NBER WORKING PAPER SERIES

LETTING DOWN THE TEAM? EVIDENCE OF SOCIAL EFFECTS OF TEAM INCENTIVES

Philip Babcock
Kelly Bedard
Gary Charness
John Hartman
Heather Royer

Working Paper 16687
http://www.nber.org/papers/w16687

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
January 2011

We would like to thank Uri Gneezy and Peter Kuhn for helpful comments. The views expressed herein are those of the authors and do not necessarily reflect the views of the National Bureau of Economic Research.

Letting Down the Team? Evidence of Social Effects of Team Incentives
Philip Babcock, Kelly Bedard, Gary Charness, John Hartman, and Heather Royer
NBER Working Paper No. 16687
January 2011
JEL No. B49,C93,J01,J33

ABSTRACT

This paper investigates the effectiveness of incentivizing people in teams versus incentivizing them as individuals. In a field experiment featuring exogenous team-formation and opportunities for repeated social interactions over time, we find that subjects are more apt to attempt an effort-intensive exercise task when they are on a team, even when the expected payout is lower. The main results are driven by inactive types, who exert more effort in team settings and are more likely to accomplish the task, despite the lower expected pay-off. We conclude that social effects in teams exist and can be decisive in motivating effort-intensive tasks.

Philip Babcock
Department of Economics
2036 North Hall
University of California, Santa Barbara
Mail Code 9210
Santa Barbara, CA 93106
and NBER
babcock@econ.ucsb.edu

Kelly Bedard
UCSB
kelly@econ.ucsb.edu

Gary Charness
Department of Economics
University of California, Santa Barbara
2127 North Hall
Santa Barbara, CA 93106
charness@econ.ucsb.edu

John Hartman
Department of Economics
2028 North Hall
University of California, Santa Barbara
Mail Code 9210
Santa Barbara, CA 93106
hartman@econ.ucsb.edu

Heather Royer
Department of Economics
University of California, Santa Barbara
2127 North Hall
Santa Barbara, CA 93106
and NBER
royer@econ.ucsb.edu

1. Introduction

The issue of incentives and performance is a vital one in economics, and lies at the heart of much of labor economics. A key question is how to design incentives that are effective in yielding improved performance. While individual monetary incentives have been found to generally motivate a higher level of effort or performance, the interaction between financial incentives and performance is not a simple one.[1] Research on this critical research topic is ongoing.

One incentive scheme that is favored in some circles is to group people into teams and then pay on the basis of the group performance. Many firms have implemented team incentive systems for a wide range of productive activities. The military relies on these incentives heavily, as do many health and wellness programs. One possible reason for the pervasiveness of team incentives is that social effects of teams are perceived by many to be powerful tools for motivating people. Anecdotally, a common belief is that individuals motivated in team or "buddy" systems increase effort because they don't want to "let down the team." They may even be willing to make sacrifices for teammates ("take one for the team") that they would not otherwise make. To the extent that this is true, peer pressure may be a fundamental channel through which team incentives enhance performance. And yet, clean evidence on this issue is scarce: We are aware of no previous field-level empirical research that confirms or refutes this common perception.

In this paper, we conduct a field intervention to provide an unusually clean test of the effect of individual and team incentives on the performance of an exercise task. Can incentives

[1] For example, field experiments by Gneezy and Rustichini (2000) and Ariely, Gneezy, Loewenstein, and Mazar (2008) demonstrate that this relationship is not monotonic, as both very small monetary incentives and very large monetary incentives can be counter-productive relative to having no financial incentives.

targeted at teams elicit higher effort than incentives targeted at individuals, *even when the expected monetary pay-offs are lower*? Answering this question sheds light on foundational principles of human behavior at the core of economics and enhances understanding of what has become a frequent practice in workplace (and other) environments.

Most theoretical and empirical work on team incentives focuses on free-riding associated with the sharing of a pay-off (Holmstrom 1982). However, it has long been theorized that social pressures may also play an important role. Kandel and Lazear (1992) observe that many practices at firms have more to do with creating social pressure in the form of "empathy, loyalty, and guilt" than with improving the production process in a direct way. Individuals may be more willing to make sacrifices in support of people with whom they have bonded, than in support of the distant, unseen principals for whom they are agents.

In this vein, a multitude of laboratory experiments in economics during the past two decades confirm that social motivations play a role in determining behavior. The experimental evidence has led to a variety of models of social preferences.[2] Some of this work involves teams and has tended to verify the existence of free-rider effects. Examples include Nalbantian and Schotter (1995), Meidinger, Rullière, and Villeval (2003), and van Dijk, Sonnemans, and van Winden (2001).[3] Bornstein, Gneezy, and Nagel (2002) investigate coordination problems within teams and find that competition between teams helps to combat the free-rider problem and improves performance; however, they do not investigate social pressure directly. Laboratory experiments, then, offer provocative evidence that social preferences may influence behavior in a controlled environment, but do not show clearly whether these may be leveraged using team

[2] The three most prominent models of social preferences are Fehr and Schmidt (1999), Bolton and Ockenfels (2000), and Charness and Rabin (2002). These models primarily stress distributional considerations, although the latter model also embeds negative reciprocity. Rabin (1993) and Dufwenberg and Kirchsteiger (2004) provide models of positive and negative reciprocity based on perceived kindness.

[3] See Charness and Kuhn (2010) for a survey of research on team incentives in laboratory experiments.

incentives to elicit effort. Moreover, it remains unclear how, when, and if these findings translate to real-world settings.

In the field, recent empirical research documents effort-related social effects, but these studies do not involve team compensation. Mas and Moretti (2009) find that supermarket checkers work faster when observed by other checkers who work fast. Falk and Ichino (2006) find similar results for workers whose task is to stuff envelopes. Bandiera, Barankay, and Rasul (2010) observe that a worker's productivity rises when she works alongside other workers in her social network. Bandiera, Barankay, and Rasul (2005) report that workers reduce effort when compensated through relative pay rather than piece rates, and convincingly interpret their findings as evidence of altruism and collusion. Though they provide strong evidence of social effects, none of these important and innovative studies sheds light on team incentives.[4]

There is some compelling empirical research on team production in the workplace, however these studies do not isolate social effects.[5] Hamilton, Nickerson, and Owan (2003), for example, find that worker productivity rose at a garment plant with the introduction of team incentives. But it is not clear whether these gains were due to increased effort that resulted from social pressure or from complementarities in production among workers that involved specialization, knowledge transfer, and other factors directly related to the production process. What would seem to be missing is an analysis that cleanly demonstrates the existence of social effects of monetary team incentives.

In field settings, precisely these social effects are often emphasized as the dominant rationale for the adoption of teams. One best-selling management consultant argues that social

[4] By "team incentives" we mean positive monetary incentives for team production. Bandiera, Barankay, and Rasul (2005) study a relative pay structure that has no potential to generate positive social effects. Mas and Moretti (2009) study a setting without explicit monetary team incentives.
[5] Leibowitz and Tollison (1980), Gaynor and Gertler (1995), Encinosa, Gaynor, and Rebitzer (2007).

effects of team incentives are more effective at eliciting effort and improving performance than any other single factor induced by policy: "More than any policy or system, there is nothing like the fear of letting down respected teammates that motivates people to improve their performance."[6] Others have argued similarly: "Letting down the team may be worse than letting down the boss."[7]

The military, in particular, attempts to link rewards and punishments to team performance to leverage social effects. It is common in boot camp for individuals to be incentivized in much the same manner as in our experiment: When one fails, all members of the team are punished. Kandel and Lazear (1992) argue that "Guilt, in the form of loyalty to… comrades, provides incentives that operate even in the absence of observability. Thus the military spends much time and money creating loyalty and team spirit" (p.807).

The perception that team rewards evoke high effort extends to health and wellness programs.[8] More than forty percent of large companies now have programs designed specifically to induce employees to exercise more, adopt healthier lives, and/or lose weight.[9] Team incentives have become very common in these programs. According to the Centers for Disease Control, companies have taken a variety of approaches to employee weight loss, including allowing workers to earn monetary rewards for combined team weight loss.[10] At Aflac, for example, "employees throughout the company joined together in teams of four each to

[6] Lencioni (2002), p. 213
[7] Brown (2006), p. 551.
[8] Behavioral effects of health interventions have recently become a topic of interest in the economics literature as well. Charness and Gneezy (2009), Ackland and Levy (2009), and Babcock and Hartman (2010) incentivize individuals (but not teams) in their pay-for-exercise experiments, and find considerable effectiveness for monetary incentives. In the first study, these beneficial effects persist over the period of time available for measurement.
[9] Hewitt Associates (2002). These programs are expected to grow in importance, since the recent health-care bill provides credits to firms that institute health-improving exercise, dieting, and wellness programs.
[10] Centers for Disease Control, http://www.cdc.gov/leanworks/build/behavioral.html

see who would lose the most combined weight. The 'biggest losers' received cash prizes."[11] Though there have been many studies of workplace health and wellness interventions, none of the published studies, to our knowledge, attempts to estimate the social effects of team incentives.[12]

One reason for this gap in the various literatures may be the difficulty of isolating the social effects of teams in a way that captures salient aspects of real-world interactions. First, one needs an environment in which potential social interaction between teammates is possible over an extended period of time--hard to accomplish in the laboratory, where one-time sessions are the mode. Second, the environment must satisfy a number of conditions rarely feasible in a workplace experiment: objectively-measurable effort outcomes not easily observed by other team members, exogenous team formation, exogenous variation in exposure to incentives, and a credible means of isolating social effects from production complementarities and free rider effects. Our pay-for-exercise experiment, which uses college students who share a common class, meets all of these requirements.

We find that many subjects are more apt to attempt an effort-intensive task when motivated as part of a team than when incentivized as an individual. Differences between responses to individual and team incentives vary by type. More active types, who go to the gym during the one-week pre-intervention period, do not respond strongly to team rewards. However, inactive types, who do not go to the gym in the pre-treatment period and for whom extrinsic incentives may be most effective, nevertheless put forth considerably more effort and are more apt to complete that task when incentivized as part of a team than when rewarded as individuals, despite the lower expected payoffs. Thus, a major contribution of our study is that it offers what

[11] Human Resource Executive Online, "Healthy Pay-offs", April 1, 2006 http://www.hreonline.com/HRE/story.jsp?storyId=4777323

[12] Anderson *et al.* (2009) and Conn *et al.* (2009) are two recent meta-surveys of workplace wellness interventions.

may be the first clean evidence that social effects of monetary team incentives exist and can be decisive in motivating effort-intensive tasks. Further dimensions of the incentive structure still need to be explored, but our message is an encouraging one for those who wish to design incentive programs to enhance performance.

The remainder of this paper is structured as follows. We provide some background on team incentives, individual and social mechanisms, and heterogeneous treatment effects in section 2, while the experimental design is described in detail in section 3. We present and discuss our experimental results in section 4, and offer some concluding remarks in section 5.

2. Mechanisms

A. Individual and Social Mechanisms

In the standard neoclassical model, people care only about their own payoff; thus, the most straightforward way to elicit effort toward completion of a task is to increase the associated payoff. Conditioning payment on the effort choices of others can only reduce the individual's effort choice. In contrast, behavioral models posit that people alter their actions in response to the payoffs or intentions of others. In order to investigate these mechanisms more carefully, we focus on a setting in which there is no free-riding.

Consider a program analogous to our own in which individuals receive a pay-off for an effort-intensive task. We imagine two alternative incentives schemes. In the individual treatment, subject *i* is paid bonus β for completing task ω: Let $\omega = 1$ denote that the individual completes the task and $\omega = 0$ indicate that he does not. There is no ω-uncertainty in the payoff $\pi(\omega)$, so the expected payoff for completing the task is: $E^I[\pi_i(1)] = \pi_i(1) = \beta$. In the second treatment, there is an additional condition: The individual is assigned a teammate *k* and receives

the bonus only if his teammate also completes the task. In this second case, there is some probability, $p(\omega_k = 0)$, that the teammate will default. The expected payoff for performing the task in the group-compensation treatment is: $E^G[\pi_i(1)] = p(\omega_k=1)^* \beta \leq \beta = E^I[\pi_i(1)]$. The team incentive scheme, then, should not elicit higher effort than the individual incentive scheme because the expected pay-off is never higher and will likely be strictly lower (since it will be difficult to know with absolute certainty that one's teammate has completed the task).

This is the prediction of the standard model, where an individual cares only about own payoffs. However, there are numerous ways in which the payoffs, actions, or intentions of others could come into play. We will focus on three broad classes of mechanisms that have been posited in previous research.

1) **Social motivations** (guilt, shame, altruism). There are a number of different forms of social motivations that could come into play in our environment. One such motivation is simple altruism, in which the payoff of another person (or persons) enters into one's own utility function regardless of circumstances, beliefs, actions, etc. Guilt aversion involves an individual feeling guilty about disappointing the expectations of people who act favorably on one's behalf; the more that one believes that the other people expect one to perform, the more guilty one would feel from non-performance.[13] Shame involves negative feelings about one's observed behavior, regardless of the expectations of others. While distinguishing between these social motivations (and others) is beyond the scope of our paper, in our setting these motivations all work in the same direction. People compensated in teams may increase effort in order to increase the

[13] Recent papers investigating altruism (in which individuals care about the payoffs of others regardless of the perceived intentions of others) include Loewenstein, Bazerman, and Thompson (1989), Bolton (1991), Fehr and Schmidt (1999), and Bolton and Ockenfels (2000). Guilt aversion is considered in Dufwenberg and Gneezy (2000), Charness and Dufwenberg (2006), and Battigalli and Dufwenberg (2007, 2009). See Charness and Kuhn (2010) for a survey of the literature on these social motivations.

payoffs of their teammates—something they wish to do for varying reasons, depending on the model.

2) **Self-control and pre-commitment**. In models of self-control and pre-commitment, individuals fail to meet goals because the present self lacks the ability to bind the future self to a plan of action; the present self would instead rather engage in a more-immediately-pleasurable activity.[14] Having a partner could remedy this problem, even if the individual does not value the teammate's payoff. If one commits oneself to exercise *with a partner*, it is more difficult for one's future self to back out. In short, individuals who have been jointly incentivized may use each other to devise commitment mechanisms.

3) **Imitation**. A model commonly used in empirical studies of peer effects posits that individuals seek to imitate the expected behavior of others in their reference group or team.[15] In this framework, individuals need not care abut the utility of their teammates, nor are they assumed to require commitment mechanisms. Rather, they seek to minimize the difference between their own effort choices and the effort choices of their teammates because they derive utility from imitation or sameness.

An advantage of the method used in this paper is that individuals will meet their teammates, and have the opportunity for repeated interaction over a period of weeks. In the

[14] For some models of self-control and commitment, see Laibson (1997), O'Donoghue and Rabin (1999, 2001), Gul and Pesendorfer (2001), Bénabou and Tirole (2004), Fudenberg and Levine (2006), and Ozdenoren, Salant, and Silverman (forthcoming). For empirical and experimental work on this topic, see DellaVigna and Malmendier (2006), Ashraf, Karlan, and Yin (2006), Burger, Charness, and Lynham (forthcoming), and Houser, Schunk, Winter, and Xiao (2009).

[15] For convenience of exposition, we have classified "imitation" in a separate category from "social motivations." This model yields different predictions in our setting from the models in 1) above. For models of imitation and identity, see Akerlof (1997) and Akerlof and Kranton (2000).

laboratory, social effects are often studied in settings where the participants are anonymous strangers between or amongst whom there will be no extended future interaction. It is entirely possible that social effects differ greatly when people meet each other, interact with each other, and will see each other in the future. We move the discussion from the laboratory into the field, where these factors are apt to be salient. This allows for an important test of the generalizability of laboratory results.[16]

We focus on crisp diverging predictions between the standard neoclassical model on the one hand, and the aforementioned behavioral models on the other. As noted earlier, the standard model suggests that subjects will put forth more effort toward completion of the task when compensated as individuals than when incentivized using the team compensation scheme. Each of the behavioral models posits a mechanism that generates a countervailing effect. If subjects increase effort relative to the individual scheme when compensated using the team-payment scheme, we would interpret this as evidence that not only do social effects exist, but they are also large enough to dominate the lowered expectations of financial remuneration. If subjects decrease effort, we would infer that the effect described in the standard model dominates, and we could draw no inference about the existence or non-existence of social effects. We also try to shed light on which of the three broad types of behavioral mechanisms is most consistent with our findings.

C. Heterogeneous Treatment Effects

A priori, it is not clear that the effect of the individual versus team incentives will be the same for all individuals. Models of guilt emphasize the importance of the expectations and

[16] Charness and Kuhn (2010) provide a discussion of issues concerning the benefits and drawbacks of laboratory and field experiments.

expected actions of one's partner. It follows that responses may well differ based not only on one's pre-existing propensity to exercise, but also on characteristics and propensities of the teammate to whom one has been assigned.

Consider a world in which there are two types of individuals: people who exercise a lot ("Active" types) and those who do not like to exercise ("Inactive" types). Individuals know their own type and their partner's type. We first consider the case of an Active randomly assigned to an Inactive. In the standard model, the compensation for an Active under the team compensation cannot exceed individual compensation, in expectation. The behavioral models tell a different story. The Inactive's expectation is that the Active will probably complete the exercise task. The Inactive may feel guilt if he reduces the Active's pay-off by defaulting, or he may experience some other social motivation that pushes him toward performing. If this channel exists and generates large effects, he may be more likely to complete the task than if he had no teammate, despite the fact that his own expected monetary payoff is lower. An Inactive matched with an Inactive, however, may have lower expectations about his partner, and thus any guilt effect would be smaller. Similarly, one would expect the effort choices of Actives to differ when matched with Inactives or with others of their same type, rising with the expected performance of their partner. In summary, we might well expect treatment effects to differ in systematic ways by type and partner's type.[17]

[17] The standard model also predicts that findings will differ by type and partner's type, though in a more transparent way: Partners less apt to exercise reduce the subject's expected payoff.

3. Experimental Design and Sampling

A. Experimental Design

Subjects were recruited during and after lectures in all nine Economics classes at University of California Santa Barbara (UCSB), during the second six-week summer session in 2010. All sign-ups for the experiment occurred during the second half of week one (August 4-6). The first stage of recruitment involved asking students to fill out a brief survey at the beginning of each lecture (Appendix A contains an in-class survey).[18] Students were told that they would be entered in a draw to win $50 if they filled out the survey. In order to claim the $50 they were also told that they would have to bring the bottom portion of their survey (which they were instructed to tear off and keep) and be present at the drawing that would take place outside the lecture hall after class. Students were also informed that a random selection of students who came outside after class would have the opportunity to make more money by participating in an experiment.

All surveys had a unique identification code. From the perspective of the students this appeared to be a numeric code for the lottery to be held after class. For our purposes, it was a random code that identified treatment group and, in the case of the team treatment, potential partners. Survey identification codes were alphanumeric and included an A, B or C as the first character, a number as the second character, and possibly a third character. The letter indicated group assignment. For example, A might indicate control group, B individual treatment, and C team treatment. In this case, all C codes would also have a matching set of C* codes allowing us to form teams (C1 and C1* for example; see below for more detail about the after-class matching

[18] All surveys, for all treatment groups, came from a randomized pile. This ensured that subjects did not know with whom they were matched until after lecture, and that subjects were not sitting near their potential partner (except by random chance).

process). We rotated the letter-experimental group match across classes to ensure that students in subsequent classes could not successfully inform their friends about what specific letters meant. The letter codes were not explained to students prior to their arrival after class and were designed to look like a random raffle identifier, or even go unnoticed, until described after class.

The students who participated in the post-class portion of the sign-up process were placed in one of three groups as described above. For descriptive ease, we refer to these students as participants throughout the paper.

Control: Participants assigned to the control group were asked to sign a standard waiver explaining that exercise has risks and told that they would have to wait a few minutes for the $50 drawing.[19]

Individual Treatment: Participants who were assigned to the individual treatment were given the same waiver as the control group, as well as instructions about how they could earn money by visiting the UCSB Recreation Center ("Rec Center"). The Rec Center is the on-campus student gym, which is free for registered students. More specifically, people in the individual-treatment group were told (both verbally and in writing) that they would be paid $2 for each eligible gym visit,[20] up to five visits, from August 7-20, and that they would also be paid a $25 bonus if and only if they accumulated five or more eligible visits during this time period.[21]

Team Treatment: To facilitate rapid pairing, the in-class team treatment surveys had a built-in pairing; for example, there might be a C1 and a C1*. Subjects with a "partner" who did not

[19] All groups were given instructions both orally and in writing. The written instructions and exercise waivers given to each group are included in Appendix A.
[20] Participants could only accumulate one gym visit per day for payment purposes.
[21] Charness and Gneezy (2009) and Babcock and Hartman (2010) incentivize individuals similarly in their pay-for exercise experiments.

show up after lecture were randomly re-matched with another subject without a "partner."[22] As with the individual treatment, all group-treatment participants were given a standard exercise waiver as well as instructions describing how they could earn money by visiting the gym. In particular, they were told that they would earn $2 for each eligible Rec Center visit, up to five visits, from August 7-20 and that they would also be paid a $25 bonus if and only if both team members accumulated five or more eligible visits during the same time period. As it was important that team members had a chance to meet and talk, we had teammates stand next to each other on numbered cards during the sign-up process and exchange names by filling out their name at the bottom of the waiver and handing it to their team mate. This design gave the teammates the opportunity to see each other, talk for several minutes, and have a written document containing the partner's name.

Both treatment groups were also informed that payments would be made in week five of the six-week session. The sharing of this information was important because it meant that subjects knew before making their exercise choices that there would be at least one full week of class remaining after payments were made. As a result, group treatment participants who accumulated five eligible visits, but only earned $10, would know their partner had failed to accumulate five eligible visits and would have the potential to interact with their partner during the last week of the summer session. To ensure that the experiment had salience, we contacted all participants in the control, individual, and team treatments via email at the end of the recruitment week to remind them about their treatment.

[22] This was done by matching in ascending sequential order. If C10 came out but not C10* and the next unmatched group treatment number was C12 we matched C10 and C12. This preserves randomization since surveys were distributed randomly in class. In the few circumstances in which this processes left a group treatment participant without a partner, we randomly selected a control group member to pair with the last group treatment participant.

B. Measuring Gym Visits

One benefit of our experimental design is that it allows for the electronic collection of effort response (Rec Center attendance) data. Whenever anyone wishes to enter the Rec Center the attendant at the front desk takes her or his student photo ID card and electronically scans it.[23] The time, date, and student card barcode of every gym entry is stored electronically. The Rec Center generously provided us with data that included all gym visits for every in-class survey respondent from July 21 through August 20, 2010. Because the Rec Center has the universe of student names and identification numbers they also verified for us that every student who filled out an in-class survey was in their database. In other words, there are no cases in which we are confounding non-attendance with an incorrect name and/or student identification number.

C. Survey Response and Experiment Participants

Table 1 reports the distribution of enrollment sizes, the number of in-class surveys collected, and the number of experiment participants (students who came outside after class and were assigned to a treatment or control group). The difference between enrollment size and survey response reflects almost entirely differences in class attendance and late arrival. While we do not have attendance for the day we signed people up for the experiment, the experimenters in the room reported that the vast majority of students present when the surveys were distributed completed the survey.[24] In terms of participation in the experiment, conditional on completing a survey, approximately 75 percent of survey respondents stayed after class for the lottery and were assigned to a treatment or control group.

[23] All UCSB students can use the recreation facilities for free by simply presenting their student card. Faculty and other guests can obtain gym passes for a fee.

[24] Students were told not to sign-up more than once. Since some students enroll in multiple Economics classes simultaneously during the summer, this lowered the participation rate in some classes. For example, Economics 100B was the final class to be signed up, and had by far the lowest participation rate.

The last row of Table 1 reports the survey and participant sample sizes used in all analyses reported in the remainder of the paper. There are a small number of sample exclusions; these exclusions stem from four possible reasons. First, and somewhat surprisingly, only one person who came out after class, across all classes, left after being assigned a partner but before signing the exercise waiver and experiment instructions. As we then re-paired the abandoned partner, we have excluded all three individuals from the sample. Second, we have excluded four individuals who signed up in two different classes, as well as all partners. Third, we removed the one person who reported a fake name and student number, or at least individuals that could not be located in the Rec Center computer system. Fourth, we excluded the small number of people with incomplete in-class surveys.

4. Empirical Results

A. Descriptive Statistics

Panel A of Table 2 shows sample means of descriptive characteristics by treatment status for all subjects who filled out the in-class survey. We report two measures of exercise for the pre-treatment period. "Self-Reported Exercise" is the number of times per week that individuals claim to have exercised during the previous month. Previous gym visits is the number of times subjects went to the Rec Center in the week prior to the treatment period, based on documentation provided by the Rec Center.

For the remainder of the paper, we will focus on the second pre-treatment measure, as it is not self-reported and relates more directly to the outcome we incentivize in the experiment: usage of the Rec Center. We define Inactive and Active types in the following way: Inactives did not use the Rec Center at all in the week prior to the treatment period; Actives used the Rec

Center at least once in the week prior to the treatment period.[25] There were no statistically significant differences between average characteristics of subjects randomized into the individual treatment, the group treatment, or the control group.

Not all of these subjects chose to participate in the lottery at which they formally became a part of the experiment and learned their treatment assignment. As displayed in Panel B, 356 of the 464 students who filled out surveys in class, or about 77 percent, went on to participate in the experiment (i.e., show up outside of class), net of exclusions. There were no statistically significant differences in age or gender between participants and non-participants. However, participants were more apt to have used the Rec Center before, on average, than non-participants. We infer that this is the case either because subjects who are energetic enough to come outside for a lottery are also more apt to have the self-discipline to go to the Rec Center, or because students inferred from the survey questions that the experiment might be about exercise. For the remainder of the paper, inferences will be based on the sample of participants. We draw no conclusions about the 23 percent of in class-responders who were non-participants and who appear to have been less active, on average. However, our sample population includes many individuals who are similar to these non-participants at least in terms of observable dimensions – potentially allowing us to infer the effect of the incentive schemes on these non-participants. This attrition rate is not large when gauged against other field experiments (e.g., Royer *et al.*, 2010).

Panel C shows sample means of descriptive characteristics by treatment status for the 356 subjects who participated in the experiment. Average age, self reported exercise, previous Rec Center visits, and fractions Inactive and Active do not differ significantly between group

[25] Results in the remainder of the paper are very similar when Actives and Inactives are defined using the self-reported exercise measure for the pre-treatment period, rather than documented Rec Center visits.

treatment, individual treatment, and control groups. The randomization was such that more males ended up in the group treatment than in either of the other two groups (the difference in means is significant at the 10% level). Conclusions from regressions reported in the remainder of the paper are not sensitive to the inclusion or omission of these control variables.

B. Results

We estimate effects of group and individual treatment relative to controls in regressions based on the following model:

$$(1) \qquad Y_i = \beta_0 + \beta_1 T_i^{Any} + \beta_2 T_i^{Team} + \varepsilon_i ,$$

where Y_i is an effort outcome for individual i, T^{Any} is an indicator variable for having been randomized into either the individual or the team treatment, T^{Team} is an indicator variable for being in the team treatment, and ε is the usual error term. The coefficient of primary interest is β_2, as this captures the difference between team treatment and individual treatment effects. We will examine three effort-related outcomes: 1) The number of visits to the Rec Center during the treatment period; 2) whether the subject went at least once to the Rec Center during the treatment period; 3) whether the subject used the Rec Center on five different days during the treatment period (which is the threshold for receiving the bonus). These outcomes are designated "Visits," "Try," and "Bonus," respectively. Table 3, column 1 contains results of OLS regressions for the continuous outcome variable "Visits" on treatment status and controls for age and gender; columns 2 and 3 report results of analogous linear probability regressions for the dichotomous

outcome variables "Try" and "Bonus."[26] Standard errors are clustered at the group level, this means that group sizes are two for those assigned to the team treatment and one for those assigned to the control and individual treatment.

The estimate of the constant in Panel A shows mean effort choices of control subjects. Control subjects in the sample visited the Rec Center 2.2 times on average. 50.6 percent of the control subjects showed up to the Rec Center at least once, and 18.1 percent reached the 5-visit bonus threshold. We see that subjects responded to the incentives provided by the treatments. Subjects in the individual and team treatments made about 1.7 more and 2.0 more visits to the Rec Center, respectively, during the treatment period than did controls. They were also 17.6 and 31.8 percentage points more likely to have gone to the Rec Center at least once and about 38 percentage points more likely to have met the 5-visit bonus payment threshold. Figure 1 shows the distribution of Rec Center visits during the treatment period, by treatment. We emphasize the stark rightward shift of the distribution for group and individual treatments relative to the distribution of the control group and that of the non-participants. In short, both incentive schemes produced an effect: Incentivized subjects went to the Rec Center more than non-incentivized subjects.

We now focus on the differing responses the differing incentive schemes elicited. The first evidence that the two compensation schemes evoked different responses is visible in Panel A, column 2: In apparent contradiction to predictions of the standard neoclassical model, subjects randomized into the team-incentive scheme were 14.2 percentage points more likely to have visited the Rec Center during the treatment period than subjects in the individual treatment,

[26] All conclusions for this table and all subsequent tables are similar if probit models are used instead of linear probability models.

and the difference is statistically significant at the 5 percent level. The remaining panels disaggregate the sample to explore differences in compensation schemes in more detail.

As discussed in Section 2, we should expect heterogeneous treatment effects by type and partner type. Panels B and C restrict the sample to Active types and Inactive types, respectively. On balance, the coefficients on Team treatment in Panels B and C reveal that Actives go to the Rec Center more when incentivized as individuals and Inactives show up more when incentivized in the team setting. (This is also visible in Figure 2.) Thus, whereas responses of Actives appear consistent with predictions of the standard model, the responses of Inactives are clearly inconsistent with these predictions and imply the existence of important behavioral effects.[27] The violation of the standard model's prediction in Panel A, then, was driven by the responses of Inactives.

We investigate differences between Actives and Inactives by partner type in panels D and E. In Panel D, the point estimates on Team Treatment are all negative, indicating that Actives go to the Rec Center less when incentived in teams than when incentivized as individuals, regardless of partner type. As most Actives in the team treatment reached the five-visit threshold (see Figure 3), it is difficult to discern differences in behavior based on teammate type. Here, it would appear that responses to changes in expected own monetary payoff dominate, and the prediction of the standard model holds: The lower expected payout associated with team bonus compensation yields marginally lower effort. Thus, we cannot infer the existence or non-existence of social effects for Active types. We infer only that if there is a social effect for Actives, it is dwarfed by the effect of the reduced expected pay-off.

[27] Of course, a response to incentives could be considered behavioral *per se*, but by behavioral effects we mean a non-neoclassical response.

Panel E, however, tells a very different story. This panel reports results for the Inactives—individuals who are less likely, ex ante, to go to the gym, and for whom these external incentives are more likely to be a decisive factor. We observe large and statistically significant differences between Inactives in the individual treatment and Inactives randomly assigned to Active teammates in the group treatment. Inactives with Active partners go to the Rec Center 1.6 more times, are 22.7 percentage points more likely to go at least once, and are 26.7 percentage points more likely to meet the 5-visit bonus threshold than Inactives incentivized as individuals. *This occurs despite the fact that the expected monetary pay-off is lower than in the Individual Treatment.*

We argue that a large non-pecuniary effect must exist for these choices to make sense at all. Though we do not claim to prove decisively which type of such an effect is dominant, the behavioral models described in Section 2 offer several possible mechanisms. It seems likely that when Inactives are matched with people who enjoy exercise, they expect that their teammate will go to the Rec Center often and be more likely to reach the 5-visit threshold. They may not wish to cost their teammate the bonus. Thus, they may try harder to break the 5-visit threshold, themselves, than they would if their effort choices had no effect on others. Alternatively, they may be coordinating with their partner to overcome commitment and self-discipline problems, or they may be imitating the expected behavior of their (more active) partner.

Inactives randomly partnered with Inactives are 24.2 percentage points more likely to try going to the Rec Center at least once than Inactives in the individual treatment. This would seem to go against imitation (mechanism 3). In the standard peer-effects story of imitation, low-performers who have low-performing peers do not improve their performance. However this is consistent with social mechanisms that emphasize guilt, shame, or altruism. Interestingly,

though, Inactives matched with Inactives appear no more likely to reach the five-visit threshold. This would appear consistent with a story in which teammates learn about each other over time: The subject perceives his teammate's type more accurately as time passes. A subject who discerns that his teammate is Inactive may be less concerned about defaulting because default is less apt to cost the teammate a bonus. Guilt is a response to an expected positive behavior. If one does not expect that one's teammate will meet the requirements for the bonus, then there is no reason to feel guilty for defaulting and there is no way to raise the partner's pay-off and feel the warm glow of altruism.

Mechanism 2) discussed in section 2 is that individuals with teammates may be better able to coordinate to solve commitment problems. We are able to investigate one possible source of coordination. If subjects in the group treatment coordinate with their partners by making appointments to go to the gym together, and thereby pre-commit their future selves to this activity, then the coordination should be visible in the timing of their visits. Specifically, subjects who are teammates should go to the gym *at the same time* more often than would randomly matched pairs of subjects in the individual treatment. We investigate this possibility in Table 4.

The Rec Center data contain information on the precise time of the gym visit. In the team treatment, there were 12 subjects (of 85) who showed up at the gym at least once at about the same-time (plus or minus 10 minutes) as a teammate. For comparative purposes, we randomly assigned placebo 'teammates' to subjects in the individual treatment. In the individual treatment, there were seven subjects who showed up at the Rec Center within 10 minutes of their placebo teammate at least once. But there were more than twice as many subjects in the team treatment as in the individual treatment. Thus, the probability that a teammate pair would have a

coincident gym visit was actually slighter higher for a 'placebo' team in the individual treatment than for a true team in the group treatment.[28] We find no evidence, then, of higher rates of gym-visit coordination in the team treatment.

In summary, we find that subjects are more apt to attempt an effort-intensive task when motivated as part of a team. The main results are driven by inactive types, who put forth more effort in team settings and are more likely to persist and accomplish the task. The findings for Inactives are consistent with some form of social motivation, and less consistent with simple peer imitation or coordination to solve commitment problems. For Actives, whose intrinsic motivations are presumed stronger, the evidence on social effects is less clear. Overall, our findings suggest that guilt, shame, or altruism may be harnessed to increase performance, particularly for individuals most in need of external incentives.

5. Conclusion

Moral hazard in the form of free-riding, a clear disadvantage of team compensation, has been studied extensively and found to exist. Why, then, are teams and team incentives used so often? One explanation is that teams take advantage of complementarities in worker productivity by fostering specialization, cooperation, and/or knowledge transfers. But it could also be that team compensation harnesses a social mechanism, altering workers' willingness to put forth effort. Management consultants allege that this kind of social effect is very powerful. They write of workers' deep-seated reluctance to "let down the team." If this is true, in part or in total, then it should be taken into account in any understanding of personnel economics.

[28] Similar results hold if we investigate subjects who went to the gym at the same time at least twice.

A first step is to observe the effect in a simple setting that allows for rigorous causal inference but also preserves the possibility of repeated social interactions over time. Previous studies have sometimes found social effects not tied to teams and sometimes found team effects that can't be proven to be social, but none of these appear to have identified social effects of monetary team incentives. Our primary contribution is that we demonstrate the existence of a social effect of team compensation: We observe people in a real-world setting raising their effort level because a teammate's payoff is at stake, despite the lower probability of receiving a bonus from this increased effort.

Ultimately, this addresses the question of how best to use incentives to evoke a desired performance at lowest cost. We have just scratched the surface on this crucial issue in personnel economics. Future work will help to delineate the boundaries of the observed effect and the environments under which team incentives are most effective.

References

Ackand, Daniel and Matthew Levy (2009), "Habit Formation, Naivete, and Projection Bias in Gym Attendance," mimeo.

Akerlof, George (1997). "Social Distance and Social Decisions," *Econometrica* 65(5): 1005-1027.

Akerlof, George, and Rachel Kranton. (2000). "Economics and Identity," *Quarterly Journal of Economics* 115(3): 715-753.

Anderson, Laurie, Toby Quinn, Karen Glanz, *et al.* (2009). "The Effectiveness of Worksite Nutrition and Physical Activity Interventions for Controlling Employee Overweight and Obesity: A Systematic Review," *American Journal of Preventative Medicine* 37(4): 340-357.

Ariely, Dan, Uri Gneezy, George Loewenstein, and Nina Mazar. (2008), "Large Stakes and Big Mistakes," *The Review of Economic Studies* 76: 451-469.

Ashraf, Nava, Dean Karlan, and Wesley Yin. (2006). "Tying Odysseus to the Mast: Evidence from a Commitment Savings Product in the Philippines," *Quarterly Journal of Economics* 121(2): 635-672.

Babcock, Philip, and John Hartman. (2010). "Exercising in Herds: Treatment Size and Status Specific Peer Effects in a Randomized Exercise Intervention," mimeo.

Bandiera, Oriana, Iwan Barankay, and Imran Rasul. (2010). "Social Incentives in the Workplace," *Review of Economics Studies* 77(2): 417-458.

Bandiera, Oriana, Iwan Barankay, and Imran Rasul. (2005). "Social Preferences and the Response to Incentives: Evidence From Personnel Data, *Quarterly Journal of Economics*, 120: 917-62.

Battigalli, Pierpaolo, and Martin Dufwenberg. (2007). "Guilt in Games," *American Economic Review Papers & Proceedings* 97(2): 170-76.

Battigalli, Pierpaolo, and Martin Dufwenberg. (2009). "Dynamic Psychological Games," *Journal of Economic Theory* 144(1): 1-35.

Bénabou, Roland, and Jean Tirole. (2004). "Willpower and personal rules," *Journal of Political Economy* 112: 848-886.

Bolton, Gary. (1991). "A comparative model of bargaining: Theory and evidence," *American Economic Review* 81(5): 1096-1136.

Bolton, Gary, and Axel Ockenfels. (2000). "ERC: A theory of equity, reciprocity and competition," *American Economic Review* 90(1): 166-193.

Bornstein, Gary, Uri Gneezy, and Rosemarie Nagel. (2002). "The Effect of Intergroup Competition on Group Coordination," *Games and Economic Behavior* 41(1): 1-25.

Brown, Thomas (2006). "Handbook of institutional pharmacy practice," ASHP; 4th edition.

Burger, Nicholas, Gary Charness, and John Lynham. (forthcoming). "Field and Online Experiments on Self-Control," *Journal of Economic Behavior and Organization*.

Charness, Gary, and Martin Dufwenberg. (2006). "Promises and Partnership," *Econometrica*, 74(6): 1579-1601.

Charness, Gary, and Uri Gneezy. (2009). "Incentives to Exercise," *Econometrica* 77(3): 909–931.

Charness, Gary, and Peter Kuhn. (2010). "Lab Labor: What Can Labor Economists Learn from the Lab?" forthcoming in "Handbook of Labor Economics, Volume 4," edited by Orley Ashenfelter and David Card, North Holland, 1st edition.

Charness, Gary, and Matthew Rabin. (2002). "Understanding Social Preferences with Simple Tests," *Quarterly Journal of Economics* 117(3): 817-69.

Conn, Vicki, Adam Hafdahl, Pamela Cooper, Lori Brown, and Sally Lusk. (2009). "Meta-Analysis of Workplace Physical Activity Interventions," *American Journal of Preventative Medicine* 37(4): 330-339.

DellaVigna, Stefano, and Ulrike Malmendier. (2006). "Paying Not To Go To the Gym," *American Economic Review* 96(3): 694-719.

Dufwenberg, Martin, and Uri Gneezy. (2000). "Measuring Beliefs in an Experimental Lost Wallet Game," *Games and Economic Behavior* 30(2): 163-82.

Dufwenberg, Martin, and Georg Kirchsteiger. (2004). "A Theory of Sequential Reciprocity," *Games and Economic Behavior* 47(2): 268-98.

Encinosa III, William E., Martin Gaynor, and James B. Rebitzer. (2007). "The Sociology of Groups and the Economics of Incentives: Theory and Evidence on Compensation Systems," *Journal of Economic Behavior & Organization* 62(2): 187-214.

Falk, Armin, and Andrea Ichino. (2006). "Clean Evidence on Peer Effects," *Journal of Labor Economics* 24(1): 39-58.

Fehr, Ernst, and Klaus Schmidt. (1999). "A Theory of Fairness, Competition and Cooperation," *Quarterly Journal of Economics* 114(3): 817-868.

Fudenberg, Drew and David Levine. (2006). "A Dual-Self Model of Impulse Control," *American Economic Review* 96: 1449-1476.

Gaynor, Martin, and Paul Gertler. (1995). "Moral Hazard and Risk Spreading in Partnerships," *RAND Journal of Economics* 26(4): 591-613.

Gneezy, Uri, and Aldo Rustichini. (2000). "Pay Enough or Don't Pay at All," *Quarterly Journal of Economics* 115(3): 791-810.

Gul, Faruk and Wolfgang Pesendorfer. (2001). "Temptation and Self-Control," *Econometrica* 69: 1403–1435.

Hamilton, Barton, Jackson Nickerson, and Hideo Owan. (2003). "Team Incentives and Worker Heterogeneity: An Empricial Analysis of the Impact of Teams on Productivity and Participation," *Journal of Political Economy* 111(3): 465-497.

Hewitt Associates LLC. (2002). "Health Promotion/Managed Health Provided by Major U.S. Employers in 2001."

Holmstrom, Bengt. (1982). "Moral Hazard in Teams," *Bell Journal of Economics* 13(2): 324-340.

Houser, Daniel, Daniel Schunk, Joachim Winter, and Erte Xiao (2009), "Temptation, Commitment, and Self-control in the Laboratory," mimeo, ICES, George Mason University.

Kandel, Eugene, and Edward Lazear. (1992). "Peer Pressure and Partnerships," *Journal of Political Economy* 100(4): 801-817.

Laibson, David. (1997). "Golden Eggs and Hyperbolic Discounting," *Quarterly Journal of Economics* 112: 443-477.

Leibowitz, Arleen, and Robert Tollison. (1980). "Free Riding, Shirking, and Team Production in Legal Partnerships," *Economic Inquiry* 18(3): 380-394.

Lencioni, Patrick. (2002). "The Five Dysfunctions of a Team: A Leadership Fable," Jossey-Bass, 1st edition.

Loewenstein, George, Max Bazerman, and Leigh Thompson. (1989). "Social Utility and Decision Making in Interpersonal Contexts," *Journal of Personality and Social Psychology* 57: 426-441.

Mas, Alexandre, and Enrico Moretti. (2009). "Peers at Work," *American Economic Review* 99(1): 112-145.

Meidinger, Claude, Jean-Louis Rullière and Marie-Claire Villeval. (2003). "Does Team-based Compensation Give Rise to Problems When Agents Vary in Their Ability?" *Experimental Economics* 6(3): 253-272.

Nalbantian, Haig and Andrew Schotter. (1995). "Matching and Efficiency in the Baseball Free-Agent System: An Experimental Examination," *Journal of Labor Economics* 13(1): 1-31.

O'Donoghue, Ted, and Matthew Rabin. (1999). "Doing it Now or Later," *American Economic Review* 89(1): 103-124.

O'Donoghue, Ted, and Matthew Rabin. (2001). "Choice and Procrastination," *Quarterly Journal of Economics* 116(1): 121-160.

Ozdenoren, Emre, Stephen Salant, and Daniel Silverman (forthcoming), "Willpower and the Optimal Control of Visceral Urges," *Journal of the European Economic Association*.

Rabin, Matthew. (1993). "Incorporating Fairness into Game Theory and Economics," *American Economic Review* 83(5): 1281-1302.

Royer, Heather, Mark Stehr, and Justin Sydnor. (2010). "Incentives, Commitments and Habit Formation in Exercise: Evidence from a Field Experiment with Workers at a Fortune-500 Company," mimeo.

Van Dijk, Frans, Joep Sonnemans, and Frans van Winden. (2001). "Incentive Systems in a Real Effort Experiment," *European Economic Review* 45(2): 187-214.

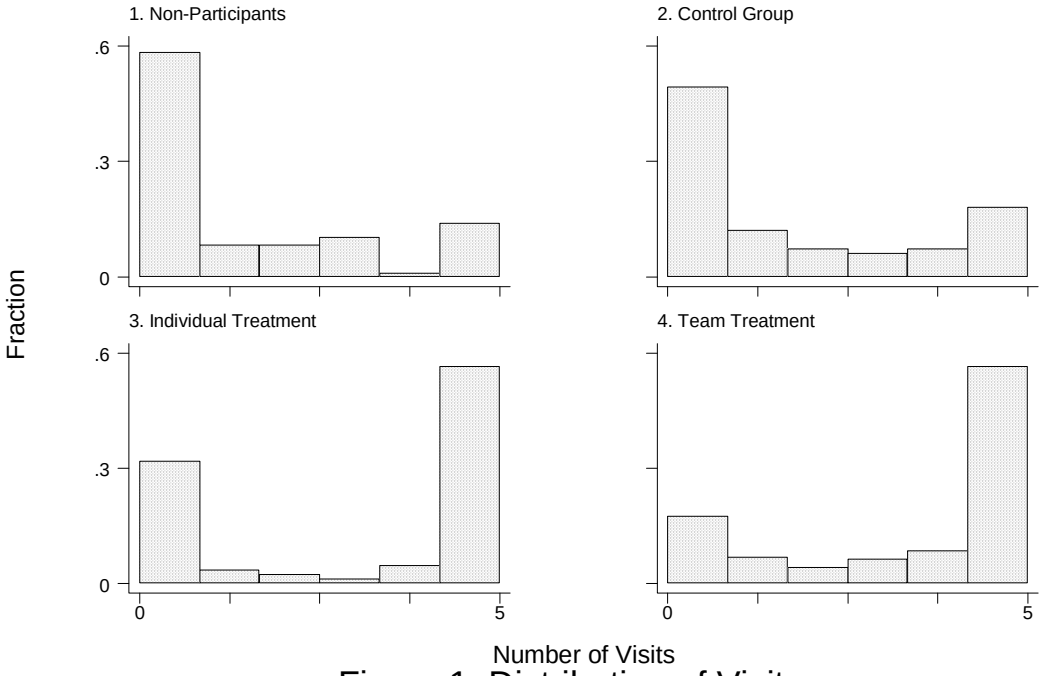

Figure 1. Distribution of Visits

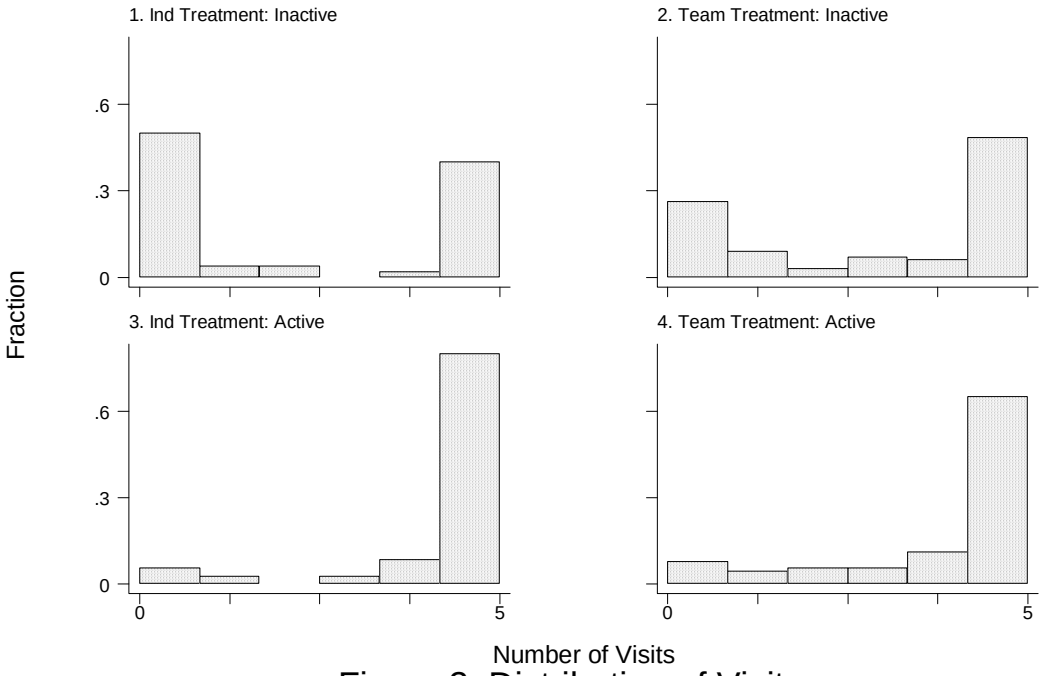

Figure 2. Distribution of Visits

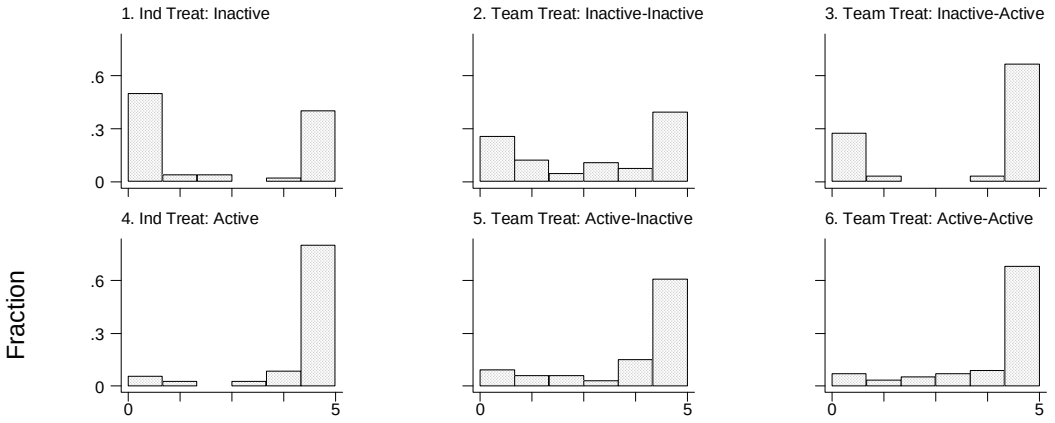

Figure 3. Distribution of Visits

Table 1. Samples

Economics Course Number	Official Enrollment	Survey Respondents	Experiment Participants
2	101	79	62
3B	119	85	66
100B	83	35	21
101	79	76	58
114	62	47	39
118	62	37	28
136A	48	33	21
136B	55	41	30
136C	75	60	50
Total	684	493	375
Removing early leaver and contaminated partners		490	373
Removing duplicates and their partners		478	362
Removing respondent who gave a fake name		477	362
Removing respondents with missing data		464	356

Table 2. Survey Response and Experiment Participation

	Male	Age	Self-Reported Exercise	Previous Gym Visits	Inactive	Active	Sample Size
Panel A: Classroom Survey Response							
Sample Means							
Control (C)	0.60	21.21	3.85	1.02	0.61	0.39	105
	(0.49)	(2.27)	(2.24)	(1.57)	(0.49)	(0.49)	
Individual Treatment (IT)	0.58	21.39	4.33	1.04	0.61	0.39	113
	(0.50)	(2.74)	(2.64)	(1.58)	(0.49)	(0.49)	
Team Treatment (TT)	0.65	21.05	4.18	1.04	0.54	0.46	246
	(0.48)	(2.10)	(2.49)	(1.40)	(0.50)	(0.50)	
Mean Differences (P-Values)							
IT - C	0.71	0.60	0.15	0.91	0.99	0.99	
TT - C	0.38	0.54	0.23	0.90	0.26	0.26	
TT - IT	0.18	0.24	0.62	0.98	0.24	0.24	
Panel B: Experiment Participation							
Sample Means							
Non-Participants (NP)	0.64	21.24	4.14	0.80	0.66	0.34	108
	(0.48)	(2.46)	(2.52)	(1.32)	(0.48)	(0.48)	
Participants (P)	0.62	21.15	4.14	1.11	0.55	0.45	356
	(0.49)	(2.26)	(2.47)	(1.52)	(0.50)	(0.50)	
Mean Differences (P-Values)							
P - NP	0.66	0.72	0.99	0.04	0.05	0.05	
Panel C: Treatment Assignment Conditional on Participation							
Sample Means							
Control	0.55	21.18	4.00	1.19	0.57	0.43	83
	(0.50)	(2.46)	(2.31)	(1.68)	(0.50)	(0.50)	
Individual Treatment	0.55	21.24	4.18	1.15	0.59	0.41	85
	(0.50)	(2.20)	(2.51)	(1.67)	(0.50)	(0.50)	
Team Treatment	0.67	21.09	4.18	1.05	0.53	0.47	188
	(0.47)	(2.21)	(2.52)	(1.38)	(0.50)	(0.50)	
Mean Differences (P-Values)							
IT - C	0.99	0.88	0.62	0.88	0.77	0.77	
TT - C	0.08	0.77	0.56	0.51	0.55	0.55	
TT - IT	0.07	0.62	1.00	0.63	0.34	0.34	

P-Values are for two-sided t-tests assuming unequal variances.

Table 3. Rec Center Visits for Individual and Team Treatments

	Visits	Try	Bonus	Sample Size
Panel A				356
Any Treatment	1.714**	0.176**	0.384**	
	(0.485)	(0.075)	(0.069)	
Team Treatment	0.305	0.142**	-0.001	
	(0.418)	(0.059)	(0.067)	
Constant	2.157**	0.506**	0.181**	
	(0.334)	(0.055)	(0.042)	
Panel B: Sample Restricted to Actives				160
Any Treatment	1.750**	0.026	0.411**	
	(0.701)	(0.061)	(0.107)	
Team Treatment	-0.978*	-0.022	-0.148*	
	(0.545)	(0.051)	(0.088)	
Constant	4.250**	0.917**	0.389**	
	(0.530)	(0.047)	(0.082)	
Panel C: Sample Restricted to Inactives				196
Any Treatment	1.827**	0.309**	0.379**	
	(0.453)	(0.092)	(0.073)	
Team Treatment	1.034**	0.237**	0.085	
	(0.490)	(0.086)	(0.089)	
Constant	0.553**	0.191**	0.021	
	(0.240)	(0.058)	(0.021)	
Panel D: Sample Restricted to Actives				160
Any Treatment	1.750**	0.026	0.411**	
	(0.703)	(0.061)	(0.107)	
Team Treatment: Inactive Partner	-1.000	-0.034	-0.194*	
	(0.681)	(0.064)	(0.110)	
Team Treatment: Active Partner	-0.964	-0.014	-0.121	
	(0.588)	(0.058)	(0.100)	
Constant	4.250**	0.917**	0.389**	
	(0.532)	(0.047)	(0.082)	
Panel E: Sample Restricted to Inactives				196
Any Treatment	1.827**	0.309**	0.379**	
	(0.454)	(0.092)	(0.073)	
Team Treatment: Inactive Partner	0.772	0.242**	-0.006	
	(0.545)	(0.094)	(0.097)	
Team Treatment: Active Partner	1.559**	0.227**	0.267**	
	(0.615)	(0.106)	(0.109)	
Constant	0.553**	0.191**	0.021	
	(0.241)	(0.058)	(0.021)	

All models include sex and age indicators. Standard errors are clustered at the group level and reported in parentheses. ** (*) indicates statistically significant at the 5 (10) percent level.

Table 4. Incidence of Pairs Visiting the Rec Center Together

Number of Same Time Visits	Individual Treatment	Team Treatment
0	78	176
	(91.8)	(93.6)
1	5	10
	(5.9)	(5.3)
2	2	2
	(2.4)	(1.1)
Total	85	188

Percentage of visits in pairs in parentheses. Individual treatment 'pairs' are randomly matched within class. Same time defined as a plus or minus ten minutes.

Appendix Table 1. Rec Center Visits for Individual and Team Treatments

	Visits	Try	Bonus	Sample Size
Panel A				356
Any Treatment	1.786**	0.186**	0.394**	
	(0.396)	(0.061)	(0.061)	
Team Treatment	0.051	0.106	-0.036	
	(0.358)	(0.053)	(0.061)	
Inactive	-2.334**	-0.338**	-0.226**	
	(0.315)	(0.044)	(0.054)	
Male	0.497	0.062	0.101**	
	(0.292)	(0.044)	(0.049)	
Age 20	-1.0481**	-0.146**	-0.119	
	(0.482)	(0.054)	(0.077)	
Age 21	-0.921*	-0.096*	-0.132	
	(0.475)	(0.054)	(0.075)	
Age 22+	-1.750**	-0.252**	-0.265**	
	(0.518)	(0.063)	(0.077)	
Constant	4.245**	0.801**	0.398**	
	(0.577)	(0.068)	(0.085)	
Panel B: Sample Restricted to Actives				160
Any Treatment	1.744**	0.031	0.422**	
	(0.702)	(0.061)	(0.107)	
Team Treatment	-0.971*	-0.019	-0.156*	
	(0.543)	(0.048)	(0.085)	
Male	0.350	0.029	0.137	
	(0.505)	(0.043)	(0.086)	
Age 20	-0.641	-0.031	-0.054	
	(0.697)	(0.051)	(0.106)	
Age 21	-0.822	-0.001	-0.095	
	(0.670)	(0.044)	(0.103)	
Age 22+	-1.501*	-0.147*	-0.205*	
	(0.822)	(0.084)	(0.122)	
Constant	4.755**	0.930**	0.374**	
	(0.887)	(0.066)	(0.137)	
Panel C: Sample Restricted to Inactives				196
Any Treatment	1.855**	0.319**	0.386**	
	(0.440)	(0.090)	(0.071)	
Team Treatment	0.842*	0.208**	0.055	
	(0.473)	(0.086)	(0.087)	
Male	0.454	0.054	0.068	
	(0.351)	(0.065)	(0.062)	
Age 20	-1.264**	-0.234**	-0.160	
	(0.632)	(0.097)	(0.109)	
Age 21	-1.141*	-0.238**	-0.169	
	(0.616)	(0.093)	(0.105)	
Age 22+	-1.866**	-0.343**	-0.296**	
	(0.619)	(0.090)	(0.098)	
Constant	1.636**	0.408**	0.179**	
	(0.643)	(0.094)	(0.091)	

Age 19 or less, female, control group, and in Panel A Active, are the omitted categories. Standard errors are clustered at the group level and reported in parentheses. ** (*) indicates statistically significant at the 5 (10) percent level.

Appendix Table 1 (Continued). Rec Center Visits for Individual and Team Treatments

	Visits	Try	Bonus	Sample Size
Panel D: Sample Restricted to Actives				160
Any Treatment	1.744**	0.031	0.422**	
	(0.704)	(0.061)	(0.107)	
Team Treatment: Inactive Partner	-0.996	-0.033	-0.197*	
	(0.679)	(0.063)	(0.107)	
Team Treatment: Active Partner	-0.957	-0.010	-0.132	
	(0.579)	(0.054)	(0.097)	
Male	0.347	0.028	0.132	
	(0.503)	(0.045)	(0.086)	
Age 20	-0.641	-0.031	-0.054	
	(0.699)	(0.050)	(0.106)	
Age 21	-0.822	-0.001	-0.095	
	(0.673)	(0.044)	(0.103)	
Age 22+	-1.503*	-0.148*	-0.207*	
	(0.821)	(0.084)	(0.122)	
Constant	4.757**	0.931**	0.378**	
	(0.886)	(0.067)	(0.136)	
Panel E: Sample Restricted to Inactives				196
Any Treatment	1.868**	0.319**	0.391**	
	(0.441)	(0.091)	(0.071)	
Team Treatment: Inactive Partner	0.565	0.207**	-0.039	
	(0.512)	(0.093)	(0.092)	
Team Treatment: Active Partner	1.425**	0.208*	0.252**	
	(0.629)	(0.108)	(0.112)	
Male	0.357	0.054	0.035	
	(0.358)	(0.066)	(0.061)	
Age 20	-1.310**	-0.234**	-0.175	
	(0.640)	(0.097)	(0.112)	
Age 21	-1.191*	-0.238**	-0.186*	
	(0.621)	(0.093)	(0.106)	
Age 22+	-1.924**	-0.343**	-0.315**	
	(0.617)	(0.090)	(0.098)	
Constant	1.718**	0.408**	0.207**	
	(0.646)	(0.095)	(0.092)	

Age 19 or less, female, control group, and in Panel A Active, are the omitted categories. Standard errors are clustered at the group level and reported in parentheses. ** (*) indicates statistically significant at the 5 (10) percent level.

Appendix 2

Survey and Consent Forms

1. In-Class Consent Form and Survey

2. Participant Consent Forms
    a. Control Group
    b. Individual Treatment
    c. Team Treatment

A1*

Hi, you are being asked to participate in a study by Philip Babcock, Kelly Bedard, Gary Charness, John Hartman, and Heather Royer. You must be at least 18 years old to participate. For your participation today, we will enter you in a random drawing, in which one person in this class will receive $50 cash today (subject to presentation of photo ID).

We are conducting a study to analyze monetary incentives to exercise. By signing up for this experiment, you are acknowledging that the authors of this study will follow your attendance at the UCSB Recreation Center ("Rec Center") for June through September 2010. By participating in the study, you may be randomly selected to earn money for attending the Rec Center. In some cases, the monetary incentives will depend solely on your attendance. In other cases, the monetary incentives will depend partially on your attendance and partially on the attendance of you and one other person (whom you will be notified about if you are selected).

I am aware that in this study, I allow Philip Babcock, Kelly Bedard, Gary Charness, John Hartman, Heather Royer, and research assistants related to this study, to access my attendance records at the UCSB Recreation Center for June to September 2010.

I also acknowledge the following information: Exercise has potential risks and benefits. Before starting any exercise program, you may want to consider contacting a doctor or other professional qualified to help determine what types of exercise are appropriate for you. When exercise is tailored to your physical condition and health, the gains from exercise usually outweigh the costs. Please also note that pregnancy may complicate the type and amount of exercise that you need. If you are pregnant or plan on becoming pregnant in the next six weeks, or if you are 17 years old or younger, you are not allowed to participate in this study.

After making payment to participants, all identifiers will be immediately removed from the data. The anonymized attendance records will be kept in a locked drawer in the office of Gary Charness.

<u>We would also like to ask you a few questions</u>:

What is your sex? M F

How old are you? 18 19 20 21 22 23 24 25 other_____

In the last month, how many times per week did you moderately or vigorously exercise for 30 minutes or more?

0 less than 1 1 2 3 4 5 6 7 more than 7

_____ _____ August _____, 2010
Print name Signature Date

_____ _____ _____
Perm # Primary e-mail address Local phone number

……..…….

A1

_____ _____ *
Print last name first name

You have been selected to receive information on the benefits of exercise.

Exercise has potential risks and benefits. Before starting any exercise program, you may want to consider contacting a doctor or other professional qualified to help determine what types of exercise are appropriate for you. When exercise is tailored to your physical condition and health, the gains from exercise usually outweigh the costs. Please also note that pregnancy may complicate the type and amount of exercise that you need.

If you have any questions, you may contact Philip Babcock at babcock@econ.ucsb.edu or 805-893-4823, or John Hartman at hartman@econ.ucsb.edu.

If you have any questions concerning any matter relating to your participation, you may also call the University of California Santa Barbara Human Subjects committee at 805-893-3807.

The University of California does not provide compensation for injury to human subjects of research except that the University will provide for any medical care required to treat any injury resulting from participation as a human subject in a University-approved activity. If you have any questions concerning this or any other matter relating to your participation in this activity, please call 893-3807.

By signing below, I acknowledge the above information. I will also do the following immediately if I become pregnant or suspect that I am pregnant:
• Stop attending the UCSB Recreation Center.
• Notify one of the researchers listed above.

Signature_____ Print name_____

You have been selected to earn additional money from attendance at the UCSB Recreation Center ("Rec Center"). From August 7-20, 2010, you will earn $2 for exercising at the Rec Center on any of these dates, up to $10. If you attend the Rec Center at least five different days from August 7-20, 2010, you will earn an additional $25.

We will pay you for qualifying Rec Center visits in approximately four weeks. You will receive an e-mail in about three weeks with more information.

Recall the following information that you acknowledged earlier today: Exercise has potential risks and benefits. Before starting any exercise program, you may want to consider contacting a doctor or other professional qualified to help determine what types of exercise are appropriate for you. When exercise is tailored to your physical condition and health, the gains from exercise usually outweigh the costs. Please also note that pregnancy may complicate the type and amount of exercise that you need. If you are pregnant or plan on becoming pregnant in the next six weeks you are not allowed to participate in this exercise study.

Your exercise participation is voluntary. There will be no repercussions should you decide not to participate. Please note that you may withdraw your participation at any time, and you will be paid based on your attendance at the Rec Center up to the point that you withdraw from participating. If you have any questions, you may contact Philip Babcock at babcock@econ.ucsb.edu or 805-893-4823, or John Hartman at hartman@econ.ucsb.edu.

If you have any questions concerning any matter relating to your participation, you may also call the University of California Santa Barbara Human Subjects committee at 805-893-3807.

The University of California does not provide compensation for injury to human subjects of research except that the University will provide for any medical care required to treat any injury resulting from participation as a human subject in a University-approved activity. If you have any questions concerning this or any other matter relating to your participation in this activity, please call 893-3807.

By signing below, I acknowledge the above information. I will also do the following immediately if I become pregnant or suspect that I am pregnant:
• Stop attending the UCSB Recreation Center.
• Notify one of the researchers listed above.

Signature_____ Print name_____

You have been selected to earn additional money from attendance at the UCSB Recreation Center ("Rec Center"). From August 7-20, 2010, you will earn $2 for exercising at the Rec Center on any of these dates, up to $10. You have also been matched with another person for this part of the study. If both of you attend the Rec Center at least five different days from August 7-20, 2010, you will each earn an additional $25. Note that if either one of you does not meet this requirement, the $50 that you could have collectively earned is lost.

We will pay you for qualifying Rec Center visits in approximately four weeks. You will receive an e-mail in about three weeks with more information.

Recall the following information that you acknowledged earlier today: Exercise has potential risks and benefits. Before starting any exercise program, you may want to consider contacting a doctor or other professional qualified to help determine what types of exercise are appropriate for you. When exercise is tailored to your physical condition and health, the gains from exercise usually outweigh the costs. Please also note that pregnancy may complicate the type and amount of exercise that you need. If you are pregnant or plan on becoming pregnant in the next six weeks you are not allowed to participate in this exercise study.

Your exercise participation is voluntary. There will be no repercussions should you decide not to participate. Please note that you may withdraw your participation at any time, and you will be paid based on your attendance at the Rec Center up to the point that you withdraw from participating. If you have any questions, you may contact Philip Babcock at babcock@econ.ucsb.edu or 805-893-4823, or John Hartman at hartman@econ.ucsb.edu.

If you have any questions concerning any matter relating to your participation, you may also call the University of California Santa Barbara Human Subjects committee at 805-893-3807.

The University of California does not provide compensation for injury to human subjects of research except that the University will provide for any medical care required to treat any injury resulting from participation as a human subject in a University-approved activity. If you have any questions concerning this or any other matter relating to your participation in this activity, please call 893-3807.

By signing below, I acknowledge the above information. I will also do the following immediately if I become pregnant or suspect that I am pregnant:
• Stop attending the UCSB Recreation Center.
• Notify one of the researchers listed above.

Partner's name _____

Signature_____ Print name_____

……..

Partner's name _____