

The Effects of Cooperation and Competition on Intrinsic Motivation and Performance

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The authors examined the effects of competition and cooperation on intrinsic motivation and performance in 4 studies. Across 3 behavioral studies that involved shooting a basketball, no differences were observed between competition and cooperation on task enjoyment or performance. However, the combination of competition and cooperation (intergroup competition) consistently led to higher levels of intrinsic motivation, and in 2 of the 3 studies, performance. In a questionnaire study, the authors replicated the positive effects of intergroup competition on enjoyment and examined process measures that might account for these effects. These findings suggest that competition and cooperation both have positive aspects and that structuring recreational activities to include both can facilitate high levels of both intrinsic motivation and performance.

I'd much rather win the World Series. Then you can go out and get drunk with 25 other guys. If you win the MVP, you get to go out and get drunk by yourself. What fun is that?

—Kent Hrbek, 1st baseman for the Minnesota Twins (early in his career when asked whether he preferred winning the World Series or the Most Valuable Player Award)

Many theorists have debated whether activities should be structured in a cooperative or competitive manner to promote motivation and performance (e.g., Deutsch, 1949; Johnson & Johnson, 1989, 1990; Slavin, 1996), but we believe that the answer may lie in a combination of these two contexts. Pure cooperation is generally defined as involving a group of individuals working together to attain a common goal (Deutsch, 1949, 1962). In contrast, pure competition involves one person attempting to outperform another

in a zero-sum situation (Kelley & Thibaut, 1969). Many theorists have argued that cooperation should facilitate performance, especially when individuals hold interdependent goals (Aronson & Bridgeman, 1979; Deutsch, 1949; Deutsch & Krauss, 1962; Sherif, Harvey, White, Hood, & Sherif, 1961). Theorists have also expressed concern that competition can promote negative behaviors and outcomes, relative to cooperation (Deci & Ryan, 1985; Deutsch, 1962; Kohn, 1992).

Researchers have studied the effects of competition and cooperation in a number of domains, such as cognitive learning tasks and psychomotor tasks, and in a variety of settings, such as classrooms, factories, and athletic fields (see Johnson, Maruyama, Johnson, Nelson, & Skon, 1981, for review). In a more focused meta-analysis, Stanne, Johnson, and Johnson (1999) compared the effects of cooperative, competitive, and/or individual goal structures on motor-performance tasks. They located 64 studies that used a variety of tasks that ranged from sport skills (e.g., shooting a basketball) to basic motor skills to more technical skills (e.g., cardiopulmonary resuscitation). They found that cooperation led to higher levels of performance than did individual and competitive conditions, indicating the positive potential of cooperation.

However, Stanne et al. (1999) also documented some positive effects of competition. They found that it led to higher levels of performance than individual conditions, and they also found that the effect of competition relative to cooperation depended on two factors: the means interdependence of a task and the way in which competition is structured. An interdependent task is one that calls for individuals to coordinate their efforts as they work on a task. These tasks often require division of labor and can be completed most effectively under cooperative conditions (Deutsch, 1949, 1962). For example, if two children shoveling snow off a sidewalk

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hold the goal of finishing as quickly as possible, they can find a way to work together and coordinate their efforts. On the other hand, if they are competing to see who can shovel their half of the sidewalk faster, each child may end up shoveling snow onto the other's side. As a result, it may take both children longer to finish the task because they interfere with one another's progress, and they could also view each other negatively. Thus, when an activity requires interdependence, cooperation should be particularly beneficial for performance, and Stanne et al. (1999) found a large effect size ($d = 1.67$) showing that cooperation promoted performance for tasks high in means interdependence, relative to competition.

A different pattern of results emerged for tasks high in means independence. In this case, each individual's performance is measured independently within either context. For example, two children are shoveling separate sidewalks on opposite sides of the street, and thus cannot interfere with each other's performance. On these types of means independent tasks Stanne et al. (1999) found no difference between cooperation and competition on motor performance ($d = .01$). Taken together, these findings indicate that the effects of cooperation and competition depend largely on the structure of a task. When a task is high in means interdependence, cooperation leads to increased performance. However, when a task is high in means independence, cooperation and competition lead to similar levels of motor performance.

Stanne et al. (1999) also tested an additional moderator of competition effects by identifying two types of competition: appropriate and inappropriate. Appropriate competition meets four conditions: (a) there is not a heavy emphasis on winning; (b) opponents are equally matched, creating a challenging competition and providing each person with a realistic chance of winning; (c) the rules of the competition are clear and straightforward, making for a fair competition; and (d) participants are able to gauge their progress relative to their opponent. Stanne et al. located 25 studies that compared cooperation with inappropriate competition and found that cooperation led to higher levels of motor performance ($d = .73$). However, a different pattern of results emerged when they compared cooperation and appropriate competition. They identified only 5 studies that satisfied these criteria and found no difference between appropriate competition and cooperation on motor performance ($d = .12$). Thus, it appears that cooperation and competition may have similar effects on motor performance when competition is structured appropriately.

Intergroup Competition

Although researchers have typically focused on comparing the effects of cooperation to competition or individual conditions, it is important to note that many activities in the real world involve both cooperative and competitive elements (Deutsch, 1962). A complete analysis therefore requires testing the effects of pure cooperation and pure competition as well as their combined effects (intergroup competition). To date, however, there are very few studies of intergroup competition, and in their meta-analysis, Stanne et al. (1999) categorized such studies together with studies of cooperation, which seems somewhat arbitrary. It seems just as logical to categorize intergroup competition with pure competition,

but it would be better still to treat these few studies of intergroup competition separately.

Some researchers have examined the effects of intergroup competition compared with purely cooperative conditions. In studies of cognitive tasks (and thus not included in Stanne et al.'s [1999] meta-analysis), some evidence has shown that intergroup competition can increase performance in work environments (Erev, Bornstein, & Galili, 1993), group productivity (Mulvey & Ribbens, 1999), and academic performance (Okebukola, 1985, 1986). The primary goal of the current research was to examine the effects of intergroup competition compared with both pure cooperation and pure competition on a means independent psychomotor task.

Intrinsic Motivation

Research on competition and cooperation has focused on performance in a variety of settings, but another important outcome is intrinsic motivation (Deci & Ryan, 1985; Harackiewicz, Barron, & Elliot, 1998), which involves the desire to take part in an activity for its own sake. Intrinsic motivation is marked by high levels of task enjoyment, and it should help individuals develop long-lasting interest in an activity. Motivation and performance have the potential to work together, such that individuals who enjoy what they are doing spend more time developing their skills in an activity, leading to increased performance (Deci & Ryan, 1985; Harackiewicz & Sansone, 1991; White, 1959). Thus, intrinsic motivation is an important outcome in its own right and may also be beneficial for long-term performance.

Deci, Betley, Kahle, Abrams, and Porac (1981) found that competition undermined intrinsic motivation. Participants who had competed against another participant were less likely to return to the activity during a free-choice period than were those who had not competed. Deci et al. argued that participants' focus on winning rather than on the activity itself was responsible for this decrease in intrinsic motivation. More recent research has demonstrated the positive potential of competition on intrinsic motivation, showing that competition can have positive effects for certain types of individuals or in certain situations (Epstein & Harackiewicz, 1992; Reeve & Deci, 1996; Tauer & Harackiewicz, 1999).

Harackiewicz and Sansone (1991; Sansone & Harackiewicz, 1996) distinguished two ways that competition can affect intrinsic motivation. The first is through the competitive context established at the outset of an activity, which can affect how individuals approach a task. The second is through performance feedback, which typically comes at the conclusion of an activity. Studies have demonstrated that competitive contexts can increase both competence valuation (or the desire to do well) and a sense of challenge or excitement, either of which can promote intrinsic motivation (Epstein & Harackiewicz, 1992; Harackiewicz & Manderlink, 1984; Reeve & Deci, 1996; Tauer & Harackiewicz, 1999). Thus, competition may have a positive effect because it poses an exciting challenge and/or increases the importance an individual places on doing well. As a result, individuals may become more involved in the activity, thereby promoting intrinsic motivation.

Research has also shown that positive feedback, which may be received at the conclusion of a competition, can increase intrinsic motivation (Reeve & Deci, 1996; Reeve, Olson, & Cole, 1985,

1987; Tauer & Harackiewicz, 1999; Vallerand & Reid, 1984). These effects are consistent with much theorizing on the beneficial role of perceived competence in promoting intrinsic motivation (Deci & Ryan, 1985; Harackiewicz & Sansone, 1991; White, 1959). However, these effects seem less relevant to the effects of competition per se.

All of the studies reviewed to this point have been based on comparisons of competitive with noncompetitive, individual control conditions and not with purely cooperative conditions. Cooperation also has the potential to affect intrinsic motivation in a number of ways. Individuals can experience the benefits of being part of a team working toward a common goal, engendering a sense of relatedness with their teammates. Relatedness has been shown to be a crucial mediator in the intrinsic motivation process (Deci & Ryan, 1991; Ryan & Deci, 2000a, 2000b; Vallerand & Losier, 1999). In addition, cooperation has the potential to provide positive feedback if a team meets its goal, which should promote perceived competence and, in turn, intrinsic motivation. However, cooperation could also have negative effects on motivation if individuals feel a loss of autonomy because they are part of a larger group, if they perceive the group goal as externally controlling, or if they fail to meet their goal. Thus, cooperation would appear to have the potential to both increase and undermine intrinsic motivation.

The Current Research

The current research examines the effects of pure cooperation, pure competition, and intergroup competition on performance and intrinsic motivation in a sport setting. The experimental activity used was free-throw shooting at a youth basketball camp. This task is high in means independence because participants performed the task individually and thus could not help or hinder another person's performance. Performance could therefore be measured equivalently in all conditions. With this activity, it is also possible to provide a goal in a pure cooperation condition that is unrelated to another team's performance, thus maintaining a purely cooperative context. In Study 1, participants were randomly assigned to one of three conditions: pure cooperation, pure competition, or intergroup competition. In the pure cooperation condition, teammates were given a team goal for how many free throws they should try to make. In the pure competition and intergroup competition conditions, the goal was to make more baskets than another person or team. We also investigated the effects of positive and negative feedback (whether participants met their goal). Participants in pure cooperation either met or did not meet their goal, and participants in competitions either won or lost.

We predicted that intergroup competition would lead to higher levels of task enjoyment and performance than would pure competition and pure cooperation. This combination of both cooperation and competition should provide participants with the best overall experience. Competition can lead individuals to value competence more, and individuals may become more involved and perform better when they value competence or perceive challenge. Cooperation can foster positive interpersonal relations and relatedness among teammates and lead individuals to value teamwork and the group's welfare. Thus, intergroup competition should enable participants to value *both* teamwork and competence. We

did not predict any differences between pure competition and pure cooperation. Both cooperation and competition have positive aspects when structured appropriately, and thus, we predicted that they would lead to similar levels of task enjoyment and performance (Deutsch, 1960). In addition, we predicted that participants who received positive feedback would enjoy the activity more than participants who received negative feedback.

Study 1

Method

Setting

The experiment took place within the context of a weeklong boys' basketball day camp held on a metropolitan university campus. The non-selective, community-based camp was 5 days long and lasted 6 hr per day. Campers were entering Grades 7–9 and possessed a wide range of abilities. Throughout a typical camp day, boys were involved in a wide variety of activities. Some activities emphasized individual skill development (e.g., free-throw shooting, layups), other activities were more cooperative (e.g., passing, teamwork drills), and still others were more competitive in nature (e.g., full-court games).

Participants and the Basic Paradigm

Thirty-six boys (mean age = 12.4 years, $SD = 0.6$) participated and attempted 20 free throws on Day 1 of camp. This pretest measure of ability allowed us to match participants (both partners and opponents) on ability. On Day 2 of camp, participants of equal ability were paired, randomly assigned to one of three experimental conditions, and given a goal by an experimenter who was unaware of the experimental hypotheses. Each participant then attempted 10 free throws, 2 at a time, in an alternating pattern. After each round of 2 free throws, the experimenter announced how many free throws each individual and/or team had made.

In the pure cooperation condition, a pair's goal was to make a certain number of baskets together. In the pure competition condition, each boy was given the goal of scoring more baskets than his opponent. In the intergroup competition, two boys formed each team, and they were given the goal of scoring more baskets than another two-person team. At the end of the session, each participant was informed whether he (or his team) had met the goal. This outcome variable was quasiexperimental because it depended on performance relative to a goal, which was either a predetermined standard or an opponent's score. This resulted in a 3 (pure cooperation, pure competition, intergroup competition) \times 2 (positive vs. negative outcome) between-subjects design.

Procedure

Pure cooperation condition. Two participants (Campers A and B) were placed on a cooperative team together. They were assigned a team goal of one more free throw than their combined average score from the pretest. For example, if each participant made 10 of 20 free throws during the pretest, their team goal would have been to make 11 out of 20 free throws during the experimental session. After each participant had attempted 10 free throws, the experimenter announced, "OK, A and B, your team made a total of y baskets out of 20 and did (not) meet your goal."

Pure competition condition. Two participants (A and B) were placed in a competition against one another. After each participant had attempted 10

free throws, the experimenter announced, "OK, A, you made y out of 10, and B, you made z out of 10, so A (B) is the winner of the competition."¹

Intergroup competition condition. Two participants (A and B) were placed in a competition against two other participants (C and D). After each participant had attempted 10 free throws, the experimenter announced, "OK, A and B, you made y out of 20, and C and D, you made z out of 20, so A and B (C and D) are the winners of the competition."

Dependent measures. The experimenter recorded the number of free throws each participant made, and this served as our dependent measure of performance. Finally, each participant was asked in private to rate how much he enjoyed the activity on a scale from 1 (*not at all*) to 10 (*very much*), and this served as our dependent measure of task enjoyment. Similar items have been used on self-report scales of intrinsic motivation (Epstein & Harackiewicz, 1992; Reeve & Deci, 1996; Tauer & Harackiewicz, 1999).

Because the experimental activity was structured to be means independent, a participant's performance and enjoyment rating was independent from that of his partner or opponent. However, participants in pure cooperation and intergroup competition participated as members of a team and were nested within dyads in these two conditions. We therefore collapsed data across individuals within dyads by using the average of task enjoyment and performance for each pair as the unit of analysis.²

Results

Multiple regression was used to test the effects of the cooperative and/or competitive context on task enjoyment and performance, and we constructed two orthogonal contrasts. The first tested whether intergroup competition led to higher levels of performance and enjoyment than pure competition and pure cooperation (intergroup contrast: intergroup competition [2], pure competition [-1], pure cooperation [-1]). The second tested for differences between the pure competition condition and the pure cooperation condition (pure competition/cooperation contrast: intergroup competition [0], pure competition [-1], pure cooperation [1]).

In addition, we tested the effects of outcome (whether participants met their goal or won: met goal or won [1], did not meet goal or lost [-1]). In competition, by definition, 50% of individuals will meet their goal (win the competition) and 50% will not (lose the competition). However, this is not necessarily the case in the pure cooperation condition, because each group has the potential to meet their goal.³ Thus, our model on enjoyment included five terms: two orthogonal contrasts to test the effects of the cooperative-competitive context, a contrast to test the effect of outcome, and the two two-way interactions between these variables. Our model on performance included a sixth term, the pretest measure of performance that we obtained on the first day of camp was used as a covariate in all analyses on performance.⁴

Task Enjoyment

We found a marginally significant effect of the intergroup contrast, $F(1, 19) = 4.21, p < .06$ ($d = 1.03$). Participants in the intergroup competition condition ($M = 7.75, SD = 1.19$) enjoyed the activity more than participants in the purely cooperative ($M = 5.21, SD = 1.47$) and the purely competitive ($M = 5.79, SD = 2.49$) conditions. There was not a significant difference between participants in the purely cooperative and purely competitive conditions. In addition, we observed that participants who achieved positive outcomes ($M = 7.00, SD = 2.27$) enjoyed the activity

more than those who did not ($M = 5.11, SD = 2.19$), but this effect was not significant. No other effects were significant.

Performance

We found a significant effect of the intergroup contrast, $F(1, 18) = 12.65, p < .01$ ($d = 1.72$). Individuals in the intergroup competition condition ($M = 6.01, SD = 0.41$) made more free throws than those individuals in the purely cooperative ($M = 3.57, SD = 1.26$) and purely competitive ($M = 3.35, SD = 1.60$) conditions. There was no difference on performance between individuals in the purely cooperative and purely competitive conditions. Although participants who had positive outcomes ($M = 4.46$) did score more free throws than those who had negative outcomes ($M = 3.32$), the outcome effect was not significant, $F(1, 18) = 1.02, p > .30$ ($d = .69$). No other effects were significant. Table 1 includes the means for task enjoyment and performance as a function of experimental condition.

Test of Mediation

To examine whether enjoyment mediated the effect of intergroup competition on performance (documented previously), we added enjoyment to the model on performance and tested whether enjoyment predicted performance and whether the significance of the intergroup competition effect was reduced in this model (Judd & Kenny, 1981). Although enjoyment and performance were significantly correlated, $r(23) = .51, p < .01$, enjoyment did not mediate the intergroup competition effect on performance, $F(1, 18) = 1.12, p = .30$ ($\beta = .22$). The intergroup competition effect remained significant, $F(1, 18) = 8.22, p < .05$.

Discussion

In support of our primary hypothesis, intergroup competition led to higher levels of task enjoyment and performance than pure cooperation and pure competition. As predicted, we did not find a difference between pure cooperation and pure competition on either task enjoyment or performance. These results indicate that combining cooperation and competition to form intergroup competition leads to the most positive outcomes. However, to truly evaluate the benefits of pure cooperation and pure competition, it

¹ If two participants or teams made the same number of baskets, they took part in a sudden-death shootout to determine the winner. Each participant proceeded to take one free throw at a time until 1 participant made his free throw and the other participant missed.

² In all of the between-subjects designs reported in this article, we collapsed data for partners in cooperative or intergroup competition groups, and all results reported reflect this collapsing. This compromised the balance of the cell sizes across conditions in Study 1, and to some degree in Study 2, and we took care to plan for this issue in Study 4. We also reanalyzed the data with individuals as the unit of analysis, and the results revealed the same patterns of findings, but they were stronger because of increased power.

³ In fact, in this study, fewer than 50% of the participants in the pure cooperation condition met their goal (two teams met their goal, five teams did not).

⁴ We tested all interactions between the covariate and our contrasts. None of these effects were significant.

Table 1
Adjusted Means or Percentage of Choices for Task Enjoyment and Performance

Variable	Range of scale	Intergroup competition	Pure competition	Pure coop-2	Pure coop-4	Pure Individual
Study 1						
<i>n</i>		8 (4)	14 (14)	14 (7)		
Task enjoyment ^a	1–10	7.75	5.79	5.23		
Performance ^b	0–10	6.01	3.35	3.57		
Study 2						
Between subjects						
<i>n</i>		36 (18)	26 (26)	30 (15)		19 (19)
Task enjoyment ^a	1–5	4.11	3.73	3.79		3.85
Performance ^b	0–6	2.95	2.21	2.55		2.43
Repeated measures						
<i>n</i>		93	93	93		93
Task enjoyment ^b	1–5	3.96	3.87	3.78		3.68
Performance	0–6	2.66	2.54	2.55		2.44
Study 3: Condition chosen most enjoyable						
<i>n</i>		128	128	128		128
Top choice, <i>n</i> / <i>%</i> ^b		59/46	45/35	17/13		7/6
Study 4						
<i>n</i>		52 (26)	24 (24)	48 (24)	76 (19)	26 (26)
Task enjoyment ^b	1–5	4.08	3.66	3.70		3.65
Performance	0–10	3.89	4.20	3.65	3.85	4.12

Note. The number of observations analyzed in each study from each condition is in parentheses. Coop-2 = pure cooperation as part of a two-person team; coop-4 = pure cooperation as part of a four-person team.

^a $p < .10$ for the intergroup competition contrast. ^b $p < .05$ for the intergroup competition contrast or chi-square test.

is necessary to have a control condition that does not involve either competition or cooperation. Thus, we added an “individual goal” condition in Study 2 and also made some methodological refinements.

Study 2

We used the same basic paradigm as was used in Study 1 with five major changes. First, we added an individual goal condition. Second, we increased our sample size considerably and had a wider age range among our participants. Third, in the pure cooperation and individual goal conditions, participants were given a goal equal to their average from the previous day, rather than a goal that was greater than their average, to ensure that approximately half of the participants in the pure cooperation condition would meet their goal. Fourth, we modified our measures slightly. Because of time constraints, we obtained our pretest measure of ability on the basis of 10 free throws (instead of 20), and our dependent measure of performance was based on 6 free throws (instead of 10). Because participants in Study 2 were younger than those in Study 1, we simplified the enjoyment scale by using a 5-point scale and clearly defined each point on the scale. Finally, we used a repeated-measures design. After completing a pretest measure of performance on the first day of camp, participants were randomly assigned to a different experimental condition for the same free-throw-shooting activity each of the final 4 days of camp. Everything else remained identical to Study 1.

Method

Participants and Design

One hundred eleven boys (mean age = 11.6 years, $SD = 1.5$) volunteered to participate. On Day 1 of camp, participants attempted 10 free

throws. On Day 2 of camp, participants were randomly assigned to one of four experimental conditions: individual goal, pure cooperation, pure competition, or intergroup competition. In the individual goal condition, each participant was given the goal of making a certain number of baskets on the basis of his performance during the pretest. At the end of the session, each participant received outcome feedback as to whether he (or his team) had met the goal. This resulted in a 4 (individual, pure cooperation, pure competition, intergroup competition) \times 2 (positive vs. negative outcome) between-subjects design.

In addition, we used a one-way repeated-measures design. After taking part in one of the four experimental conditions on the second day of camp, participants were randomly assigned to a different experimental condition on each successive day of camp. They were matched with new partners and opponents each day, using the same criteria described earlier.

Procedure

Aside from the exceptions noted earlier, the pure cooperation, pure competition, and intergroup competition conditions were identical to those used in Study 1.

Participants were given a goal of making the same percentage of shots they had made in the pretest. After the participant had attempted six free throws, the experimenter announced, “OK, A, you made a total of *y* baskets out of six, and did (not) meet your goal.”

Results

Overview of Between-Subjects Analyses

Multiple regression was used to test the effects of the cooperative and/or competitive context and outcome on task enjoyment and performance from the first day of the study. We constructed three orthogonal contrasts to test effects on enjoyment and performance. The first tested whether intergroup competition led to higher levels of enjoyment and performance than the pure coop-

eration, pure competition, and individual goal conditions (intergroup contrast: intergroup competition [3], pure competition [-1], pure cooperation [-1], individual goal [-1]). The second tested for differences between the pure competition and the pure cooperation conditions (pure competition/cooperation contrast: intergroup competition [0], pure competition [-1], pure cooperation [1], individual goal [0]). The third tested for differences between the individual condition and the purely competitive and purely cooperative conditions (individual contrast: intergroup competition [0], pure competition [1], pure cooperation [1], individual goal [-2]). In addition, we tested the effects of outcome (met goal or won [1], did not meet goal or lost [-1]).⁵ Thus, our model on task enjoyment included seven terms: three orthogonal contrasts to test the effects of goal context, a contrast to test the effect of outcome, and the three two-way interactions between these variables. Our model on performance included an eighth term, the pretest measure of performance.

Task enjoyment. We found a marginally significant effect of the intergroup contrast, $F(1, 70) = 3.70, p < .06 (d = .51)$. Participants in the intergroup competition condition ($M = 4.11, SD = 0.47$) enjoyed the activity more than participants in the purely cooperative ($M = 3.80, SD = 0.59$), the purely competitive ($M = 3.73, SD = 0.67$), and the individual goal ($M = 3.84, SD = 0.69$) conditions. There was no difference on enjoyment between participants in purely cooperative and competitive conditions, nor was there a difference between participants in these two conditions compared with the individual goal condition. In addition, we observed a marginally significant effect of outcome, $F(1, 70) = 2.95, p < .10 (d = .39)$. Participants who met their goal ($M = 3.99, SD = 0.58$) enjoyed the activity somewhat more than those who did not meet their goal ($M = 3.73, SD = 0.65$). No other effects were significant.

Performance. We found a significant effect for the intergroup contrast, $F(1, 69) = 4.22, p < .05 (d = .40)$. Individuals in the intergroup competition condition ($M = 2.95, SD = 1.11$) made more free throws than participants in the purely cooperative ($M = 2.55, SD = 1.07$), purely competitive ($M = 2.21, SD = 1.46$), and individual ($M = 2.42, SD = 1.62$) conditions. There was no difference in performance between individuals in purely cooperative and competitive conditions, nor was there a difference between these two conditions and the individual goal condition. As expected, there was a significant effect of outcome on performance, $F(1, 69) = 44.37, p < .01 (d = 1.13)$, such that participants who met their goal ($M = 3.30, SD = 1.15$) made more free throws than those who did not ($M = 1.76, SD = 1.19$). There was also an unexpected interaction between the individual goal contrast and outcome, $F(1, 69) = 6.28, p < .05$.⁶ Finally, there was a significant effect of our pretest measure of performance, $F(1, 69) = 20.91, p < .01$. No other effects were significant.

Enjoyment as a mediator of performance. To examine whether enjoyment mediated the effect of intergroup competition on performance, we added enjoyment to the model on performance. Enjoyment and performance were significantly correlated, $r(76) = .34, p < .01$, and when added to the model on performance, enjoyment had a significant effect, $F(1, 68) = 5.90, p < .05$. In addition, the intergroup competition effect on performance was rendered nonsignificant, $F(1, 68) = 2.34, p > .10$ (β reduced from .17 to .13). This result suggests that enjoyment partially mediated the effect of intergroup competition on performance.

Repeated Measures Analyses

Of our original 111 participants, 93 were present during all 5 days of the study and took part in all four experimental conditions. As a result, we were able to test the effects of the cooperative-competitive context in a repeated-measures design for these participants.⁷ We tested the three orthogonal contrasts described earlier on both enjoyment and performance. Outcome was not experimentally controlled, but rather was a quasiexperimental variable, and it did not end up fully crossed with condition across participants. It was therefore impossible to test the effects of outcome on each of the 4 days as either a repeated or a between-subjects factor. However, we did include the outcome from Day 1 of the study as a factor, to control for first performance outcomes.

We found a significant effect of the intergroup contrast, $F(1, 91) = 4.76, p < .05 (d = .23)$. Participants enjoyed the activity more when they were in the intergroup competition condition ($M = 3.96, SD = 0.79$) than when they were in the purely cooperative ($M = 3.78, SD = 0.85$), the purely competitive ($M = 3.87, SD = 0.81$), and the individual goal ($M = 3.68, SD = 0.80$) conditions. In addition, we found a significant effect of the individual goal contrast, $F(1, 91) = 3.94, p < .05 (d = .17)$. Participants enjoyed the purely cooperative and purely competitive conditions more than the individual goal condition. Once again, there was no difference between the purely cooperative and purely competitive conditions. There were no significant effects of the cooperative-competitive context on performance in the repeated-measures design. Table 1 presents the means from Study 2 for task enjoyment and performance.

Discussion

We sought to replicate and extend our findings from Study 1 by conducting between-subjects analyses on the data collected on Day 1 of the study. We again found that intergroup competition led to higher levels of both performance and task enjoyment compared with pure cooperation and pure competition, and we also found this pattern relative to individual goal conditions. Replicating the results from Study 1, we did not find a difference between pure cooperation and pure competition on either performance or task enjoyment. In sum, the results of our between-subjects analyses

⁵ In this study, we produced a more equal distribution of outcomes by slightly lowering the goals in the pure cooperation and individual conditions. Fifty-three percent of participants had a positive outcome in the pure cooperation condition and 47% had a positive outcome in the individual condition.

⁶ This interaction indicated that participants who had a positive outcome made more free throws in the individual goal condition ($M = 3.56, SD = 1.13$) than did participants in the purely cooperative ($M = 3.00, SD = 0.89$) and competitive ($M = 2.92, SD = 1.38$) conditions. However, when participants had a negative outcome, they made fewer baskets in the individual condition ($M = 1.00, SD = 0.82$) than did participants in the purely cooperative ($M = 2.36, SD = 1.21$) and competitive ($M = 1.62, SD = 1.26$) conditions. It is possible that participants in the individual goal condition disengaged from the activity once they felt they would not meet their goal.

⁷ Because of the fact that participants were paired with a different person each day of the study, we were unable to collapse across partners in the repeated measures portion of the design.

were consistent with the results of Study 1, but we also documented that the effects on performance were mediated by enjoyment, suggesting that task enjoyment plays an important role in performance.

We also found that individuals who met their goal enjoyed the activity more than those who did not, regardless of experimental condition. This is consistent with several theoretical perspectives in intrinsic motivation and much previous research (Reeve & Deci, 1996; Reeve et al., 1985, 1987; Tauer & Harackiewicz, 1999). Given that outcome did not interact with condition, we can conclude that intergroup competition has positive effects because of the context created rather than the feedback provided. Consistent with Harackiewicz and Sansone's (1991) process model, we observed two distinct routes to task enjoyment: one via the context and the other as a function of feedback.

We also conducted repeated measures analyses on the data collected over the course of the entire study. These results mirrored our between-subjects findings on task enjoyment, indicating that intergroup competition led to higher enjoyment than the pure cooperation, pure competition, and individual goal conditions. We also found that pure cooperation and pure competition led to higher levels of task enjoyment than the individual goal condition. Taken together, these findings provide strong support for our hypotheses that both pure cooperation and pure competition have positive effects as well as that combining them leads to the highest levels of task enjoyment. We did not find significant differences on performance in our repeated measures analyses, but the pattern of results was similar to that in the between-subjects analysis.

In Study 3, we used a different paradigm that allowed us to examine the potential mechanisms underlying these effects. Specifically, by using a questionnaire format, we could ask campers more questions about their perceptions of cooperative and competitive contexts. The primary goals of this study were to identify process variables that might account for the positive effect of intergroup competition on task enjoyment and to assess intrinsic motivation with a different measure, based on choice.

Study 3

Method

One hundred twenty-eight participants, tested in groups at a basketball camp, heard four scenarios that described the four experimental conditions in Study 2 (individual, pure cooperation, pure competition, and intergroup competition). Each of four groups heard the scenarios in a different order. Participants were asked how much they would look forward to shooting with the other person in the activity; how important it would be to meet their goal (competence valuation); how challenging the situation seemed; and how friendly, cooperative and competitive they would feel in each situation. Participants were then asked to choose which of the four conditions they would find most enjoyable. Finally, participants were asked to describe why they would find that condition more enjoyable.

Results

Process Variables

Interpersonal enthusiasm. We combined the three items hypothesized to reflect cooperation processes (looking forward to playing with others, friendliness, and cooperativeness) into one scale. On this measure, we tested three orthogonal contrasts. First,

we compared the two conditions involving cooperation (pure cooperation and intergroup competition) with the pure competition condition. Second, we tested the pure cooperation condition compared with the intergroup competition condition. Finally, we compared the individual condition with the other three conditions. Participants were more enthusiastic about working with the other person in the two conditions involving cooperation than they were in the pure competition condition, $F(1, 127) = 22.06, p < .001$. There was not a significant difference between the intergroup competition and pure cooperation condition, nor between the individual condition and the other three conditions.

Competitive excitement. We combined the three items hypothesized to reflect competition processes (competence valuation, challenge, and competitiveness), into one scale. On this measure, we tested a different set of three orthogonal contrasts. First, we compared the conditions involving competition (pure competition and intergroup competition) with the pure cooperation condition. Second, we compared the pure competition condition to the intergroup competition condition. Finally, we compared the individual condition to the other three conditions. Competitive excitement was higher in the two conditions involving competition than in the pure cooperation condition, $F(1, 127) = 15.05, p < .001$. In part, this was due to the fact that competitive excitement was higher in the pure competition condition than the intergroup competition condition, $F(1, 127) = 45.78, p < .001$. Compared with the other three conditions, the individual condition produced lower levels of competitive excitement, $F(1, 127) = 49.72, p < .001$. Table 2 presents a summary of means for the two process measures.

Choice Measure

On the choice measure, a chi-square analysis revealed a significant effect of condition, $\chi^2(3, N = 128) = 54.63, p < .001$. Fifty-nine participants (46.1%) chose the intergroup competition condition, 45 (35.1%) chose the pure competition condition, 17 (13.3%) chose the pure cooperation, and only 7 (5.5%) chose the individual condition. These results are summarized in Table 1.

We coded participants' explanations for their choices in terms of competitive themes (concerning competence, performance, and challenge) and interpersonal themes (concerning teamwork and friendship). Responses were quite short, but reliably coded by two independent raters, who agreed on 95% of the responses. The two raters resolved the 5% of cases with differences in their coding through a careful discussion of responses. An example of an interpersonal theme was, "I like to work with other people"; an example of a competitive theme was, "I like 1-on-1 competition because it is competitive and challenging"; an example of a re-

Table 2
Means for Process Variables in Study 3

Variable	Range of scale	Intergroup competition	Pure competition	Pure cooperation	Individual
Competitive excitement	1-5	4.02	4.22	3.76	3.63
Interpersonal enthusiasm	1-5	3.93	3.63	3.99	3.82

sponse with both themes was "I chose that because competition and teamwork are very enjoyable. Having a 2-on-2 would be fun."

Of the participants who chose pure cooperation, 82% mentioned interpersonal themes, 12% mentioned competence-related concerns, and 6% did not mention either. Of the participants who chose the pure competition, 87% mentioned competition themes, 4% mentioned interpersonal themes, and 9% did not mention either. Of the 59 participants who chose the intergroup competition, 90% mentioned interpersonal themes and 41% mentioned competitive themes. Of particular note was the fact that 36% of the participants who chose intergroup competition mentioned *both* interpersonal and competition themes (whereas no one in any of the other three conditions mentioned both themes), providing additional evidence that many participants enjoy both aspects of intergroup competition. Table 3 summarizes these results.

Discussion

Study 3 provided additional evidence that intergroup competition is perceived as more enjoyable than pure cooperation, pure competition, or individualistic conditions, using a different, choice-based measure of intrinsic motivation. The qualitative responses we coded highlighted the presence of cooperative and competitive themes in the intergroup competition condition. Furthermore, participants in competition conditions reported higher levels of competitive excitement, whereas participants in cooperation conditions reported higher levels of interpersonal enthusiasm. However, only participants in intergroup competition were higher on both of these processes. This provides some support for our theoretical predictions regarding the distinct motivational processes engendered by cooperation and competition. In Study 4, we sought to test whether competitive excitement and/or interpersonal enthusiasm mediated the effects of intergroup competition effects on task enjoyment.

Across these three studies, we have found clear and consistent evidence that intergroup competition leads to higher levels of task enjoyment than pure cooperation and pure competition. One alternative explanation for this finding is that participants in intergroup competition enjoy the activity more simply because of the larger number of people involved. This could make for a more enjoyable social situation and be partially responsible for the differences that we have observed on task enjoyment. To test this possibility, we included a pure cooperation condition in Study 4 in which four individuals worked together toward a goal. If the differences we have observed to this point are due to the cooperative-competitive

context, and not to the increased number of people, intergroup competition should still lead to higher levels of task enjoyment than this purely cooperative condition.

Study 4

The primary goals of Study 4 were to examine group size as a potential moderator of cooperation effects and to test whether the motivational process variables identified in Study 3 would mediate the effects of intergroup competition on task enjoyment. We used the same basic paradigm as in the first two behavioral studies, with seven changes. First, we added a pure cooperation condition in which 4 participants worked together to meet a goal. Second, we replaced the individual goal condition with an "individual-do-your-best" control condition. Participants in this condition were not given a specific goal but rather were given the general goal of making as many baskets as they could, a typical control condition in the goal-setting literature (Locke & Latham, 1990). Third, we obtained a pretest measure of enjoyment, which allowed us to control for preexisting individual differences in enjoyment of free-throw shooting. Fourth, we included four brief questions about competence valuation, perceived challenge, and the extent to which participants felt friendly and were looking forward to shooting with another participant at the beginning of the session to explore processes that might account for context effects. Fifth, we conducted a more in-depth assessment of task enjoyment. Participants responded to four items that assessed their enjoyment of the activity immediately after the session was completed. In addition, after the session we asked participants to rate both how cooperative and how competitive the session was. Sixth, participants attempted 10 free throws during the experimental session, as in Study 1. Seventh, we included both boys and girls in Study 3 because a camp for girls had been added.

Method

Participants and Design

Two hundred twenty-eight participants (196 boys and 32 girls ranging in age from 9 to 15 years) from a youth basketball camp volunteered to participate. Camps were either exclusively for boys or for girls, so participants worked with partners and opponents of the same gender. Participants were randomly assigned to one of five experimental conditions: individual-do-your-best, pure cooperation as part of a two-person team (cooperation-2), pure cooperation as part of a four-person team (cooperation-4), pure competition, or intergroup competition. Participants in the cooperation-4

Table 3
Frequency (and Percentage) of Competitive and Interpersonal Themes Obtained From Open-Ended Coding in Study 3

Variable	Range of scale	Intergroup competition	Pure competition	Pure cooperation	Individual
Competitive themes	0–100	24 (41)	39 (87)	2 (12)	6 (84)
Interpersonal themes	0–100	53 (90)	2 (4)	14 (82)	0 (0)
Both competitive and interpersonal themes reported	0–100	21 (36)	0 (0)	0 (0)	0 (0)

Note. Percentages are based on the number of responses coded within each condition, but some responses were coded as having both themes, or neither, and thus the percentages do not sum to 100 within each condition.

condition were given a group goal based on their average scores during pretesting.

In the individual-do-your-best condition, participants shot in the presence of another participant, and each participant was simply told to try to make as many baskets as possible. Because each participant's score was announced at the conclusion of the session, participants in this condition learned their own score as well as the score of the other participant; however, no explicit normative comparison was made between the two participants. For purposes of data analyses, campers who made more shots were placed in the positive outcome condition, and participants who made fewer shots were placed in the negative outcome condition. This resulted in a 5 (individual-do-your-best, pure cooperation-2, pure cooperation-4, competition, intergroup competition) \times 2 (positive vs. negative outcome) between-subjects design.

Procedure

Aside from the exceptions noted earlier, the pure cooperation, pure competition, and intergroup competition conditions were identical to those used in Study 1. Before shooting free throws, participants responded to four items. Two items measured the extent to which participants felt friendly and were looking forward to shooting with the other person or people at their basket (interpersonal enthusiasm), a third item assessed competence valuation ("It is really important to me to meet the goal"), and a fourth item measured perceived challenge ("I think shooting will be challenging").

Pure cooperation-4 condition. A team of four participants (A, B, C, and D) was assigned a goal based on their combined average scores from the pretest, in a manner consistent with the way goals were assigned in the cooperation-2 condition. After each participant had attempted 10 free throws, the experimenter announced, "OK, A, B, C, and D, your team made a total of y baskets out of 40, and did (not) meet your goal."⁸

Individual-do-your-best condition. Participants were told to simply make as many baskets as possible. After the participants had each attempted 10 free throws, the experimenter announced, "OK, A you made a total of y baskets out of 10, and B, you made a total of z baskets out of 10."

Dependent measures. We recorded the number of free throws made out of 10 as our measure of performance. After participants received feedback about their performance, they were asked to respond to a brief questionnaire that contained four statements ("Shooting free throws today was interesting," "I enjoyed shooting free throws today," "I had fun shooting free throws today," "I really enjoyed shooting free throws today"; Cronbach's $\alpha = .90$) on a scale from 1 (*strongly disagree*) to 5 (*strongly agree*) that measured their enjoyment of the free-throw-shooting activity.

Results

Manipulation Checks: Participants' Perceptions of the Experimental Session

On ratings of the competitiveness of the session, we compared the conditions that involved competition (intergroup competition and pure competition) to those conditions that did not (individual-do-your-best, pure cooperation-2, pure cooperation-4). We found a significant effect of competitive context, $F(1, 117) = 21.41, p < .001$, indicating that the competition conditions ($M = 3.67, SD = 0.87$) were perceived as more competitive than the noncompetitive conditions ($M = 2.85, SD = 1.02$). On ratings of the cooperativeness of the session, we compared the conditions that involved cooperation (intergroup competition, pure cooperation-2, and pure cooperation-4) to those conditions that did not (individual-do-your-best, pure competition). We found a significant effect of cooperative context, $F(1, 117) = 9.06, p < .01$, indicating that

cooperation conditions ($M = 3.96, SD = 0.61$) were perceived as more cooperative than the noncooperative conditions ($M = 3.50, SD = 1.04$). In sum, both manipulations were effective, and participants in intergroup competition thought the activity was *both* cooperative and competitive.

Overview of Primary Analyses

Multiple regression was used to test the effects of context and outcome on task enjoyment and performance. We constructed four orthogonal contrasts, and the first tested whether the combination of competition and cooperation (intergroup competition) led to higher levels of performance and enjoyment than the pure competition and pure cooperation conditions (intergroup contrast: intergroup competition [3], pure competition [-1], pure cooperation-2 [-1], pure cooperation-4 [-1], individual-do-your-best [0]). The second tested for differences between the pure competition and the two purely cooperative conditions (pure competition/cooperation contrast: intergroup competition [0], pure competition [-2], cooperation-2 [1], cooperation-4 [1], individual-do-your-best [0]). The third contrast tested for differences between the two purely cooperative conditions (pure cooperation contrast: intergroup competition [0], pure competition [0], pure cooperation-2 [1], pure cooperation-4 [-1], individual-do-your-best [0]). The fourth contrast tested for differences between the individual-do-your-best condition and the four conditions involving competition and/or cooperation (individual-do-your-best contrast: intergroup competition [1], pure competition [1], cooperation-2 [1], cooperation-4 [1], individual-do-your-best [-4]). In addition, we tested the effects of outcome (met goal or won [1], did not meet goal or lost [-1]).⁹ Finally, we included the main effect of gender in all analyses.¹⁰ Thus, our model on enjoyment included 11 terms: 4 orthogonal contrasts to test the effects of context, a contrast to test the effect of outcome, 4 two-way interactions between these variables, the main effect of gender, and our pretest measure of enjoyment. Our model on performance also had 11 terms and included the same terms as the model on enjoyment with one exception: The pretest measure of performance was included instead of the pretest measure of enjoyment.

Primary Analyses

Task enjoyment. We found a significant effect of the intergroup contrast, $F(1, 107) = 5.38, p < .05 (d = .49)$. Replicating

⁸ For purposes of data analyses, we collapsed across all four members of a team in the cooperation-4 condition.

⁹ In this study, 50% of participants had a positive outcome in the pure cooperation-2 condition, 58% of participants had a positive outcome in the pure cooperation-4 condition, and 50% had a positive outcome in the individual-do-your-best condition.

¹⁰ We tested all possible two-way and three-way interactions between gender, our contrasts, and outcome. We did not find any main effects or interactions involving gender on either of our measures of enjoyment. Of course, due to the relatively small sample of girls, statistical power to detect gender effects is low. We did find a main effect of gender on performance, indicating that boys outperformed girls, but this effect was not significant once we controlled for pretest performance. Nonetheless, we included the main effect of gender in all subsequent analyses.

our results from the first two studies, participants in the intergroup competition condition ($M = 4.08$, $SD = 0.71$) enjoyed the activity more than those participants in the pure cooperation-2 ($M = 3.70$, $SD = 0.69$), the pure cooperation-4 ($M = 3.65$, $SD = 0.56$), and the pure competition ($M = 3.66$, $SD = 1.18$) conditions. There was no difference between participants in purely cooperative and competitive conditions, nor was there a difference between participants in the two purely cooperative conditions. The individual-do-your-best condition ($M = 3.63$, $SD = 0.90$) did not differ from the other four experimental conditions. We also observed a significant effect of outcome, $F(1, 107) = 26.54$, $p < .001$ ($d = .87$). Participants who met their goal ($M = 4.11$, $SD = 0.67$) enjoyed the activity more than those who did not ($M = 3.38$, $SD = 0.86$). No other effects were significant.

Performance. We found a significant effect of pretest performance, $F(1, 107) = 84.85$, $p < .01$, such that individuals who performed well during the pretest performed well during the experimental session. As would be expected, there was a significant effect of outcome on performance, $F(1, 107) = 65.22$, $p < .01$ ($d = .75$), such that participants who met their goal ($M = 4.83$, $SD = 1.75$) made more free throws than those who did not ($M = 3.05$, $SD = 1.55$). In addition, we observed an interaction between the individual-do-your-best condition and outcome, $F(1, 107) = 6.01$, $p < .05$. Those individuals who met their goal in the individual condition performed similarly to participants in the other four conditions; however, those in the individual condition who did not meet their goal performed quite poorly compared with participants in the other conditions. No other effects were significant. Table 1 presents the means from Study 4 for task enjoyment and performance.

Mediation Analysis of Task Enjoyment

Effects on process measures. The two interpersonal measures were significantly correlated, $r(117) = .47$, $p < .001$, and combined. On this measure of interpersonal enthusiasm, we compared conditions that involved cooperation (intergroup competition, cooperation-2, and cooperation-4) to the pure competition condition. We found a significant effect that indicated individuals in cooperation conditions had higher levels of interpersonal enthusiasm ($M = 4.25$, $SD = 0.40$) than participants in pure competition ($M = 3.90$, $SD = 0.72$), $F(1, 117) = 7.85$, $p < .01$.

Competence valuation and perceived challenge were not significantly correlated in this study, $r(117) = .05$, $p > .60$, and so we analyzed these measures separately. On each measure, we com-

pared conditions that involved competition (intergroup competition and pure competition) with conditions that involved cooperation (cooperation-2 and cooperation-4). Although not significant, we found a trend that indicated individuals in competition conditions ($M = 4.31$, $SD = 0.66$) placed more emphasis on meeting their goal than participants in cooperation conditions ($M = 4.11$, $SD = 0.52$), $F(1, 117) = 2.34$, $p < .15$. Participants in competition conditions ($M = 3.51$, $SD = 0.87$) perceived higher levels of challenge than those in cooperation conditions ($M = 3.21$, $SD = 0.50$), $F(1, 117) = 4.02$, $p < .05$. The pattern of these results replicates that found in Study 3 and provides support for our predictions that cooperation increases interpersonal enthusiasm, competition increases competence valuation and perceptions of challenge, and intergroup competition leads to higher levels of all three variables. Table 4 presents the intercorrelations for all measures collected in this study.

Test of mediation. We added interpersonal enthusiasm, competence valuation, perceived challenge, and two-way interactions between these variables and our contrasts to test for mediation of the intergroup competition effect on task enjoyment. There was not a significant effect of perceived challenge or competence valuation on task enjoyment, and these terms were subsequently trimmed from the model. We found a significant effect of interpersonal enthusiasm on task enjoyment, $F(1, 105) = 4.33$, $p < .05$ ($\beta = .19$). In addition, we found a significant interaction between interpersonal enthusiasm and intergroup competition, $F(1, 105) = 4.05$, $p < .05$ ($\beta = .18$), indicating that the effect of interpersonal enthusiasm was particularly strong for individuals in the intergroup competition condition ($\beta = .37$) compared with other conditions ($\beta = .00$). Finally, the intergroup competition effect on enjoyment was no longer significant, $F(1, 105) = 1.75$, $p > .15$ (beta reduced from .19 to .12), satisfying the final requirement for partial mediation (Judd & Kenny, 1981).

Meta-Analysis of Results Across Studies 1, 2, and 4

Although the experimental designs varied across the three behavioral studies reported thus far, each study included three critical conditions: intergroup competition, pure competition, and pure cooperation. The critical test of the intergroup competition versus the other two conditions was reported in each study, but the specific contrast tested depended on the other conditions in the design. In the present analysis, we computed a contrast to compare the effects of intergroup competition versus pure cooperation and pure competition across the three studies. Only the participants in

Table 4
Zero-Order Correlations for Process Variables, Manipulation Checks, and Enjoyment in Study 3

Variable	1	2	3	4	5	6	7
1. Interpersonal enthusiasm	—						
2. Competence valuation	.25*	—					
3. Perceived challenge	.02	.05	—				
4. Competitiveness (postsession)	.05	.09	.16	—			
5. Cooperativeness (presession)	.44*	.21*	.01	.18	—		
6. Performance	-.09	.13	.05	.06	.20*	—	
7. Task enjoyment	.21*	.10	.12	.12	.39*	.46*	—

* $p < .05$.

these three conditions were included in statistical analyses. Results were combined meta-analytically using Stouffer's method of adding z s (Rosenthal, 1978; Stouffer, Suchman, DeVinney, Star, & Williams, 1949). In addition, we computed a weighted effect size for each of these effects. On enjoyment, there was a positive effect of intergroup competition, compared with pure cooperation and pure competition ($z = 3.41, p < .001$, weighted $d = .59$). On performance, there was also a positive effect of intergroup competition, compared with pure cooperation and pure competition ($z = 2.68, p < .01$, weighted $d = .43$). Thus, when considered across studies, the positive effect of intergroup competition on task enjoyment and performance was highly significant.

Discussion

In Study 4, we sought to clarify the results obtained in Studies 1 and 2 by adding a purely cooperative condition that involved 4 participants. Intergroup competition led to higher levels of task enjoyment than the pure cooperation conditions (with both 2 and 4 participants) and the pure competition condition. Because we created a cooperation condition with an equivalent number of people as the intergroup competition, we can rule out the possibility that intergroup competition makes an activity more enjoyable only because of the increased number of people taking part in the activity.

We also replicated our previous feedback results. Participants who met their goal enjoyed the activity more than participants who did not, and once again, this was true across experimental conditions. However, we did not observe significant performance differences in Study 4. This may be due in part to the fact that there is a sizeable degree of variability in performance on our experimental task, and thus, we would expect performance effects to be less reliable than those on task enjoyment.

Our analyses of participants' perceptions of the experimental session, collected at the end of the session, provide insight into the nature of intergroup competition. Participants in conditions that involved cooperation reported a greater sense of cooperativeness, and participants in conditions that involved competition reported a greater sense of competitiveness. Thus, our manipulations were successful and led participants in intergroup competition to experience high levels of both cooperation and competition throughout the session, whereas participants in pure cooperation or pure competition felt only high levels of cooperativeness or competitiveness, respectively.

In turn, our measures of interpersonal enthusiasm, competence valuation, and perceived challenge, measured before participants began the task, illustrate the different motivational processes engendered by competition and cooperation. Although it was difficult to collect detailed, online process measures in our camp paradigm, because of logistics and time constraints, these brief items did reveal some effects consistent with our hypotheses. Individuals in cooperative conditions were more likely to feel friendly and look forward to shooting with others. Individuals in competitive conditions perceived more challenge and demonstrated a slight tendency to value competence more than participants in cooperative conditions. Moreover, when we tested mediation, interpersonal enthusiasm proved to be a significant partial mediator of the effect of intergroup competition on enjoyment, and the benefits of interpersonal enthusiasm were especially strong in

the intergroup competition condition. Apparently, fostering a sense of unity within a competitive team is particularly helpful in promoting enjoyment.

Although we predicted that competence valuation would also mediate enjoyment effects, it is possible that competence valuation did not play as large a role in these studies because of the social nature of the recreational activity. In previous laboratory studies, competence valuation has been shown to mediate competition effects (Reeve & Deci, 1996; Tauer & Harackiewicz, 1999), but those were controlled studies in which interpersonal interaction was minimized. In the field studies reported here, participants were less restricted in their interactions, and this may partially explain why interpersonal variables were more powerful predictors of enjoyment in Study 4.

General Discussion

We conducted four field experiments that investigated the effects of pure cooperation, pure competition, and intergroup competition on intrinsic motivation and performance in a sport setting. We used free-throw shooting, an activity high in means independence, and we structured both competition and cooperation appropriately (Stanne et al., 1999). Accordingly, the rules of the activity were clear, a challenging goal was provided, pressure was not placed on participants to meet their goal (whether it was to outperform others or to attain a particular score), and participants were provided with feedback regarding their performance throughout the activity. We obtained strong evidence that intergroup competition leads individuals to enjoy an activity more than pure cooperation and pure competition. We observed this effect across three behavioral studies as well as in a questionnaire study, in both between-subjects and within-subject designs. We also observed positive effects of intergroup competition on performance, although these results were not quite as consistent as the effects on task enjoyment. Meta-analyses indicated that these effects on enjoyment and performance were robust and highly significant across the three behavioral studies. In sum, intergroup competition led to higher levels of task enjoyment on all measures and to comparable or higher levels of performance, relative to pure cooperation, pure competition, and a number of additional control conditions.

Our findings are consistent with Slavin's (1983a, 1983b, 1996) theorizing about the benefits of cooperation being greatest when presented in conjunction with an external contingency (e.g., rewards, competition). In fact, Slavin (1996) argued that in the absence of some external contingency, students in cooperative groups will perform similarly to students working individually in a traditional classroom setting. Johnson and Johnson (1990) also reported increased achievement in cooperative learning situations in the presence of a reward contingency compared with common-goal control conditions. Providing an extra incentive such as competition may lead students to place more emphasis on performing at a high level. In turn, elevated competence valuation may lead to higher levels of motivation and performance (Harackiewicz, 1979; Harackiewicz & Sansone, 1991; Sansone & Harackiewicz, 1996; Slavin, 1996).

Importantly, in comparisons of pure cooperation and pure competition, we found no significant differences on *any* measure of task enjoyment or performance in any of the three studies where

participants shot free throws. Free-throw shooting is an activity high in means independence, and thus, this finding is consistent with Stanne et al.'s (1999) conclusions regarding the effects of cooperation and competition on motor performance. Previous research has not compared the effects of pure cooperation and pure competition on intrinsic motivation, and our results indicate that the positive features of each context may balance each other, leading to similar levels of task enjoyment.

We also examined a second factor responsible for differences in task enjoyment: outcome feedback. In all three studies, we observed that participants who met their goal enjoyed the activity more than those who did not, although the difference was not significant in Study 1. Although this was not a surprising finding, it is noteworthy that these positive effects were constant across varying conditions of cooperation and competition. One possibility is that because we structured both competition and cooperation appropriately (Stanne et al., 1999), feedback functioned similarly in these different contexts. In other words, participants in our competition conditions experienced no more performance pressure than did those in cooperation conditions. We would expect negative feedback to have more detrimental effects whenever individuals experience performance pressure, whether it is in competition or cooperation.

Finally, in Studies 3 and 4, we assessed the effects of our manipulations on variables related to different motivational processes hypothesized to mediate the effects of competition and cooperation. Using different paradigms in the two studies, we obtained consistent evidence that cooperation caused participants to approach the activity with more interpersonal enthusiasm, competition led individuals to value competence and perceive greater challenge, and intergroup competition led participants to do both. Although we found the predicted effects of competition on competence valuation and challenge, we did not find that these variables mediated effects on enjoyment in Study 4. Interpersonal enthusiasm, however, did mediate the intergroup competition effect on enjoyment, indicating the powerful role social dynamics play in fostering enjoyment of competitive and cooperative situations. Considered together, the results of these two studies provide additional evidence for the benefits of intergroup competition, and our process analyses represent first steps toward identifying the motivational and interpersonal processes initiated by competition and cooperation. In addition, the results of Study 4 provide evidence that interpersonal enthusiasm partially mediates the effects of intergroup competition.

These four studies comprise the first systematic examination of the effects of pure cooperation, pure competition, and intergroup competition on intrinsic motivation and performance. We attempted to create an unbiased test of these different goal contexts and found strong and consistent evidence that intergroup competition leads to more positive outcomes than pure cooperation and pure competition.

Finally, we hope that rather than treating cooperation and competition as polar opposites, researchers will use these studies as a springboard to examine the unique and joint effects of cooperation and competition on motivation and performance. Lepper and Henderlong (2000) have argued that researchers have too often attempted to polarize constructs that may be relatively uncorrelated (e.g., intrinsic motivation vs. extrinsic motivation; performance goals vs. mastery goals; cf. Hidi & Harackiewicz, 2000).

We hope that the current research will discourage researchers from treating cooperation and competition as an "either/or" proposition but rather encourage them to examine the benefits of both cooperation and competition.

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