# Intrinsic and Extrinsic Motivational Orientations in the Competitive Context: An Examination of Person–Situation Interactions

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**ABSTRACT** The current study examined Intrinsic Motivation Orientation and Extrinsic Motivation Orientation (Work Preference Inventory; Amabile, Hill, Hennessey, & Tighe, 1994) as potential trait-level moderators of the way Internet chess players responded to the intrinsic and extrinsic rewards of the chess games they played. On the basis of the defining characteristics of these 2 types of motivational orientations, we predicted that (a) Intrinsic Motivation Orientation would be associated with a stronger curvilinear relationship between challenge and enjoyment and (b) Extrinsic Motivation Orientation would be associated with a heightened affective responsivity to competitive outcome (i.e., winning vs. losing). Results supported the predictions. Implications of the findings are discussed.

*Intrinsic motivation* represents a motivation to engage in an activity purely for the sake of the activity itself (Lepper, Green, & Nisbett, 1973). When individuals are intrinsically motivated, they pursue activities for the interest and enjoyment those activities provide (Csikszentmihalyi, 1975), and they often perform at relatively high levels (Amabile, 1996; Grolnick & Ryan, 1987). In contrast, *extrinsic motivation* represents a motivation to engage in an activity as a means to an end rather than an end in itself (Pintrich & Schunk, 1996). When individuals are extrinsically motivated, they engage in

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Journal of Personality 77:5, October 2009 © 2009, Copyright the Authors Journal compilation © 2009, Wiley Periodicals, Inc. DOI: 10.1111/j.1467-6494.2009.00594.x activities in pursuit of rewards they desire such as money, prestige, or journal publications.

Past research on intrinsic and extrinsic motivation has focused primarily on the situational factors that promote or inhibit them. Findings suggest that perceiving oneself as competent at an activity often promotes enjoyment of (and presumably intrinsic motivation for) that activity (e.g., Blank, Reis, & Jackson, 1984; Deci, 1971; Reeve & Deci, 1996; Tauer & Harackiewicz, 1999; Vallerand & Reid, 1984; Vansteenkiste & Deci, 2003), as does the presence of "optimal" challenges (e.g., Csikszentmihalvi, 1975; Csikszentmihalvi & Lefevre, 1989; Danner & Lonky; 1981; Harter, 1978; Moneta & Csikszentmihalyi, 1996) and valuing competence in the activity (Elliot et al., 2000; Harackiewicz & Manderlink, 1984; Sansone, 1989; Tauer & Harackiewicz, 1999). Although extrinsic motivation has received less research attention, here too the focus has been on the situational factors that influence it, including performance-contingent rewards (which can increase extrinsic motivation; Eisenberger & Rhoades, 2001) and task-intrinsic rewards (which can decrease extrinsic motivation; Kruglanski, 1975).

Despite this emphasis on motivational orientation as the product of situational factors, there is evidence that stable, relatively enduring motivational orientations at the trait level may also exert considerable influence on state-level experience and behavior. For example, in a study which used the Experience Sampling Method (Larson & Csikszentmihalyi, 1983) to assess psychological and behavioral patterns related to the academic achievement of highschool students, Wong and Csikszentmihalyi (1991) found that students' "work motivation"-a composite "higher order" trait positively related to achievement motivation and negatively related to play and impulsivity (from the PRF form; Jackson, 1984)-was positively related to the amount of time the students spent studying. Additionally, using the Causality Orientations Scale (Deci & Ryan, 1985) to assess differences in autonomy, controlled, and interpersonal orientations, researchers have found that these three individual differences can have significant consequences for motivation at the situational level (e.g., Koestner, Bernieri, & Zuckerman, 1992).

Still, the first personality inventory designed to directly assess the major elements of both intrinsic and extrinsic motivation as described by contemporary motivation theorists and researchers was developed only relatively recently.<sup>1</sup> The Work Preference Inventory (WPI; Amabile, Hill, Hennessey, & Tighe, 1994) is composed of two primary scales: Intrinsic Motivation Orientation (IMO) and Extrinsic Motivation Orientation (EMO). The IMO scale assesses a preference for the situational conditions that are thought to promote intrinsically motivated behavior, including a preference for challenge (e.g., "I want my work to provide me with opportunities for increasing my knowledge and skills"), as well as the desire to experience the psychological states these conditions are thought to promote (e.g., "I enjoy doing work that is so absorbing that I forget about everything else"; "What matters most to me is enjoying what I do"). Items in the EMO scale assess an inclination to pursue performance-based rewards such as money and social status (e.g., "I'm strongly motivated by the money I can earn"), as well as a desire to outperform others ("To me, success means doing better than other people") and be recognized by others (e.g., "I am strongly motivated by the recognition I can earn from other people"). The WPI has been shown to have a meaningful factor structure, with good long-term stability (Amabile et al., 1994).

IMO and EMO are conceptualized as independent motivational orientations. IMO is characterized by the valuation and enjoyment of process-based rewards, and EMO is characterized by the valuation of outcome-based rewards, such as money and peer recognition. These two types of rewards do not necessarily conflict with one another, and it is possible for individuals to be motivated by both types of rewards. Indeed, preliminary empirical findings suggest that it is not uncommon for individuals to score high or low on both scales (Amabile et al., 1994).

## The Relationship Between Trait-Level Motivational Orientations and State-Level Experience

It is useful to distinguish two means through which trait-level differences in motivational orientations may influence state-level experi-

<sup>1.</sup> Although Harter (1981) did create a scale designed to tap cross-situational consistency in intrinsic/extrinsic motivational orientation, this scale is intended for children and is intended to measure behavioral consistency in classroom-related behavior only.



Figure 1

Two routes through which individual differences in motivational orientation may influence subjective experience.

ence. The most direct implication of trait-level differences in motivational orientatation is that, on average, individuals high on trait-level IMO should tend to be more intrinsically motivated at the state level than individuals low on IMO, and individuals high on EMO would tend to be more extrinsically motivated than individuals low on EMO (see Figure 1a). With regard to IMO, this possibility has already received some empirical support. Artists high in IMO spent significantly more time per week painting or drawing than artists low in IMO (Amabile et al., 1994). Additionally, in an experience sampling study of the relationship between Intrinsic Motivation Orientation and the perception of time, participants high in IMO checked and thought about the time less frequently than participants low in IMO, perceived time as moving more quickly, and had a greater tendency to lose track of time (Conti, 2001). All of these behaviors suggest greater state-level intrinsic motivation.

A second implication of the existence of enduring, trait-level differences in motivational orientation is that such differences should influence sensitivity to the intrinsic and extrinsic rewards of specific contexts. The emphasis of this person  $\times$  situation interactional proposition is not on how motivational orientation may affect state-level experience across situations but rather how motivational orientation may result in a differential reactivity to the intrinsic and extrinsic rewards of specific contexts (see Figure 1b). This second implication is the one explored in the current study.

## Intrinsic and Extrinsic Motivation Orientations in the Competitive Context

Contemporary theories of intrinsic motivation consider "optimal challenges"-challenges that are perceived to be neither too easy nor too difficult-to be essential for the maximization of enjoyment. According to both competence motivation theory (Harter, 1978) and self-determination theory (Deci & Ryan, 1985), the successful pursuit of optimal challenges maximizes one's sense of competence, which in turn increases enjoyment. According to Csikszentmihalyi's (1975) theory of intrinsic rewards, optimal challenges channel one's attentional resources from cognitive processes unrelated to the task at hand (e.g., self-focus, monitoring time) to the task itself, allowing the person to become more fully engaged in the activity. The proposition that optimal challenges maximize enjoyment has received empirical support from laboratory-based studies of young children (Danner & Lonky, 1981; Harter, 1978), as well as naturalistic, experience-sampling based studies of adolescents (Moneta & Csikszentmihalyi, 1996) and adults (Csikszentmihalyi & Lefevre, 1989).

It is useful to map the relationship implied by the optimal challenge proposition onto a two-dimensional xy plane. The proposition implies a curvilinear relationship between difficulty (x-axis) and enjoyment (y-axis). That is, enjoyment is thought to be positively related to difficulty until the task is perceived to be beyond one's capabilities, at which point the relationship becomes increasingly negative. Where the apex of this curvilinear relationship occurs along the x-axis is not specifically addressed by the optimal challenge proposition, which conceives of challenge as a subjective rather than objective construct. Thus what may be optimally challenging at the subjective level may be relatively easy or difficult at the objective level.

IMO represents a motivational orientation toward process-based enjoyment, manifested in part as a sensitivity to the conditions that tend to promote enjoyment. Past research suggests that one of these conditions is the presence of optimal challenges (Csikszentmihalyi & Lefevre, 1989; Danner & Lonky, 1981; Harter, 1978; Moneta & Csikszentmihalyi, 1996). The enjoyment experienced by individuals high in IMO should therefore be particularly sensitive to the presence or absence of optimal challenges. Referring back to the curvilinear relationship between difficulty and enjoyment implied by the optimal challenge proposition, this suggests that the degree of curvature associated with the curvilinear relationship should vary as a function of IMO. Within the context of the zero-sum competitive activity we examine in the current study (Internet chess), the degree of difficulty associated with a given chess game is related to differences in chess ratings (i.e., skill levels) between players and their opponents. Very large differences should result in games that are too easy for the superior opponent and too difficult for the inferior opponent. In both cases, the opportunities to exercise and test one's skills are limited. In contrast, games between more evenly matched players should be more engaging and enjoyable. Because individuals high in IMO are conceptualized as being particularly responsive to optimal challenges, we predicted this curvilinear relationship would be stronger for individuals high in IMO than for individuals low in IMO.

In contrast to intrinsic motivation, extrinsic motivation is characterized by a focus on the extrinsic rewards an activity may bring, whether this be recognition from one's peers, prize money, bragging rights, and so forth. Within the zero-sum competitive context, the acquisition of these rewards is contingent on defeating one's opponent. Because EMO represents a heightened focus on and valuation of extrinsic rewards, we predicted that individuals high in EMO would be more affectively responsive to competitive outcome (i.e., winning vs. losing) than individuals low in EMO. Stated differently, we expected the outcome of a chess game would have a greater impact on the affect of individuals high in EMO than individuals low in EMO.

## METHOD

#### Overview

For 2 weeks, members of a popular chess Web site completed a short Web-based survey immediately following each game they played against other members of the Web site.<sup>2</sup> The survey assessed the degree to which they enjoyed the game they had just played as well as their current mood/

2. Because only a small minority of members at the chess site participated in the study, most games were played between study participants and nonparticipants. In a small number of games (n = 44), however, both players were participants.

affect. Objective information about each game, including the chess ratings of participants and their opponents and the outcome of each game, were recorded. At the end of the 2-week study period, participants completed a personality questionnaire, which included the Intrinsic Motivation Orientation and Extrinsic Orientation scales from the Work Preference Inventory.

### Participants

The study began with 121 adults (119 men and 2 women) who participated on a voluntary basis.<sup>3</sup> During the course of the study, 17 participants withdrew or did not complete the final questionnaire. In addition, we eliminated data from 14 participants who played fewer than three games against rated opponents during the course of the study as well as data from 4 participants whose survey responses were patterned and consistently implausible. Finally, because only 2 of the participants were female, we discarded their data to control for gender. The final sample thus consisted of 84 men.

The mean age of the participants was 42 years. On average, participants had 27 years of chess-playing experience. Sixty-nine percent of the sample were American, with the remaining 31% represented by a wide range of countries including Canada (8%), Germany (4%), Sweden (2%), and Denmark (2%).

#### Measures

#### Within-Person Measures

*Enjoyment.* Immediately following each game, participants completed a short online survey that asked them to indicate how *interesting*, *exciting*, and *fun* the game they had just played was, using a 1 (*not at all*) to 5 (*very much*) point scale. These three items showed high reliability across the 1,406 surveys that were collected ( $\alpha = .88$ ) and were averaged to create a composite *enjoyment* measure.

*Challenge*. All members of the chess site had a chess rating corresponding to their skill level, based on the standard ELO chess rating system

In these cases, in order to avoid potential problems arising from statistical nonindependence, we only included the data from one of the two participants. 3. To encourage participation, prospective participants were informed that at the conclusion of the study they would be provided with various statistics regarding their chess playing styles (e.g., average number of "blunders" per game), computed using chess analysis software. used by the World Chess Federation.<sup>4</sup> This chess rating is a numeric value derived using statistical and probability theory and is updated continually according to recent results against other rated players. We operationalized challenge using *relative chess rating*—the difference between a participant's chess rating and his or her opponent's chess rating. For example, if a participant with a chess rating of 1500 played a game against an opponent with a chess rating of 1750, the participant's relative chess rating for that game would have been -250. As another example, a participant who competed against an opponent with a chess rating 100 points lower than himself would have had a relative ability of +100.

*Game outcome*. This variable simply represented whether a participant lost or won a given game (coded as 0 and 1, respectively). Games which ended in a draw or stalemate (n = 42) were coded as .5.

Affect. Postgame affect was operationalized by averaging three items that were included in the postgame survey: an item that asked participants how *happy* they felt at that moment, an item that asked participants how *energetic* they felt, and an item that asked participants how *proud* they felt ( $\alpha = .81$ ).<sup>5</sup> Participants responded to all three questions using a 1 (*not at all*) to 5 (*very much*) point scale.

## Between-Person Measures: Motivation Orientation

Intrinsic and extrinsic motivation orientations were measured using the WPI (Amabile et al., 1994). The 30-item WPI is composed of two primary scales, the IMO(15 items;  $\alpha = .84$ ) and the EMO (15 items;  $\alpha = .68$ ).<sup>6</sup>

4. More information on this rating system can be found at the Web site of the World Chess Federation (www.fide.com).

5. The postgame survey included two items that tapped negative affect (upset, discouraged,  $\alpha = .73$ ). However, because the relationship between negative affect and outcome mirrored that of positive affect and outcome (inversely), we only used the positive affect measure to operationalize affect and do not make a distinction between positive and negative affect.

6. Each of the two primary scales is composed of two subscales. The IMO scale is composed of an "Enjoyment" subscale that is intended to tap motivation for enjoyment (10 items; sample question: "It is important for me to be able to do what I most enjoy") and a "Challenge" subscale that is intended to tap motivation for challenging activities (5 items; sample question: "The more difficult the problem, the more I enjoy trying to solve it"). Likewise, the EMO scale is composed two subscales, an "Outward" subscale that is intended to tap motivation for social recognition (10 items; sample question: "To me, success means doing better than other people") and a "Compensation" subscale that is intended to tap motivation

Sample items of the IMO scale include "What matters most to me is enjoying what I do" and "I enjoy tackling problems that are completely new to me." Sample items of the EMO scale include "I am strongly motivated by the recognition I can earn from other people" and "To me, success means doing better than other people." Consistent with past studies (Amabile et al., 1994; Conti, 2001), the IMO and EMO scales were orthogonal (r = .06, ns).

#### Procedure

Before describing the procedure used in the study, it will be useful to briefly describe the manner in which the chess Web site operates. When members of the chess Web site wish to play a game, they navigate to a "waiting room" Web page that contains a listing of members who are seeking a game. The Web page displays the username of the members as well as their chess ratings. Members may either select an opponent from the list or post a notice that they are seeking a game to the list themselves. Once a match is made, the game begins. At the end of each game, each player's chess rating is adjusted according to whether he or she won or lost the game. The new ratings are displayed to participants. Participants are then given an option of returning to the waiting room to seek another match or of exiting the site.

During the 2-week study period, the only change made to the procedure above was that participants were automatically linked to the online survey immediately following each game they played. The questions in the survey were randomized each time the survey was administered. After completing this survey, participants were then directed to the chess site waiting room, where they had the option of playing another game or exiting the Web site.

Participants played a total of 1,406 games over the study period, an average of 16.7 games per participant. At the end of the 2-week study period, participants completed an online personality questionnaire consisting of several individual difference measures including the Work Preference Inventory. Following this, the study ended and participants were directed to an online debriefing form.

#### RESULTS

The data represented a two-level hierarchical structure: games (Level 1) nested within players (Level 2). As a result of person-level factors

for material rewards (5 items; sample question: "I am strongly motivated by the money I can earn").

(e.g., individual differences), such multilevel data sets in which observations are nested within persons are typically characterized by nonindependence among observations—two observations from the same person are likely to be more similar than two observations from different persons. Because traditional ordinary least squares methods assume independence across all observations, the use of these methods to analyze multilevel data sets typically results in biased parameter estimates and significance tests.

To take into account the hierarchical structure of the data, multilevel regression models were used (Bryk & Raudenbush, 1992; Hox, 2002; Snijders & Bosker, 1999). Multilevel models accommodate the hierarchical nature of multilevel data by taking into account variability at each level of the data hierarchy. Thus in the case of the current study, both between-person variability and within-person variability were simultaneously modeled. An added advantage of this simultaneous modeling of between-person and within-person variability (aside from more accurate parameter estimation and significance tests) is that hypotheses regarding cross-level interactions between person-level characteristics and within-person associations (such as the hypotheses in the current study) can be appropriately tested (Schwartz & Stone, 1998).

All analyses were conducted using the HLM 5.04 program (Raudenbush, Bryk, Cheong, & Congdon, 2001). Descriptive statistics associated with the study variables are presented in Table 1.

	п	М	SD	1	2	3	4	5	6
Game-level variables									
Enjoyment	1,406	3.35	0.97	_		_			
Affect	1,406	2.78	1.00	.49*					
Relative chess rating	g 1,406	25.09	191.32	26*	.00	_			
Outcome	1,406	0.57	0.49	.10	.55*	.38*			
Person-level variables									
IMO	84	4.85	0.63	.17	.31*	14	.06		
EMO	84	3.51	0.55	.03	.02	.04	.10	.06	

Table 1	
Means, Standard Deviations, and Correlations of Study Varia	ables

\*Correlation is significant at .01 level.

Our first analysis tested IMO as a trait-level moderator of the relationship between relative chess rating (i.e., challenge) and enjoyment. We created a two level model with two Level 1 predictors *relative chess rating* and *relative chess rating*<sup>2</sup>—and *enjoyment* as the outcome variable. The Level 1 model was thus as follows:

enjoyment<sub>ij</sub> = 
$$\beta_{0j} + \beta_{1j}$$
(relative chess rating)<sub>ij</sub>  
+  $\beta_{2j}$ (relative chess rating<sup>2</sup>)<sub>ij</sub> +  $r_{ij}$ .

The *j* subscripts indicate that a separate Level 1 model is estimated for each of the 84 participants.  $\beta_{0j}$  represents participant *j*'s intercept (i.e., participant *j*'s expected enjoyment when relative chess rating equals zero),  $\beta_{1j}$  represents the slope of the linear relationship between *enjoyment* and *relative chess rating* for participant *j*, and  $\beta_{2j}$ represents the degree of curvature in the relationship between *enjoyment* and *relative chess rating* for participant *j*. *r*<sub>ij</sub> is the error term.

The three parameters,  $\beta_{0j}$ ,  $\beta_{1j}$ , and  $\beta_{2j}$ , were estimated in the Level 2 (i.e., between persons) regression equations, where they were modeled as a function of participants IMO scores. We also included EMO as a Level 2 predictor in order to control for possible covariation with IMO. Both IMO and EMO were centered around their overall means (i.e., "grand-mean centered"). The three Level 2 equations were as follows:

$$\beta_{0j} = \gamma_{00} + \gamma_{01} IMO_j + \gamma_{02} EMO_j + u_{0j}$$
  

$$\beta_{1j} = \gamma_{10} + \gamma_{11} IMO_j + \gamma_{12} EMO_j + u_{1j}$$
  

$$\beta_{2j} = \gamma_{20} + \gamma_{21} IMO_j + \gamma_{22} EMO_j + u_{2j},$$

where  $\gamma_{00}$  is average enjoyment across individuals,  $\gamma_{10}$  is the *relative chess rating* – *enjoyment* slope across individuals, and  $\gamma_{20}$  is the *relative chess rating*<sup>2</sup> – *enjoyment* curve across individuals.  $\gamma_{01}$  represents the effect of IMO on enjoyment across individuals,  $\gamma_{11}$ represents the effect of IMO on the linear relationship between relative chess rating and enjoyment across individuals, and  $\gamma_{21}$ represents the effect of IMO on the curvilinear relationship between relative chess rating and enjoyment across individuals.  $u_{0j}$ ,  $u_{1j}$ , and  $u_{2j}$  represent residual error for participant *j*. Thus the coefficient of central interest in this analysis is  $\gamma_{21}$ .

Results of this analysis are shown in Table 2. As expected, on average across individuals, there was a significant curvilinear relationship between relative chess rating and enjoyment,  $\gamma_{20} = -2.3 \times$ 

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Fixed Effects	Coefficient	SE	t Ratio	<i>df</i> 81	
Intercept, $\gamma_{00}$	3.41	0.06	55.44***		
IMO $\gamma_{01}$	0.24	0.11	2.22*	81	
EMO $\gamma_{02}$	0.00	0.09	0.01	81	
Relative chess	$-1.3 \times 10^{-1}$	$1.9 \times 10^{-2}$	- 6.62***	81	
rating (linear), $\gamma_{10}$					
IMO $\gamma_{11}$	$-5.8 \times 10^{-2}$	$3.1 \times 10^{-2}$	-1.86*	81	
EMO $\gamma_{12}$	$5.2 \times 10^{-2}$	$4.0 \times 10^{-2}$	1.32	81	
Relative chess	$-2.3 \times 10^{-2}$	$5.4 \times 10^{-3}$	-4.24***	81	
rating (squared), $\gamma_{20}$					
IMO $\gamma_{21}$	$-2.1 \times 10^{-2}$	$8.3 \times 10^{-3}$	-2.54**	81	
EMO $\gamma_{22}$	$02 \times 10^{-2}$	$9.0 \times 10^{-3}$	-0.25	81	

Table 2

Relationship Between Relative Chess Rating (Linear and Squared) and Enjoyment as a Function of Intrinsic Motivation Orientation and Extrinsic Motivation Orientation

\**p* < .05; \*\**p* < .01; \*\*\**p* < .001.

 $10^{-2}$ ,  $SE = 5.4 \times 10^{-3}$ , t(81) = -4.24, p < .001. Furthermore, consistent with our first prediction, IMO significantly moderated this curvilinear relationship,  $\gamma_{21} = -2.1 \times 10^{-2}$ ,  $SE = 8.3 \times 10^{-3}$ , t(81) = -2.54, p < .01. In other words, "optimally challenging" matchups were a stronger predictor of game enjoyment for individuals high in IMO than for participants low in IMO. Table 2 also shows that IMO moderated the linear relationship between relative chess rating and enjoyment,  $\gamma_{11} = -5.8 \times 10^{-2}$ ,  $SE = 3.1 \times 10^{-2}$ , t(81) = -1.86, p < .05, with players high in IMO enjoying games against superior opponents more than players low in IMO did. This effect remained significant when the analysis was conducted with the quadratic relative chess rating term ( $\gamma_{20}$ ) removed from the model.

Figure 2 plots the average curves for participants with IMO scores in the upper and lower quartiles (high IMO and low IMO, respectively). As can be seen, high IMO is associated with considerably greater curvature in the relationship between relative chess rating and enjoyment. The approximate winning probabilities associated with relative chess ratings are displayed below the *x*-axis.

The personality inventory participants completed at the end of the study also measured Behavioral Activation (BAS; Carver & White, 1994) and Achievement Motivation (n-Ach; Jackson, 1984). BAS is



Relationship between relative chess rating and enjoyment as a function of high IMO versus low IMO.

associated with a tendency to approach and engage in challenging activities and was significantly correlated with IMO (r = .53). Achievement motivation is associated with a desire to achieve difficult goals and to maintain high performance standards and was also correlated with IMO (r = .56). Because of the conceptual overlap between these measures and IMO, we examined the possibility that IMO's moderation of the curvilinear relationship between relative chess rating and enjoyment may have been accounted for by differences in BAS or Ach. With respect to BAS, although the crosslevel interaction between BAS and the curvilinear relationship was significant when BAS was entered alone,  $-2.1 \times 10^{-2}$ ,  $SE = 1.0 \times 10^{-2}$ , t(81) = -2.28, p < .05, two-tailed, when BAS and IMO were entered simultaneously only IMO remained a significant moderator,  $-2.0 \times 10^{-2}$ ,  $SE = 8.7 \times 10^{-3}$ , t(81) = -2.22, p < .05. With respect to n-Ach, the cross-level interaction between n-Ach and the curvilinear relationship approached significance but was not significant,  $-1.4 \times 10^{-2}$ ,  $SE = 8.9 \times 10^{-3}$ , t(81) = -1.56, p < .12. When n-Ach and IMO were entered simultaneously, only IMO was a significant moderator,  $-2.5 \times 10^{-2}$ ,  $SE = 1.1 \times 10^{-2}$ , t(81) = -2.20, p < .05.

## Extrinsic Motivation Orientation and Outcome

We predicted that EMO would be associated with a greater affective responsivity to outcome. To test this prediction, we created a twolevel model, regressing affect on outcome at Level 1:

affect<sub>ij</sub> = 
$$\beta_{0j} + \beta_{1j}$$
(outcome)<sub>ij</sub> +  $r_{ij}$ .

 $\beta_{0j}$  is participant *j*'s adjusted mean level of affect for losses,  $\beta_{1j}$  represents the expected change in *affect* between wins and losses for participant *j*, and  $r_{ij}$  is the error term.

 $\beta_{0j}$  and  $\beta_{1j}$  were estimated in the Level 2 (i.e., between persons) equations, where they were modeled as a function of participants EMO, controlling for IMO. As in the previous analysis, EMO and IMO were both grand-mean centered. The two Level 2 equations were

$$\beta_{0j} = \gamma_{00} + \gamma_{01} \text{EMO}_j + \gamma_{01} \text{IMO}_j + u_{0j}$$
  
$$\beta_{1i} = \gamma_{10} + \gamma_{11} \text{EMO}_i + \gamma_{01} \text{IMO}_i + u_{1i},$$

where  $\gamma_{00}$  is average affect for losses across individuals,  $\gamma_{10}$  is the average change in affect between losses and wins across individuals,  $\gamma_{01}$  is the effect of EMO on affect for losses across individuals, and  $\gamma_{11}$  is the effect of EMO on the change in affect betweens losses and wins across individuals.  $u_{0j}$  and  $u_{1j}$  represent residual error for participant *j*. Results of this analysis are shown in Table 3.

The prediction that EMO would be associated with a greater affective responsivity to outcome was supported,  $\gamma_{11} = .29$ , SE = .13, t(81) = 2.20, p < .05. IMO also moderated the relationship between outcome and affect but, in contrast to EMO, was associated with a lesser affective responsivity to outcome,  $\gamma_{12} = -.29$ , SE = .11, t(81) = -2.70, p < .01. Figure 3 shows the relationship between outcome and affect for upper and lower quartiles of EMO and IMO scores.

Fixed Effects	Coefficient	SE	t Ratio	df
Intercept, $\gamma_{00}$	2.16	0.06	33.03***	81
EMO $\gamma_{01}$	-0.12	0.13	-0.91	81
IMO $\gamma_{02}$	0.46	0.11	4.18***	81
Outcome, $\gamma_{10}$	0.98	0.07	13.99***	81
EMO $\gamma_{11}$	0.29	0.13	2.20*	81
IMO $\gamma_{12}$	-0.29	0.11	$-2.70^{**}$	81

Relationship Between Winning, Losing, and Postgame Affect as a Function of Extrinsic Motivation Orientation and Intrinsic Motivation Orientation

Table 3

\*p < .05; \*\*p < .01; \*\*\*p < .001.



#### Figure 3

Relationship between outcome and postgame affect as a function of high versus low Intrinsic Motivation Orientation and high versus low Extrinsic Motivation Orientation. High IMO and high EMO represent average scores for top quartiles of IMO and EMO, respectively; low IMO and low EMO represent average scores for bottom quartiles of IMO and EMO, respectively.

## DISCUSSION

The current study examined whether global, trait-level intrinsic and extrinsic motivation orientations would be associated with a heightened responsivity to specific features of the competitive context associated with intrinsic and extrinsic rewards. As predicted, IMO was associated with a stronger curvilinear relationship between challenge and enjoyment, and EMO was associated with a greater affective responsivity to competitive outcome. These findings and their implications are elaborated below.

### Optimal Challenge and Intrinsic Motivation Orientation

Previous studies have demonstrated that experimentally induced intrinsically motivated orientations toward tasks can lead individuals to choose to perform more difficult tasks than individuals who are not intrinsically motivated (Koestner, Zuckerman, & Koestner, 1987; Tzuriel & Haywood, 1984) and to verbalize their preference for such tasks (Harter, 1978). Results from the current study were consistent with the notion that an intrinsically motivated orientation is associated with a greater preference for challenge: IMO moderated the linear relationship between relative chess rating and enjoyment, with individuals high in IMO enjoying more difficult games than individuals low in IMO. Results also indicated, however, that the relationship between challenge and enjoyment may be moderated in a very different way. Specifically, IMO was associated with a stronger curvilinear relationship between difficulty and enjoyment (i.e., a stronger "optimal challenge" effect). Though past studies have provided support for a curvilinear relationship between level of difficulty and enjoyment at the situational level (e.g., Danner & Lonky, 1981; Harter, 1978) the current finding represents the first identification of a trait-level moderator of this relationship.

The finding that IMO moderates the strength of the "optimal challenge" effect has clear developmental implications. It is during episodes of engagement in optimally challenging situations that learning is maximized (Dewey, 1934; Vygotsky, 1978). Previous research has shown that individuals tend to selectively engage in activities that best match their personalities (Diener, Larsen & Emmons, 1984). Because individuals high in IMO show a stronger sensitivity for optimally challenging situations than individuals low in IMO (as suggested by their enjoyment curves), it is likely they

would gravitate toward such situations and attempt to spend more time engaged in them. One consequence of this greater tendency to engage in optimally challenging activities would be enhanced skill development. Although the current study was unable to address this possibility, a longitudinal investigation on the topic may yield important insights.

## Outcome and Extrinsic Motivation Orientation

One of the characteristic traits thought to represent an extrinsic motivation orientation is "concerns with competition" (Amabile et al., 1994, p. 950). To the extent these concerns represent outcome-related concerns, the current study provides some support for this view. EMO moderated the relationship between outcome and affect, with participants high in EMO demonstrating a greater affective responsivity to outcome than participants low in EMO.

Consistent with previous studies that have reported the correlation between the IMO and EMO scales of the WPI (Amabile et al., 1994; Conti, 2001), the two constructs were not significantly correlated. Still, there was some evidence of opposing influences on affective responses to outcome. Although, as predicted, EMO was associated with a greater affective responsivity to outcome, IMO also moderated the relationship, in the opposite direction: Greater IMO was associated with a lesser affective responsivity to outcome. One possible explanation for this unexpected finding is suggested by the results presented in Figure 3. As can be seen, losing did not appear to bother players high in IMO nearly as much as it bothered players low in IMO, as indicated by postgame affect. This makes sense when we consider that losing is typically the outcome of relatively difficult games: Individuals high in IMO enjoyed these games and presumably valued the experiences they elicited (related to this, an item in the IMO measure asks respondents, "No matter what the outcome of a project, I am satisfied if I feel I gained a new experience."). It should be noted that this is not the first time IMO and EMO have been associated with oppositional effects. Indeed, several such effects emerged in previous validation studies of the Work Preference Inventory (Amabile et al., 1994). For example, whereas IMO was positively associated with the average number of artworks created by artists per week (r = .41), EMO was negatively correlated with it (r = -.43). Clearly there are some circumstances under which the effects of IMO and EMO on state-level processes and behavior are oppositional, despite the orthogonality of the two constructs.

Extrinsic motivation has acquired a largely negative connotation in the motivation literature. In the current study, however, trait-level extrinsic motivation was not associated with diminished positive experience. More specifically, EMO was not associated with less enjoyment of chess games, nor was it associated with a lower overall level of postgame affect. Of course this does not preclude the possibility of negative developmental implications for individuals high in EMO. Because EMO is associated with particularly positive responses to wins, individuals high in EMO may selectively engage in activities in which the odds of winning are strongly stacked in their favor. Such activities would tend to be fairly easy, and the lack of challenge provided by such activities would likely stifle skill development. Still, because EMO and IMO do appear to sometimes have reciprocal effects on state-level experience, perhaps the most interesting questions regarding their long-term implications relate to potential interactions between them, and the conditions under which one motivation may trump the other.

#### Caveats

The current study examined the subjective experiences associated with intrinsic and extrinsic motivation orientations within the context of a real-life activity in a nonexperimental context, using a minimally intrusive study design. Though this design allows for greater confidence in the ecological validity of the findings, it also limited the amount of control that was possible over the composition of the study sample, as well as the nature of the task itself. In this respect, three aspects of the study are especially worth noting. First, all participants in the study were male. Although chess enthusiasts by and large do tend to be male (Graham, 1987), the lack of female participants means that it is impossible to rule out the possibility that the moderating effects of IMO and EMO examined in this study are themselves moderated by gender. Second, chess players are legendary for their unconventional and sometimes bizarre behavior. To account for such behavior, psychologists and nonpsychologists alike have long speculated on possible person-level characteristics that may distinguish chess players from the general population, from narcissism and repressed homosexuality (Fine, 1956) to Oedipal

motives and castration anxiety (Melamed & Berman, 1981). Although most of these propositions have received little or no empirical support, it is impossible to know whether such differences existed in the study sample and, if so, whether they had any impact on the nature of the examined relationships. Third, there are some indications that meaningful congruence between traits and the predictable situational responses they elicit may be restricted largely to "chosen" (as opposed to imposed) situations (e.g., Emmons & Diener, 1986). In the current study, all participants were chess enthusiasts and engaged in the chess games they played on their own volition (i.e., "chosen" situations). Caution is therefore warranted when attempting to generalize the current findings to less autonomously chosen contexts.

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