MOTIVATIONAL CLIMATE AND PERCEIVED COMPETENCE IN ANXIETY AND TENNIS PERFORMANCE

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Summary.—This study was done to verify a prediction in achievement goal-orientation theory in a Korean physical education setting. It was hypothesized that the interactions of situationally induced motivational climates (Task and Ego) and perceived competence would differentially influence anxiety and performance in tennis classes. 60 undergraduate men were assigned to a Task-involving and an Ego-involving program in tennis classes for 6 wk. Their perceptions of motivation climates and tennis competence were measured after the first 3 wk., and anxiety responses (cognitive and somatic) and tennis skill performance were evaluated every week over the second 3 wk. of the class. Analysis showed in Task-involving condition students decreased anxiety responses and increased tennis performance, whereas Ego-involving students who had low perception of their tennis competence maintained their anxiety responses and decreased their tennis performance. These results support the hypotheses and the predictions of goal-orientation theory and suggested practical application of the goal-orientation theory in Korea could be explored.

Sports and physical activities obviously involve achievement-related affect and behaviors since participants try to improve performance. Advances in our understanding of the antecedents of affect and behaviors in sport have been slow to develop. Many investigations have had a descriptive and a theoretical character (Vlachopoulos, Biddle, & Fox, 1996; Hall, Kerr, & Matthews, 1998).

Based on social-cognitive approaches to motivation (Dweck, 1986; Nicholls, 1989), an achievement goal-orientation theory has been proposed to explain achievement-related cognition, affect, and sporting behavior (Duda, 1992, 1993; Roberts, 1992; Weiss & Chaumeton, 1992). This theory states that individuals participate in sports to show competence via two orthogonal goal orientations, task and ego goals. Task-involved individuals judge their ability with reference to their previous performance and feel successful when developing skills. Ego-involved individuals judge their ability normatively and feel successful when outperforming others or winning.

The goal-orientation theory predicts that goal orientation and perceived competence interactively influence cognitive, affective, and behavioral responses in achievement contexts (Nicholls, 1989). Ego-involved individuals perceiving low ability will show incompetence since they expect to fail on
moderately difficult tasks. Such an expectation can produce negative affect, divided attention, and possibly impaired performance. These maladaptive patterns are not predicted for Ego-involved individuals perceiving high competence. They will show competence since they expect success on moderately difficult tasks. Similarly, adaptive patterns are predicted for Task-involved individuals, independent of perceived ability, because they focus on mastery and learning at a given task (Vlachopoulos & Biddle, 1997).

Several researchers have focused on the motivational climate that influences affect and behavior in achievement (Ames, 1992; Seifriz, Duda, & Chi, 1992; Walling, Duda, & Chi, 1993). The motivational climate can be considered task- or ego-involving, depending on the demands of the situation. For example, when a teacher in a physical activity class emphasizes learning, the students are more likely to perceive a Task-involving climate. However, a physical activity class, characterized by interpersonal competition, public evaluation, and normative feedback, is more likely to create an Ego-involving climate (Ames, 1992; Roberts, 1992). Along with the predictions of goal-orientation theory, Ames suggested (1992) that students who perceive mastery-involving climates, i.e., Task-involving, are likely to show adaptive behaviors in the classes, while those who perceive ability-involving climates, e.g., Ego involving, are likely to show maladaptive behaviors if they feel low in competence. Research on correlates of the motivational climates provided empirical evidence for this proposition in the physical domain (Kavussanu & Roberts, 1996; Treasure, 1997; Yoo, 1999). A field-based intervention study also suggested that a mastery motivational climate, i.e., Task-involving, could influence positive enjoyment and enhanced motor skill learning (Theeboom, De Knop, & Weiss, 1995).

The predictions of the goal-orientation theory have been supported in sport settings. However, studies have mostly been conducted in western countries. Maehr and Nicholls (1980) argued that perception of success and failure would influence goals differently across cultural backgrounds. In the sport setting, Duda and Allison (1990) reviewed evidence for cultural variations in achievement goals. Underlying reasons for such differences are not clear. Prevailing motivational climate in a culture should differentially influence the goals people adopt in physical activities (Kim & Gill, 1997; Yoo, 1997; Yoo & Kim, 2002). Thus, this study concerned an application of the goal-orientation theory within Korean culture.

Duda (1992) suggested that studies should test the practical implication of goal-orientation theory in real-life sport settings. Based on the previous intervention studies (e.g., Ames, 1992; Theeboom, et al., 1995), this study examined how situationally induced motivational climates (task and ego) and perceived competence would jointly influence anxiety responses and tennis performance by Korean college students in physical education. It was hypoth-
esized that the students in task-involving climate, regardless of their perceived competence in tennis, would experience lower scores on state anxiety and exhibit higher performance during a tennis skill test. However, the students in ego-involving climate would experience higher state anxiety and exhibit lower skill test scores, when they perceive their competence in tennis to be low.

Method

Participants

Sixty male undergraduate students enrolled in beginning tennis classes participated (age: $M=20.1$, $SD=2.0$). The classes were elective and designed to improve their basic tennis skills. The students were considered physically healthy but self-identified novices in tennis skills. They were assigned to a Task-involving condition and an Ego-involving condition with the restriction that the two groups were to have equal numbers of participants ($ns=30$).

Instruction

In the academic domain, Ames (1992) developed a TARGET program to enhance a mastery orientation in the classroom: task, authority, recognition, grouping, evaluation, and time. Theeboom, et al. (1995) successfully used this program to examine the effect of motivation climate in practice of Chinese martial arts. Like Theeboom, et al., an instruction program was constructed for this study. The task-involving instruction involved a variety of partners and small-group practice allowing flexible allocation of time, while the ego-involving instruction consisted of repetitive basic drills and simultaneously executed individual practice (task, grouping, time).

More specifically, different evaluation and recognition strategies were employed for each condition. The students in the Task-involving condition were informed that their learning skill would be individually evaluated in the test sessions. It was emphasized: “don’t compare your skills with others in this class, and focus on learning, improving, and progressing of skills in the course of the class. These are your goals as well as this class’s goals.” The students’ correct tennis performance was praised individually, and information was provided (e.g., “Good work! You have a good body-turn.”). When they performed incorrectly, encouragement and corrective feedback for improvement were given (e.g., “Nice try! If you can, keep your body-turn next time.”). In contrast, the students in the Ego-involving condition were informed that their tennis skills would be evaluated in comparison with others in this class at the test sessions. Thus, the following was emphasized: “compete in your performance with others to do better in the course. You should outperform other students in this class to have good result on the test. These are your goals as well as this class’s goals.” The students’ correct ten-
nis performance was praised by the instructor and given public recognition (e.g., “Very good! Everybody, look at her.”). When they performed incorrectly, an evaluative response plus corrective feedback were given (e.g., “No, this is not good! You must turn your body. Look at others.”).

Measures

Motivational climate.—Perceptions of the motivational climate were measured by the Korean version of Perceived Motivational Climate in Sport Questionnaire (Seifriz, et al., 1992). The questionnaire was a 19-item scale including 11 Performance (e.g., “Students are encouraged to outplay classmates.”) and eight Mastery items (e.g., “The teacher focuses on skill improvement.”). The stem “In this class...” preceded each item, and the participants responded to the items on a 5-point Likert-type scale using anchors of 1: strongly disagree and 5: strongly agree. Cronbach alphas of .94 and .93 were found for the Mastery and the Performance subscales, respectively. Their intercorrelation was .18. Confirmatory factor analysis suggested an acceptable fit of the data with the hypothesized model (Yoo, 1999).

Perceived competence.—Perceptions of tennis competence were assessed using the Sport Competence subscale from the Physical Self-perception Profile (Fox, 1990). Instead of the 4-choice answering format, the participants responded to the items (e.g., “Some people feel that they are good when it comes to playing tennis.”) on a 5-point Likert scale using anchors of 1: not like me and 5: like me. Factorial validity and the internal consistency of the profile with Korean college students in sport settings have been reported by Yoo and So (1998).

Anxiety responses.—The Korean version of the Worry-Emotionality Inventory (Morris, Davis, & Hutchings, 1981) was chosen to measure the students’ cognitive and somatic anxiety responses during a tennis skill test. The inventory is a 10-item scale (5-point Likert-type) including five cognitive anxiety items and five somatic anxiety items. Yoo (1996) reported the validity and reliability of this inventory in Korea.

Tennis skill.—The participants were required to return tennis balls coming from a tennis ball machine with consistent speed but at random intervals (within 10 sec.). When they hit back into the assigned area (3 m x 3 m) on the other side of the court with a forehand stroke, they received one point in an objective evaluation. Ten trials were given each student. Furthermore, the two tennis experts subjectively judged the students’ stroke skills (footstep, swing balance, intensity, and hit timing) based on a 5-point rating scale. The rating scale was valid in that it was based on the official scoring method for tennis evaluation in classes.

Procedure

Once placed into the Task-involving and the Ego-involving conditions,
all students signed a consent form and were informed the class’s goals and objectives at the beginning of classes. They participated in 6-wk. tennis classes for 2 hr. a week along Task- and Ego-involving programs. After the first 3 wk. of the class, their perceptions of motivational climates and tennis competence in the classes were measured. Their tennis skills were evaluated every week over the second 3 wk. of the class. Participants performed 10 trials of tennis strokes for each test, so there were 30 trials over 3 wk. Their anxiety ratings were assessed prior to each test, and performance feedback and normative feedback were given to them in the Task- and the Ego-involving conditions, respectively.

**Results**

*Motivational Climates and Perceived Competence*

A series of *t* tests were performed to check possible differences in motivational climates and perceived competence between the Task-involving and the Ego-involving group after 3 wk. of instruction. The analysis showed that the Task-involving group (*M*=4.6, *SD*=.3) had a significantly higher mean than the Ego-involving group (*M*=3.7, *SD*=.3) on the Mastery subscale (*p*<.05), while the Ego-involving group (*M*=4.5, *SD*=.6) exhibited a significantly higher mean on the Performance or Ego subscale (*M*=3.8, *SD*=.3). However, there were no significant differences in perceived competence between the two groups (*p*>.05). Using a median-split procedure, two groups of high and low perceived competence were created from each goal condition: for the Task-involving condition (*Mdn*=3.8) there were 17 of high competence and 13 low; for the Ego-involving condition (*Mdn*=3.6) there were 13 of high competence and 17 low.

*Anxiety Responses*

A multivariate analysis of variance was conducted to examine the anxiety responses (cognitive and somatic anxiety) produced over three weekly occasions of tennis performance as a function of climate and competence. The multivariate results indicated significant main effects for climate, competence, time (Wilks lambda = .86; *F* = 4.49, *p* < .05; Wilks lambda = .71, *F* = 11.35, *p* < .01; Wilks lambda = .72, *F* = 5.28, *p* < .01, respectively). The interaction of climate × time and the three-way interaction of climate × competence × time were also significant (Wilks lambda = .70, *F* = 5.61, *p* < .01; Wilks lambda = .84, *F* = 2.56, *p* < .05, respectively). Separate univariate analyses on cognitive and somatic anxiety resulted in significant main effects for climates, competence, and time. The interaction of climate × time and of climate × competence × time were significant for cognitive anxiety (*F* = 4.22, *p* < .05) and for somatic anxiety (*F* = 4.18, *p* < .05).

Table 1 displays mean anxiety for climate by competence groups over
three occasions or times. Observations indicated that, except for persons of low competence in the Ego-involving condition, the three climate by competence groups exhibited gradually lower cognitive anxiety over time. Results for the simple main effects indicated that all groups were not significantly different on cognitive anxiety at Times 1 and 2 ($p > .01$). However, at Time 3, those of low competence in the Ego-involving condition exhibited the highest mean anxiety, whereas high competence in the Task-involving condition showed the lowest mean rating. In the other condition, those of low competence had significantly decreased cognitive anxiety at Time 3 ($p < .01$). Mean anxiety for those highly competent in the Ego-involving condition remained constant over time. For somatic anxiety, those of high competence in both conditions showed lower ratings than the low competence groups and remained stable over time. Subjects of low competence in the Task-involving condition had a decreased mean over time. But those in the Ego-involving condition increased mean somatic anxiety over time, exhibiting a significantly higher mean rating at Time 3 than other groups ($p < .01$).

**Table 1**

<table>
<thead>
<tr>
<th>Group</th>
<th>Cognitive Anxiety</th>
<th></th>
<th>Somatic Anxiety</th>
<th></th>
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<tbody>
<tr>
<td></td>
<td>Time 1</td>
<td>Time 2</td>
<td>Time 3</td>
<td>Time 1</td>
</tr>
<tr>
<td>Task-involving</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High competence</td>
<td>M</td>
<td>2.47</td>
<td>2.51</td>
<td>1.49</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>.42</td>
<td>.52</td>
<td>.30</td>
</tr>
<tr>
<td>Low competence</td>
<td>M</td>
<td>3.69</td>
<td>3.42</td>
<td>2.46</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>.71</td>
<td>.75</td>
<td>.64</td>
</tr>
<tr>
<td>Ego-involving</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High competence</td>
<td>M</td>
<td>2.79</td>
<td>2.60</td>
<td>2.50</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>.60</td>
<td>.60</td>
<td>.52</td>
</tr>
<tr>
<td>Low competence</td>
<td>M</td>
<td>3.27</td>
<td>3.72</td>
<td>3.73</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>.65</td>
<td>.79</td>
<td>.85</td>
</tr>
</tbody>
</table>

**Tennis Performance**

A multivariate analysis of variance was performed to investigate the effects of climate, competence, and time on the subjective and objective tennis performance, with repeated measures on time. This analysis yielded a significant main effect for competence and time (Wilks lambda = .53, $F_{235} = 24.89$, $p < .01$; Wilks lambda = .39, $F_{435} = 20.99$, $p < .01$, respectively). The interaction of climate $\times$ competence $\times$ time was also significant (Wilks lambda = .62, $F_{435} = 8.11$, $p < .01$).

Table 2 shows mean tennis performance as a function of climate, competence, and time. Subsequent univariate analyses on objective performance...
(points) showed significant main effects for competence and time. The three-way interaction of goal x competence x time was also significant. Analyses of the simple main effects showed that persons of low competence in the Task-involving condition who had the lowest objective performance at Time 1 significantly increased over the three times (p<.01), but those of high competence significantly increased objective performance from Time 1 to Time 2 (p<.01). In the Ego-involving condition those of low competence showed the lowest performance at Times 2 and 3 (p<.01), and those of high competence showed a decreased tendency, albeit nonsignificant (p>.01). There was also a significant three-way interaction among climate, competence, and time on subjective performance. Table 2 indicates similar patterns between subjective and objective performance among climate by competence groups over time. Highly competent groups continuously showed higher subjective performance than groups low in competence, but those in the Task-involving condition somewhat increased their subjective performance at Time 3 (p<.01), and those in the Ego-involving condition had the lowest subjective performance at Time 3 (p<.01).

<table>
<thead>
<tr>
<th>Group</th>
<th>Objective Skill</th>
<th>Subjective Skill</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Time 1</td>
<td>Time 2</td>
</tr>
<tr>
<td>Task-involving</td>
<td></td>
<td></td>
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<tr>
<td>High competence</td>
<td>M</td>
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<td></td>
<td>SD</td>
<td>.92</td>
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<tr>
<td>Low competence</td>
<td>M</td>
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<tr>
<td></td>
<td>SD</td>
<td>.81</td>
</tr>
<tr>
<td>Ego-involving</td>
<td></td>
<td></td>
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<tr>
<td>High competence</td>
<td>M</td>
<td>3.56</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>.90</td>
</tr>
<tr>
<td>Low competence</td>
<td>M</td>
<td>4.24</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>.96</td>
</tr>
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</table>

**Discussion**

This study showed that the Task- and the Ego-involving conditions in tennis classes successfully produced the mastery and the performance climates, respectively. As the TARGET program suggests (Ames, 1992), recognizing and emphasizing personal skill improvement, self-comparison, and variety of exercises can be regarded as task-induced instructional strategies, while emphasizing performance outcome, peer-comparison, and repetitious exercise can be considered as ego-induced instructional strategies for students. However, no significant differences were found between the students in the two conditions for their mean perceived competence. A possible ex-
planation might be that the first 3 wk. of the program was not long enough to enable the novices to feel competent in tennis skills. They could not make effective use of informational sources by which to assess their tennis competence.

In line with goal-orientation theory (Nicholls, 1989; Ames, 1992), this study examined the effects of motivational climates and perceived competence on rated anxiety conditions and tennis performance through a comparison of Task- and Ego-involving conditions in an actual physical education setting in Korea. Overall, in the Task-involving condition, students seemed to rate anxiety as deceased and tennis performance as increased. Ego-involving students perceiving their low competence in tennis had increased their mean rated anxiety and decreased rated tennis performance over times of test. In the Ego-involving conditions, students perceiving high competence in tennis had relatively stable rated anxiety and tennis performance over the times of test. These results supported the hypotheses and the predictions from the goal-orientation theory.

The structure of the achievement climate endorsing particular goals will change the personal meaning of achievement and influence the patterns of cognition, affect, and behavior (Roberts, 1986; Ames, 1992). The students in the Task-involving climate would view the tennis performance as challenging tasks in self-referent terms. They would perceive failure in a process of learning and improvement and not become threatened by perceptions of social comparative failure. Thus, they were less likely to rate anxiety high during the tests. Rather, they tended to control their negative thoughts and expectations of performance during the evaluation session and subsequently improved their tennis performance.

These results are consistent with the findings conducted in both academic and sport settings over the world (Elliott & Dweck, 1988; Goudas & Biddle, 1994; Theeboom, et al., 1995; Kavussanu & Roberts, 1996; Treasure, 1997; Yoo, 1999). For example, with mastery-involvement (task-involved) children in the classroom responded with positive affect and increased persistence on the task (Elliott & Dweck, 1988), and athletes high in a task-orientation showed reduced state anxiety and confidence about competition (Roberts, 1986; Hall & Kerr, 1998; Hall, et al., 1998). In physical education contexts, the task-involving climate was positively associated with sport-skill performance and adherence to the tasks among students attending physical education classes in Korea (Yoo, 1999). Theeboom, et al. (1995) also found that children in a mastery program for three weeks increased their rated intrinsic motivation and rated higher on martial art skills than those in a traditional program.

In this study, meaning of performance would be different for the students practicing tennis skills in the Ego-involving climate. The students
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might consider their performance achievement in either normative or comparative terms, and when they felt low in ability as compared with others, their perceptions of self-worth would be threatened. Thus, the students reporting low perceived ability in the Ego-involving climate rated their anxiety highest during tennis evaluation, and subsequent tennis performance did not improve. The strength of physiological symptoms, i.e., somatic anxiety, would be also expected for these students when evaluation situations continued. Vealey and Campbell (1988) reported that young ice skaters who were more focused on social comparison and competitive outcomes rated their precompetitive anxiety higher. Hall and Kerr (1998) stated that perceived competence predicted both cognitive and somatic anxiety before athletic competition. When the effects of perceived competence had been removed from the analyses, a winning orientation consistently contributed to the prediction of cognitive anxiety throughout the week prior to competition but only predicted somatic anxiety when evaluation was imminent.

A few laboratory and field experiments have provided preliminary evidence of the potentially performance-debilitating effects of ego involvement (see Duda, 1992, 1993). Although little information is available about the underlying mechanism for this effect, ego involvement may be associated with impaired performance because state anxiety is elevated. One result of sport study by Duda, Newton, and Chi (1990) was that tennis players who were high in ego orientation exhibited high precompetitive cognitive and somatic anxiety and did not expect to win the match. Other motivational mechanisms may also be linked to potential performance-debilitating effects of ego involvement (Duda, 1992).

It is recognized that most physical educators have been greatly concerned about achievement-related affect and performance in classes. These results suggest that the Task-involving condition is a more favorable alternative for teaching tennis skill to novices. However, more evidence should be obtained with students at different learning stages. A traditional teaching program, i.e., Ego-involving program, may become appropriate with complex technical skills at a later stage of learning (Theeboom, et al., 1995). Further, the systematic program for developing motivational climate in physical activity contexts should be constructed in terms of how to emphasize learning from one's mistakes, importance of exerting effort, personal skill mastery, and participation for this participant's sake.

Finally, this study involved a practical application of the goal-orientation theory in a different cultural setting. For Koreans, group identity and harmony are important cultural values rather than self-identity and independence (Kim & Gill, 1997; Yoo & Kim, 2002). These cultural variations, typically ignored in goal-orientation studies, can be measured across cultures. Investigation of similarities and differences in the relations of goal-orientations
with sociocultural variables across Korean and western samples should be conducted to facilitate generalization of these ideas in sports.

REFERENCES


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