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To pay or not to pay?: Do extrinsic incentives alter the Köhler group motivation gain?

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To Pay or Not to Pay?:

Do Extrinsic Incentives Alter the Köhler Group Motivation Gain?

ABSTRACT

The Köhler effect is an increase in task motivation that occurs in performance groups when one is (a) less capable than one's fellow group members, and (b) one's efforts are particularly indispensable for group success. Recently, it has been shown that the Köhler effect can dramatically increase one's motivation to exercise. The present study examines the potential moderating effect of the provision of extrinsic incentives on such Köhler motivation gains. When participants were offered such an extrinsic incentive for persisting at an exercise task, a robust Köhler effect was observed—participants who thought they were the less capable member of a dyad working at a conjunctive group exercise task persisted 26% longer than comparable individual exercisers. But an even stronger effect (a 43% improvement) was observed when no such incentive was on offer. Possible explanations and boundary conditions for this moderating effect are discussed.

To Pay or Not to Pay?: Do Extrinsic Incentives Alter the Köhler Group Motivation Gain?

In the United States, and to lesser extents in other developed countries, obesity is a serious problem, contributing to a number of poor health outcomes, including diabetes and heart disease (e.g., CDC, 2010; Weinstein et al., 2004). Although obesity is a complex phenomenon, with several genetic, dietary, medical, and lifestyle factors playing significant causal roles, insufficient physical activity appears to be a major contributor (USDHHS, 2008). Low demands for physical activity in normal daily routines mean that for many, achieving enough physical activity for basic fitness requires that their normal routines must be supplemented in some way (e.g., through an exercise regimen or participation in sport). Most people recognize the value of exercise and many try to initiate one or another exercise program. However, it is notoriously hard to persist in keeping such good resolutions—e.g., research has typically reported about a 50% drop out rate within the first 6 months of initiating an exercise program (Dishman, 1994). Thus, a key question in any attempt to improve fitness and combat obesity is, “how can motivation to exercise be enhanced?” We suggest that one general answer to this question is, “create the right social context for exercise.”

There are a number of social factors that have been shown to influence motivation to exercise (Franzini et al., 2009; USDHHS, 2008). These include social support from health professionals, family, and friends (Coleman, Cox, & Roker, 2008; Zakarian, Hovell, Hofstetter, Sallis, & Keating, 1994), social modeling of physical activity (Feltz & Riessinger, 1990; Fox, Rejeski, & Gauvin, 2000), having fellow exercise participants (Carron, Hausenblas, & Mack, 1996), and group exercise programs (Dishman & Buckworth, 1996). A novel but promising approach is to exploit social psychological processes that have been shown to enhance motivation in task performing groups (e.g., for overviews, see Baron & Kerr, 2003; Karau & Williams, 1993). In particular, considerable research over the last 35 years has shown that working together with others at a task can have powerful effects on task motivation. Much of the earliest research showed that certain group work conditions could be

demotivating, producing *group motivation losses* (Steiner, 1972)—e.g., when being in the group meant that individual levels of effort were harder to identify or monitor (e.g., Harkins & Jackson, 1985; Williams et al., 1981), when group members thought that they might be able to free ride on the efforts of other members (e.g., Kerr & Bruun, 1983), or when group members thought that others might not be doing their fair share and reduced their own efforts to avoid being exploited (e.g., Kerr, 1983).

But more recent work (e.g., Erev, Bornstein, & Gallili, 1993; Williams & Karau, 1991) has shown that there are also certain group work conditions that can lead group members to work harder than they would work if working individually, producing *group motivation gains*. The most thoroughly studied and documented of these phenomena is the *Köhler effect* (Köhler, 1927). The Köhler effect occurs when low ability group members increase their motivation (a) due to an invidious social comparison with their more capable group members and/or (b) when low ability group members see their contributions as particularly indispensable for group success and social evaluation (Kerr et al., 2007). Many factors that moderate this effect have also been identified (e.g., the discrepancy in member abilities, Messé et al., 2002; group sex composition, Lount et al., 2000; how long the group has worked together; Lount et al., 2008). Most importantly, the demands of the group task can be crucial; group tasks that make the least capable member's performance critical for group success (e.g., a mountain climbing team tethered together and able to climb at the speed of the slowest climber--what Steiner, 1972, called a *conjunctive group task*) generally results in the strongest Köhler effect (Hertel et al., 2008; Kerr et al., 2007). See Weber & Hertel (2008) for a meta-analytic or Kerr & Hertel (2011) for a narrative review of this literature.

The utility of the Köhler effect for enhancing motivation to exercise has been demonstrated in a series of recent studies. In the first, Feltz, Kerr, and Irwin (2011) found that exercising with a more capable partner led to a 24% improvement in persistence at a series of isometric plank exercises, relative to exercising alone. In the second, Irwin et al. (in press) found that exercising with a more capable partner at a conjunctive team exercise task (i.e., when it was the first person to quit who defined the

team's overall performance) led to a remarkable 125% improvement in persistence at an aerobic exercise (viz., riding a stationary bike), again relative to exercising alone. In the third, Feltz et al. (in press) replicated the basic effect at a conjunctive version of the isometric exercise task (overall, an increase in persistence of 48%, relative to individual exercise).¹

The present study focuses on the question, “will offering extrinsic incentives for good performance alter the Köhler effect?” This question is not only of general theoretical interest, but is of particular relevance to attempts to enhance motivation to exercise. Although there are obviously a number of personal incentives to exercise (e.g., losing weight, greater fitness, better appearance, more energy), it is highly unusual for one to be offered extrinsic and tangible incentives (e.g., payments; prizes) to actively exercise. Hence, if the presence of extrinsic incentives were found to be a facilitating condition for the Köhler effect, its utility for enhancing motivation to exercise might be limited.

A layperson's common-sense answer to our research question might be, “of course, offering incentives will enhance motivation—if you want workers to work harder, pay them more” and there is more than anecdotal evidence for the motivation enhancing effects of extrinsic incentives, in the workplace (e.g., Jex & Britt, 2008), the classroom (“Pay for grades...”, 2010), and even standardized testing (Bradley-Johnson et al., 1984). And when one is part of a team, motivation may not only be enhanced by the personal value attached to an extrinsic incentive, but by virtue of the fact that good performance may also benefit the rest of the team (e.g., Erez & Somech, 1996; Shepperd & Wright, 1989). Recall that one process that contributes to the Köhler effect is concern that one's poor performance will adversely affect the group; hence, it makes sense that the more the group stands to gain through good performance, the stronger this process would be. Such considerations suggest that the Köhler effect would likely be enhanced by offering tangible extrinsic incentives for good performance.

On the other hand, much work on the overjustification effect (e.g., Deci et al., 1999) documents that tangible extrinsic incentives can undermine one's intrinsic interest, and group members' task motivation is clearly affected by their personal, intrinsic interest in the group task (e.g., Brickner et al.,

1986; Williams & Karau, 1991). Moreover, if other group members are outperforming you, the existence of extrinsic incentives provides another attribution for other group members' superior performance—that their desire for the incentive is particularly (and perhaps, excessively) high. Such an attribution could undermine the social comparison process that contributes to the Köhler effect (e.g., “others' superior performance is not an indictment of my own ability, but simply a reflection of their particularly strong desire for the available incentive”), and/or the indispensability mechanism (e.g., “if it seems that it is the available incentive that is motivating others in the group, not the whole team's welfare, then perhaps I needn't worry so much about whether I let the team down”). And the less personally valuable the incentive was for that least-capable group member, the greater these undermining effects should be. Such considerations suggest that the Köhler effect would likely be attenuated by offering explicit incentives for good performance.

Most prior studies of the Köhler effect have offered some kind of extrinsic incentive for good performance, such as a cash incentive. Since the majority of these have been laboratory studies, such incentives gave the participants some reason to engage in the experimental task. By contrast, all but one of the extant studies of the Köhler effect in exercise contexts (*viz.*, Köhler, 1926, 1927; Feltz et al., *in press*, Irwin et al., *in press*) have offered no explicit incentive; the exception is Feltz et al. (2011). The fact that robust Köhler effects were observed in all of the former of these studies clearly indicates that such incentives are not absolutely necessary for the effect. But that still leaves open the question of whether offering such incentives would change the magnitude of the effect. What is clearly needed is a direct contrast of the presence of incentives, which the present paper provides. As noted above, there are plausible reasons to expect such incentives to both bolster and attenuate the Köhler effect. Thus, we advanced no explicit hypothesis, but rather approached this as an open and interesting research question.

Method

Design and Participants

The basic design of this study was a 2 (incentive: present vs. absent) x 2 (work condition: individual vs. conjunctive team) x 2 (performance block: Block 1 & Block 2) factorial with repeated measures on the latter factor. The data for two of the between-Ss conditions (viz., the two incentive-present conditions) were provided by two conditions reported in the Feltz et al. (2011) paper, which offered an extrinsic incentive in all of its conditions.² The data for one of the remaining conditions (viz., the Individual/incentive-absent condition) were provided by one condition reported in the Feltz et al. (in press) paper, which offered no extrinsic incentive in any of its conditions. The data from Feltz et al. (2011, in press) reports and for the remaining condition (viz., conjunctive team/incentive absent) were collected in the same term from the same participant population using identical experimental procedures, and participants were randomly assigned to all 4 conditions—functionally, the conditions examined in the present report and the two previous reports were parts of a single multi-condition study. The participants were 170 (84 Males, 86 Females) college students (M age = 20.19, SD = 2.81) recruited from introductory psychology and kinesiology courses at a large midwestern university in the United States. Students were given course credit for their participation.

Exercise Task

The task for this study was an exercise video game (exergame) designed for the Playstation 2 (PS2) gaming module. The software used was EyeToy:Kinetic, a game that offers a variety of fitness activities (e.g. yoga, strengthening exercises, combat exercises). This particular software operates in conjunction with an additional accessory called the Eye Toy, designed specifically for the PS2 system. The Eye Toy is essentially a small camera that connects to the PS2 system via a USB cable and allows images of the user to be displayed on the TV monitor and interact with virtual environments supported by the software.

The abdominal plank exercises within the strength training module of the EyeToy: Kinetic software were used for this experiment. These are a type of body-weight resistance exercise where participants are required to suspend their own body weight using their abdominal muscles. These

exercises are also isometric in nature, require very little coordination, and are highly effort-based. Each exercise targeted the abdominal muscles, but there were slight differences between each (e.g., holding a push-up position on one's forearms vs. on each side; see Feltz et al, 2011 for a detailed description of all exercises).

Measures

Performance. Performance was the total number of seconds that the exercise was held. Block scores were calculated by taking the summed total of the five exercises within each trial.

Self-efficacy (SE). Task SE was measured with a scale developed specifically for this study. The measures contained five items, each corresponding to one of the five exercises within each trial. All items were preceded by the stem "What is the number of seconds that you are completely confident you can hold:" followed by "The first exercise", "the second exercise" and so on for each of the five exercises. Respondents wrote in the number of seconds in a blank box following each item. The questionnaire was administered at three time points. Once before Block 1 (after the participant had watched a brief instructional video demonstrating the exercises), a second time after performing the exercises in Block 1, and again after the second block of exercises. A total SE score for each administration was calculated by taking the sum of the five exercises within each block; in our sample, pre-Block1 $\alpha=.98$, post-Block 1 $\alpha=.97$, post-Block 2 $\alpha=.97$.

Ratings of perceived exertion (RPE). Perceived exertion was measured using the 6-20 version of the Borg (1998) RPE scale. The scale ranges from 6-20 where 6 means "no exertion at all" and 20 means "maximal exertion." Participants were asked to rate their exertion at the end of each exercise, with particular reference to their perceived exertion at the moment right before the end of the exercise.

Task Enjoyment. Enjoyment was measured using a short 8-item version of the Physical Activity Enjoyment Scale (PAES; Kendzierski & DeCarlo, 1991). Each item was rated on a 7-point bipolar scale beginning with the stem "Please rate how you feel at the moment about the physical activity you have been doing according to the following scales" (e.g., 1= "*I loved it*"; 7= "*I hated it*").

Intention to exercise in the future. Intention to exercise was measured with one-item asking participants to respond to the following statement “I intend to exercise tomorrow for at least 30 minutes” on a scale of -3 (“*Not at all true for me*”) to +3 (“*Completely true for me*”).

Post-experimental questionnaire. Besides some questions checking participants’ understanding of the instructions and procedures, there were questions probing their interest in participating in a future exercise study like the present one, a rating of task difficulty, and a rating of effort expended on the task (each made on 8-point scales). The latter item was similar to the previously-collected RPE ratings, except it was made on a different scale, described the total set of exercises, and was collected well after the last exercise had been completed.

Procedures

A detailed description of experimental procedures is provided in Feltz et al. (2011). Here, we simply describe the basic procedure and note how the incentive manipulation was achieved.

Participants first watched a brief instructional video from the PS2-Eye Toy Kinetic software in which a virtual trainer demonstrated the five exercises. A baseline measure of self-efficacy was then taken. In the incentive-present condition, a tangible extrinsic incentive for good performance was then described. Persistence scores translated into lottery tickets (1 ticket per second persisted; the lottery winner would receive a membership at the university’s fitness center, worth ~\$80.00; this membership is not covered by student fees). No mention was made of such a lottery or prize in the incentive-absent conditions.

All participants then performed the first block of exercises, holding each of the five exercises for as long as they could (as measured by the experimenter with a stopwatch; when a participant could no longer continue to hold the exercise, s/he said “Stop”--which ended the trial--and lowered him/herself to the mat). There were 30s rest periods between each exercise. Immediately after each exercise, the participant announced his/her perceived exertion on the 15-point RPE scale. After the block was

finished, all participants were given veridical feedback on their performance (i.e., the average number of seconds they held each exercise).

The work condition manipulation was introduced at this point. Participants in the individual control conditions simply rested for 10 min. Participants in the conjunctive-team conditions were told that another participant was being run simultaneously at another lab on campus, and that the two participants would be able to see one another over an internet video connection during future trials. The participants then met briefly with that other, same-sex participant in a controlled Skype interaction (we will refer to that other participant hereafter as “the partner”). In reality, the partner was an experimental confederate whose side of the interaction was pre-recorded. After the interaction, participants were also given bogus feedback on how well the partner had done on the first trial. That feedback was 1.4 times the participant’s own actual performance.

Participants were told that they would be part of an exercise team and, in the incentive condition, both teammates were also told they would earn the same number of lottery tickets, to be determined by the team’s score. The team score in both conjunctive-team conditions would be the persistence score of the first teammate to quit an exercise. Following the manipulation, participants responded to a self-efficacy questionnaire.

Block 2 then commenced. In the individual control conditions, the participant could only see him/herself on the screen, as during Block 1. In the conjunctive-team conditions, the participant could see the partner’s image (which was actually prerecorded) before and during the exercise; the participant believed that the partner could likewise see his/her (the participant’s) image. The images available to the participant suggested that s/he was always the first to quit each exercise. The video link was allegedly frozen as soon as either teammate quit an exercise and until just before the start of the next exercise; hence, the participant only knew that his/her partner was able to persist longer, but not how much longer. After Block 2 was over, the participant completed a series of questionnaires (self-efficacy,

intention to exercise, enjoyment of physical activity, and manipulation checks). S/he was debriefed, thanked, and excused.

Results

Exercise Persistence

Following the analyses done in earlier studies, exercise persistence was taken as the sum of the time each participant held the five exercises within each block, producing a Block 1 and Block 2 score. There are, of course, individual differences in fitness and strength that we wish to control for. This can be done in different ways. In many prior studies (e.g., Hertel et al., 2000; Kerr et al., 2007), participants' Block 1 performance was used as a baseline and difference scores (i.e., Block 2 – Block 1) were the primary dependant variable, one that expressed each participant's Block 2 score relative to his/her Block 1 score (which, of course, reflected individual differences in fitness and strength). An alternative, less vulnerable to certain problems that can arise from the use of difference scores (e.g., Edwards & Parry, 1993), is to use Block 1 scores as a covariate in the analysis of Block 2 scores. Here, we present the results using the former, difference-score method because the mean values presented for such an analysis are more easily understood and interpreted. But the reader should note that the two methods produced an identical pattern of results.³

The (Block 2 - Block 1) difference scores were analyzed in a 2 (incentive) x 2 (work condition) analysis of variance.⁴ Both main effects were significant, incentive $F(1,162) = 8.59, p < .003, \eta_p^2 = .05$; work condition $F(1, 162) = 65.42, p < .001, \eta_p^2 = .288$, but were qualified by a significant interaction effect, $F(1, 162) = 7.59, p < .05, \eta_p^2 = .045$. The condition means are plotted in Figure 1. First, note that the individual controls persisted about 49 s less at Block 2 than at Block 1. This estimates the effect of fatigue and/or boredom with the task. Second, the two individual control conditions did not differ from one another (incentive-absent mean = -48.46, SD=57.2; incentive-present mean = -50.06, SD=44.4; $F(1, 162) = .013, ns$). Thus, offering an incentive did not alter the degree to which the individual controls fatigued at the task. The individual control difference score is the baseline against which a Köhler

motivation gain in our team conditions can be detected--that is, compared to the observed, fatigue-induced drop in persistence among control individuals, do those exercising in the conjunctive-teams persist any longer? As is clear in the figure, they do—i.e., participants in the conjunctive team conditions persisted longer than those in the corresponding individual control conditions (reflecting the overall work-condition main effect noted above). This Köhler effect is highly significant in both incentive conditions ($F(1, 162) = 17.55, p < .001$, in the incentive-present condition; $F(1, 162) = 49.42, p < .001$, in the incentive-absent condition). Fourth, and most relevant to our immediate concerns, as the significant interaction effect confirms, the Köhler effect is stronger when no incentives are offered than when they are. As a result, the conjunctive-team members not offered the incentive persisted significantly longer (mean difference score = 49.98s, $SD=58.2$) than those offered the incentive (mean = -1.64s, $SD=65.4$; $F(1, 162) = 18.89, p < .001$). The latter effect was not moderated by exercise when the five exercises were included as another repeated measures factor; hence the effect did not seem only to occur early or late in the sequence of exercises.

Ancillary Analyses

Our primary focus was on willingness to persist at the exercises, but we also examined several other variables, primarily to determine if withholding incentives altered any of the effects previously observed by Feltz et al. (2011) when an extrinsic incentive had been offered.

Subjective effort. Two variables were relevant here—reports of physical exertion (RPE), averaged across exercises within blocks (for Block 1 $\alpha=.93$, for Block 2 $\alpha=.93$), and the post-experimental rating of effort expended at the task. A 2 (incentive) x 2 (work condition) x 2 (block) analysis of the RPE data found that participants reported greater exertion at Block 2 (14.59; $SD=1.88$) than Block 1 (14.01, $SD=1.84$; $F(1, 161) = 49.50, p < .001$), hardly surprising given the fatiguing nature of the task. This effect was also stronger in the conjunctive teams (block difference of .81) than in the individual controls (.36; Block x Work condition $F(1, 161) = 7.46, p < .001$); again, this is not too surprising, given the objective persistence results. The only other result of interest was a marginally-

significant incentive main effect, $F(1, 161) = 3.02, p < .085$ —although incentives led to a smaller motivation gain, participants who were given an incentive actually tended to report higher levels of exertion (14.55, $SD=1.69$) than those offered no incentive (14.05, $SD=1.88$). This same trend was observed for the final rating of effort expended—participants who were offered incentives tended to report a higher level of effort (6.00 on the 8-point rating scale; $SD=1.24$) than those not offered incentives (5.64, $SD=1.38$; $F(1,163)=2.85, p<.10$). No other effects were significant for the latter variable.

Exercise self efficacy (SE). Post-block efficacy scores (sum of number of seconds participants estimated they could persist at all 5 exercises) were examined in a 2 (block) x 2 (incentive) x 4 (work condition) ANCOVA which used the pre-Block 1 SE score as a covariate. As in Feltz et al. (2011), there was a Block main effect, $F(1,160) = 8.18, p < .01$; participants were less sanguine about their prospects for persisting after Block 2 (adjusted mean = 157.3s; $SD=92.61$) than after Block 1 (adjusted mean= 193.1s; $SD=114.65$). Although both work condition and incentive affected actual persistence, neither showed any effects on participant's expectations of what they could do in the future.

Evaluations of the task. An overall enjoyment measure was computed based on the 8 items of the PAES scale ($\alpha=.87$). The grand mean (4.70, $SD=1.00$, on the 8-point scale) was not significantly different from the scale midpoint (4.5), suggesting that participants were, at worst, indifferent toward the exercise task. There were no significant effects in a 2 (work condition) x 2 (incentive) ANOVA of this measure—working harder at the task did not appear to undercut participants' enjoyment of it. Participants' post-experimental rating of the difficulty of the task suggested that they viewed it as moderately difficult (grand mean=4.92, $SD=1.59$, significantly above the scale midpoint, $p<.05$). The task was rated as more difficult in the conjunctive team conditions where participants had worked harder (5.36, $SD=1.37$) than by the individual controls (4.47, $SD=1.73$; $F(1,163)=13.25, p<.001$). The only other effect to emerge from the 2 x 2 ANOVA of this measure was a marginally significant Incentive effect, $F(1, 163) = 3.16, p < .08$; even though absence of an incentive led to larger motivation gains,

participants reported that the exercise task was less difficult in this condition (4.70, SD=1.63) than when an incentive had been offered (5.13, SD=1.55).

Intention to exercise. Overall, at the end of the experimental session, participants expressed a positive intent to exercise for at least 30-minutes the following day. The grand mean was 1.67 (SD=1.63) on the 7-point scale anchored by -3 (“*Not at all true for me*”) to +3 (“*Completely true for me*”); this was significantly ($p < .05$) above the midpoint of the scale. Again, just as an incentive attenuated the motivation gain, it also attenuated the intention to exercise in the future (incentive-absent = 1.92, SD=1.53; incentive-present = 1.42, SD=1.69; $F(1, 164) = 3.88, p = .05$). This intention was also somewhat weaker in the conjunctive team condition, where participants had already worked harder (mean = 1.38, SD=1.75) than in the individual control conditions (mean=1.96, SD=1.43; $F(1, 164) = 4.95, p < .03$). Finally, these two main effects were qualified by a marginally significant interaction effect, $F(1, 164) = 3.26, p < .075$. The main effects were attributable to a particularly high intention to exercise by individual controls offered no incentive ($M = 2.44, SD=.92$); the remaining conditions were very similar (conjunctive-team/incentive-absent = 1.40, SD=1.68; individual/incentive = 1.47; SD=1.54; conjunctive-team/incentive = 1.36, SD=1.85) and not statistically different from one another (as determined by a Newman-Keuls post-hoc test following a one-way analysis of all conditions).

Discussion

The objective of this study was to determine whether offering extrinsic incentives for exercising moderated the Köhler motivation gain effect. Our results clearly indicated that it did. The Köhler effect was substantial and significant when a prize worth \$80 was at stake—the inferior member of a conjunctive exercise team persisted, on average, about a minute longer (59.5s) at the five plank exercises than comparable individual controls, an improvement of 26%. But the motivation gain was even larger when there was no such prize at stake, with the conjunctive-team member persisting 100.2s longer than comparable individuals, an improvement of 43%. These results are quite encouraging with respect to the Köhler effect’s potential utility for bolstering motivation to exercise. Clearly, it is more feasible and

inexpensive to implement interventions that omit extrinsic incentives for exercising than to include them. Our findings suggest it is also more effective.

Much research (see Deci et al., 1999) suggests that offering extrinsic incentives can undermine one's intrinsic interest in an activity. It is possible that such a process contributes to certain aspects of our data (e.g., the intention to exercise among individual controls), but it remains unclear why such undermining would affect the exercise persistence of group members but not of individual exercisers (see Figure 1).⁵ Hence, we suspect that our persistence results can be better understood by focusing on the likely effect of extrinsic incentives on each of the psychological processes that have been shown to contribute to the Köhler effect. First, an invidious social comparison of performance can be motivating (e.g., Seta, 1982)—it can lead to performance goal revision (Stroebe et al., 1996) or to a competitive goal (Kerr et al., 2005). But the availability of an extrinsic incentive could undermine this process. One could more easily attribute the other's higher performance not to a greater ability, but to a greater desire for the available incentive, and come to see the other as a less informative basis for comparison. Second, being indispensable to the group's success can also be motivating (e.g., Gockel et al., 2008; Kerr & Bruun, 1983)—one does not want to let one's team down. But if one sees the principle object of good team performance to be obtaining some extrinsic incentive, rather than the usual social incentives (e.g., team pride, mutual respect), this process too could be undermined, especially if one valued the incentive less than one's teammate.

These processes assume that participants either initially valued the incentive less than their partner, or after being outperformed by their partner, found it convenient and self-serving to assume that their partner placed a higher value on the incentive. In hindsight, it would have been informative to have assessed how much participants valued the incentive and how much they believed their partners did, both initially and at the end of the study. However, either of these processes could explain our results. It will require additional measurement (e.g., of incentive valuation) and more complex experimental

designs (e.g., including superior coactors, who should not engage the indispensability mechanism) to document whether one or both processes occur and to determine their relative importance.

In the present study, there is no indication that the greater effort that resulted from an absence of incentives led to any withdrawal or aversion to the exercise task. Participants' reported enjoyment of the task and their perceived self-efficacy for performing it were unaffected by the incentive manipulation. And remarkably, even though they had persisted longer when they had no extrinsic incentive, they also tended to report having exerted themselves *less* and to have experienced the exercise task as less difficult. Thus, under these conditions, withholding extrinsic incentives seems not only to bolster group member's willingness to exercise but to enhance their attitudes toward exercising.

Although these results are quite encouraging, they are not conclusive or necessarily applicable to any and all extrinsic incentives. For example, they assume that the tangible extrinsic incentive (viz., the fitness-club membership) was valued to some degree by all participants. But some participants could have attached little value to this incentive; some may have even wanted to avoid it (e.g., "if it wouldn't cost me anything to go to the fitness club, I'd have to go more often"). It is possible that incentives undercut the Köhler effect when they are not very highly valued, whereas they could have a different effect (even a motivating one) when they are highly and universally valued. Thus, it would be useful to replicate our results with an incentive that was highly and equally valued by all participants (e.g., a large cash reward for good performance). It would also be interesting to try to extend our findings by exploring the impact of extrinsic incentives on motivation at group tasks for which such incentives are usual and expected (e.g., organizational teamwork), unlike the present exercise task.

We began this paper by posing the question "how can motivation to exercise be enhanced?", and suggested that at least some useful answers could stem from creating the right social context for exercise. The Köhler effect literature points to a number of social contexts that can dramatically bolster task motivation, including the motivation to exercise. These include making one's efforts indispensable for collective success and one's evaluation in the group, making the group important, and making it easy

for teammates to monitor and evaluate each others' performances continuously (see Kerr & Hertel, 2011). The present paper suggests that minimizing extrinsic incentives for exercising is yet another motivation-enhancing contextual feature.

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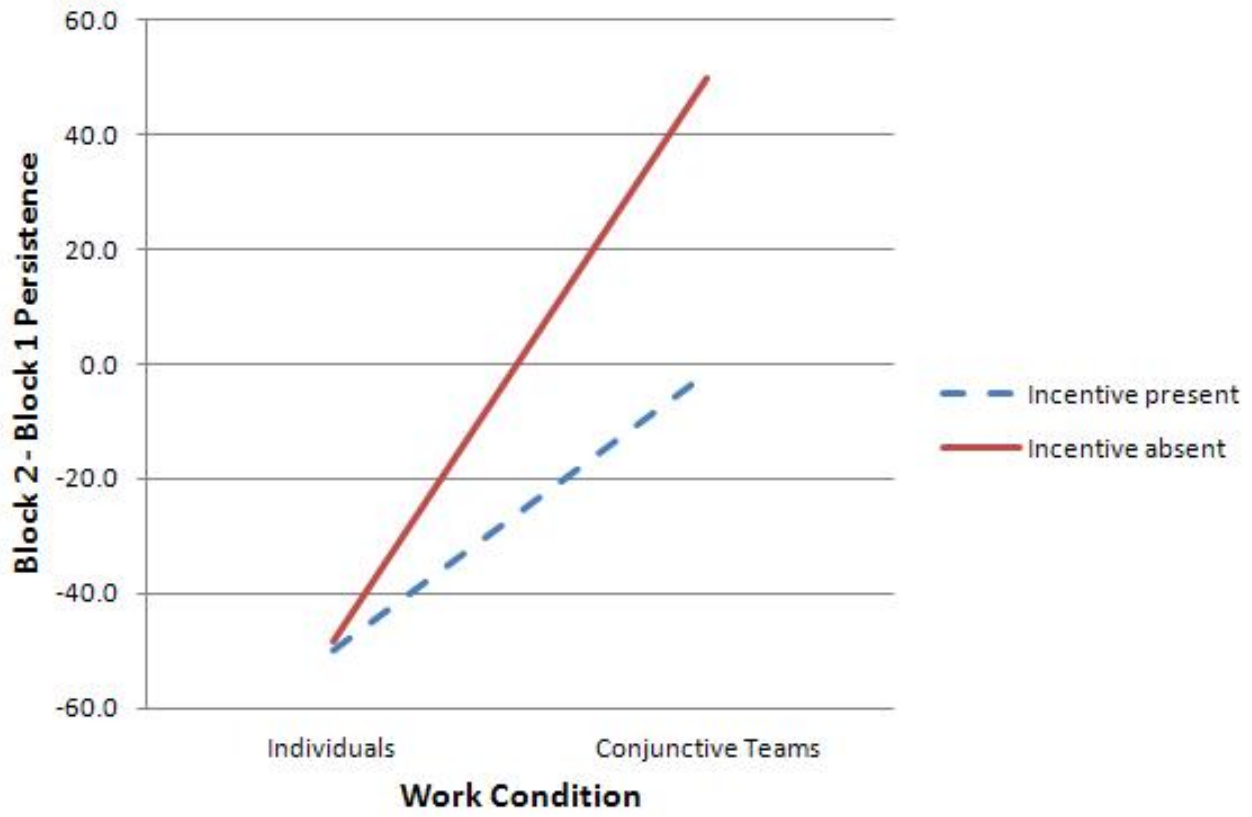
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Fig. 1. Block difference scores.



Footnotes

¹ This study also replicated the finding that the Köhler effect was maximal (a 58% increase) when the difference in ability between the weaker and stronger member was moderate in magnitude (viz., the ratio of stronger to weaker persistence was ~ 1.4 ; cf. Messé et al., 2002).

² The primary objective of Feltz et al. (2011) were to attempt to replicate the Köhler effect in an exercise context, under conditions where the indispensability mechanism would be wholly absent (coaching exercisers), clearly present (conjunctive team task), and potentially present (additive team task, where the team score was the sum of all members' performances). Thus, it contrasted four conditions: individuals, conjunctive team task, additive team task, coaction; the data from the participants in the first two of these conditions are incorporated into the present report.

³ Either method of analysis might overlook an overall effect on persistence due to incentive (which was manipulated before the first performance trial). A preliminary analysis of Block 1 performance showed somewhat longer persistence in the incentive-present condition (281s) than in the incentive-absent condition (256s), but this difference was not significant ($p=.13$). Further, a 2 (Block) x 2 (Incentive) repeated measures analysis of the persistence scores of the Individual controls showed no significant effect of Incentive.

⁴ A preliminary analysis including participant gender was also run, but since gender entered into no significant main or interaction effects, the simpler analysis ignoring gender is presented here.

⁵ It is possible to interpret our findings from the perspective of self-determination theory (e.g., Deci & Ryan, 1985) if certain additional assumptions were made. If the incentive offered here were sufficiently weak, it might not produce the usual effect on individual controls predicted by self-determination theory. But in the dyad conditions, if the incentive (either for oneself or for one's teammate) further reduced one's sense of autonomy (initially undercut because one might feel s/he is "working for others" and not for him/herself), the result could be a drop in intrinsic task motivation which could attenuate the usual

incentives that produce the Köhler effect (i.e., striving to obtain a more favorable social comparison; striving to maximize group performance). (Thanks to an anonymous reviewer for outlining this possibility.)