PREPARATORY AND PERFORMANCE SELF-EFFICACY IN ATHLETES

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PREPARATORY AND PERFORMANCE SELF-EFFICACY IN ATHLETES

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The present study examines two subdivisions of general self-efficacy: preparatory self-efficacy, (the belief that you will be able to successfully complete a task) and performance self-efficacy (the belief held while accomplishing a task that it would be successful). These were examined as participants varying in athletic expertise performed two spatial imagery tasks while either being told or not that they were in competition with others completing the same tasks. Results indicated that preparatory self-efficacy was not affected by either engagement in the task or the perception of competition with others. However, for those who perceived they were competing with others, results indicated a relationship between general self-efficacy and performance self-efficacy. Contrary to extant research, there were no gender differences in the results, nor was there an expected relationship of changes in self-efficacy with athletic expertise. Based on these results, implications for future research include examining the contribution of overconfidence to preparatory and performance self-efficacy; people may believe that they can complete a task without having the necessary resources to do so effectively.
People might better spend more time practicing tasks, despite feeling confident in their abilities.

*Keywords:* self-efficacy, preparation, performance, imagery, overconfidence, athletes
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CHAPTER 1
INTRODUCTION

Prior to completing a task, people typically assess a number of variables that will either help or inhibit their success on the impending task. In order to make an assessment of the situation, they will utilize their past experience, such as receiving a high grade on an exam after hours of studying, and the experiences of others. The present study seeks to examine this particular relationship between past experiences and future behavior of participants with regards to specific forms of self-efficacy, which are the beliefs that people hold motivating them to perform certain behaviors. Self-efficacy is further broken down into preparatory self-efficacy, which includes the beliefs people hold during the preparation phase of an activity, and performance self-efficacy, which includes the beliefs that people hold during the performance phase of an activity. An extensive literature review revealed no study that has examined how competition on spatial imagery tasks is affected by the relationship between preparatory and performance self-efficacy. These spatial imagery tasks will serve as the operational definition of performance in relation to performance self-efficacy.

Self-Efficacy

Albert Bandura (1977) studied various cognitions in relation to behavior and argued that, “through cognitive representation of future outcomes individuals can
generate current motivators for behavior” (p.193). This statement constitutes the
cognitive concept of self-efficacy. He theorized a relationship between three different
variables to further define self-efficacy: people, their behavior, and the ensuing outcome
of that behavior. This theory assumes that psychological processes (such as goal setting)
serve to create and strengthen expectations of personal self-efficacy (Bandura, 1977).
Essentially, people base their current performance and their expectations on a selection of
variables from similar past events. If a similar event has not happened before, then they
can base their assessment on others’ experiences. Furthermore, Bandura (1977) suggested
that the ability of people to use coping behaviors, which are beliefs as to whether one can
manage a given situation, will affect expectations of personal mastery and consequent
behavior. For example, people will avoid activities that they deem to be too difficult to
perform with the coping skills available to them.

To further explain the relationship between people, behaviors, and outcomes,
Bandura (1977) described the interaction between these expectancies of success.
According to Bandura (1977), expectations can be broken down into efficacy
expectations and outcome expectations. Bandura (1977) defines efficacy expectation as
the conviction that people have that they can successfully execute behaviors to produce a
specific outcome. After establishing their efficacy expectation, people assess their
outcome expectations, which serve as an estimate that their behavior elicits certain
results. Bandura (1977) argues that people will assess the amount of success they will
have performing an action, and then assess how likely it is that the behavior will lead to
the outcome. Once people go through this cognitive process repeatedly, they begin to
develop perceptions of self-efficacy. The more successful outcomes that people achieve
by repeating this cognitive process, the higher their self-efficacy becomes, which then aids in raising their confidence.

Perceived self-efficacy beliefs are essential in determining the type and the effect of the action that follows the assessment of a situation. That is, perceived self-efficacy not only influences decision-making, it also affects eventual success. Bandura (1977) points out that efficacy expectations determine the effort and length of time that people put forth in the face of obstacles and other aversive situations. For example, experiencing repeated failures can be overcome by determined and sustained effort. Thus, the more confident people are in their effort as related to potential success, the more likely they are to persist in a behavior that encounters many obstacles. This persistence seemingly correlates with strong perceived self-efficacy (Bandura, 1977). The persistence of the activity during difficult circumstances stands to reinforce perceived self-efficacy even more. Consequently, stopping an activity prematurely compromises coping abilities and reinforces fear and self-debilitating expectations, which lead to avoidance of threatening situations (e.g., not studying for the second exam in a class after receiving a low grade on the first exam).

However, Bandura (1977) notes that perceived self-efficacy encompasses more than just expectations. Other factors that contribute to the relationship between performance and self-efficacy beliefs are the proper skills and adequate incentives for performing a behavior. These two factors, coupled with efficacy expectations, are a major determinant of behavior according to Bandura’s (1977) research. Additionally, performance varies depending on the perceived cause of the success, such as whether performance is due to effort or due mainly to perceived ability. Further, cognitive
appraisal of the difficulty of the task impacts performance and perceived self-efficacy (Bandura, 1977). These conditions make perceived self-efficacy a broad construct that remains relatively stable, over time. Bandura (1977) states that once perceived self-efficacy is established, it tends to generalize to a variety of other situations where performance could be affected.

**General Self-Efficacy.** In competitive settings, academic settings (e.g., Coutinho & Neuman, 2008; Lane, Lane, & Kyprianoc, 2004) and musical performance settings (Cahill Clark, 2013; Ritchie & Williamon, 2012), research has supported the notion that higher levels of general self-efficacy directly affect persistence, effort, and performance on an activity. Coutinho and Neuman (2008) tested whether general self-efficacy was positively related to academic performance, metacognition, and deep processing of new information (e.g., critical thinking) with 629 undergraduates. They found that general self-efficacy was the strongest predictor of performance, indicating that students with confidence in their abilities tend to experience success in performance.

Lane and colleagues (2004) examined how general self-efficacy may boost performance in adult postgraduate students. Measures of general self-efficacy involved, “the ability to maintain motivation with difficulties, cope with intellectual demands of post-graduate program, and achieve a passing grade at the conclusion of the semester” (Lane et al., p. 250). Of these three measures, Lane and colleagues (2004) found earning a passing grade was the only criterion that showed a relationship with general self-esteem affecting performance. On the other hand, when students were asked to identify a reason for their success, results indicated that general self-efficacy mediated the influence of previous performance accomplishments on later performance (Lane et al., 2004). Thus,
results that showed earning a passing grade affected performance support earlier research results (e.g., Lane & Lane, 2001) that showed how general self-efficacy significantly related to academic performance. Subsequent research (e.g., Coutinho & Neuman, 2008) examining this relationship showed the same results.

General self-efficacy affects performance in the performing arts according to Cahill Clark (2013), who noted its significant correlation with performance achievement of music students. Greater musical self-efficacy, based on Cahill Clark’s musical self-efficacy measure (2008), predicted higher ranking in musical competition for 4 high-school string musicians. Cahill Clark (2013) studied the practice habits and strategies of the 4 musicians who scored highly on the musical self-efficacy measures. The researcher identified common characteristics among these high musical self-efficacy students as they prepared for competition. The more highly efficacious the musician, the more playing through an excerpt without stopping was accomplished during practice. Also, the more highly efficacious the musician, the more attention was given to correcting errors made during practice. The most successful student, who met his goal of qualifying for the Texas All-State Orchestra, had higher than average motivation as well. Therefore, in this study, the more practice and the higher the motivation, the greater the indication of musical self-efficacy, which may have translated into more persistence and better performance outcomes in the competition.

Ritchie and Williamon (2012) examined the quality of musical performance in comparison to general self-efficacy. In their first study, of 125 undergraduate music students, general self-efficacy and practice time were measured before a performance. A second study furthered the research by looking not only at the practice habits of 30
highly-skilled music conservatory students, but also at their general self-efficacy related to a self-rating of overall level of performance and quality. Entry into the music conservatory required students to pass technical and recital examinations as part of their studies, thus differentiating them as highly-skilled. Ritchie and Williamon (2012) assessed the effects of the general self-efficacy beliefs of students and time spent practicing on the quality of musical performance for the students. Results of the first study suggested that general self-efficacy was the only significant predictor of musical performance quality and accounted for 10% of the variance. However, the results of the second study showed that general self-efficacy accounted for nearly double the percent (17%) of the variance as a predictor of musical performance quality. Thus, results from both studies suggest that general self-efficacy is a significant factor in predicting musical performance.

Preparatory Self-Efficacy. According to Bandura (1997), preparatory self-efficacy is the belief that people, including athletes, hold about a situation or a competition during the preparation phase, that period of time when individuals train for an upcoming event. Bandura (1997) believed that people who are highly efficacious with regards to a specific task, would have little incentive to invest in the preparatory stage prior to completing this task. In other words, as people prepare for a task or competition, when preparatory self-efficacy is high, uncertainty about performance tends to be low.

Furthermore, additional practice with a specific task produces a peak in preparatory self-efficacy beliefs. Once people reach this peak, practice effort starts to decline because they become highly efficacious and see little reason to invest more time or effort in practicing the task. Therefore, Bandura (1997) stated that a certain amount of
uncertainty about a specific task could actually be beneficial to individuals in reducing overconfidence and increasing their effort during practice. This led Bandura (1997) to hypothesize that preparatory self-efficacy would have a curvilinear, and, specifically, an inverted-U relationship with performance and effort, or with persistence (Feltz, Short, & Sullivan, 2008; cf., Yerkes & Dodson, 1908). As people practice to reduce their uncertainty regarding a specific task, preparatory self-efficacy increases and so does effort. However, with sufficient knowledge and skill to be proficient in the activity, preparatory self-efficacy declines and so does effort, or persistence. Thus, research on the preparatory self-efficacy of athletes (e.g., Vealey, Hayashi, Garner-Holman, & Giacobbi, 1998; Garza & Feltz, 1998; Wood, 2011) has produced conflicting results as to whether or not preparatory self-efficacy as adhering to the theories presented by Bandura has been demonstrated. Further conflicting results come from other research; Garza and Feltz (1998) studied figure skaters and subcategories of preparatory self-efficacy by examining practice techniques (i.e., paper freestyle drawing and a walk-through on the floor of skating sequences) and their impact as preparatory techniques on performance self-efficacy during competition. They found that, according to subjective raters (coaches) who evaluated the figure skaters’ performance, both practice techniques positively correlated with ability and confidence during competition compared to a similar evaluation of a no-practice control group. The findings of this study support the first part of Bandura’s (1997) theory regarding preparatory self-efficacy: as confidence increases, so does effort and subsequent performance. However, Garza and Feltz (1998) did not discuss whether a decrease in effort, persistence, or self-efficacy was present after a certain amount of practice. Their findings were limited to whether the mental practice
treatments would improve competition confidence compared to a no-mental-practice control group.

Wood (2011) focused on the preparatory self-efficacy phase of the relationship between preparation and performance in his research and tested whether lower levels of preparatory self-efficacy would actually be beneficial to effort in getting ready for a competitive event. That is, Wood (2011) was interested in whether self-doubt during the time spent in preparing for competition could increase motivation during the competition, as proposed by Bandura’s (1997) theory of preparatory self-efficacy. To address this, Wood (2011) carried out two studies in which participants used a golf putter to hit three different target zones of varying difficulty. These were defined as high, medium, and low self-efficacy targets. In order to determine these zones, participants were allotted 30 practice putts; then, the researcher assessed self-efficacy for each target. The zones were identified as follows: First, the furthest zone in which participants could make five out of five practice putts was marked Zone 5 with a labeled poker chip and denoted the high self-efficacy target. Second, the zone in which participants could make three out of five practice putts was labeled Zone 3 and denoted the medium self-efficacy target. Third, the zone in which participants could make only one out of five practice putts denoted the low self-efficacy target. After the 30th practice putt, participants began the performance phase, taking five putts in each target zone. However, support was not found for Bandura’s (1997) theory of preparatory self-efficacy. Wood (2011) found that the target zone identified as the high self-efficacy target resulted in the lowest levels of preparation effort compared to the preparation effort seen for the target zones identified as the medium- and
the low self-efficacy targets. Wood (2011) determined preparation effort based upon the number of practice putts an individual took prior to the task.

**Performance Self-Efficacy.** Bandura’s (1997) beliefs regarding performance self-efficacy in competition differ from preparatory self-efficacy because of the presence of uncertainty during a competition. During performance, or when people are presumed to be in a competitive state of mind, Bandura (1997) argues that people must have a strong belief in their performance self-efficacy to mobilize the sustained effort and attentional focus needed to triumph over tough opponents or to stage successful comebacks after defeat. Having any sort of uncertainty present during competition does not serve the best interest of competitors. Bandura (1997) states that having uncertainty promotes self-inhibition under intense competition. For example, when people have too much uncertainty they can experience it as a stressor, thus debilitating performance (Feltz et al., 2008). Rather, according to Bandura (1997), performance self-efficacy should be boosted and reaffirmed in order for performance to be successful. To clarify this concept, Bandura (1997) states that a linear relationship most likely exists between performance self-efficacy beliefs and performance (Feltz et al., 2008). As performance self-efficacy beliefs increase, so does effort and persistence which then helps to increase performance. This relationship indicates a positive relationship between performance self-efficacy and performance that is mediated by effort.

Knowing the relationship between performance self-efficacy beliefs and performance is especially important for athletes due to the various sources of sports confidence. According to Vealey and colleagues (1998), sports confidence can be generated from nine different sources. When athletes seek to gain confidence they find it through
mastery, demonstration of ability, physical and mental preparation, social support, vicarious experience, physical self-presentation, environmental comfort, situational favorableness, and leadership of the coach. In order to define the first two concepts of mastery and demonstration of ability, Vealey and colleagues (1998) draw inspiration from Bandura’s original theory of general self-efficacy (i.e., Bandura, 1977). When athletes perform well or reach set goals, this indicates mastery, which relates to ability; whereas the demonstration of ability is determined by exhibiting evidence of beating others in a competitive setting. Physical and mental preparation derives from Horn and Hasbrook’s (1987) notion that effort can be seen as a source of competence used by athletes. An example of this is extant research (e.g., Gould, Hodge, Peterson, & Giannini, 1989) that demonstrated physical preparation (i.e., physical conditioning) was often used by coaches and athletes to promote self-confidence in athletes. Participating in physical conditioning led to increased effort by the athletes and, hence, self-confidence. Once again, effort is the mediating factor. Social support is based on Bandura’s (1977) ideas regarding verbal persuasion in which Bandura believed other individuals (not participating in an event) could lead participants to believe that the participants could successfully perform a task. For Vealey and colleagues (1998) this meant that positive verbal support from coaches and teammates could promote sport confidence. The source of sports confidence called vicarious experience reflects Bandura’s idea that watching others succeed builds confidence (Vealey et al., 1998). Thus, an athlete who observes the success of other teammates, for example, should experience an increase in confidence him- or herself.
The physical self-presentation source reflects athletes’ perceived body presentation of their physical selves. This source includes the self-confidence athletes feel when they perceive a positive body self-image (e.g., feeling strong and healthy). Environmental comfort is defined as the feelings that athletes get when they compete in a familiar setting such as their home court in a basketball game and/or perform their specific rituals such as dribbling the basketball a certain number of times before a free throw. Situational favorableness encompasses factors that athletes felt helped during competition (Vealey et al., 1998). These factors were originally labeled as luck/superstition, but the definition has changed to reflect the confidence athletes gained in situations where they thought they “caught a break,” such as receiving a favorable call by a referee. Finally, Vealey and colleagues (1998) suggest that the leadership of the coach reflects the coach’s ability to successfully make important decisions and lead the team effectively as determined by the coach’s athletes. Vealey and colleagues (1998) suggest the more athletes trust in their coach’s decisions, the better the athletes’ ability to make sound decisions and lead the team effectively themselves.

As Feltz and colleagues (2008) point out, performance self-efficacy is one of the most important and influential psychological constructs for facilitating achievement in sports (e.g., Feltz, 1988; 1994). Further, they believe that without this characteristic, athletes would lack the motivation and skills to pursue their athletic goals. Highly efficacious athletes are more likely to pursue challenging goals, cope with pain, and persevere through setbacks. Conversely, athletes with low performance self-efficacy avoid difficult goals, worry about possible injury, expend less effort, and are likely to give up in the face of failure (Feltz et al., 2008). This further explains why it is advantageous for athletes to
develop a high sense of performance self-efficacy because of its relationship with greater
effort and persistence during an activity, which translates into better performance.

**Visualization and Efficacy**

It is important for the purposes of the present study to identify a task that has the potential to inspire highly efficacious behavior in athletes. Murphy and Martin (2002) argue that sport psychology research generally promotes imagery as one of the most universal tasks used by athletes. Evidence shows that athletes use imagery naturally, as they begin to develop their motor control (Murphy & Martin, 2002). Richardson (1969) suggested that all those things of which people are semi-sensory or consciously aware constitute a form of mental imagery because they can exist in the absence of the original stimulus conditions known to produce their sensory or perceptual parts. This definition of imagery relates to the underlying physiological substrates (e.g., changes in neuronal connections formed by the original visual or other sensory experience) that reflect memories and calls attention to three different aspects of this imagery construct. First, research (e.g., Kosslyn, 1980) shows that the sensory and perceptual experiences people have can be simulated through imagery. Second, Murphy and Martin (2002) state that imagery is differentiated from dreaming in that, with imagery, individuals are cognitively aware of these experiences occurring, while with dreaming, people are in an altered state of consciousness that does not necessitate cognitive awareness. Third, imagery can occur regardless of previous prompting by actual and present relevant stimuli (Murphy & Martin, 2002). For example, skiers may image skiing without being on a mountain, although thinking of a mountain may assist in the image of skiing.
Several applied models of athletic imagery (e.g., Martin, Moritz, & Hall, 1999; Murphy & Martin, 2002) have been developed, seeking to support imagery theory. Martin and colleagues (1999) proposed that different types of imagery would be used for different athletic goals. One type, motivational general-mastery imagery, represents the effective coping and mastery of challenging situations (e.g., being mentally tough, confident, focused during competition). Murphy and Martin (2002) suggested a three-level model of applied imagery in sports, as well. According to this model, Level 1 represents the overall physiological and cognitive processes concerning imagery (Murphy & Martin, 2002). Level 2, which goes deeper, describes how athletes use imagery specifically during mental preparation, which, in turn, affects performance. Murphy and Martin (2002) state that Level 3 goes even deeper and describe how imagery plays a larger role in the context of sports competition. Taking this applied imagery model into account, athletes would use these skills in both the preparation and performance phases of competition. Nonathletic participants would also use these skills; however, it may not be to the same extent as athletic participants (Murphy & Martin, 2002). Thus, assessing the visualization and imagery skills of participants with spatial tasks would be an appropriate way to assess the differences in specific skills of athletic and nonathletic participants when in a competition. It also allows the researcher to compare the performance of nonathletic participants with athletic participants to determine if there is a difference between the spatial skills of participants with different levels of athletic experience.

Gender and Efficacy

When approaching a specific task, general self-efficacy may differ depending on gender. Schunk and Lilly (1984) explored the relationship between gender and reported
general self-efficacy beliefs of middle-school students. The researchers hypothesized that when participants faced a new mathematical task (i.e., residue problems), general self-efficacy would be differentiated by gender. They predicted that boys would report higher levels of general self-efficacy than girls would when learning how to do residue math problems. However, Schunk and Lilly (1984) also predicted that providing clear feedback on students’ performance would moderate the gender difference, resulting in reported performance self-efficacy following the instruction that was equivalent for boys and girls. The sample (N=30) consisted of an equal number of boys and girls, and they were tested using several measures. The researchers assessed preparatory self-efficacy (referred to as pretest self-efficacy), asked the participants to answer the problems, provided performance feedback, assessed attributional beliefs, and assessed performance self-efficacy (referred to as posttest self-efficacy). There was a significant gender difference in preparatory self-efficacy such that girls entered the study with lower self-efficacy beliefs than boys (Schunk & Lilly, 1984). However, there was no significant gender difference for performance self-efficacy, supporting Schunk and Lilly’s (1984) hypothesis that gender differences would be moderated by performance feedback. Thus, Schunk and Lilly’s (1984) research supported existing evidence (e.g., Crandall, 1969) of a gender difference in general self-efficacy prior to a novel task.

The Present Research

The present research seeks to further examine the relationship between preparatory and performance self-efficacy through the administration of two spatial imagery tasks. Extant research (e.g., Garza & Feltz, 1998; Vealey et al., 1998) on preparatory and performance self-efficacy evaluated these concepts as separate entities, rather than
examining the relationship between the two when participants are presumed to be in a
competition. Participants in the present study will be asked to perform two spatial
imagery tasks that use spatial ability and other cognitive processes such as visualization.
Visualization is here defined as the ability to image an experience from memory without
actually having the stimuli of the experience present (Morris, Spittle, & Watt, 2005).
Participants will experience one of two conditions. Participants in one condition will be
told they are taking part in a competition (although they are not); participants in a second
condition will not be told they are in a competition.

As Hegarty and Waller (2004) note, the ability to image an object’s movement
represents the concept of spatial visualization. For example, testing the ability to spatially
image the clicking of a pen (i.e., a so-called surface development test) would be one form
of a spatial visualization task. In the present research, the first task will be the Mental
Rotation Task, which is hypothesized to measure the cognitive processes of mental
rotation and spatial ability (Vandenburg & Kuse, 1978). The Mental Rotation Task
requires participants to match a criterion figure correctly to the same figure in a rotated
position shown among other distracters.

After performing a study testing various spatial orientation tasks, Hegarty and Waller
(2004) found that the Mental Rotation Task is associated with other tasks of spatial
visualization. Results of that study indicated an association between the study’s task (i.e.,
a pencil-and-paper spatial perspective-taking test) and perspective taking on a grand
scale. That is, when participants viewed a certain pattern, they could image it from
different perspectives, even if it was not seen from the different perspectives. One of the
spatial tests associated with the Mental Rotation Task is the Spatial Orientation Test,
which will be the second task used in the present research. This task was first developed by Kozhevnikov and Hegarty (2001) and later revised by Hegarty and Waller (2004). The aim of this test is to assess the ability to image different perspectives or orientations of an object in space. Results of the research by Kozhevnikov and Hegarty (2001) showed that participants reoriented themselves after an object was manipulated and rotated in order to complete the aforementioned task. That is, as the objects were manipulated in the Spatial Orientation Test, participants showed adjustments in their perspective (perspective taking) to match the manipulations.

**Hypotheses**

There are four hypotheses to be examined in the present research. The first and second hypotheses pertain to those participants who are told they will be in competition (*competitive condition*). The third hypothesis pertains to those participants who are not told they will be in competition (*noncompetitive condition*). The fourth hypothesis proposes that the reported self-efficacy of participants will differ by gender.

The first hypothesis (represented in Figure 1) proposes that for those in the competitive condition there will be a curvilinear relationship between preparatory self-efficacy beliefs (as measured by a state anxiety inventory) and personal agency (as measured by a general self-efficacy scale) prior to the spatial imagery tasks. That is, at first, as participants indicate higher scores for preparatory self-efficacy, they will also indicate greater personal agency. However, for those participants, as scores on personal agency continue to increase, scores on preparatory self-efficacy will decrease. In other words, as participants begin to learn a skill, they show low self-efficacy which rises as they become more proficient. At a certain point, participants reach an optimal level of
self-efficacy and effort. Once reaching this point, they will not seek to exert much effort in preparation. In fact, their effort may decline, with a concomitant decline in preparatory self-efficacy while their personal agency continues to increase, because they already have worked to hone their spatial skills. This results in a curvilinear relationship between preparatory self-efficacy and personal agency.

Figure 1. Hypothesis 1 for participants in the noncompetitive condition.

Note. The x-axis represents the competitive condition’s preparatory self-efficacy approaching a task and the y-axis represents their level of general self-efficacy.

The second hypothesis (represented in Figure 2) proposes that for those in the competitive condition there will be a linear relationship between performance on spatial imagery tasks and performance self-efficacy constructs (mastery, demonstration of ability, and physical/mental preparation, as measured by a sport confidence questionnaire). That is, as participants indicate higher scores for performance self-efficacy, they will also demonstrate better performance on the spatial imagery tasks.
Figure 2. Hypothesis 2 for participants in competitive condition.

Note. The x-axis represents the competitive condition’s performance self-efficacy after a task and the y-axis represents their performance on the spatial imagery tasks.

The third hypothesis (represented in Figure 3) proposes that for the participants who are not told they will be in competition (noncompetitive condition) there will be a curvilinear relationship between preparatory self-efficacy beliefs and personal agency prior to the spatial imagery task. After completing the spatial imagery tasks, there will also be a curvilinear relationship between scores on the performance self-efficacy measure and performance on the spatial tasks. This hypothesis is based on Bandura’s (1997) theory that proposes a linear relationship in the performance stage between self-efficacy beliefs and effort during competition. Because these participants will not experience instructions about competition, they will continue to exhibit behavior and beliefs similar to their preparatory self-efficacy behavior and beliefs.
Figure 3. Hypothesis 3 for participants in the noncompetitive condition.

*Note.* The x-axis represents the noncompetitive condition’s performance self-efficacy after a task and the y-axis represents their performance on the spatial imagery tasks.

The fourth hypothesis proposes that male participants will report higher self-efficacy beliefs than will female participants, regardless of being told that they are in competition or not, as evidenced by the responses of participants on the preparatory self-efficacy, personal agency, and performance self-efficacy questionnaires. Existing research (e.g., Schunk & Lilly, 1984) report gender differences in self-efficacy prior to a novel task. Participants in the present study will be performing novel spatial imagery tasks, not typically encountered, as seen in the present research, in daily life. The results are expected to support gender differences in self-efficacy prior to the spatial imagery tasks. These gender differences will be seen in each self-efficacy measure used in the present research. However, participants will not be receiving performance feedback, as in previous research (e.g., Schunk & Lilly, 1984).
CHAPTER 2

METHOD

Participants

There were 129 university students who participated in this study. The participants were enrolled in an Introductory Psychology course, and they completed the study as one option to meet a course requirement. Of those who volunteered, the data for 8 participants were excluded from analyses because of failure to follow directions, leaving a total of 121 participants (64 men and 57 women) in the sample. To assess athletic experience, all participants reported the level of athletic competition with which they identified: intramural, college club, intercollegiate, high school varsity, or high school junior varsity. Their years of athletic experience were then totaled ($M=10.96$, $SD=9.09$), serving as a continuous variable.

Measures

There were three self-efficacy questionnaires and two spatial imagery ability measurement tasks used in the present research. The self-efficacy questionnaires included the General Self-Efficacy Scale (Schwarzer & Jerusalem, 1995), the Competitive State Anxiety Inventory-2 (Martens, Vealey, & Burton, 1990), and the Sources of Sport Confidence Questionnaire (Vealey, 1998). The spatial imagery tasks were a Mental Rotation Task (Vandenburg & Kuse, 1978), and a Spatial Orientation Task (Hegarty,
Kozhevnikov, & Waller, 2004), that served as effort and performance measures. In order to simulate competition, half of the participants were randomly assigned to read a vignette designed to inspire competition (competitive vignette) prior to engagement in the two spatial imagery tasks.

**Test of General Self-Efficacy.** General self-efficacy was assessed using the General Self-Efficacy Scale (GSE; Schwarzer & Jerusalem, 1995; see Appendix A for complete scale) prior to the spatial imagery tasks. This scale is a 10-item psychometric assessment of optimistic beliefs in the ability to cope with general demands of life. Specifically, this scale refers to personal agency, which is the belief that one’s actions are responsible for successful outcomes. Cronbach’s alpha for internal consistency ranges from 0.75 to 0.91 (Scherbaum, Cohen-Charash, & Kern, 2006). According to Nunnally’s standards of reliability (1978), this range indicates that some scores fall below the reliability of .80, which is the generally accepted cutoff for basic research. This scale is unidimensional and used as a general measure of self-efficacy, not of self-efficacy in performing specific behaviors. An example of a question from the GSE is, “I can always manage to solve difficult problems if I try hard enough” (Schwarzer & Jerusalem, 1995). The response format on the GSE is a Likert-type scale ranging from 1 (Not true at all) to 4 (Exactly true). Higher scores on the scale indicate higher GSE for individuals completing the questionnaire (Scherbaum et al., 2006). Scores for each item are totaled with no necessary recoding to produce a composite score that can range from 10-40.

**Test of Preparatory Self-Efficacy.** Preparatory self-efficacy was examined with the Competitive State Anxiety Inventory-2 (CSAI-2; Martens, Vealey, & Burton, 1990; see Appendix B for the complete scale). This scale was created by Martens and
colleagues (1990) in order to assess cognitive anxiety, somatic anxiety, and a related component of self-confidence. Examples of self-confidence questions are, “I feel at ease,” and “I’m confident of coming through under pressure.” As Feltz, Short, and Sullivan (2008) note, the items from the self-confidence component represent the level of intensity that athletes feel surrounding their self-confidence about competing. The response format on the CSAI-2 is a Likert-type scale ranging from 1 (Not at all) to 4 (Very much). Higher scores on the scale indicate higher levels of anxiety and decreased preparatory self-efficacy for individuals completing the questionnaire (Martens, et al., 1990). Scores for each item on the questionnaire are taken at face value with the exception of Item 14, which is reverse scored. The items in the cognitive anxiety component, somatic anxiety component, and self-confidence component are summed with total scores ranging from 9 to 36. A score of 9 indicates low anxiety (i.e., high self-confidence) and a score of 36 indicates high anxiety (i.e., low self-confidence).

The scale’s internal consistency has been previously assessed. Cronbach’s alpha was computed using three different samples (i.e., Sample 1, n = 57; Sample 2, n = 40; Sample 3, n = 54) across each subscale of the CSAI-2. The results showed that Cronbach’s alpha ranged from .79 to .90 (Martens et al., 1990).

**Test of Performance Self-Efficacy.** Due to the specific nature of performance self-efficacy, it was assessed using a task-specific questionnaire. For the purposes of this scale, performance is defined as using specific skills during the performance portion of competition. This functions as a way to obtain scores that can subsequently be compared to the scores of other participants (Wood, 2011). To assess performance in the present research, participants completed a modified version of the Sources of Sport Confidence...
Questionnaire (SSCQ; Vealey, 1998; see Appendix C for the complete modified scale). Vealey and colleagues (1998) modified the SSCQ through a four-phase study completed to develop a reliable and valid measure of sport confidence. An example of a question on the modified SSCQ is, “I gain self-confidence in my sport when I keep my focus on the task.”

The questions for this modified scale were developed based on the nine sources of sport confidence previously discussed (mastery, demonstration of ability, physical and mental preparation, social support, vicarious experience, physical self-presentation, environmental comfort, situation favorableness, and leadership of coach). The scale consists of 43 questions divided to represent these nine sources of sport confidence. The questions were divided as follows, physical self-presentation and situational favorableness had three questions each, environmental comfort had four questions each, mastery, vicarious experience, and leadership of coach had five questions each, and demonstration of ability, physical/mental preparation, and social support had six questions each. The response format on the SSCQ is a Likert-type scale ranging from 1 (not at all important) to 7 (of highest importance). Higher scores on the scale indicate higher levels of sports confidence and higher performance self-efficacy scores for those individuals completing the questionnaire (Vealey et al., 1998). No recording was necessary to score items on the SSCQ. All items on the scale begin with a self-confidence statement: “I gain self-confidence in my sport when I…” (Vealey et al., 1998). An example of a question in the mastery subcategory following the self-confidence statement would indicate skill improvement or achieving personal goals (e.g., “I gain self-confidence in my sport when I improve my skill”). An example of a question in the
*demonstration of ability* subscale would indicate extrinsic success (e.g., “I gain self-confidence in my sport when I demonstrate I am better than others”). An example of a question in the *mental and physical preparation* subscale would indicate athletes’ practice habits (e.g., “I gain self-confidence in my sport when I stay focused on my goals”).

Reliability analyses of the initial data collected with this modified scale found that the internal consistency for the subscales exceeded .70 except for the Environmental Comfort subscale (Vealey et al., 1998). However, since only two items were included on this subscale Vealey and colleagues (1998) decided to retain the subscale and generate additional items to help increase the *alpha* in subsequent studies. After the completion of two more phases of their study on the sources of sport confidence, Vealey and colleagues (1998) found that the Environmental Comfort subscale was able to measure the comfort of athletes in a competitive environment. The resulting *alpha* of the Environmental Comfort subscale was .93, surpassing the .70 criterion established by Nunnally (1978) standards (Vealey et al., 1998).

**Competitive Vignette.** Since preparatory and performance self-efficacy were examined in relation to a competition, a perceived competitive setting needed to be created. This took the form of a competitive vignette, a commonly-used research procedure (e.g., Garza & Feltz, 1998; Hinsz, 2005; Martin & Gill, 1991). The researcher for this present study created this vignette, based on the competitive vignette that Martin and Gill had utilized in their research (1991; see Appendix D for vignette). The competitive vignette reads as follows: “At the conclusion of these spatial tasks, your
performance will be evaluated and compared to the other participants in this study. We will compare the number of correct responses you give to the following spatial tasks.”

**Spatial Imagery Tasks.** To assess the skill of participants in visualization/spatial abilities, the Mental Rotation Task and Spatial Orientation Test were used. The Mental Rotation Task was developed by Vandenburg and Kuse (1978; see Appendix E for the task) based on the India ink drawings of Shepard and Metzler (1971). The test is divided into two parts. Within each part, there are 10 sets of figures, with each set having a criterion figure, two correct alternatives and two distracters. The correct alternatives are always identical to the criterion figure, itself, except that they have been rotated with respect to the criterion figure. The Kuder-Richardson 20 reliability for this test was .88 in one study (Vandenburg & Kuse, 1978). In another test-retest study, the correlation was .83 and after a year, using an age-correlated sample, the test-retest reliability was .70 (Vandenburg & Kuse, 1978).

The Spatial Orientation Test was developed by Hegarty, Kozhevnikov, and Waller (2004; see Appendix F for complete test), and is based on a revised version of Hegarty and Kozhevnikov’s (2001) Object Perspectives Test. The Object Perspectives Test consisted of a configuration of seven objects (i.e., cat, car, stoplight, tree, flower, house, stop sign) placed on an 8.5 x 11 inch paper. Hegarty and Kozhevnikov’s original test has a Cronbach’s alpha of .79 for construct validity (Hegarty & Waller, 2004). Additionally, the Object Perspectives Test has a .49 correlation ($p < .01$) with other spatial measures, including Vandenburg and Kuse’s (1978) Mental Rotation Task. In a second experiment testing the Object Perspectives Test, the Spatial Orientation test had concurrent validity of .85 with the Object Perspectives Test. Based on the results of the
Object Perspectives Test studies, Hegarty and Waller (2004) developed a new test, the Spatial Orientation Test, used in the present study. It is slightly more difficult than the Object Perspectives Test because all the items require the participant to take a perspective at least 90° different from the orientation of the original array (Hegarty & Waller, 2004). The original array is a set of objects (i.e., cat, car, stoplight, tree, flower, house, stop sign) where participants image standing at an object in the center of the array facing another object (e.g., standing at the cat facing the car as seen in Appendix F).

**Design**

The current research examined the role that competition plays in affecting personal agency, preparatory self-efficacy and performance self-efficacy, the latter measured by self-report and performance on spatial imagery tasks. In addition, the variable being manipulated was competitive state of mind using a competitive vignette; participants were either led to believe that their performance on the spatial tasks was being compared with that of other participants, or not. Thus, participants were randomly assigned to a condition believed to be either competitive or noncompetitive. There were two outcome variables being examined. First examined was the relationship between preparatory self-efficacy and personal agency, prior to the spatial imagery tasks. The second examined was the relationship between performance self-efficacy and performance on the spatial imagery tasks. These relationships were expected to differ as a function of the belief of being in a competition.

**Procedure**

Participants completed the two questionnaires prior to the spatial imagery tasks in order to assess general self-efficacy and preparatory self-efficacy at Time 1. During the
administration of the spatial imagery tasks, the participants completed the preparatory self-efficacy questionnaire at Time 2 in order to assess the possible changes in preparatory self-efficacy. The participants completed one performance questionnaire after the spatial imagery tasks in order to assess performance self-efficacy and performance on spatial tasks. The study took place at a university classroom. Participants were assessed in groups of 6 to 8 people, and they were all randomly assigned either to the competitive condition or to the noncompetitive condition. All of the questionnaires and tasks that the participants completed were done with pen and paper. In order to ensure participant anonymity, participant answers were placed in a manila envelope. Each envelope was individually coded (e.g., 01, 02, 03) distinguishing whether participants were placed in the competitive or noncompetitive condition. The coding also ensured that participant responses remain anonymous.

The participants completed the Demographic Questionnaire (see Appendix G for complete questionnaire). Questions on the Demographic Questionnaire related to gender, age, year in school, sport played if they played a sport, and the number of years participants a sport was played. Participants took the personal agency measure of the GSE. Next participants complete the preparatory self-efficacy questionnaire (CSAI-2), at Time 1. Once the participants completed these questionnaires, they were placed into the competitive condition or the noncompetitive condition. Deception was used when administering a competitive vignette in order to create the illusion of a competition. Participants were told that their performance on the spatial imagery tasks would be directly compared to the other participants in the study. However, this did not actually occur and was only used as a means of creating the perception of competition in the
study. The order of completion of the Mental Rotation Task and Spatial Orientation Test was counterbalanced as participants were randomly assigned either to the competitive condition or the noncompetitive condition and to control any effect of task order on performance in the competitive condition. The participants randomly received either Part I or Part II of the Mental Rotation Task, since both parts assess the same constructs. After completing one part (Part 1 or Part 2 depending on random assignment) of the Mental Rotation Task participants completed the preparatory self-efficacy (CSAI-2), at Time 2. Next, participants completed the Spatial Orientation Test. Participants were then asked to complete the performance self-efficacy questionnaire (SSCQ). Finally, participants were debriefed and the deception used in the experiment was explained. There were no concerns from the participants despite the fact that deception was used.
CHAPTER 3
RESULTS

Preliminary Analysis

This study examined the role of competition with regards to personal agency, preparatory self-efficacy, and performance self-efficacy. Represented in Tables 1 and 2 are initial descriptive statistics for the General Self-Efficacy questionnaire (measuring personal agency), the Competitive State Anxiety Inventory (measuring preparatory self-efficacy; measured at Time 1 and Time 2), the Mental Rotation Task and Spatial Orientation Test (measuring performance on spatial imagery tasks), and the Sources of Sport Confidence Questionnaire (measuring performance self-efficacy). Additionally, Tables 1 and 2 present correlations calculated to evaluate relationships between the noncompetitive condition and personal agency, preparatory self-efficacy (measured at Time 1 and Time 2), performance on spatial imagery tasks, and performance self-efficacy (presented in Table 1); and between the competitive condition and personal agency, preparatory self-efficacy (measured at Time 1 and Time 2), performance on spatial imagery tasks, and performance self-efficacy (presented in Table 2).

The results are reported according to the four hypotheses guiding this research. The first hypothesis addressed the relationship between preparatory self-efficacy beliefs (as measured by the CSAI-2 at Time 1 and Time 2) and personal agency (as measured by
the GSE). The results of the analysis of the data for the competitive condition are presented in Table 3. The second hypothesis addressed the relationship between performance on the spatial imagery tasks (as measured by the Spatial Orientation Test and Mental Rotation Task) and performance self-efficacy (as measured by the SSCQ). Results of the analysis of the data for the competitive condition are presented in Table 4. The third hypothesis addressed the relationship between preparatory self-efficacy (as measured by the CSAI-2 at Time 1 and Time 2) and personal agency and the relationship between the performance on spatial imagery tasks (as measured by the Spatial Orientation Test and Mental Rotation Task) and performance self-efficacy constructs (as measured by the SSCQ). The results of the analysis of the data for the noncompetitive condition are presented in Table 5. Finally the fourth hypothesis addressed the male participants’ self-efficacy beliefs on preparatory self-efficacy (as measured by the CSAI-2 at Time 1 and Time 2), personal agency (as measured by the GSE), and performance self-efficacy questionnaires (as measured by the SSCQ). The analysis of the male participants’ self-efficacy beliefs is discussed in the final section of these results.

**Analysis of Initial Descriptive Statistics and Correlations for Competitive Condition and Noncompetitive Conditions**

Descriptive statistics and correlations are presented in Table 1 for the noncompetitive condition and indicate a relationship between preparatory self-efficacy measured at two separate times by the CSAI-2 questionnaires, \( r (df = 63) = .422, p < 0.01 \). The results of the correlation indicate that 17.8\% of the variance \( (R^2 = .178) \) was accounted for by the relationship between preparatory self-efficacy measured at Time 1 and Time 2. Results in Table 1 also indicate a negative relationship between the scores
on the two spatial imagery tasks, as measured by the Mental Rotation Task and Spatial Orientation Test, \( r (df = 63 = -.42, p < 0.01) \). The results of the correlation indicate that 17.6% of the variance \( \left( R^2 = .176 \right) \) was accounted for by the relationship between the Mental Rotation Task and the Spatial Orientation Test. Of particular interest, the bivariate relationship between scores on the mental rotation task and the spatial orientation test support previous research (e.g., Hegarty & Waller, 2004), suggesting a difference in these tests, even though both spatial imagery tasks are designed to test the ability of an individual to manipulate an object-based mental stimulus. Analyses indicated no other significant relationships between the variables measured in the noncompetitive condition.

Table 1

<table>
<thead>
<tr>
<th>YPS</th>
<th>GSE</th>
<th>CSAI_T1</th>
<th>CSAI_T2</th>
<th>MR</th>
<th>SO</th>
<th>SSCQ</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. GSE</td>
<td>0.16</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. CSAI_T1</td>
<td>-0.15</td>
<td>-0.004</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. CSAI_T2</td>
<td>0.09</td>
<td>0.20</td>
<td>0.42**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. MR</td>
<td>0.03</td>
<td>-0.03</td>
<td>0.07</td>
<td>0.13</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. SO</td>
<td>0.05</td>
<td>0.09</td>
<td>0.03</td>
<td>0.09</td>
<td>-0.42**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. SSCQ</td>
<td>0.01</td>
<td>0.15</td>
<td>-0.04</td>
<td>0.08</td>
<td>0.00</td>
<td>0.12</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: YPS=Years playing sports (as self-reported on demographic questionnaire). GSE=Personal agency (as measured by the General Self-Efficacy Questionnaire). CSAI_1=Preparatory self-efficacy at time 1 (as measured by the Competitive State Anxiety Inventory-2). CSAI_2=Preparatory self-efficacy at time 2 (as measured by the Competitive State Anxiety Inventory-2). MR=Mental rotation scores (as measured by the Mental Rotation Task). SO=Spatial orientation scores (as measured by the Spatial Orientation Questionnaire). SSCQ=Performance self-efficacy (as measured by the Sources of Sports Confidence Questionnaire). **p<0.01

The results presented in Table 2 for the competitive condition indicate similar relationships to those found in the noncompetitive condition between preparatory self-efficacy measured at Time 1 and Time 2, \( r (df = 56) = .434, p < .01 \). The results of the correlation analysis indicate that 18.5% of the variance \( (R^2 = .185) \), was accounted for by
the relationship between preparatory self-efficacy measure given at Time 1 and Time 2. As previously discussed for the noncompetitive condition, the competitive condition also demonstrated a similar relationship between the scores on the two spatial imagery tasks, $r (df = 56) = .462, p < 0.01; M=9.48, SD=5.38; \text{ and } M=561.96, SD=459.79; \text{ respectively, for the Mental Rotation Task and Spatial Orientation Test). Of primary interest, Table 2 indicates the presence of a relationship between scores of personal agency, as measured by the GSE questionnaire, ($M=32.38, SD=3.96$) and scores on performance self-efficacy, as measured by the SSCQ ($M=83.44, SD=10.91$), $r (df = 56) = .481, p < .01$. The results of the correlation analysis indicate that 23.1% of the variance ($R^2 = .231$) was accounted for by the relationship between personal agency and performance self-efficacy. Previous research done by Vealey and colleagues (1998) explored the relationship between Bandura’s four sources of self-efficacy, performance accomplishments, vicarious experience, verbal persuasion, and physiological states and the sources of sport confidence (Bandura, 1977). Of the four sources, performance accomplishments seem to relate most significantly with an individual performing well on a specific task (Feltz & Riessinger, 1990). Therefore, it is important to note, as seen in Table 2, that this relationship between personal agency and performance self-efficacy is significant for those participants in the competitive condition but not for those participants in the noncompetitive condition. The results in Table 2 reflect the relationship between the performance self-efficacy and general self-efficacy that Bandura (1997) hypothesized in his research.
Table 2
Descriptive statistics and bivariate correlations for competitive condition.

<table>
<thead>
<tr>
<th></th>
<th>YPS</th>
<th>GSE</th>
<th>CSAI_T1</th>
<th>CSAI_T2</th>
<th>MR</th>
<th>SO</th>
<th>SSCQ</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. YPS</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2. GSE</td>
<td>0.14</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>32.28</td>
<td>3.96</td>
</tr>
<tr>
<td>3. CSAI_T1</td>
<td>0.10</td>
<td>0.12</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>59.61</td>
<td>11.67</td>
</tr>
<tr>
<td>4. CSAI_T2</td>
<td>-0.06</td>
<td>0.04</td>
<td>0.43**</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>56.79</td>
<td>12.68</td>
</tr>
<tr>
<td>5. MR</td>
<td>0.18</td>
<td>0.02</td>
<td>0.03</td>
<td>-0.10</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>9.84</td>
<td>5.38</td>
</tr>
<tr>
<td>6. SO</td>
<td>-0.19</td>
<td>0.06</td>
<td>0.05</td>
<td>0.06</td>
<td>-0.46**</td>
<td>-</td>
<td>-</td>
<td>561.96</td>
<td>459.79</td>
</tr>
<tr>
<td>7. SSCQ</td>
<td>0.08</td>
<td>0.48**</td>
<td>0.05</td>
<td>0.04</td>
<td>-0.14</td>
<td>0.17</td>
<td>-</td>
<td>83.44</td>
<td>10.91</td>
</tr>
</tbody>
</table>

**p<0.01, See Table 1 for abbreviations.

Analysis of Preparatory Self-Efficacy Beliefs and Personal Agency for the

Competitive Condition

Table 3 presents the results of the curve estimation regression analysis to test the first hypothesis. The first hypothesis stated that as participants indicate higher scores for preparatory self-efficacy (as measured by a state anxiety inventory), they will also indicate greater personal agency (as measured by a general self-efficacy scale).

Correlations for this relationship between preparatory self-efficacy (at Time 1 and Time 2) and personal agency were computed using a curve estimation regression. However, the present results (see Table 3) did not indicate a significant relationship between preparatory self-efficacy (“CSAI_tot_1”; “CSAI_tot_2”) and personal agency (“GSE”), F (2,63) = .006; p =0.99 at Time 1 and F (2,63) = 1.35; p =0.27 at Time 2.

Table 3
Curve estimation regression analysis of preparatory self-efficacy beliefs and personal agency for those in competition.

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>SE</th>
<th>β</th>
<th>F</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>GSE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time 1</td>
<td>-0.004</td>
<td>0.13</td>
<td>-0.004</td>
<td>0.006</td>
<td>0.00</td>
</tr>
<tr>
<td>Time 2</td>
<td>0.203</td>
<td>0.13</td>
<td>0.203</td>
<td>1.35</td>
<td>0.04</td>
</tr>
</tbody>
</table>

Note: Dependent variables=CSAI_tot_1; CSAI_tot_2
Analysis of Performance on Spatial Tasks and Performance Self-Efficacy for the Competitive Condition

Table 4 presents the results of the linear regression analysis to test the second hypothesis. The second hypothesis stated: as participants indicate higher scores for performance self-efficacy (mastery, demonstration of ability, and physical/mental preparation, as measured by a sport confidence questionnaire), they will also demonstrate greater performance on the spatial imagery tasks (scores on the Mental Rotations Task and Spatial Orientation Test). A linear regression analysis of the performance variables (performance on the spatial tasks) was conducted using the control variables of mastery, demonstration of ability, and physical/mental preparation to evaluate the second hypothesis. Results (presented in Table 4) do not indicate a significant relationship between performance self-efficacy and the performance variables, $F(1,56) = 1.60; p = 0.21$.

Table 4

<table>
<thead>
<tr>
<th></th>
<th>$B$</th>
<th>$SE$</th>
<th>$\beta$</th>
<th>$F$</th>
<th>$R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRz</td>
<td>-0.13</td>
<td>0.13</td>
<td>-0.14</td>
<td>1.06</td>
<td>0.02</td>
</tr>
<tr>
<td>SO</td>
<td>0.17</td>
<td>0.13</td>
<td>0.17</td>
<td>1.60</td>
<td>0.03</td>
</tr>
</tbody>
</table>

Note: Dependent variables=MRz (scores on Mental Rotation Task); SO (scores on Spatial Orientation Test)
Analysis of Preparatory Self-Efficacy and Personal Agency Scores on Performance
Self-Efficacy and Performance on Spatial Imagery Tasks for the Noncompetitive Condition

Table 5 presents the results of the analysis of the curve estimation regression performed to test the third hypothesis. The third hypothesis, based on Bandura’s (1997) theory, proposes a linear relationship in the performance stage between self-efficacy beliefs and effort during competition. Because these participants did not experience competition, they would continue to exhibit behavior similar to the preparatory self-efficacy behavior. In order to test these relationships, a curve estimation regression analysis of the performance variables (scores on CSAI-2, Mental Rotation Task, and Spatial Orientation Task) on the control variables (personal agency, mastery, demonstration of ability, and physical/mental preparation) was conducted. Evidence for a curvilinear relationship was not significant for any of the three curve estimation regression analyses in these results, $F(2,63) = 1.28; p = 0.29$ for the Mental Rotation Task and $F(2,63) = 4.56; p = 0.01$ for the Spatial Orientation Test.

Table 5
Curve estimation regression analysis of preparatory self-efficacy beliefs and personal agency and scores on the spatial tasks and performance self-efficacy beliefs for those not in competition.

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>SE</th>
<th>β</th>
<th>F</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>GSE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time 1</td>
<td>-0.01</td>
<td>0.12</td>
<td>-0.01</td>
<td>0.06</td>
<td>0.00</td>
</tr>
<tr>
<td>Time 2</td>
<td>-0.04</td>
<td>0.12</td>
<td>-0.04</td>
<td>1.35</td>
<td>0.04</td>
</tr>
<tr>
<td>MRz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SO</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.26</td>
<td>0.09</td>
<td>0.38</td>
<td>4.56</td>
<td>0.10</td>
</tr>
</tbody>
</table>

Note: Dependent variables=Time 1 (CSAI_tot_1); Time 2 (CSAI_tot_2); MRz (scores on Mental Rotation Task); SO (scores on Spatial Orientation Test).
Analysis of Male Participants’ Self-Efficacy Beliefs on Preparatory Self-Efficacy, Personal Agency, and Performance Self-Efficacy Questionnaires

The fourth hypothesis was based on existing research (e.g., Schunk & Lilly, 1984) that had reported gender differences in self-efficacy prior to a novel task. Participants in the present study performed novel spatial imagery tasks, not typically encountered in daily life, which were expected to support gender differences in self-efficacy prior to the spatial imagery tasks. To test the fourth hypothesis, performance scores were converted to z-scores and a MANOVA examined the effect of gender on preparatory self-efficacy at Time 1, (male participants, $M = 0.12$, $SD = 1.03$; female participants, $M = -0.16$, $SD = 0.92$), preparatory self-efficacy at Time 2, (male participants, $M = 0.18$, $SD = 0.86$; female participants, $M = -0.24$, $SD = 1.11$) and performance self-efficacy (male participants, $M = 0.08$, $SD = 0.90$; female participants, $M = -0.11$, $SD = 1.11$). The multivariate result for gender, Wilk’s Lambda = 0.94, $F (3,117) = 2.34; p =0.08$, was not significant for any of these three measures. This indicates that male and female participants did not differ in their responses on the measures of self-efficacy assessed in the present research.
CHAPTER 4
DISCUSSION

This study examined self-efficacy, which establishes the relationship between people and their goal-directed behavior. For the present study, general self-efficacy (personal agency) was further divided into two specific types, preparatory self-efficacy and performance self-efficacy. The effects of perceived competition on personal agency, preparatory self-efficacy, and performance self-efficacy were examined. Results of the analyses indicated the following: for participants, regardless of a perception of being in competition or not (here referred to as competitive state of mind), there was a relationship between preparatory self-efficacy at two separate times (as measured by the CSAI-2). Although this finding does not directly relate to the hypotheses, it does support the reliability of the preparatory self-efficacy measure used. Additionally, there was a relationship between scores on the two spatial imagery tasks, the Mental Rotation Task and the Spatial Orientation Test, regardless of participants’ competitive state of mind. Again, though this finding does not specifically relate to the hypotheses, it does confirm previous research (Hegarty & Waller, 2004) that these two spatial imagery tasks are negatively related and both assess spatial imagery abilities of the participants.

Results for the competitive condition indicate a positive relationship between personal agency (as measured by the GSE) and performance self-efficacy (as measured
by the SSCQ). This appears to say that as an individual’s personal agency score increases, so does an individual’s score on performance self-efficacy. However, there was not enough evidence to support Hypothesis 1; for the results from the competitive condition to support the hypothesis, there would need to be a significant positive linear relationship between preparatory self-efficacy beliefs and personal agency. This would have been demonstrated by evidence of higher preparatory self-efficacy scores as personal agency scores increase. Further, there was not enough evidence to support Hypothesis 2; for the results from the competitive condition to support the hypothesis, there would need to be a significant positive linear relationship between performance scores on the spatial imagery tasks and performance self-efficacy scores. This would have been demonstrated by evidence of higher performance self-efficacy scores and an increase in spatial imagery task scores. Despite higher scores on the performance self-efficacy questionnaire, participants did not perform better (i.e., achieve higher scores) on spatial imagery tasks. This result seems to indicate that higher self-efficacy scores are not significant enough to reflect a change in an individual’s performance on spatial imagery tasks.

Results for the test of Hypothesis 3 for the noncompetitive condition did not support a positive linear relationship between preparatory self-efficacy beliefs and personal agency; nor was there a relationship between performance self-efficacy beliefs and performance on spatial imagery tasks. These results appear to indicate that an individual’s level of personal agency had no effect on his or her level of preparatory self-efficacy. Further, an individual’s performance self-efficacy beliefs did not influence his or her performance on the spatial imagery tasks. It also appears that being placed in the
noncompetitive condition does not elicit any changes to an individual’s personal agency, preparatory self-efficacy, or performance self-efficacy beliefs.

Results for Hypothesis 4 did not support higher self-efficacy beliefs for personal agency, preparatory self-efficacy, and performance self-efficacy for male participants than for female participants, regardless of whether they were told they were in competition. There appears to be no gender difference between male participants’ and female participants’ self-efficacy beliefs. However, participants did not receive performance feedback on their tasks, as in previous research (e.g., Schunk & Lilly, 1984). This lack of feedback may have affected the absence of a significant difference in male participants’ and female participants’ self-efficacy scores. Had participants known how they performed on the spatial imagery tasks, there may have been a difference in male and female performance self-efficacy scores after receiving feedback.

While examining these results, it is important to note two possible limitations to conclusions about results of the present research. First, using athletic ability as a continuous variable may have affected the outcome of the study, lessening the impact of athleticism on the results. In a previous study done by Garza and Feltz (1998), their use of categorical variables was dictated by level of expertise. They divided participants into six categories based on level of expertise (e.g., pre-preliminary to novice). Additionally, Garza and Feltz (1998) created individualized questionnaires for each category to match the participants’ level of expertise. This high level of specificity in the expertise of their participants may have supported their use of a categorical variable. In the present study, it may have been better to follow Garza and Feltz’s (1998) approach and categorize participants by the level of expertise they had in athletic competition (i.e., being an
NCAA athlete vs. club athlete) as a way to quantify athleticism. This may have been able to produce a greater distinction in performance score of participants, such that those with more expertise would show better performance scores in relation to their self-efficacy rating. Second, the use of a competitive vignette to establish a competitive state of mind in place of an actual competition may not have been as effective for participants in the present research. Hinsz (2005) stated in his research that competitiveness could be measured in different ways (i.e., zero-sum, where there is a winner and a loser vs. goal-setting). The use of goal-setting competition (i.e., competitive vignette) in the present research could have impacted the results. Participants may not have actually believed they were in a competitive setting, which would havenegated the effect of being placed in the *competitive condition* versus being placed in the *noncompetitive condition*. Further, Hinsz (2005) theorized that there could be personality traits linked with competitiveness of an individual. It may be possible that a person more intrinsically competitive would result in better performance on the spatial tasks than a person who lacks the intrinsic competitive nature would demonstrate on the tasks.

Despite the limitations on the interpretation of the results of the present research, it highlighted areas that are worth further research. First, both the Spatial Orientation Task and Mental Rotation Test assessed participants’ spatial imagery abilities; the negative correlation between these tasks suggests that the Spatial Orientation Task assesses spatial imagery ability differently than the Mental Rotation Test. This result appears to support research conducted by Hegarty and Waller (2004) that found perspective taking tests (i.e., the Spatial Orientation Task in the present study) and mental rotation tests (i.e., the Mental Rotation Test in the present study) measure separate spatial
imagery abilities. Hegarty and Waller (2004) suggest the implications of this finding reflect a distinction between an individual’s ability to make egocentric spatial changes and the ability to make object-based spatial transformations in the environment. Participants who are better at egocentric spatial tasks may be better able to image themselves with respect to the environment. Conversely, participants who are better at object-based spatial tasks may be better able to imagine objects changing positions while maintaining their current environmental orientation. Since the present research analysis did not specifically examine this distinction, it may have been a factor in participants’ performance on the spatial imagery tasks.

Second, the present research appears to indicate a relationship between general self-efficacy (i.e., personal agency) and performance self-efficacy without an increase in performance scores. The absence of increased performance was also found in Coutinho and Neuman’s (2008) research. In their study, they found performance goals set in the study could either be associated or not associated with self-efficacy. What dictated the association between performance goals and self-efficacy appeared to be the nature of the task itself, rather than the participants’ self-efficacy beliefs. Based on the results of the present study, it is important to identify what is driving the relationship between general self-efficacy and performance self-efficacy. As in the case of Coutinho and Neuman (2008), the participants’ self-efficacy beliefs could be influenced by another variable, such as the type of task (i.e., spatial imagery task), used in the present study. Perhaps the use of the spatial imagery task in the present study was not the most appropriate measure of an athleticism construct. It may have been more appropriate to have participants
perform a physical spatial imagery task, such as shooting free throws with a basketball, rather than using a pen and paper spatial imagery task.

It has been demonstrated that individuals with higher levels of self-efficacy are likely to be more confident prior to a competition (Coutinho & Neuman, 2008; Martin & Gill, 1991). Vealey and colleagues (1998) suggest a competitive orientation (consisting of goals regarding positive performance and goals focused on winning) would develop over time in athletes, also promoting confidence in competition. This confidence would affect performance self-efficacy scores, causing an increase in scores and, additionally, overall performance. Overall, results of the present research seem to indicate that being confident does not necessarily indicate change in performance, either in a positive or negative way. Moores and Chang (2009) examined the relationship between prior judgment of self-efficacy at Time 1 and subsequent judgment of self-efficacy at Time 2. Results of this research conducted by Moores and Chang (2009) stated the level of self-efficacy prior to a task did not appear to inhibit performance, nor did it improve performance. Consequently, it appears that individuals cannot rely solely on confidence to ensure positive outcomes on a task.

Additionally, overconfidence seemed to be present across individuals regardless of their state of mind (i.e., being in a competitive state of mind versus being in a noncompetitive state of mind). However, it did not appear that the presence of competition was a significant factor in either promoting or inhibiting performance. Previous research conducted by Martin and Gill (1991) supported this finding, noting an individual’s competitive nature did not affect confidence. Therefore, lack of a true competition may not have affected the results of the study.
Another possible reason for presence of overconfidence in the present research is supported by findings seen in a study conducted by Vancouver, Thompson, Tischner, and Putka (2002). Vancouver and colleagues (2002) suggested that once individuals reach a certain level of confidence, their performance might be directly affected. Participants in their research played a game in which they were required to guess solutions, receive feedback, and use logic to determine the solution. Vancouver and colleagues (2002) believed that the higher the self-efficacy of the participant going into the game, the higher the level of confidence the participant would need to determine a solution for the game. Results of the study found that for those individuals with an inflated sense of ability confidence goals were too easily achieved, despite reporting lower levels of self-efficacy. Vancouver and colleagues (2002) argue that rather than self-efficacy beliefs serving as a motivational factor, they might be used to construct perceptions about a current state. Once the self-efficacy beliefs establish an individual’s views on a current state they then promote the individual to work towards a desired state. The role of self-efficacy in this scenario would be as follows, the greater an individual’s self-efficacy, the greater its importance in affecting the actions to achieve the desired results (Vancouver et al., 2002). Therefore, Vancouver and colleagues (2002) argue that the greater the self-efficacy, the sooner a desired goal is achieved. If an individual feels overconfident approaching a task, he or she may not be motivated to allot the necessary resources to finish the task effectively. Relating these findings to the present research may account for the presence of overconfidence and the absence of increased performance. An individual may hold the belief that he or she can effectively complete the spatial imagery tasks without actually
having the necessary resources to finish the spatial imagery task, thus eliciting a positive performance.

Applying this knowledge to a real world setting may mean, for example, that coaches need to spend more time in practicing with their athletes, even though their athletes feel confident in their abilities. Additionally, it may mean that athletes use heuristics, that is, mental shortcuts, (e.g., relying on muscle memory to shoot free throws) to complete complex tasks, needed during game time performance. This may be helpful during competition where split-second decisions need to be made in order to perform efficiently. However, the use of heuristics may not be as helpful in practice, where athletes have more time to analyze and evaluate their actions. Rather than taking these mental shortcuts in practice, athletes could focus on areas of improvement in order to sharpen the game-time use of heuristics. Overall, the overconfidence and apparent high self-efficacy of athletes may be critical for motivating them to approach a task for which they may not necessarily be prepared. A successful outcome to the task that challenges their skills would build more confidence and skill in the athletes, which would be useful for future competitions.
REFERENCES


performance feedback on self-efficacy and muscular endurance. *Journal of Sport & Exercise Psychology, 12*, 132-143.


Competitive anxiety in sport (pp. 127-140). Champaign, IL: Human Kinetics


APPENDIX A

General Self-Efficacy


1. I can always manage to solve difficult problems if I try hard enough.
2. If someone opposes me, I can find the means and ways to get what I want.
3. It is easy for me to stick to my aims and accomplish my goals.
4. I am confident that I could deal efficiently with unexpected events.
5. Thanks to my resourcefulness, I know how to handle unforeseen situations.
6. I can solve most problems if I invest the necessary effort.
7. I can remain calm when facing difficulties because I can rely on my coping abilities.
8. When I am confronted with a problem, I can usually find several solutions.
9. If I am in trouble, I can usually think of a solution.
10. I can usually handle whatever comes my way.

Response Format: 1=Not true at all; 2=Hardly true; 3=Moderately true; 4=Exactly true
APPENDIX B

Preparatory Self-Efficacy

Competitive State Anxiety Inventory-2 (CSAI-2)-Martens, Vealey, & Burton (1990)

The following are several statements that athletes use to describe their feelings before competition. Read each statement and circle the appropriate number to indicate how you feel right now, at this moment. There are no right or wrong answers. Do not spend too much time on any one statement.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Not at all</th>
<th>Somewhat</th>
<th>Moderately so</th>
<th>Very much so</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I am concerned about this competition.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2. I feel nervous.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3. I feel at ease.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4. I have self-doubts.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5. I feel jittery.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6. I feel comfortable.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7. I am concerned I may not do as well in this competition as I could.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8. My body feels tense.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>9. I feel self-confident.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>10. I am concerned about losing.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>11. I feel tense in my stomach.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>12. I feel secure.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
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<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>13</td>
<td>My body feels relaxed.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>14</td>
<td>I’m confident I can meet the challenge.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>15</td>
<td>I’m concerned about performing poorly.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>16</td>
<td>My heart is racing.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>17</td>
<td>I’m confident about performing well.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>18</td>
<td>I’m worried about reaching my goal.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>19</td>
<td>I feel my stomach sinking.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>20</td>
<td>I feel mentally relaxed.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>21</td>
<td>I’m concerned that others will be disappointed with my performance.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>22</td>
<td>My hands are clammy.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>23</td>
<td>I’m confident because I mentally picture myself reaching my goal.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>24</td>
<td>I’m concerned I won’t be able to concentrate.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>25</td>
<td>My body feels tight.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>26</td>
<td>I’m confident of coming through under pressure.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
APPENDIX C

Performance Self-Efficacy

Sources of Sport Confidence Questionnaire (SSCQ)-Vealey

Think back to times when you felt very confident when participating in your sport. What things made you feel confident? What things helped you believe in your abilities and gave you confidence that you would be successful?

Listed below are some things that may help athletes feel confident in sport situations. For each statement, circle the number which indicates how important that is in helping you feel confident in your sport. Please respond to every question even though they may seem repetitive. There are no right or wrong answers because every athlete is different. Please be honest - your answers will be kept completely confidential.

I gain self-confidence in my sport when I...

1. get positive feedback from my teammates and/or friends.
2. keep my focus on the task.
3. psych myself up.
4. master a new skill in my sport.
5. get breaks from officials or referees.
6. perform in an environment (gym, pool, stadium, etc.) that I like and in which I feel comfortable.
7. feel good about my weight.
8. believe in my coach's abilities.
9. know I have support from others than are important to me.
10. demonstrate that I am better than others.
11. see successful performances by other athletes.
12. know that I am mentally prepared for the situation.
13. improve my performance on a skill in my sport.
14. see the breaks are going my way.
15. feel I look good.
16. know my coach will make good decisions.
17. am told that others believe in me and my abilities.
18. show my ability by winning or placing.
19. watch another athlete I admire perform successfully.
20. stay focused on my goals.

I gain self-confidence in my sport when I...

21. improve my skills.
22. feel comfortable in the environment (gym, pool, stadium, etc.) in which I'm performing.
23. feel that everything is "going right" for me in that situation.
24. feel my body looks good.
25. know my coach is a good leader.
26. am encouraged by coaches and/or family.
27. know I can outperform opponents.
28. watch a teammate perform well.
29. prepare myself physically and mentally for a situation.
30. increase the number of skills I can perform.
31. like the environment where I am performing.
32. have trust in my coach's decisions.
33. get positive feedback from coaches and/or family.
34. prove I am better than my opponents.
35. see a friend perform successfully.
36. believe in my ability to give maximum effort to succeed.
37. receive support and encouragement from others.
38. show I'm one of the best in my sport.
39. watch teammates who are at my level perform well.
40. develop new skills and improve.
41. feel my coach provides effective leadership.

Response Format: 1=Not at all important; 2=Not very important; 3=Slightly important; 4=Of average importance; 5=Very important; 6=Extremely important; 7=Of highest importance
APPENDIX D

Competitive Vignette

At the conclusion of this task, your performance will be evaluated and compared to the other participants in this study. We will compare the number of correct responses you give to the following spatial tasks.
APPENDIX E

Mental Rotation Test

This is a test of your ability to look at a drawing of a given object and find the same object within a set of dissimilar objects. The only difference between the original object and the chosen object will be that they are presented at different angles. An illustration of this principle is given below where the same single object is given in five different positions. Look at each of them to satisfy yourself that they are only presented at different angles from one another.

Below are two drawings of new objects. They cannot be made to match the above five drawings. Please note that you may not turn over the objects. Satisfy yourself that they are different from the above.

Now let’s do some sample problems. For each problem there is a primary object on the far left. You are to determine which two of four objects to the right are the same object given on the far left. In each problem always two of the four drawings are the same object as the one on the left. You are to put Xs in the boxes below the correct ones, and leave the incorrect ones blank. The first sample problem is done for you.

[Diagrams and boxes with Xs and blanks]
Do the rest of the sample problems yourself. Which two drawings of the four on the right show the same object as the one on the left? There are always two and only two correct answers for each problem. Put an X under the two correct drawings.

Answers:  
(1) first and second drawings are correct  
(2) first and third drawings are correct  
(3) second and third drawings are correct  

This test has two parts. You will have 3 minutes for each of the two parts. Each part has two pages. When you have finished Part I, STOP. Please do not go on to Part II until you are asked to do so. Remember: There are always two and only two correct answers for each item.
Work as quickly as you can without sacrificing accuracy. Your score on this test will reflect both the correct and incorrect responses. Therefore, it will not be to your advantage to guess unless you have some idea which choice is correct.

Do Not Turn This Page Until Asked To Do So
Part I.

1.

2.

3.

4.
9.

10.

Stop

Do Not Turn This Page Until Asked To Do So.
PART II

11.

12.

13.

14.

15.
APPENDIX F

Spatial Orientation Test
Perspective Taking/Spatial Orientation Test
Developed by Mary Hegarty, Maria Kozhevnikov, David Waller

© University of California Santa Barbara

This package contains a copy of the test instructions, test, and answer key.

It is important that the instructions are followed carefully when administering the test. In particular, participants should not be allowed to make any marks on the diagram showing the configuration of objects, and they should not be allowed to rotate the test booklet.

Further information on the ability measured by this test can be found in the following publications. This version of the test was used by Hegarty and Waller (2004) and is a revised version of the test used by Kozhevnikov and Hegarty (2001).


Spatial Orientation Test

This is a test of your ability to imagine different perspectives or orientations in space. On each of the following pages you will see a picture of an array of objects and an "arrow circle" with a question about the direction between some of the objects. For the question on each page, you should imagine that you are standing at one object in the array (which will be named in the center of the circle) and facing another object, named at the top of the circle. Your task is to draw an arrow from the center object showing the direction to a third object from this facing orientation.

Look at the sample item on the next page. In this item you are asked to imagine that you are standing at the flower, which is named in the center of the circle and facing the tree which is named at the top of the circle. Your task is to draw an arrow pointing to the cat. In the sample item this arrow has been drawn for you. In the test items, your task is to draw this arrow. Can you see that if you were at the flower facing the tree, the cat would be in this direction? Please ask the experimenter now if you have any questions about what you are required to do.

There are 12 items in this test, one on each page. For each item, the array of objects is shown at the top of the page and the arrow circle is shown at the bottom. Please do not pick up or turn the test booklet, and do not make any marks on the maps. Try to mark the correct directions but do not spend too much time on any one question.

You will have 5 minutes for this test.
Spatial Orientation Test

Name: ______________________

Example:
Imagine you are standing at the flower and facing the tree.
Point to the cat.
1. Imagine you are standing at the car and facing the traffic light. Point to the stop sign.
2. Imagine you are standing at the cat and facing the tree. Point to the car.
3. Imagine you are standing at the stop sign and facing the cat. Point to the house.
4. Imagine you are standing at the cat facing the flower
Point to the car.
5. Imagine you are standing at the stop sign and facing the tree. Point to the traffic light.
6. Imagine you are standing at the stop sign and facing the flower. Point to the car.
7. Imagine you are standing at the traffic light and facing the house. Point to the flower.
8. Imagine you are standing at the house and facing the flower. Point to the stop sign.
9. Imagine you are standing at the car and facing the stop sign.
   Point to the tree
10. Imagine you are standing at the traffic light and facing the cat.
    Point to the cat.
11. Imagine you are standing at the tree and facing the flower. Point to the house.
12. Imagine you are standing at the **cat** and facing the **house**. Point to the **traffic light**.
APPENDIX G

Demographic Questionnaire

1. Sex: Female       Male (circle one)

2. Age:  18-19  20-21  22-23  24 and over (circle one)

3. Year in school:   _____Freshman   _____Sophomore   _____Junior   _____Senior
                      _____5th Year

Mark all that apply and circle the highest level of participation and note the number of years playing that sport with a team. Please only include sports played for more than 3 years. The total number of years you played sports must be 8 years or greater.

4. Sport             Highest Level of Competition            Number of Years with Team

   Basketball         Intramural College Club Intercollegiate          ______________
                        High school Varsity High school JV

   Baseball/Softball  Intramural College Club Intercollegiate          ______________
                        High school Varsity High school JV

   Football           Intramural College Club Intercollegiate          ______________
                        High school Varsity High school JV
<table>
<thead>
<tr>
<th>Sport</th>
<th>Intramural College Club</th>
<th>Intercollegiate</th>
<th>High school Varsity</th>
<th>High school JV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soccer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hockey</td>
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<tr>
<td>Lacrosse</td>
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<td>Tennis</td>
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<tr>
<td>Volleyball</td>
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<tr>
<td>Field Hockey</td>
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<tr>
<td>Rugby</td>
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<td></td>
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<tr>
<td>Swimming</td>
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</table>
Other Intramural College Club Intercollegiate  

High school Varsity High school JV  

If other please specify__________

5. Intercollegiate Sport at UD ________________