivized
κ = The level to which the player is financially incentivized
C = In-group identification dummy variable

$$\Phi(X\beta) = \int_{-\infty}^{x\beta} \Phi(z)dz = \pi$$

$$\Phi(z) = \frac{1}{\sqrt{2\pi}} e^{\frac{-z^2}{2}}$$

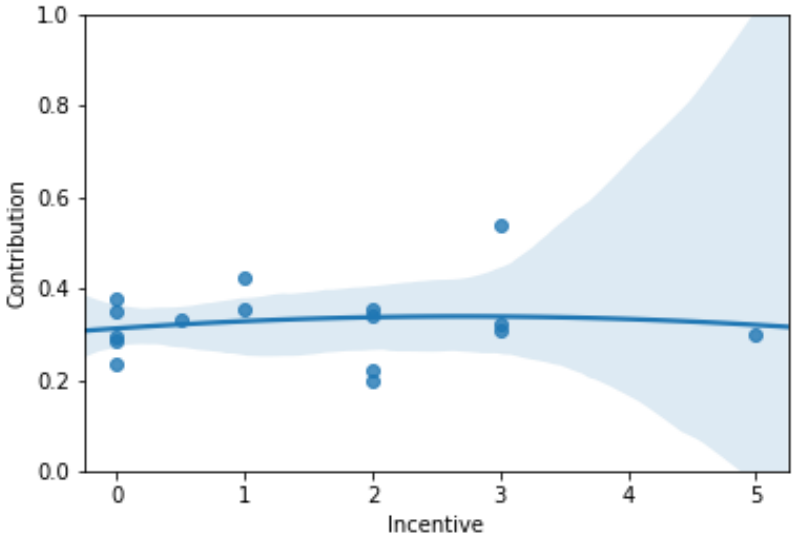
Results

Data for tournaments was collected over 16 events, with incentives varying from zero to five dollars. Data for the survey was collected in four waves, once at the 5 dollar treatment, once at the 3 dollar treatment, once at the 2 dollar treatment, and once at the control.

Table 1: Contribution Data

Incentive	Participants	Consoles	Contribution Ratio
$0.00	35	10	28.6%
$0.00	24	9	37.5%
$0.00	20	7	35.0%
$0.00	43	10	23.3%
$0.50	15	5	33.3%
$1.00	17	6	35.3%
$1.00	19	8	42.1%
$2.00	10	2	20.0%
$2.00	32	7	21.9%
$2.00	51	18	35.3%
$2.00	56	19	33.9%
$3.00	13	7	53.8%
$3.00	26	8	30.8%
$3.00	53	17	32.1%
$5.00	47	16	34.0%

Figure 1: Quadratic Fit on Incentive vs. Contribution Percentage[3]



[3]Plot done in Python 3.6 using the matplotlib and seaborn libraries.

Table 2: Probit Models

	(1) P(Contributor)	(2) P(Contributor)	(3) P(Contributor)	(4) P(Contributor)
Treatment Incentive	−0.0107	−0.0387	−0.0173	−0.0322
	(−0.11)	(−0.41)	(−0.18)	(−0.33)
Interest in the game	0.386	−0.0550	−1.054	−1.265
	(1.19)	(−0.08)	(−0.91)	(−1.08)
Incentivized positively	0.0389	0.800	−0.316	0.345
	(0.11)	(0.90)	(−0.40)	(0.34)
Incentivized w/ cash	−0.779*	−0.626	−0.871	−0.198
	(−1.80)	(−0.71)	(−0.72)	(−0.14)
In-group identification	1.216**	1.293**	1.218**	1.344**
	(2.38)	(2.44)	(2.33)	(2.40)
Cash × Interest		0.340		−0.0784
		(0.68)		(−0.12)
Cash × Positive		−0.519		−0.579
		(−0.86)		(−0.92)
Interest^2			0.572	0.674
			(1.26)	(1.24)
Positive^2			0.0690	0.103
			(0.51)	(0.74)
Cash^2			0.0417	0.110
			(0.09)	(0.20)
Constant	−0.0261	−0.295	0.863	0.107
	(−0.04)	(−0.26)	(0.86)	(0.09)
Observations	63	63	63	63

t statistics in parentheses

* $p < 0.001$, ** $p < 0.05$, *** $p < 0.01$

Upon first look at the graph of our contributor data, it's clear that we don't observe a U-shape; the fit appears to be a very weak negative quadratic fit, giving us the slight arch. In our quadratic fit, it should be noted that the confidence interval on the right side is very unreliable due to the lack of data at the 5 dollar incentive level. In our regression model, in-group identification is clearly a strong predictor of contribution across all models, to the point where no other variable other than cash incentivization strength has significance. It should be noted that our results find that the incentive received at the given survey treatment has no effect on contribution.

Table 3: Contribution Percentage Means Test

	In-group
Contribution Percentage	0.271**
	(2.09)
N	63

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 4: Game Interest Means Test

	In-group
Interest level	0.774**
	(2.26)
Observations	63

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Positive Incentivization Means Test

	In-group
Level of positive incentivization	1.016**
	(2.04)
Observations	63

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Our basic population mean hypothesis test appears to agree with our probit model; there is a statistically significant difference of 27 percent between the contribution levels in our in-group and out-group. According to the next two tests, individuals in the in-group had a significantly higher interest in the game and felt significantly more incentivized to contribute.

Table 6: Survey Data Statistics

	Mean	Std Dev.	Min	Max
Interest	5.59	1.34	1	7
Comm. Connect	5.48	1.15	3	7
Positive Inc.	4.79	1.93	1	7
Interest Others	5.75	1.34	1	7
Cash Inc.	4.30	1.94	1	7

Table 7: Survey Data Statistics (Contributors)

	Mean	Std Dev.	Min	Max
Interest	6.00 (+0.41)	1.25 (-0.09)	2	7
Comm. Connect	5.59 (+0.11)	1.21 (+0.06)	3	7
Positive Inc.	5.62 (+0.83)	1.59 (-0.34)	1	7
Interest Others	6.00 (+0.25)	1.04 (-0.30)	3	7
Cash Inc.	4.52 (+0.22)	1.94 (+0.00)	1	7
Recognition	4.69	1.42	1	7
Comm. Contribute	5.59	1.12	4	7

From our survey data statistics, it is clear that individuals who contributed to the events recoded higher responses across the board for all questions. Additionally, there was a lower standard deviation for three of the responses: Interest in the game, positive incentivization, and the level that community members played into game interest.

Discussion

The first result to talk to would likely be the lack of U-shape in our contribution curve; no motivation crowding was indeed the result we expected. Looking at our regression model, we observe that cash incentivization is weakly related or unrelated with contribution, validating our findings in the quadratic contribution fit. Our models also behave nicely, telling us exactly what we wanted to hear—in-group identification strength is the main, if not the only factor in predicting contribution. This is additionally confirmed in our linear model where we found about a 27% difference in contribution. The union of both results allows us to hold the position that in-group identification is likely the cause for the recapturing of intrinsic motivation at low incentive levels.

Results from the summary statistics show that there may be some behavior clustering, as higher response values and lower standard deviations indicate the existence of two unique groups within our population. These properties provide further credence to our claims, as we can more strongly state the existence of a core in-group that is more likely to contribute to the community. The existence of a discrete group would also validate our model, as we

use a binary variable for in-group identification as opposed to an ordinal variable with more granularity or a continuous variable generated from exogenous factors. Utilizing this knowledge would be useful in experimental design for further research in the topic; as clean as our results are in the probit model, it might be naive to assume that in-group identification is the only factor affecting contribution.

We should consider the fact that an increase in participants should tend to decrease the individual motivation to contribute, also known as the bystander effect, popularized by Latané and Darley (1970). However, there are limited indicators as to the size of a given tournament, making it a limited information public goods game that changes the nature of such psychological phenomena. Participants can estimate the attendance level through observing individuals that have preregistered, but know from experience that many individuals show up without doing so. It should then follow from the literature that an individual's decision on whether or not to bring their console should hinge on the benefit received for their contribution to the public good, the innate satisfaction from serving their duty to their community, and the financial compensation for doing so. Keeping all of this in mind, contribution was fairly constant across different levels of attendance and incentive. This sort of contradictory behavior also goes against the literature on motivation crowding, which predicted higher crowding at events with lower turnout.

Conclusion

Using previous models in the literature, primarily from Frey (1997) and Kyriacou (2010), we were able to create a survey design that captures the effects of motivation crowding while testing for in-group identification. Combined with the empirical test for observing crowding in the community environment, we were able to not only observe behavior, but also directly link it to certain beliefs that we elicited through the survey. Our results show that individuals who identify strongly with their community have significantly higher contribution rates, feel more positively incentivized, and are on average more interested in the activity at hand. Additionally, since no motivation crowding was observed, we can back up the claim that this in-group of individuals is likely the cause for the recapture of intrinsic motivation to contribute at low incentive levels.

The economic implications of this are fairly straightforward, but quite profound; in order to get individuals to contribute regardless of financial incentive, efforts should be made to reward pro-social behavior in individuals with high interest in the activity and community. Simple bonding activities and promotion of an inclusive environment strengthens community ties and guarantees contribution when events are contingent on it. Although it is unlikely to get the majority of a community's population to identify strongly with the community, there is evidence to support that a small yet significant subgroup can carry the weight of an entire organization.

Appendix - Survey Questions

Questions for everyone:

1) What is your level of interest in the given game?

   1 2 3 4 5 6 7

2) To what level do you feel like you get to actively participate at the events?

   1 2 3 4 5 6 7

3) How connected are you to most of the members in the community?

   1 2 3 4 5 6 7

4) Do you feel positively incentivized to bring your console?

   1 2 3 4 5 6 7

5) To what level do other members in the community factor into your interest in the game?

   1 2 3 4 5 6 7

6) How big of a role does cash reimbursement play into bringing your setup?

   1 2 3 4 5 6 7

Questions for people that bring consoles:

7) How recognized do you feel for your contribution?

   1 2 3 4 5 6 7

8) To what level is your contribution supported by your connection to the community?

   1 2 3 4 5 6 7

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