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# Elements of the Competitive Situation That Affect Intrinsic Motivation

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*Effects on intrinsic motivation of three elements of the competitive situation (viz., competitive set, competitive outcome, and interpersonal context) were explored. Participants solved puzzles with a same-sex confederate under one of five experimental inductions, and intrinsic motivation was assessed by subsequent free-choice behavior and self-reports of interest/enjoyment. As predicted by cognitive evaluation theory, competitive outcome (viz., winning vs. losing) and interpersonal context (viz., pressured vs. nonpressured) affected intrinsic motivation. Path analyses showed that (a) winning (relative to losing) increased intrinsic motivation by enhancing perceived competence and (b) a pressured (relative to nonpressured) interpersonal context decreased intrinsic motivation by diminishing perceived self-determination. Further, competence valuation—the importance one places on doing well—related positively to perceived competence, perceived self-determination, and intrinsic motivation.*

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**D**uring the last two decades, numerous psychologists have explored the impact of social environments on intrinsic motivation (see Deci & Ryan, 1985; Lepper & Greene, 1978). One theoretical guide for much of that work has been cognitive evaluation theory (Deci & Ryan, 1985).

According to this theory, intrinsic motivation is based in the organismic needs for competence and self-determination. Any event that affects one's perceived competence or perceived self-determination will thus affect intrinsic motivation. External events influence perceived competence via their informational aspect and influence perceived self-determination via their controlling aspect. The informational aspect provides either positive or negative effectance-relevant information. When positive, it enhances intrinsic motivation, and when negative, it diminishes intrinsic motivation. The controlling aspect diminishes people's self-determination by pressuring them to think, feel, or believe in particular

ways. When experienced as controlling, an event promotes an external perceived locus of causality (deCharms, 1968; Heider, 1958) and undermines intrinsic motivation. An event that is not experienced as controlling is referred to as noncontrolling, and according to the theory, it is only when an event is noncontrolling that its informational aspect will have an impact on intrinsic motivation.

Early results consistent with cognitive evaluation theory revealed that external events such as monetary rewards (Deci, 1971), prizes (Harackiewicz, 1979), deadlines (Amabile, DeJong, & Lepper, 1976), and surveillance (Lepper & Greene, 1975) undermined intrinsic motivation, presumably because they were experienced as controlling. Such events are frequently used in everyday life as a means of pressuring people to behave in specific ways, so people come to experience them as controlling. In contrast, the event of positive feedback was found to enhance intrinsic motivation, presumably because its positive informational aspect enhanced perceived competence (e.g., Deci, 1971). However, the positive informational aspect has been found to promote intrinsic motivation only when the context in which it is delivered is noncontrolling (Fisher, 1978; Ryan, 1982).

A study by Deci, Betley, Kahle, Abrams, and Porac (1981) explored the effects of competition versus no competition on intrinsic motivation. Subjects and confederates worked on a series of interesting puzzles after

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having been instructed either to "try to beat the other person" (a competitive set) or to "do their best" (a noncompetitive set). In both conditions, subjects were allowed to finish the puzzles faster than the confederates. Those given the competitive set displayed significantly less subsequent free-choice-period puzzle playing than participants given the no-competition set. Apparently, the subjects experienced the competition as controlling rather than informational, thus leading to decreased intrinsic motivation. A follow-up study with children (Vallerand, Gauvin, & Halliwell, 1986) replicated the findings of Deci et al., and Amabile (1982) found that competing for prizes decreased children's artistic creativity, which is positively related to intrinsic motivation.

Some studies, however, have not found that competition undermines intrinsic motivation; instead, they have found that competition can, for some people under some circumstances, facilitate intrinsic motivation (e.g., Epstein & Harackiewicz, 1992; Weinberg & Ragan, 1979). Because the various studies have used substantially different procedures and measures, between-study comparisons are difficult. Nonetheless, the disparate results do suggest that exploring the effects of specific elements of the competitive situation on intrinsic motivation would be a fruitful means of clarifying the varied effects of competition.

The present study differentiated distinct elements of a competitive situation and explored their effects on intrinsic motivation. These elements were (a) competitive set—competition versus no competition, (b) competitive outcome—win versus lose, and (c) interpersonal context—controlling versus noncontrolling.

#### *Elements of the Competitive Situation*

*Competitive outcome.* In the Deci et al. (1981) experiment, subjects in the competition condition won all three of the experimental trials and subjects in the no-competition condition completed all three trials more quickly than the experimental accomplice. Thus the competence-relevant information subjects garnered from the situation was positive. In real competitions, of course, the feedback one receives is not necessarily positive, for one can lose or do poorly rather than win or do well. According to cognitive evaluation theory, the competitive outcome of winning versus losing should also affect intrinsic motivation by affecting perceived competence, assuming the context is relatively noncontrolling.

Several studies (McAuley & Tammen, 1989; Olson, 1985; Reeve, Cole, & Olson, 1986; Reeve, Olson, & Cole, 1985, 1987; Vallerand & Reid, 1984; Weinberg & Ragan, 1979) have, in fact, found that competitive winners reported greater perceived competence and displayed more free-choice-period behavior than did competitive

losers. Vallerand and Reid (1984) used path analysis to show that the effect of competitive outcome on intrinsic motivation was mediated by perceived competence. The present study also included conditions in which subjects either won or lost a competition. We predicted (following Vallerand & Reid, 1984) that, among competitors, intrinsic motivation would be greater for winners than for losers, because of the impact of competitive outcome on perceived competence.

*Interpersonal context.* According to cognitive evaluation theory, the interpersonal context within which any event is administered can have a substantial impact on how the event is experienced and thus on how it affects intrinsic motivation. Some contexts are highly pressuring, and any event administered within such contexts is likely to have a negative effect on intrinsic motivation, whereas others are noncontrolling, so that events administered within them are less likely to have a negative effect on intrinsic motivation.

A study by Ryan (1982), for example, revealed that when positive feedback was administered controllingly (i.e., "Good, you did just as you *should*"), it decreased intrinsic motivation relative to when it was administered informationally (i.e., "Good, you did well at that"). In a similar vein, a study by Ryan, Mims, and Koestner (1983) indicated that when performance-contingent rewards were administered controllingly (i.e., for "performing as you *should*"), the rewards decreased intrinsic motivation relative to when they were given informationally (i.e., for "doing well").

We now suggest that winning a competition could also be experienced either as controlling (if the interpersonal context emphasizes the importance of beating one's opponent) or as positively informational (if the interpersonal context does not pressure one to win). To test this reasoning, the present study included two competitive conditions in which subjects won the competition. In one condition, the experimenter created a relatively noncontrolling puzzle engagement by instructing subjects simply to try to solve their puzzles faster than the other person, whereas in the other condition, the experimenter created a relatively controlling engagement by pressuring subjects to focus their full attention on winning. We expected that winning in the latter condition, referred to as the pressure-to-win condition, would be experienced as controlling and thus would undermine intrinsic motivation, whereas winning in the former condition would be experienced as positively informational and thus would facilitate intrinsic motivation.

*Competition and perceived challenge.* Deci (1975) suggested that to be intrinsically motivating, activities must be optimally challenging, and Csikszentmihalyi (1990)

TABLE 1: Contrast Codes for Competitive Set, Competitive Outcome, and Interpersonal Context

	No Competition		Competition		
	No Feedback	No Feedback	Lose	Win	Pressure to Win
Competition-set contrast	-1	1	0	0	0
Competitive-outcome contrast	0	0	-1	1	0
Interpersonal-context (i.e., pressure-to-win) contrast	0	0	0	-1	1

proposed that "One simple way to find challenges is to enter a competitive situation" (p. 50). If that were so, one would predict that competition itself (independent of the outcome) might enhance intrinsic motivation, with perceived challenge mediating the effect. Accordingly, we assessed perceived challenge to explore this alternative prediction.

*Competence valuation.* Harackiewicz and her colleagues (e.g., Epstein & Harackiewicz, 1992; Harackiewicz, Manderlink, & Sansone, 1992; Harackiewicz, Sansone, & Manderlink, 1985) found that competence valuation—that is, placing importance on doing well—generates in competitors an affective involvement in the task, which enhances the task's personal meaningfulness. Therefore, we assessed competence valuation and tested to see whether competition enhanced competence valuation. In addition, competence valuation has been theorized to increase one's responsiveness to performance feedback (Epstein & Harackiewicz, 1992). Accordingly, we tested to see whether competence valuation interacts with competitive outcome to affect intrinsic motivation. Specifically, one might expect that competence valuation would exaggerate the effects of competitive outcome on intrinsic motivation such that, compared to competitors low in competence valuation, competitors high in competence valuation would be more intrinsically motivated when they won and less intrinsically motivated when they lost.

### The Present Study

To recapitulate, the following hypotheses were tested:

1. The competitive set will decrease intrinsic motivation by decreasing participants' perceptions of self-determination.
2. The competitive outcome of winning (versus losing) will increase intrinsic motivation by facilitating competence. Further, competence valuation will interact with competitive outcome in affecting intrinsic motivation.
3. A pressuring interpersonal context will decrease intrinsic motivation through its detrimental effect on participants' perceptions of self-determination.

Table 1 lists the five experimental conditions necessary to test these predictions and shows the contrast codes associated with each individual element of compe-

tion. The five experimental conditions were (a) no competition with no feedback, (b) competition with no feedback, (c) losing a competition, (d) winning a competition in a nonpressured context, and (e) winning a competition in a pressured context. The first contrast compared the no-competition, no-feedback condition to the competition, no-feedback condition to test whether the competitive set itself (with no feedback available) has a significant effect on intrinsic motivation. The second contrast compared the competition-win condition with the competition-lose condition to test for the effects of competitive outcome on intrinsic motivation within a relatively noncontrolling interpersonal context. The third contrast compared the two competition conditions in which subjects won—the first involving a noncontrolling interpersonal context and the second involving a controlling context—to test whether the interpersonal context moderates the effect of winning the competition.

### METHODS

#### Participants

A total of 100 undergraduates (52 females and 48 males) from introductory psychology courses at a private university volunteered to participate in partial fulfillment of a course requirement.

#### Procedure

Subjects arrived at an experimental waiting room and met a same-sex confederate, posing as a second participant. A same-sex experimenter welcomed them and took them into the experimental room where they were seated at a table facing each other. On the table were two Happy Cube puzzles, nine three-dimensional wooden-block configurations that could be reproduced with the Happy Cubes, and a selection of popular magazines that served as an alternative activity during a later free-choice period. The experimenter announced that there would be a series of six puzzles to solve. Two were practice puzzles (3 min were allotted to solve each), and four were the performance puzzles (4 min were allowed to solve each).

The confederate never completed the first practice solution in the 3 min allotted but always solved the

second solution within 1 min. This guaranteed that the subject always completed the first practice configuration before the confederate did and that the confederate always solved the second practice configuration before the subject did. This matching of outcomes was done to convey the impression that the two people were roughly of equal ability.

Following the practice session, the experimenter explained that because it was important that the two participants work independently during the performance session, one puzzle solver would remain in the experimental room, and the other would relocate next door. The experimenter showed the participants a pair of room assignment cards and asked the participant to select one. Both cards had the experimental room number on them, but the confederate feigned drawing the next-door room assignment. After taking 20 s to seat the confederate in the adjoining room, the experimenter returned to the experimental room. The experimenter could see the confederate through the large window and could communicate over an intercom, although the subject was positioned so that he or she could not see the confederate.

Experimental inductions for the five conditions began after the pair had been separated. In the one no-competition condition, the experimenter asked participants to work individually, "just doing your individual best." In each of the four competitive conditions, the experimenter asked participants to try "to outperform the other by solving your puzzles faster than the other person." In one competitive condition (the pressure-to-win condition), the experimenter added that "it doesn't matter how fast or slow you solve each puzzle, and it doesn't matter whether you figure out how the puzzle works. The only thing that matters is which of you wins the competition. So, focus all of your attention on being the winner." Further, at the beginning of each separate trial, the experimenter reminded the participants either to "do your individual best" (the no-competition condition), "solve your puzzle faster than the other person" (the three competition conditions), or "focus your attention fully on being the winner" (the pressure-to-win condition).

In two conditions (the no-competition and the competition-no-feedback conditions), the experimenter provided no comparison feedback after the trials. The experimenter simply allowed the allotted 4 min to elapse on each trial and then invited the pair to begin the next trial. In three conditions (the win, lose, and pressure-to-win conditions), the experimenter did provide (bogus) performance feedback to the participants by announcing the competitive outcome at the end of each 4-min period. For the lose manipulation, the experimenter

announced at the end of each separate trial that the confederate had won (e.g., "Pat, you won that trial") and that the subject had lost (e.g., "Chris, you lost that trial"). For the two win conditions (the nonpressuring-win and the pressuring-win conditions), the experimenter announced that the subject had won each of the four trials.

After the four performance trials, the experimenter said that the puzzle-solving phase of the experiment was over and that he or she would like to interview each participant. The experimenter always selected the confederate for the interview first, thereby leaving the subject alone in the experimental room for a 5-min free-choice interval during which an observer recorded the amount of behavior in each of two categories of free-choice activity (viz., playing with previously encountered configurations and playing with new configurations). The experimenter then reentered the experimental room, administered the postexperimental questionnaire, and debriefed the subject.

#### *Experimental Task*

The experimental task was a spatial-relations puzzle called Happy Cubes. Past studies with college students solving the Happy Cubes puzzle indicate that participants find it to be a highly interesting activity and persist at it during free-choice periods (e.g., Reeve et al., 1986, 1985, 1987). Participants were provided scaled wooden-block models of the six configurations they were asked to reproduce and three others that were available as new puzzle-solving opportunities during the subsequent free-choice period.

#### *Questionnaire Measures*

Participants completed three questionnaires during the course of the experiment.

The preperformance questionnaire, which was given after the induction but before the four performance trials, included 1 item (patterned after Harackiewicz et al., 1985, and scored on an 11-point scale) that assessed competence valuation ("How important is it to you that you perform well on these puzzles?"), and 11 filler items.

The postperformance questionnaire, which was given after the four trials but before the free-choice period, included 3 items (scored on 11-point scales) that served as manipulation checks ("How competitive did the atmosphere feel during the puzzle-solving?"; "Do you appraise your performance to be a success, a failure, or something in between?"; and "How would you compare your performance to that of the other participant?"). The postperformance questionnaire also included 20 items (scored on 7-point scales) that measured intrinsic motivation and potential mediating constructs. The fol-

lowing were assessed: interest/enjoyment, which constituted the self-report measure of intrinsic motivation (8 items, e.g., "How interesting did you find the puzzle?";  $\alpha = .94$ ); perceived self-determination (2 items, e.g., "How much freedom did you feel?"),  $r(100) = .37, p < .01$ ; perceived competence (3 items, e.g., "How competent did you feel?";  $\alpha = .94$ ); perceived challenge (2 items, e.g., "How much challenge did you feel from the other person?"),  $r(100) = .48, p < .01$ ; and 3 filler items.

The postexperimental questionnaire, containing 10 items (Olson, 1985), was given to each participant who played with the puzzle for any amount of time during the free-choice interval. It asked the reasons why the subject played with the puzzle. (Of the 100 participants, 59 played with the puzzle.) A principal components factor analysis with varimax rotation was performed on the 10 items. The resulting factors (with their proportion of variance accounted for, alpha coefficients, and number of items with factor loadings  $> .50$ ) were as follows: Intrinsic Interest (34%, 3 items,  $\alpha = .91$ ); Frustration (25%, 4 items,  $\alpha = .78$ ); and Passing Time (11%, 3 items,  $\alpha = .37$ ). Because the internal consistency of the third factor was unacceptably low, those data were not analyzed. The Intrinsic Interest and Frustration scores were then computed by summing each item score, weighted by its factor loading.

#### *Behavioral Measure of Intrinsic Motivation*

The behavioral measure of intrinsic motivation was adapted from Deci's (1971) procedure of assessing the number of seconds a participant spends playing with the puzzle during a 5-min free-choice period. This free-choice behavioral measure is widely used, although recent research has shown that participants sometimes initiate and persist at free-choice puzzle playing for reasons unrelated to intrinsic motivation—reasons such as ego-involvement (Ryan, Koestner, & Deci, 1991), frustration (Pelletier, 1989), or the Zeigarnik effect (Reeve et al., 1986). To ameliorate some of the interpretation ambiguities of the traditional free-choice measure, we partitioned participants' free-choice puzzle playing into two categories: (a) puzzle playing with the previously encountered configurations and (b) puzzle playing with new configurations. The six configurations used in the practice and performance phases of the puzzle solving were kept on one side of the table, and the other three, which represented new forms, were kept on the opposite side of the table; hence, the observer's task of distinguishing between "playing with previous configurations" and "playing with new configurations" was easy.<sup>1</sup> Playing with new configurations was used as the measure of intrinsic motivation, because intrinsic motivation is conceptualized as a willingness to seek out and master new challenges (e.g., Deci & Ryan, 1985). Wild, Enzle, and

Hawkins (1992) used essentially this same procedure in their study of intrinsic motivation for piano playing.

To validate the two behavioral measures, each category of free-choice puzzle-playing behavior was correlated with the self-report measure of intrinsic motivation and with subjects' reported reasons for their puzzle playing. The self-report measure of intrinsic motivation correlated significantly with playing with new configurations,  $r(100) = .30, p < .01$ , but not with playing with the previous configurations. From the postexperimental questionnaire, Intrinsic Interest (Factor 1) correlated significantly with playing with new configurations,  $r(59) = .32, p < .05$ , but not with playing with previous configurations. In contrast, Frustration (Factor 2) correlated positively with playing with previous configurations,  $r(59) = .36, p < .01$ , and negatively with playing with new configurations,  $r(59) = -.28, p < .05$ .

## RESULTS

### *Manipulation Checks*

The study included checks for the competitive set and competitive outcome manipulations. For the competition manipulation, the group of 80 participants in the four competition conditions ( $M = 5.8$ ) perceived the atmosphere to be significantly more competitive than did the participants in the no-competition condition ( $M = 4.5$ ),  $t(98) = 2.10, p < .05$ . For the outcome manipulation, winners rated their performance as more of a success than did losers ( $M_s = 8.7$  and  $3.4$ , respectively),  $t(38) = 8.02, p < .01$ , and as better than the confederate's ( $M_s = 8.4$  and  $2.0$ , respectively),  $t(38) = 13.15, p < .01$ .

### *Preperformance Effects*

The competence valuation data were collected before the competitive outcome manipulation, so the tests for preperformance effects compared only noncompetitors, competitors in a nonpressured context, and competitors in a pressured context. Overall, participants in the four competitive conditions did report greater competence valuation than did participants in the single no-competition condition ( $M_s = 5.0$  and  $3.9$ , respectively),  $t(98) = 2.00, p < .05$ . Specific effects on competence valuation, however, were nonsignificant for both the competition-set contrast ( $M_s = 3.9$  and  $4.4$ , respectively),  $t(38) = 0.79, ns$ , and the interpersonal-context contrast ( $M_s = 5.6$  and  $4.8$ , respectively),  $t(38) = 1.09, ns$ . Overall, competition increased competence valuation; however, because the competition-set and interpersonal-context contrasts were not significant, analyses involving competence valuation were limited to its predictive effect on intrinsic motivation (as reported in the process analyses).

TABLE 2: Means for Dependent Variables by Experimental Condition

Variable	No Competition		Competition		
	No Feedback	No Feedback	Lose	Win	Pressure to Win
Perceived self-determination <sup>a</sup>	4.4	3.7	4.0	5.0	3.7
Perceived competence <sup>a</sup>	5.3	4.8	4.1	5.5	5.6
Perceived challenge <sup>a</sup>	3.3	3.3	4.8	4.2	4.2
Interest/enjoyment <sup>a</sup>	5.4	4.8	4.7	5.6	5.4
Playing with new configurations <sup>b</sup>	86.1	85.3	37.0	144.0	39.5
Playing with previous configurations <sup>b</sup>	35.2	31.8	112.4	43.0	57.4
Intrinsic motivation, composite measure (z score)	.19	-.21	-.72	.95	-.19

NOTE:  $n = 20$  per cell.

a. Possible range for the self-report variables is 1 to 7; higher numbers indicate greater degree of the variable.

b. Possible range for the behavioral variables is 0 to 300 s.

### Postperformance Effects

Table 2 shows the means for perceived self-determination, perceived competence, and perceived challenge by experimental condition. For each of these measures, an initial one-way ANOVA was performed; any significant effect was followed up with Newman-Keuls a posteriori comparisons to test for specific nonorthogonal group differences.

Perceived self-determination differed significantly across the experimental groups,  $F(4, 95) = 3.39, p < .02$  ( $MSE = 1.76$ ). For interpersonal context, competitors pressured to win reported less self-determination than those not pressured ( $p < .05$ ). For competitive outcome, winners reported more self-determination than did losers ( $p < .05$ ). The effect for competitive set was not significant.

Perceived competence also differed significantly across the experimental groups,  $F(4, 95) = 4.38, p < .01$  ( $MSE = 1.59$ ). For competitive outcome, winners reported greater perceived competence than did losers ( $p < .05$ ). Neither competitive set nor interpersonal context significantly affected perceived competence.

Finally, perceived challenge also differed significantly across the experimental conditions,  $F(4, 95) = 4.66, p < .01$  ( $MSE = 2.69$ ). Competitive set, competitive outcome, and interpersonal context did not significantly affect perceived challenge, however. An inspection of the means reveals that conditions with feedback—that is, conditions in which competitors found out whether they won or lost—seem to be different from those without feedback. Therefore, we compared the two no-feedback conditions to the three feedback conditions, and the results were significant ( $p < .01$ ). Because perceived challenge was not affected by the specified predictor variables, it was not used in the process analyses.

### Intrinsic Motivational Outcomes

Table 2 also shows the means for interest/enjoyment, the two categories of free-choice behavior, and a com-

posite measure of intrinsic motivation (discussed below). For interest/enjoyment, the experimental groups did not differ significantly from one another,  $F(4, 95) = 1.63, ns$ , although winners tended to report higher interest/enjoyment than did losers. For the behavioral measure of intrinsic motivation (viz., playing with new configurations), the experimental groups did differ significantly from one another,  $F(4, 95) = 3.13, p < .02$  ( $MSE = 10,776$ ). For competitive outcome, winners played with the new puzzle forms more than did losers ( $p < .05$ ). For interpersonal context, competitors not pressured to win played with the new puzzle forms more than did competitors pressured to win ( $p < .05$ ). Competitive set did not have a significant effect on playing with new forms. For playing with the previously encountered configurations, the experimental groups did not differ significantly from one another,  $F(4, 95) = 2.30, p < .07$ , although losers tended to play with the previously encountered puzzles more than did winners.

In addition, we constructed a single intrinsic-motivation outcome measure by standardizing and then averaging the self-report and behavioral measures,  $r(100) = .30, p < .01$ . On this composite outcome measure, the experimental groups differed significantly from one another,  $F(4, 95) = 2.80, p < .03$  ( $MSE = 2.41$ ). Interpersonal context affected intrinsic motivation such that competitors not pressured to win were more intrinsically motivated than competitors pressured to win ( $p < .05$ ). For competitive outcome, winners were more intrinsically motivated than losers ( $p < .05$ ). Competitive set did not have a significant effect on the composite measure of intrinsic motivation.

Because the experimental manipulations affected perceived competence, which was related to intrinsic motivation, the effect of the experimental manipulations on actual competence (i.e., performance) was also tested. Performance was operationally defined as the average number of seconds taken to solve the four puzzles during the performance phase of the puzzle solving (possible range = 0 to 240 s). Performance did not differ

TABLE 3: Intercorrelation Matrix for Predictors (Variables 1 Through 3), Possible Mediators (Variables 4 and 5), and the Outcome Measure of Intrinsic Motivation (Variable 6)

Variable	1	2	3	4	5	6
1. Interpersonal context	—	.00	-.11	-.29**	.01	-.21*
2. Competitive outcome		—	-.03	.09	.38**	.24*
3. Competence valuation			—	.27**	.23*	.37**
4. Perceived self-determination				—	.48**	.62**
5. Perceived competence					—	.54**
6. Intrinsic motivation						—

\* $p < .05$ ; \*\* $p < .01$ .

significantly among the experimental groups,  $F(4, 95) = 0.33$ , *ns.*<sup>2</sup>

### Process Model

Interpersonal context and competitive outcome (but not competitive set) had significant effects on intrinsic motivational outcomes. To test the mediating hypotheses that the independent variables would affect intrinsic motivation through their effects on perceived competence and perceived self-determination, we used regression-based path models. According to Judd and Kenny (1981), data fit a mediation model if (a) the independent variables significantly predict the outcome measure, (b) the independent variables significantly predict the hypothesized mediating variables, and (c) the mediators significantly predict the outcome measure when the effects of the independent variables are controlled.

To do a process analysis with multiple contrasts as independent variables, the contrasts need to be orthogonal. To make the contrasts used for competitive outcome and interpersonal context orthogonal, the weights of the competitive outcome contrasts were changed from those shown in Table 1 to the following: lose (-2), win (1), and pressure to win (1). The new contrast weights effectively changed the definition of winning to include winning in either a pressured or a nonpressured context, but this seemed appropriate, because perceived competence was equally high in both win conditions. Competence valuation (measured as a continuous variable) was also included as a predictor in the process analysis to test for its direct effect on intrinsic motivation and for its hypothesized interaction with competitive outcome. The resulting process analysis, which predicted intrinsic motivation from the three independent variables and two potential mediators, controlled for the shared variance between the mediators (perceived competence and perceived self-determination),  $r(100) = .48$ ,  $p < .01$ .

Table 3 shows the zero-order correlations between all variables used in the process analysis. In the series of regressions, none of the interaction terms emerged as a significant predictor in any of the models. Therefore, the

analyses reported below include only the main effects from the three predictors and two possible mediators.

In a test of the first requirement of the process analysis, intrinsic motivation was regressed onto the set of predictor variables (outcome contrast, interpersonal context contrast, and competence valuation). The effect of the three-term model was significant,  $F(3, 96) = 9.37$ ,  $p < .01$  ( $R^2 = .23$ ), and individual effects emerged for competitive outcome,  $F(1, 96) = 7.51$ ,  $p < .01$  ( $\beta = .25$ ), interpersonal context,  $F(1, 96) = 3.63$ ,  $p < .06$  ( $\beta = -.17$ ), and competence valuation,  $F(1, 96) = 15.74$ ,  $p < .01$  ( $\beta = .36$ ). In a test of the second requirement, each possible mediator was regressed individually onto the same three-term predictor model. In the perceived competence regression, the effect of the three-term predictor model was significant overall,  $F(3, 96) = 8.12$ ,  $p < .01$  ( $R^2 = .20$ ), and individual effects emerged for competitive outcome,  $F(1, 96) = 17.97$ ,  $p < .01$  ( $\beta = .39$ ), and competence valuation,  $F(1, 96) = 7.07$ ,  $p < .01$  ( $\beta = .24$ ). In the perceived self-determination regression, the effect of the three-term predictor model was significant overall,  $F(3, 96) = 5.62$ ,  $p < .02$  ( $R^2 = .15$ ), and individual effects emerged for interpersonal context,  $F(1, 96) = 7.65$ ,  $p < .01$  ( $\beta = -.26$ ), and competence valuation,  $F(1, 96) = 6.50$ ,  $p < .02$  ( $\beta = .24$ ). In the test of the final requirement, intrinsic motivation was regressed onto the five-term model (three predictors, two possible mediators). Overall, the model was significant,  $F(5, 94) = 19.36$ ,  $p < .01$  ( $R^2 = .51$ ), with individual effects for perceived competence,  $F(1, 94) = 7.99$ ,  $p < .01$  ( $\beta = .26$ ), perceived self-determination,  $F(1, 94) = 21.37$ ,  $p < .01$  ( $\beta = .41$ ), and competence valuation,  $F(1, 94) = 6.58$ ,  $p < .02$  ( $\beta = .20$ ). Figure 1 shows the path model for these results.

### DISCUSSION

Because previous studies of the effects of competition on intrinsic motivation have yielded somewhat confusing results, the present experiment was undertaken (a) to differentiate aspects of the competitive situation and explore the effects of each on intrinsic motivation and (b) to explore the mediational processes of those effects. Results revealed, in line with cognitive evaluation theory, that two elements of the competitive situation affected intrinsic motivation (*viz.*, competitive outcome and interpersonal context) and that two variables (*viz.*, perceived competence and perceived self-determination) mediated these effects. In addition, competence valuation related positively to perceived competence, perceived self-determination, and intrinsic motivation.

The element of the competitive situation that facilitated intrinsic motivation was the positively informational element of winning, relative to losing, although, as predicted, this occurred only in the relatively noncon-

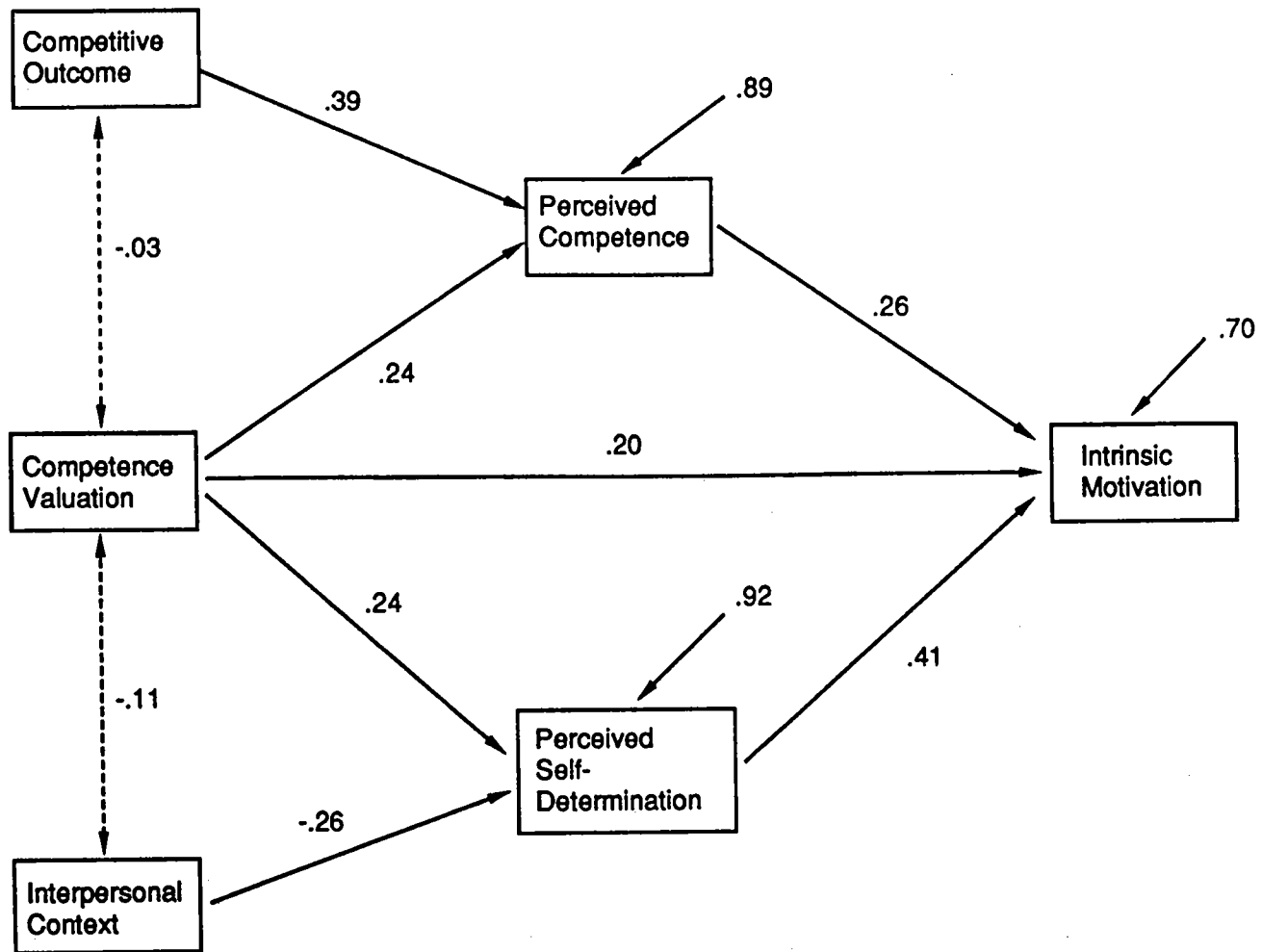


Figure 1 Process model.

NOTE: Solid lines with arrows on the right side indicate significant paths,  $p < .05$ . Solid lines with arrows on the left side indicate error terms.

trolling contexts. The element that undermined intrinsic motivation was the controlling interpersonal context that pressured participants to win. Such findings are consistent with previous studies on the effects of competitive outcome (e.g., Reeve et al., 1985) and interpersonal contexts (e.g., Ryan et al., 1983), although no previous study has explored the interpersonal context of competition.

The fact that the competitive-set contrast did not affect any experiential variable, decrease intrinsic motivation (as we predicted), or increase intrinsic motivation (as the perceived-challenge reasoning predicted) seems at first to be discrepant with past findings. These findings, however, are readily reconcilable. No previous study has explored the effects of competition versus no competition without providing subjects with information about the quality of their performance. It seems that for competition to affect intrinsic motivation, whether positively or negatively, information about one's perfor-

mance (e.g., competitive outcome information) must be present. Indeed, as the data showed, subjects did not even find competition more challenging than no competition unless there was feedback about the outcome.

The fact that winning a competition decreased intrinsic motivation in the Deci et al. (1981) study suggests that something about that situation led subjects to feel pressured to win, although there was no specifically pressuring interpersonal context. It may have been, for example, that the opponent's (i.e., the confederate's) presence in the same room in a face-to-face competition made it seem more controlling. Whatever the reason, the complex of findings suggests that there may be other elements of the competitive situation that affect intrinsic motivation and that deserve empirical consideration.

The present study went beyond isolating elements of the competitive situation that affect people's experience and intrinsic motivation by clarifying mediational processes. First, the effect of competitive outcome on intrinsic



sisic motivation was mediated by perceived competence (a finding that replicates Vallerand & Reid, 1984), and, second, the effect of interpersonal context on intrinsic motivation was mediated by perceived self-determination (a new finding). The results of this mediational analysis are consistent with the prediction of cognitive evaluation theory, which specifies that perceived competence and perceived self-determination are the processes through which elements of the competitive situation affect intrinsic motivation.

The central element within the competitive situation that nurtures intrinsic motivation seems to be receiving positive information about one's performance (i.e., winning relative to losing). However, only the noncontrolling win condition enhanced intrinsic motivation, as cognitive evaluation theory had predicted (e.g., Fisher, 1978; Ryan, 1982). Both groups of winners—those in the nonpressured context and those pressured to win—felt highly competent, relative to losers, but those who received positive information about their performance in a pressured manner also showed a marked reduction in perceived self-determination, which, in turn, undermined their intrinsic motivation.

The effects of the interpersonal context of competition on intrinsic motivation give one pause to think about how competition is viewed within our modern culture. The results of this study indicate that winning a competition may not undermine intrinsic motivation if the interpersonal context does not add undue pressure to win. Unfortunately, it seems that the unyielding focus of our society on winning—whether in athletic competitions or in school performance, for example—may be creating a pressuring context that can have quite negative effects on individuals' experience and motivation.

In addition to self-determination and competence, competence valuation, which is an emotional involvement in attaining competence, was a third internal state that predicted intrinsic motivation, even after controlling for the effects of perceived competence and perceived self-determination. Across all experimental conditions, participants who cared more about doing well showed higher intrinsic motivation than those who cared little about doing well, a finding that replicates previous research (e.g., Harackiewicz & Manderlink, 1984). Contrary to the predicted interaction with competitive outcome, competence valuation increased intrinsic motivation directly (presumably through arousal or excitement). Thus our findings support Epstein and Harackiewicz's (1992) contention that the controlling, informational, and competence valuation processes may all influence intrinsic motivation in competitive situations. However, competence valuation also increased intrinsic motivation indirectly, through its effects on perceived competence and perceived self-determination.

This finding is important, because it suggests not only that favorable cognitive evaluations increase positive affect (Deci, 1987) but also that a favorable affective task involvement may increase positive cognitive evaluations (i.e., perceived competence and perceived self-determination).

The behavioral measure of intrinsic motivation used in this study, and also in a study by Wild et al. (1992), deserves note. Because past studies (e.g., Ryan et al., 1991) have shown that not all free-choice behavior is intrinsically motivated, we recorded two distinct categories of free-choice persistence—one involving new configurations, which is theorized to reflect intrinsic motivation, and the other involving perseverating with previous configurations, which is theorized to represent internally controlled activity (Ryan et al., 1991). In support of this view, the behavioral measure of intrinsically motivated activity (viz., playing with new configurations) correlated significantly with self-determination, competence, and interest/enjoyment, whereas the measure of internally controlled activity (viz., playing with previously encountered configurations) correlated only with frustration.

Ryan et al. (1991) argued that examining within-cell correlations between free-choice behavior and internal states can serve as the basis for distinguishing persistence that is intrinsically motivated from persistence that is not. However, that approach necessarily treats all free-choice behavior within a particular cell as either intrinsically motivated or internally controlled. The current approach of dividing free-choice persistence into separate categories is an additional, perhaps better, method of distinguishing intrinsically motivated activity from internally controlled activity. By partitioning free-choice persistence into activity aimed at seeking out new challenges versus activity aimed at alleviating frustration or bolstering an injured self-esteem, the empirical task of quantifying intrinsically motivated behavior becomes more precise.

#### NOTES

1. Playing with new configurations was operationally defined as (a) solving one of the three configurations, (b) inventing a unique configuration, or (c) puzzle playing with no apparent solution goal. Playing with previous configurations was operationally defined as re-solving one of the six puzzle solutions used during the practice or performance phases of the experiment.

2. Performance time means (in seconds) were as follows: no competition, 106; competition, no feedback, 100; competition lose, 108; competition win, 97; and competition, pressure to win, 101.

#### REFERENCES

- Amabile, T. M. (1982). Children's artistic creativity: Detrimental effects of competition in a field study. *Personality and Social Psychology Bulletin*, 8, 573-578.

- Amabile, T. M., DeJong, W., & Lepper, M. R. (1976). Effects of externally imposed deadlines on subsequent intrinsic motivation. *Journal of Personality and Social Psychology, 34*, 92-98.
- Csikszentmihalyi, M. (1990). *Flow: The psychology of optimal experience*. New York: Harper & Row.
- deCharms, R. (1968). *Personal causation: The internal affective determinants of behavior*. New York: Academic Press.
- Deci, E. L. (1971). Effects of externally mediated rewards on intrinsic motivation. *Journal of Personality and Social Psychology, 18*, 105-115.
- Deci, E. L. (1975). *Intrinsic motivation*. New York: Plenum.
- Deci, E. L. (1987). Theories and paradigms, constructs and operations: Intrinsic motivation is already exciting. *Journal of Social Behavior and Personality, 2*, 177-185.
- Deci, E. L., Betley, G., Kahle, J., Abrams, L., & Porac, J. (1981). When trying to win: Competition and intrinsic motivation. *Personality and Social Psychology Bulletin, 7*, 79-83.
- Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum.
- Epstein, J. A., & Harackiewicz, J. M. (1992). Winning is not enough: The effects of competition and achievement orientation on intrinsic interest. *Personality and Social Psychology Bulletin, 18*, 128-138.
- Fisher, C. D. (1978). The effects of personal control, competence, and extrinsic reward systems on intrinsic motivation. *Organizational Behavior and Human Performance, 21*, 273-288.
- Harackiewicz, J. M. (1979). The effects of reward contingency and performance feedback on intrinsic motivation. *Journal of Personality and Social Psychology, 37*, 1352-1363.
- Harackiewicz, J. M., & Manderlink, G. (1984). A process analysis of the effects of performance-contingent rewards on intrinsic motivation. *Journal of Experimental Social Psychology, 20*, 531-551.
- Harackiewicz, J. M., Manderlink, G., & Sansone, C. (1992). Competence processes and achievement motivation: Implications for intrinsic motivation. In A. K. Boggiano & T. S. Pittman (Eds.), *Achievement and motivation: A social-developmental perspective* (pp. 115-137). New York: Cambridge University Press.
- Harackiewicz, J. M., Sansone, C., & Manderlink, G. (1985). Competence, achievement orientation, and intrinsic motivation: A process analysis. *Journal of Personality and Social Psychology, 48*, 493-508.
- Heider, F. (1958). *The psychology of interpersonal relations*. New York: John Wiley.
- Judd, C. M., & Kenny, D. A. (1981). *Estimating the effects of social interventions*. Cambridge, UK: Cambridge University Press.
- Lepper, M. R., & Greene, D. (1975). Turning play into work: Effects of adult surveillance and extrinsic rewards on children's intrinsic motivation. *Journal of Personality and Social Psychology, 31*, 479-486.
- Lepper, M. R., & Greene, D. (Eds.). (1978). *The hidden costs of reward*. Hillsdale, NJ: Lawrence Erlbaum.
- McAuley, E., & Tammen, V. V. (1989). The effects of subjective and objective competitive outcomes on intrinsic motivation. *Journal of Sport and Exercise Psychology, 11*, 84-93.
- Olson, B. C. (1985). *The effect of informational and controlling feedback on intrinsic motivation in competition*. Unpublished doctoral dissertation, Texas Christian University, Fortworth.
- Pelletier, L. G. (1989). *Une analyse des antecedents et des consequences de style du superviseur sur la motivation intrinseque du subordonne* [An analysis of the antecedents and consequences of supervisor style on worker's intrinsic motivation]. Unpublished doctoral dissertation, University of Quebec at Montreal.
- Reeve, J., Cole, S. G., & Olson, B. C. (1986). Intrinsic motivation and the Zeigarnik effect: Are they the same? *Motivation and Emotion, 10*, 233-245.
- Reeve, J., Olson, B. C., & Cole, S. G. (1985). Motivation and performance: Two consequences of winning and losing in competition. *Motivation and Emotion, 9*, 291-298.
- Reeve, J., Olson, B. C., & Cole, S. G. (1987). Intrinsic motivation in competition: The intervening role of four individual differences following objective competence information. *Journal of Research in Personality, 21*, 148-170.
- Ryan, R. M. (1982). Control and information in the intrapersonal sphere: An extension of cognitive evaluation theory. *Journal of Personality and Social Psychology, 43*, 450-461.
- Ryan, R. M., Koestner, R., & Deci, E. L. (1991). Ego-involved persistence: When free-choice behavior is not intrinsically motivated. *Motivation and Emotion, 15*, 185-205.
- Ryan, R. M., Mims, V., & Koestner, R. (1983). Relation of reward contingency and interpersonal context to intrinsic motivation: A review and test using cognitive evaluation theory. *Journal of Personality and Social Psychology, 45*, 736-770.
- Vallerand, R. J., Gauvin, L. I., & Halliwell, W. R. (1986). Negative effects of competition on children's intrinsic motivation. *Journal of Social Psychology, 126*, 649-656.
- Vallerand, R. J., & Reid, G. (1984). On the causal effects of perceived competence on intrinsic motivation: A test of cognitive evaluation theory. *Journal of Sport Psychology, 6*, 94-102.
- Weinberg, R. S., & Ragan, J. (1979). Effects of competition, success/failure, and sex on intrinsic motivation. *Research Quarterly, 50*, 503-510.
- Wild, T. C., Enzle, M. E., & Hawkins, W. L. (1992). Effects of perceived extrinsic versus intrinsic teacher motivation on student reactions to skill acquisition. *Personality and Social Psychology Bulletin, 18*, 245-251.

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