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Emotional Intelligence (EI) has received recognition in education, health, business, and recently sport. Yet, after 2 decades, there is little consensus over its definition and measurement (Zeidner et al., 2008). Some describe EI as a set of abilities and form of intelligence (Mayer & Salovey, 1997), while others conceptualize EI as a mixture of abilities and personality (Bar-On, 1997; Goleman, 1995). The limited research in sport has examined EI and its connection to a variety of performance-related outcomes, using measures developed from each of the two theories mentioned. While EI has been tied to performance outcomes, it may be that athletes' use of mental skills mediates the relationship between EI and performance.

The primary purpose of this study was to examine the association between performance-based EI and use of mental skills. A secondary purpose of this study was to explore the extent to which gender and sport moderate the relationship between EI and mental skills use. Performance-based EI was measured using the online version of the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT: Mayer, Salovey, & Caruso, 2002), while mental skill use was measured using the Test of Performance Strategies (TOPS: Thomas, Murphy, & Hardy, 1999). Participants included 67 male and female Division III athletes from intact teams in baseball, softball, tennis and swimming. Relationships between the MSCEIT (and its subscales) and the TOPS (and its subscales) were examined. In addition, the extent to which athletes' gender and sport moderated the relationship between their EI and mental skill use was explored. Analyses revealed that

there were no significant, positive relationships between EI and mental skill use totals or at the subscale level. On the contrary, one significant, negative relationship was found between the facilitating emotions branch of the MSCEIT and goal setting in practice. However, the main findings of this study centered on the low internal reliability of two branches of the MSCEIT. Results suggest that more research needs be done with a larger sample size to assess the reliability of using the MSCEIT with an athlete population before further studies are conducted in this area.

EXAMINING PERFORMANCE-BASED EI AND ITS ASSOCIATION TO MENTAL SKILL USE IN ATHLETES

by

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APPROVAL PAGE

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CHAPTER I

INTRODUCTION

Emotional Intelligence (EI) is a term that was coined by Salovey and Mayer (1990), and that has foundations in both social intelligence (Thorndike, 1920) and Gardner's (1983) multiple intelligences. EI can be described as the ability to perceive emotion in oneself and others, use emotion to facilitate thought and problem solving, understand complex emotion, and manage emotions in oneself and others. Over the last 20 years, however, two distinct models of EI have developed. Briefly, the two theories are the ability model (Salovey & Mayer, 1990; Mayer & Salovey 1997) and the mixed model (Bar-On, 1997; Goleman, 1995) Studies have been conducted using both theories (and their measures) to explore the connection between EI and variables in a variety of domains.

Many researchers have suggested the importance of the construct of EI to the field of sport psychology (Stough et al. 2009; Meyer & Fletcher, 2007; Meyer & Zizzi, 2007). Zizzi and colleagues (2003) contend that the utility of EI lies in its predictive ability, and could be directly related to factors connected to performance. One such connection is the possible overlap between the construct of EI and mental skills such as self-talk and energy management (Zizzi et al., 2003). Stough and colleagues propose that athletes with high EI could be better equipped to deal effectively with their own and others' emotions. According to Stough and colleagues, EI training could be integrated into traditional sport

psychology and mental training programs to enhance skills that could provide an advantage in competition.

EI has been studied in performance areas other than sport. In particular, EI has been shown to be connected to performance and other variables in the domains of education, health outcomes, and workplace/job performance. Studies testing the relationships in education have shown that EI is a weak predictor of outcomes such as academic success, but has been more strongly related to variables such as delinquency, drug/alcohol use, and truancy, which may themselves affect academic performance (Zeidner et al., 2008). In the area of health outcomes, EI was found to be significantly related to higher mental, physical, and psychosomatic health (Schutte et al., 2007). In the area of job performance, two meta-analyses (O'Boyle et al., 2011; Joseph & Newman, 2010) have reported that, in regards to predicting job performance above and beyond personality and cognitive ability, EI showed high predictive validity. This demonstrates that there is a value to using EI to predict job performance above and beyond what personality and cognitive factors can predict.

The first study of EI and sport was conducted by Zizzi et al, (2003), examining the relationship between EI and objective performance outcomes of baseball players. In the last ten years, however, ten studies examining EI and some aspect of sport performance, as well as two major reviews (Meyer & Fletcher, 2007; Meyer & Zizzi, 2006) on EI and sport, have emerged. Many of these studies have found significant relationships with objective, sport performance outcomes (Zizzi et al., 2003; Perlini & Halverson, 2003; Stough et al. 2009), as well as with other aspects related to sport

performance such as the use of mental skills (Lane et al., 2009b), pre-competition anxiety (Lu et al., 2010), and team performance (Crombie et al., 2009). Up to this point, most of the research on EI and sport performance has been correlational and exploratory in design. However, results of two intervention studies have shown that EI can be increased using an EI training program (Devonport, 2006; Crombie et al., 2011), but neither explored the relationship of this increase in EI to performance or factors related to performance.

As previously mentioned, evidence supports a link between EI and mental skill use by athletes. In male athletes (N=54), Lane et al. (2009b) explored the relationship between EI and the use of mental skills, as measured by the Test of Performance Skills (TOPS: Thomas & Hardy, 1999). Results of this study showed a significant relationship between EI and the use of a number of mental skills such as imagery, self-talk, and activation. This is an intriguing result, however, by using only male athletes generalizability of these results is limited, and excluded the ability to explore the possible moderating effects of gender on the EI and mental skill use relationship. Furthermore, despite the use of athletes from a variety of sports, group differences between these athletes were not examined. Gender has been found to be a significant factor in EI scores (Mayer et al., 2002; Palmer et al., 2005), and sport has been proposed as a possible moderator in the EI and sport performance relationship (Stough et al., 2009; Bal et al., 2011). No studies, however, have explored gender and sport as possible moderators of the EI and mental skill use relationship in athletes.

As previously mentioned, the two main theories of EI (ability and mixed models) have yielded a number of different measures of EI. The ability model (Mayer & Salovey, 1997) focuses on emotional abilities and the use of these abilities to perceive, facilitate, understand, and manage emotion. Proponents of this model typically use a performance-based measure, the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT) in assessing EI. The mixed models (Bar-On, 1997; Goleman, 1995) are so-named due to the combination of emotional abilities and personality traits used to define EI and proponents of these models typically use a self-report measure of EI, the Emotional Quotient Inventory (EQ-i: Bar-On, 1997).

In addition to differences in response type (performance vs. self-report), the two measures differ greatly in their convergence with measures of personality. The MSCEIT has low correlations with measures of personality, while the EQ-i has high correlations with personality measures (Livingstone & Day, 2005). Due, in part, to these results, Meyer and Fletcher (2007) and Meyer and Zizzi (2006) recommend the use of the ability model (and measure) to explore the relationship between EI and sport performance.

The primary research question for this study was: Is there an association between performance-based EI and the use of mental skills (Research Question 1)? The exploration of the connection between EI and mental skills use, using the Test of Performance Strategies (TOPS) amongst athletes replicates prior literature (Lane et al. 2009b), but also extends the knowledge in this area by using the recommended measure of EI that assesses actual ability as opposed to perceived ability and incorporates different dimensions of EI. Based upon findings of the previous study (Lane et al., 2009), it was

hypothesized that significant, positive relationships would be found between EI (both total and the subscale scores), and the use of mental skills (16 TOPS subscales).

The secondary research questions for the study were: To what extent do gender (Research Question 2) and sport (Exploratory Question 3) influence the relationship between EI and the use of mental skills in athletes? No specific hypotheses concerning gender or sport were made as this is the first study to explore the moderating effects of these variables on EI and mental skill use.

Exploring the relationship between performance-based EI and athletes' use of mental skills may offer some insight into specific connections between mental skill use and the different dimensions of EI. These connections could provide a basis for using EI models and interventions to strengthen the use of mental skills to enhance performance. Results could also be useful in designing an EI intervention for athletes that may be tailored uniquely based on gender and sport. As this is the first study to explore the relationship between performance-based EI and mental skills use, as well as the moderating effects of gender and sport, it could provide an initial direction for future research in this area.

CHAPTER II

REVIEW OF THE LITERATURE

What is Emotional Intelligence (EI)?

Unfortunately, after nearly 2 decades of research, there appears to be little consensus over how to define, conceptualize and measure EI (Zeidner, Roberts, & Matthews, 2008). There have been a number of theories and definitions, as well as measures developed for EI. Yet, each theory seems to define EI in a different way, using different theoretical components, and very different measurement tools. Some of these theories describe EI as a set of abilities that can be defined as intelligence, while others incorporate a mixture of abilities and personality constructs to explain EI.

In the mid 1990's EI was introduced as a popular alternative to Intelligence Quotient (IQ) as a predictor of success (Goleman, 1995), earning Daniel Goleman a Time Magazine cover in October 1995. Although the term EI had been coined half a decade earlier by Salovey and Mayer (1990) in a peer reviewed, academic journal, this popularization by Goleman prompted a host of non-empirical publications on EI. There are two main theories that are most often credited as the foundation for EI; social intelligence (Thorndike, 1920) and multiple intelligences (Gardner, 1983).

Foundations of EI. Thorndike (1920) introduced the notion of social intelligence and considered this form of intelligence to consist of three facets. These three facets represent the ability to understand and manage ideas (abstract), concrete objects

(mechanical), and people (social). Social intelligence was initially defined as the ability to understand and manage other people and to engage in adaptive social interactions. Thorndike (1920) eventually expanded that definition to include the ability to perceive one's own and other's internal states, motives, and behaviors, and to act toward them optimally on the basis of that information. Using Thorndike's theory, EI is a term used to describe a type of social intelligence that involves the ability to monitor one's own emotions and the emotions of others, to discriminate among them, and to use that knowledge to give direction to one's thoughts and actions (Salovey & Mayer, 1990).

Social intelligence, however, like EI, also had its critics. Many scientists and psychologists had a skeptical view of social intelligence. In response, Salovey and Mayer (1990) stated that the reason traditional views (such as Thorndike's) of social intelligence were poorly received was because they excluded consideration of one's own and other's emotions that may guide behavior in a more pro social manner. The inclusion of the emotional consideration for oneself and others as influencing positive behavior helped explain social intelligence in a more positive and constructive way.

Thorndike (1920) defined social intelligence relatively easily, but found measuring social intelligence to be more difficult. Kosmitzki and John (1993) were one of the first to collect qualitative data on components of social intelligence. In this study, 55 undergraduates judged 18 features (descriptors) of social intelligence and found considerable agreement amongst judges on the features most central to the concept of social intelligence. Those features included the degree to which one: 1) understands people's thoughts, feelings, and intentions well, 2) is good at dealing with people, 3) has

extensive knowledge of rules and norms in human relations, 4) is good at taking the perspective of other people, 5) adapts well in social situations, 6) is warm and caring, and 7) is open to new experiences, ideas, and values.

The theory of multiple intelligences was proposed in Howard Gardner's book, Frames of Mind (1983). Gardner arrived at this theory using empirical findings from hundreds of studies across a number of fields including psychometric and experimental psychology, cognitive and developmental psychology, neuroscience, anthropology, and differential psychology (Gardner & Moran, 2006). So, although the initial work was published in a non-peer reviewed book, a number of peer-reviewed articles have since been published supporting this theory (e.g. Gardner, 1987; Gardner & Moran, 2006).

Gardner's (1983) book refuted traditional IQ theory (which only recognized verbal and mathematical intelligence) and proposed that there was not just one concrete kind of intelligence that was crucial for life success, but seven key varieties that covered a wide spectrum of intelligences. These intelligences included the two academic forms of intelligence: verbal and mathematical, but also included spatial brilliance seen in a great artist or architect, kinesthetic genius displayed in physical fluidity by elite athletes like Magic Johnson or Michael Jordan, and the musical element apparent in the works of Mozart or Yo Yo Ma. The last two types of intelligences were considered to be personal intelligences: Interpersonal and intrapersonal (Gardner, 1987). Since his initial research, Gardner has added an eighth (naturalistic) and then a ninth (existential) intelligence to

these myriad intelligences (Gardner & Moran, 2006). However, this review is focused upon the inter- and intrapersonal intelligences, which are most commonly connected to EI.

Gardner (1993) defined interpersonal intelligence as an ability to understand other people; specifically, in terms of motivation, cooperation, and function. Gardner (1993) describes this ability to understand others in terms of recognizing contrasts in people's mood, temperament, motivations, and intentions. Interestingly, Gardner defines this form of intelligence as an ability. Similarly, he describes intrapersonal intelligence as essentially the same qualities turned inward. Gardner (1993) describes intrapersonal intelligence as the ability to accurately assess oneself and to be able to use that information to live effectively. A critical piece to both the interpersonal and intrapersonal definitions is the inclusion of the idea that using (not simply recognizing) these skills of understanding oneself, one's motivations, etc. to guide behavior and decisions (Gardner, 1993) is a crucial component to competency in these "personal intelligences."

While both social intelligence and multiple intelligences provided important foundations for EI, neither can be used independently to explain EI. As will be discussed in the following section, some EI theorists used the ideas of Gardner (1983, 1993) in describing EI as an ability used to regulate behavior and solve emotion-laden problems (Mayer & Salovey, 1997), while others defined EI as encompassing a broad array of personal attributes including political awareness, self-confidence, conscientiousness, and achievement motive among other personality traits (Goleman, 1995). The ability model, proposed by Salovey and Mayer (1990; 1997), is named due to its focus on emotion-

driven abilities and how they interact with thought (Mayer et al. 2000). The mixed models, (Bar-On, 1997; 2006, Goleman, 1995), are most often described as an intermingling of emotional abilities and a variety of other traits.

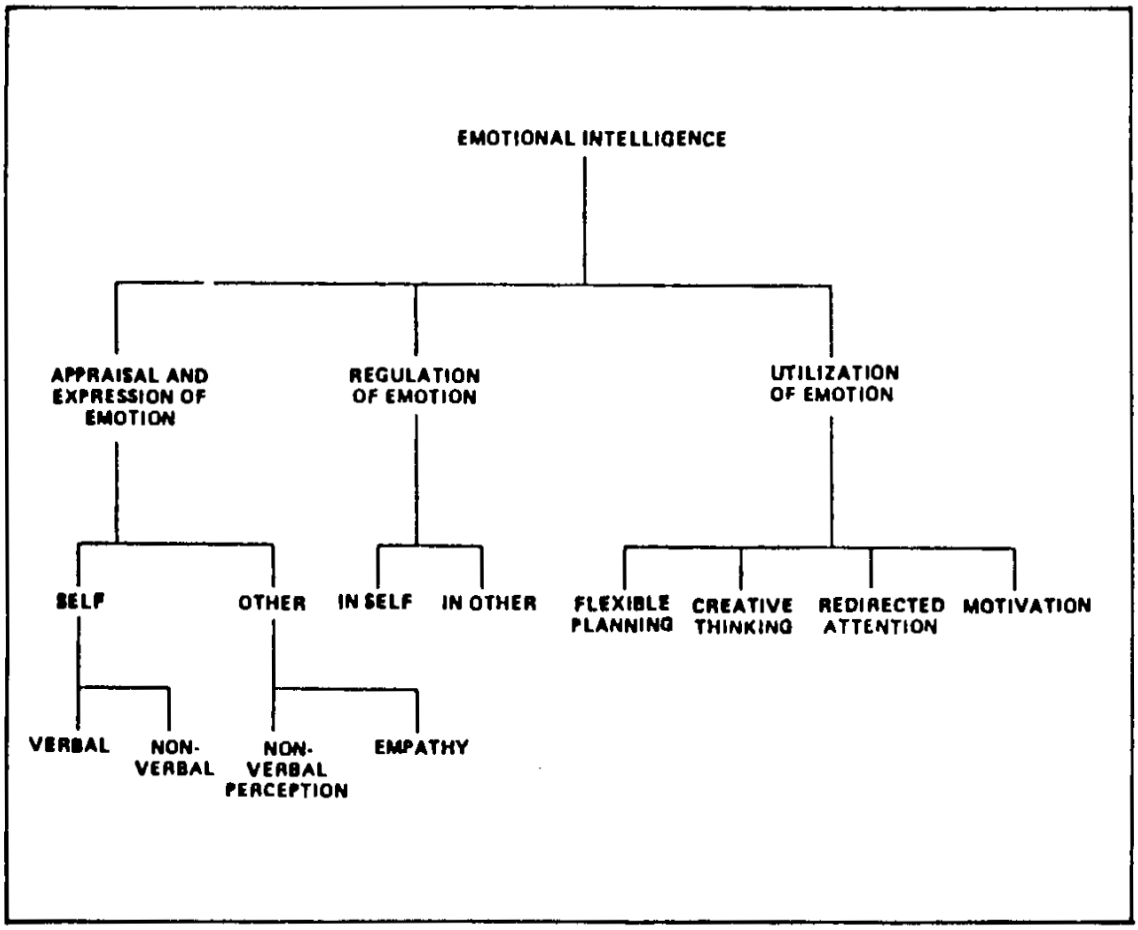
Models of EI

Ability model: Salovey and Mayer. Salovey and Mayer (1990), following Gardner's (1983) theory of multiple intelligences, first coined the term Emotional Intelligence (EI). In their 1990 article, Salovey and Mayer justified the term EI by breaking it into its parts: emotion and intelligence. They defined emotion as organized responses that arise in response to an event that can be internal or external, can be positive or negative, and can be distinguished from mood in that they are shorter and more intense. Salovey and Mayer, (1990) explored a number of definitions of intelligence dating back to Pythagoras and Descartes. Then, they came to rest on a definition by Wechsler (1958), who defined intelligence as the global capacity to act purposefully, think rationally and deal effectively with one's environment. The authors described this definition as being more broadly encompassing about what people believe intelligence is than other more narrow definitions.

Salovey and Mayer (1990) first defined EI as, "a subset of social intelligence that involves the ability to monitor one's own and other's feelings and emotions, to discriminate among them and to use this information to guide one's thinking and actions (p. 189)." As noted earlier, this definition mirrors Gardner's (1983) description of interpersonal and intrapersonal intelligence in terms of using the information acquired about one's own and other's emotions to guide behavior and actions. Salovey and Mayer

divided EI into 3 subcategories of mental processes (see Figure 1) that included, a) appraising and expressing emotions in the self and others, b) regulating emotion in the self and others, and c) using emotions in adaptive ways (i.e. planning, creative thinking). An essential piece to this model allows for the recognition that people differ in their aptitude to understand and express emotions and addresses the possibility that these mental processes are skills that can be learned.

Figure 1. Salovey & Mayer, 1990, Model of EI



Mayer and Salovey (1997) later revised their definition of EI, describing their original definition as unclear, lacking in the area of using emotions to facilitate thought, and focusing solely on the perception and regulation of emotion. The revision defined EI as:

> The ability to perceive accurately, appraise, and express emotion; the ability to access and/or generate feelings when they facilitate thought; the ability to understand emotion and emotional knowledge; and the ability to regulate emotions to promote emotional and intellectual growth (p. 35, Salovey et al., 2004).

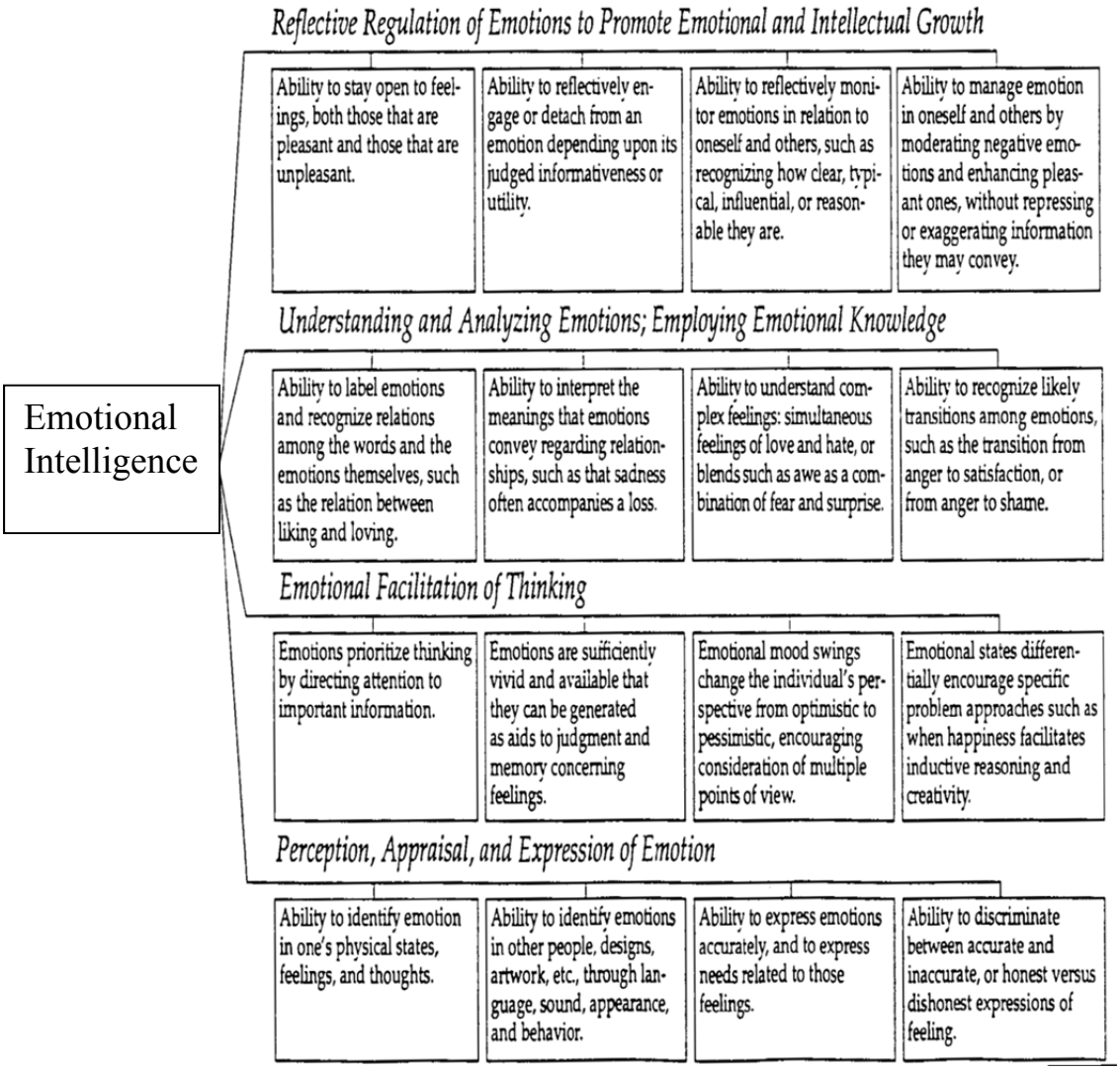
This new definition addressed the recognition of the emotional facilitation of thinking as well as understanding and analyzing complex emotions. The revised model (see Figure 2), not only added a new branch to the model of EI, but also added developmental and hierarchical dimensions.

The four branches of the Mayer and Salovey (1997) model are arranged from the more basic psychological processes at the bottom of the model to higher order processes that are more psychologically integrated at the top. For example, Branch 1, perceiving emotions, deals with the relatively simple task of recognizing, perceiving, and expressing emotion, whereas Branch 4, managing emotions, concerns the conscious, reflective regulation of emotion. In terms of developmental distinctions, of the four boxes that appear below each branch, the abilities on the left emerge relatively early in life and as one moves to the boxes to the right the abilities are viewed as emerging later in life. For example, in Branch 1, the ability to perceive emotions in the self develops before the

ability to perceive emotions in others, which develops before the ability to discriminate between honest and dishonest expressions of feeling.

Branch 1, perceiving emotions, involves registering and deciphering emotional messages that can be found in voices, facial expressions, or even cultural artifacts. "Emotional Intelligence is impossible without the competencies involved in this first branch (Salovey et al., 2004, p. 64)." Salovey et al. (2002) use the example of an individual who notices a brief moment of fear on another's face. He/she would understand much more about the other person's emotions and thoughts than someone who had missed that expression of fear. So, while Branch 1 constitutes the lowest, most basic order of the model, it is also the most essential.

Figure 2. Mayer & Salovey, 1997, Model of EI



Branch 2, facilitation of thought, concerns how emotions affect the cognitive system, and thus can be used to facilitate problem-solving, creative thinking and reasoning skills. Another essential piece to this branch is the ability to utilize emotions to prioritize and attend to what is important, as well as to be able to focus on how the

cognitive system functions most effectively in a given mood (Salovey et al., 2002). This last idea will be revisited later in a discussion of Hanin (1994) and his Individual Zones of Optimal Functioning.

Branch 3, emotional understanding, involves the ability to see the relationship between emotions, the blending of emotions, and how they progress over time (Salovey et al., 2002). For example, the ability to recognize that, given a provocative stimulus, the combination of annoyance and irritation can lead to rage (Salovey et al., 2002); or that envy and love can evoke feelings of jealousy.

The highest order, Branch 4, emotional management, deals with the ability to monitor, reflect upon, and manage one's own and other's emotions. Many people identify EI with this branch, possibly due to societal pressures connected to regulating one's emotions (Salovey et al., 2002). Another important aspect of this branch is the conscious regulation of one's emotions for the purpose of promoting emotional and intellectual growth (Mayer & Salovey, 1997).

Mixed models of EI differ greatly from the ability model (Mayer et al., 2000). However, the authors of the ability model (Salovey & Mayer, 1990; Mayer & Salovey, 1997) admitted that their initial definition and explanation of EI openly described personality characteristics as accompanying ability/intelligence (Mayer et al., 2000). Mayer et al. (2000) went on to say that a distinction between abilities and personality traits would be important for analyzing how these different constructs (abilities and traits) independently contribute to someone's behavior and life competence; and, that although personality traits are important, they are better addressed as distinct from EI.

Mixed models differ from ability models in their inclusion of a variety of personality traits such as conscientiousness and self-confidence. The two main theories that fall under this model were proposed by Bar-On (1997) and Goleman (1995). Both theories attempted to integrate concepts from both Gardner (1983) and Salovey and Mayer (1990), but added elements such as general mood, adaptability, altruism, and handling relationships in their definition of EI.

Mixed model: Bar-On. One of the mixed models of EI was proposed by Bar-On (1997) with his creation of the Emotional Quotient Inventory, the EQ-i (measures of EI will be discussed later). Bar-On (2006) credited the formation of his theory of EI to Darwin's early work on emotional expression for adaptation and survival, as well as Thorndike's (1920) description of social intelligence and Wechsler's (1940) research related to non-cognitive factors. Bar-On (2006) stressed the importance of emotional expression and considered an individual's ability to effectively adapt as emotionally and socially intelligent behavior.

In 1997 Bar-On defined EI as, "an array of non-cognitive capabilities, competencies, and skills that influence one's ability to succeed in coping with environmental demands and pressures (p. 14)." He defined five major skill areas, each with between two and five specific skills 1) intrapersonal skills (emotional self-awareness, assertiveness, self-regard, self-actualization, independence), 2) interpersonal skills (interpersonal relationships, social responsibility, empathy), 3) adaptability (problem-solving, reality testing, flexibility), 4) stress management (stress tolerance, impulse control), and 5) general mood (happiness, optimism).

Bar-On (2006) has since revised his definition of what he now calls Emotional-Social Intelligence (ESI) as follows:

> EIS is a cross-section of interrelated emotional and social competencies, skills, and facilitators that determine how effectively we understand and express ourselves, understand others and relate with them, and cope with daily demands (p. 14).

This revised definition and theory maintained the same five major skill areas as originally proposed, as well as the same specific skills that fall under each major skill. While this theory does contain a mental ability component, such as emotional self-awareness, Bar-On (1997, 2006) also mixes in other more dispositional characteristics such as independence, self-regard, and mood, making this theory a mixed model (Mayer et al., 2000). Livingstone and Day (2005) agree that while emotional self-awareness and problem-solving could be labeled as mental abilities, other descriptors in this model, such as adaptability and optimism appear to be more personality based.

Despite the breadth of his model, Bar-On (1997) is somewhat cautious in his claims about what his model of EI predicts (Mayer et al., 2000). His model is said to predict success, but more accurately predicts the potential to succeed, rather than success itself (Bar-on, 1997).

Mixed model: Goleman. Goleman (1995) proposed the second of the two major mixed models of EI. Goleman (1995) categorized EI into five broad domains: 1) knowing one's self, 2) managing emotions, 3) motivating one's self, 4) recognizing emotions in

others, and 5) handing relationships. Each domain is defined using descriptors, as well as consequences and benefits of being either low or high in these areas.

The "knowing one's self" domain may be the closest conceptually to EI as proposed in the ability model because this domain is described as the ability to recognize emotions in oneself. The "managing emotions" domain is described as a capacity to soothe oneself, and to shake off anxiety, gloom, and irritability. Within the other domains Goleman (1995) included trait-like descriptions such as delaying gratification, stifling impulsiveness, creativity, zeal, persistence and altruism and predictive claims such as "being a social star and undergirding popularity (p. 43)." Mayer et al. (2000) stated that Goleman (1995; 1998) makes extraordinary claims for the predictive validity of his mixed model. Among those are predictions that EI will account for success at home, school, and work; and among youth will lead to less aggression, more popularity, and improved learning, as well as better decision-making concerning drugs, sex and alcohol.

While some of these domains, such as "knowing one's emotions", "managing emotions" and "recognizing emotions in others" may seem to mirror some of the branches of Mayer and Salovey's (1997) model, a closer look at the descriptions of these domains shows how dissimilar they are.

Goleman (1995) credited ability model researchers like Salovey and Mayer (1990) for first proposing the concept of EI, as well as Gardner's (1983) work on multiple intelligences for laying the groundwork of the personal intelligences. He clearly strayed from these previously mentioned theorists, however, with his inclusion of traits such as trustworthiness, adaptability, innovation, communication, and team capabilities, as well

as describing EI as a set of traits which could be called "character." This inclusion of such dispositions and personality traits categorize this theory of EI as a mixed model.

On a final note concerning the ability vs. mixed models; Mayer et al. (2008) claimed that the mixed models of EI are unclear as to why certain traits are included (openness, adaptability, optimism) in the model, while others are left out; and similarly for some emotional abilities that seem to be chosen without justification. The only rationale in this selection process includes the occasional mention that these attributes may be more likely to predict success (i.e. Bar-On, 1997).

Mayer et al. (2008) made a number of recommendations for researchers interested in studying EI. Two of these recommendations are especially salient; first, that the term EI be confined to the interaction between emotions and intelligence, specifically to the abilities involved in emotional understanding and using emotions to enhance reasoning. Second, that the array of widely studied personality traits, such as the motivation for achievement, self-control, happiness, and social styles like assertiveness should be labeled as thus and kept separate, rather than be thrown together in a seemingly random collection and called EI.

Three models of EI have been described (See Table 1 for summary); falling into two types, the ability model and the mixed model. Many researchers in the field agree that the term EI has been used to cover too many different traits and concepts (Landy, 2005; Murphy 2006; Zeidner, Roberts, & Matthews, 2004; Mayer et al., 2008). Bar-On (2006) claimed that "mixed" characteristics exist in all models of EI in that they all overlap with personality traits and cognitive intelligence to some extent. He argued that

the degree of difference in the overlap (with personality traits and cognitive intelligence) between models is too small to use such descriptors to differentiate "mixed" vs. "ability" when categorizing these models.

The following section provides a description of the instruments used to measure EI, some based on the ability model and some on the mixed model; followed by a number of reliability and validity studies conducted to explore if a differentiation in "ability" vs. "mixed" model is warranted.

Table 1

Models, Authors, and Related Measurements of EI

Model Type	Authors/Revisions	Components	Measures
Ability Model/Performance-based measure	Salovey & Mayer (1990) Mayer & Salovey (1997)	4 Branches (Perceiving, Facilitating, Understanding, Managing emotions)	MEIS, MSCEIT, MSCEIT V2.0
Mixed Model/Self-report measure	Bar-On (1997, 2000, 2006)	5 Components (Interpersonal, Intrapersonal, Stress Management, Adaptability, General Mood)	EQi
Mixed Model/Self-report measure	Goleman (1995)	5 Domains (Knowing one's emotions, Managing emotions, Motivating oneself, Recognizing emotions in others, Handling relationships)	ECI
Ability Model/Self-report measure	Schutte et al. (1998) *Based on Salovey & Mayer (1990) model	*See Figure 1	EIS
Workplace Model of EI behaviors/Self-report measure	Palmer & Stough (2001) Palmer et al., (2009)	7 Factors (Emotional: Self-Awareness, Expression, Awareness of others, Reasoning, Self-management, Management of others, Self-control)	SUIET or Genos EI

Measuring Emotional Intelligence

A number of instruments have been developed to measure EI. As we have seen, a theoretical conceptualization of EI cannot be agreed upon, thus the instruments that have been created reflect the varying ability and mixed models. According to Van Rooy and Viswesvaran (2004) each measure varies considerably on aspects such as length and reliability, in addition to their specific conceptualizations of EI. For the most part, performance-based measures were created to assess EI from the perspective of the ability model, while self-report measures dominate the mixed model instruments. There are also a few examples of instruments that do not follow the pattern described above that will be discussed. In addition, instruments to measure EI have been developed for a number of reasons and populations, i.e. workplace, college students, adolescents.

Although many instruments for measuring EI have been developed, for the purposes of this review, five instruments (as well as their newer versions) will be reviewed. These five instruments were found to have been peer-reviewed, examined for their psychometric properties and follow one of the major theories of EI. They also represent instruments used to examine EI in relevant domains such as business and sport. The Multifactor Emotional Intelligence Scale (MEIS) and its evolution into the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT 2.0) is an ability model measure. Two of the mixed-model, self-report measures are the Emotional Quotient Inventory (EQi) and the Emotional Competence Inventory (ECI). Finally, a description of the Emotional Intelligence Scale (EIS), which is based on the ability model, but employs the

self-report method, as well as the Genos EI, a workplace-based measure of emotionally intelligent behaviors will be included.

Ability model instruments. The MEIS (Mayer et al., 1999) is an ability measure of EI. The MEIS consists of 402 items broken down into 12 tasks, representing each of the four branches of the Mayer and Salovey (1997) ability model of EI (perceiving, assimilating, understanding, and managing emotion). The specific tasks are based on the assumption of EI that certain emotional problems have answers that can be judged as correct or incorrect (Mayer et al., 1999). For example, Branch 3 (understanding emotions) contains a task called "Blends," which measures the participants' ability to analyze blended or complex emotions, i.e., Optimism most closely combines which two emotions? a) pleasure and anticipation, b) acceptance and joy, c) surprise and joy, d) pleasure and joy (See Mayer et al, 1999).

The MEIS employs two main types of scoring methods (a third method, target scoring, was suggested in the original version, but only for two tasks and was removed in subsequent versions of this instrument) in order to make these right or wrong judgments: Consensus and Expert scoring. The consensus scoring method scores each participant's response to either a multiple choice or 5-point rating scale in accordance to its agreement with the proportion of other participants who answered the same. For example, if 50% (0.5) of the participants reported a specific answer on a 1-5 scale (i.e. "4"), then all participants who selected "4" would receive 0.5 for that item. Similarly, if only 6% (0.06) selected "3", then all those participants who selected "3" would receive 0.06 for that item. Expert scoring utilizes the expertise of the first two authors of the instrument based

on their knowledge of Western philosophical treatments of emotion, as well as contemporary psychological models of emotion. The authors identified the best alternative (1 to 5) for each question; participants who selected the chosen value scored "1", others were scored "0."

Correlations between consensus and expert methods were found to be moderately high, significant at the $p < 0.0001$ level. This convergence among the methods provided support for the above mentioned assumption concerning emotional problems and their ability to be accurately judged as correct or incorrect (Mayer et al., 1999). The convergence on correct answers of these two scoring methods to the degree anticipated represented an important finding, as it added to the confidence of either of the scoring approaches (Mayer et al., 2000).

Unfortunately, this research on the MEIS also revealed some psychometric problems including poor convergence amongst the two scoring methods (Roberts et al., 2001), low levels of internal consistency for some of the subscales, and factor structure issues (Palmer et al., 2005). The use of the MEIS in studies was minimal due to its short-lived existence (Van Rooy & Viswesvaran, 2004) in favor of a revised version: the MSCEIT, which was designed by the authors of the MEIS to address and improve upon these limitations (Palmer et al., 2005).

The MSCEIT Version 1.1 consisted of 292 items, comprised of 12 subscales based on the four branch model of Mayer and Salovey (1997). The MSCEIT V2.0 was designed to make test taking easier on the participant as well as to increase research and practical application by reducing the number of items to 141 as well as the subscales

down to 8 (Mayer et al., 2000). It used tasks similar to those used in the MEIS to measure the four branches of EI (Mayer et al., 2001). The MSCEIT V2.0 is the most recent version and represents an improvement in all the areas that were criticized in the MEIS. Palmer et al. (2005) stated that research findings with the MSCEIT suggested that its psychometric properties were considerably better than those of its predecessor the MEIS, specifically in the areas of scoring, reliability and factor structure. However, as will be discussed later, the reliability of the MSCEIT could be problematic when used with an athlete sample.

In terms of scoring, the authors decided to replace themselves as the expert scorers in favor of 21 members of the International Society of Research in Emotion (ISRE). As a result the MSCEIT demonstrated a higher level of convergence between expert and consensus scoring methods (Palmer et al., 2005). In addition, the target scoring method was removed from the MSCEIT. Reliability analyses of the MSCEIT revealed that it had good internal consistency at the full scale (α=0.91), area (Experiential [α=0.91] and Strategic [α=0.78]), and branch levels (B1: α=0.90, B2: α=0.73, B3: α=0.71, B4: α=0.76) (Palmer et al., 2005; Papadogiannis, Logan, & Sitarenios, 2009). Factor analyses of the MSCEIT suggested that its factor structure better supported (than the MEIS) the four branch model of the Mayer and Salovey (1997) model. The factor loadings were all positive and statistically significant ($p<.001$), ranging from r=.37 to .64 (Palmer et al., 2005), in addition to a Comparative Fit Index (CFI) of .95, supporting that the MSCEIT four-factor model fit the data well (Livingstone & Day, 2005).

Finally, a 101-item MSCEIT: Youth Version (YV) has been developed for youth between the ages of 10-18 (The MSCEIT V2.0 is recommended for adults age 17 and older). The instrument is similarly based on the four branch model of EI (Salovey & Mayer, 1997), but tasks only breakdown as far as the branch level, i.e. 4 branches, 4 tasks (instead of 8 tasks as seen in the adult version). Another major difference in the YV is the use of only expert scoring. It was determined that the most frequently endorsed responses by youth were clearly not the correct choice; therefore it was deemed inappropriate to base a set of scores on the general consensus of this age group (Papadogiannis et al., 2009). The MSCEIT YV is still in development; normative data is being collected and reliability and validity studies underway (Papadogiannis et al., 2009).

Mixed model instruments. The EQ-I, developed by Bar-On (1997), is a self-report measure consisting of 133 items recommended for ages 16 and up with at least a sixth grade reading level. It was designed to assess EI as a concept referring to capabilities, competencies, and skills required to cope with environmental demands and pressures (Bar-On, 1997). The EQ-i was the first measure of EI to be published by a psychological test publisher and is the most widely used measure of EI to date (Bar-On, 2006; Van Rooy & Viswesvaran, 2004).

The test is based on 5-point Likert scale responses from 1 (very seldom or not true of me) to 5 (Very often true of me or true of me). The EQi renders a total EQ score along with 5 composite scales that reflect the Bar-On (1997) model of EI: interpersonal, intrapersonal, adaptability, stress management, and general mood.

Bar-On (1997) reported that average test-retest reliability appeared to be adequate (r=.85 and .75 for 1- to 4-month periods), as was internal consistency (r=.76). Livingstone and Day, (2005), however, showed a lack of support for the 5-factor model (CFI=.77), demonstrating the model did not fit the data well. According to Conte (2005) the EQi demonstrates adequate reliability and there is some evidence of validity, but the measure lacks evidence regarding discriminant validity, and few studies have examined whether or not it provides incremental predictive validity above and beyond established predictors such as cognitive ability and the Big Five personality dimensions.

Another of the mixed model measures of EI is the ECI. This instrument was developed by Boyatzis, Goleman, and Rhee (2000). The ECI is a 110-item self-report measure with the purpose of assessing emotional competency, which is defined as the ability to recognize and manage one's own emotions and the emotions of others and the ability to motivate oneself (Goleman et al., 1999). The competencies measured in this instrument are broken into four groups: 1) self-awareness, 2) self-management, 3) social awareness, and 4) social skills. Each grouping is further broken into specific competencies, i.e. self-awareness includes emotional awareness, accurate self-assessment, and self-confidence. There are a total of 20 competencies in all.

In terms of psychometrics, internal consistency reliabilities ranged from 0.61 to 0.85 (Conte, 2005). The authors of this instrument suggest that it is supported by validity evidence from the Self-Assessment Questionnaire (SAQ), which is a predecessor of the ECI (Conte, 2005). However, few independent assessments of reliability and validity have been done with this instrument due to the reluctance of the test developers to allow

many of its items to be evaluated by other researchers (Conte, 2005). For this reason, reported validity and reliability findings on the ECI are considered, "tentative at best (Conte, 2005, p. 434)." Finally, the competencies within the ECI have also been found to share characteristics with four of the five Big Five personality dimensions (Van Rooy & Viswesvaran, 2004). Finally, Conte (2005) concludes that evidence of discriminant and predictive validity for the ECI has not been provided, and thus concludes that the measure does not deserve serious consideration until peer-reviewed empirical studies are conducted.

Other instruments. The Emotional Intelligence Scale (EIS), or Self-Report Emotional Intelligence Test (SREIT) as it has been called, is a 33-item, self-report measure developed by Schutte et al. (1998). The 33 items are rated on a Likert scale from 1 to 5, where 1 represents "strongly disagree" and 5 represents "strongly agree." The authors of this instrument developed the EIS because they believed there was a need for a brief, validated measures of EI, based on a cohesive and comprehensive model. The theoretical foundation they used for the EIS was the original Salovey and Mayer (1990) ability model of EI as they believed that this "encompassing model of EI" would provide a sound foundation for a measure of an individual's current EI level (Schutte et al., 1998).

The EIS began with an initial pool of 62 items; after which, a factor analysis resulted in a single-factor 33-item instrument. This 33-item instrument showed good internal consistency with a α=.87and test-retest reliability (two-weeks) of 0.78 (Schutte et al., 1998). Petrides and Furnham (2000), however, criticize the psychometric properties of the EIS, claiming that the scale does not fit the Salovey and Mayer (1990) model of EI.

Recall that Mayer et al. (2000) described their initial model (1990) as openly including personality characteristics that may accompany such a mental ability/intelligence. For this reason it is not surprising that Schutte et al. (1998) describe EI as a trait-like characteristic that may be related to the Big Five personality dimensions.

Following this line of thinking, the EIS was found to correlate moderately to strongly with various personality constructs including alexithymia, optimism, impulse control, and openness to experience (Schutte et al., 1998). As with other self-report measures, the EIS shares large amounts of variance with existing personality scales (Brackett & Mayer, 2003). These findings have led some researchers to believe that the EIS may be better characterized with types of personality inventories and not measures of EI (Mayer et al., 2000; Brackett & Mayer, 2003). The EIS did provide some important between group differences, demonstrating that a group of psychotherapists scored significantly higher than a group of female inmates (M=134.92, M=120.08, respectively), as well as females scoring significantly higher than males (M=130.94, M=124.78, respectively). Based on this information the EIS should be considered to fall under the umbrella of mixed model measures despite its theoretical underpinnings (e.g. Salovey and Mayer, 1990).

The final instrument to be discussed briefly is the Genos EI, which was originally conceptualized by Palmer and Stough (2001) at Swinburne University under the name: Swinburne University Emotional Intelligence Test (SUEIT). This instrument differs from the others described in that it does not purport to measure EI, rather it measures the

frequency with which people demonstrate emotionally intelligent workplace behaviors (Palmer et al., 2009).

The Genos EI was developed specifically for use in the workplace for the purpose of identifying, selecting, and developing employees (Palmer et al., 2009). The rationale for the development of this instrument includes the lack of workplace face validity and long completion time of the MSCEIT, EQi and ECI. Palmer and colleagues (2009) address the assertion that the MSCEIT (a performance-based measure) is a superior measure of EI due to the lack of reliance on respondent insight and the susceptibility to social desirability bias. However, they also contend that scores on ability measures of EI in the workplace do not necessarily translate to performance outcomes that could prove more important in employee development.

The Genos model comprises a general factor of EI as well as 7 sub-factors including emotional self-awareness, emotional expression, emotional awareness of others, emotional reasoning, emotional self-management, emotional management of others, and emotional self-control. Participants respond by indicating how often a behavior in question is demonstrated on a scale from 1 to 5 (1= almost never, and 5= almost always). The Genos EI was found to have good internal consistency reliability (0.96) as well as support for the 7-factor model implied in the inventory based on confirmatory factor analyses (Palmer et al., 2009).

The Genos EI does not seem to fit either the ability or mixed model of EI as it does not purport to measure EI directly, but instead measures emotionally intelligent behaviors; in addition, it was developed specifically for use in the workplace. In the

following section, comparisons between ability and mixed model measures are presented. The Genos EI and the ECI are not included in this discussion as both have been shown to lack vital areas of validity and reliability essential to such a discussion. Therefore, what follows will be a comparison of similarities and differences between the MSCEIT V2.0, EQi, and EIS.

Comparison of Mixed and Ability Model Measures. A comparison of instruments measuring a construct such as EI must include aspects of both validity and reliability. Specifically, a number of studies compared the internal consistency reliability, test-retest reliability, construct validity (factor structure), convergent validity, and discriminant validity of these measures

The first study by Livingstone and Day (2005) explored the differences in construct, convergent, and discriminant validity between the MSCEIT and the EQi. The first aspect of validity examined was factor structure. Livingstone and Day (2005) found that the four-factor model of the MSCEIT fit the data well. They did not find a good fit for the EQi, however, finding it to be a poor fit to the theoretical model. Livingstone and Day (2005), thus call into question the construct validity of the EQi due to its failure to support the theorized five-factor model.

The next types of validity examined by Livingstone and Day (2005) were convergent and discriminant validity. They examined the extent to which each of the measures converged with each other as well as with measures of cognitive ability (one of the criteria to be considered an intelligence is a moderate relationship to other measures of cognitive ability [Mayer & Salovey, 1997]). In terms of discriminant validity, they

explored the extent to which each instrument differed from personality measures. This is important because the construct validity of a measure is determined by its ability to relate to other constructs that purport to measure the same thing (convergent) as well as how well they differ from constructs that should be measuring something completely different (discriminant). Livingstone and Day (2005) found that the MSCEIT and the EQi showed low to moderate correlations (r's= 0.13-0.31) to each other. This suggests that the MSCEIT and the EQi are assessing different constructs. The EQi showed no positive correlations to other measures of cognitive ability, while two branches of the MSCEIT (emotional management and emotional understanding) demonstrated low correlations with Verbal Ability (r= 0.14). Regressed separately, however, three components of cognitive ability (verbal, spatial, problem-solving) accounted for a statistically significant amount of variance in the Emotional Understanding scale of the MCSEIT (Livingstone & Day, 2005); cognitive ability measures did not account for significant variance in any of the EQi scales.

Discriminant validity was assessed by comparisons to the Big Five personality dimensions. The MSCEIT showed low to moderate correlations (r's= .04 to 0.29), while the EQi demonstrated stronger correlations (r's=0.15 to 0.66) with personality measures (Livingstone & Day, 2005). As reported by Conte (2005), the EQi lacks discriminant validity evidence and few studies have examined whether it provides predictive ability above and beyond established predictors such as the Big Five personality dimensions. These studies show that while the MSCEIT demonstrates good discriminant validity and

average convergent validity, the EQi was found to have poor discriminant and convergent validity.

A study of convergent and discriminant validity conducted by Brackett and Mayer (2003) support the research done by Livingstone and Day (2005), as well as include the EIS in the analysis. Brackett and Mayer (2003) concluded that both the EQi and EIS shared considerable variance with the Big Five personality dimensions, while the MSCEIT showed the most discriminant validity. The authors go on to state that while Bar-On (2000) stressed that the EQi was not developed to measure personality traits, the current study showed that the EQi is highly correlated to the Big Five (r= 0.75). Brackett and Mayer (2003) conclude that the mixed models, as measured by the EQi and EIS, substantially overlap with existing personality measures suggesting that these instruments cover an area not all that different from well-studied personality and well-being scales.

In a study of the MSCEIT, (Palmer et al., 2005) confirmatory factor analyses (CFA) as well as reliability are examined. First, the CFA showed the data to be a good fit with a general factor of EI. The other focus of this study was the reliability. They conducted both test-retest and split half reliability tests for the MSCEIT. They found the test retest reliability to be good (r= 0.86). However, they found the split half reliabilities to be good at the overall, area, and branch level (r=.90), but not at the subscale level (each branch of the measure has two tasks). Thus, they advise that interpreting the test at the task level is not advisable, but interpretation is acceptable at the overall, area and branch levels.

Based on the studies described above, the ability model measure of EI (MSCEIT) would be the most appropriate instrument to use when measuring EI. However, Bar-On (2006) continues to make claims about the construct validity of the EQi, stating that the instrument measures what it was designed to measure. Bar-On (2006) also makes claims about the small degree of overlap with personality without conducting any analyses of his own; simply suggesting that the overlap is smaller than was previously thought.

Despite these claims researchers continue to confirm that questionnaire measures for EI overlap greatly with standard personality traits; citing Bar-On's (2004) EQi as the biggest offender, which correlates around 0.80 with trait anxiety and general psychopathology (Zeidner et al., 2008). Furthermore, Petrides and Furnham (2003) claim that self-report inventories of EI belong with personality measures and do not measure abilities, even to the extent to call them "mixed."

The authors of the MSCEIT claim that the ability-based approach can best measure EI, explaining that intelligences are generally described as mental abilities and mental abilities are best measured by asking questions that can be judged based on correctness (Mayer et al., 2008). Mayer et al. (2008) go on to state that mixed model tests often assess the wrong concepts by including EI irrelevant variables such as need for achievement and self-esteem.

Papadogiannis et al. (2009) support Mayer and colleagues (2008) and the use of the MSCEIT by stating that the theoretical and empirical evidence suggests good reliability and validity for the MSCEIT and supports the claim that the ability model, as measured by the MSCEIT, shows more promise than any other measures of EI in use at

this time. Conte (2005) expresses a similar opinion, claiming that the self-report measures of EI are likely to receive less attention in the future due to their lack of psychometric support, specifically in the area of discriminant validity. These statements, made by researchers independent of the EI instruments in question, lend strong support to the place for ability-based measures of EI (MSCEIT) in the study of EI in research and practical settings.

Van Rooy et al. (2005), however, argue that while mixed and ability models of EI may not be measuring the same construct, it does not imply that one of the models is inferior to the other. Instead, Van Rooy and colleagues claim that both models may be useful, depending on the context in which they are used. The authors suggest that due to the breadth of the mixed model it may have value in the context of selection as well as being useful in certain organizational settings. They further suggest that ability model measures are better suited for use in developmental programs where the goal is to increase performance in employees, and these models could also apply to domains outside the workplace.

Domains of EI Research and Application

A number of domains and settings have been explored in relation to EI. Some of those areas include educational settings, health and wellness, business/workplace, and sport. EI and its relationship to educational factors are important, and will be discussed briefly. This review will focus, however, upon the relationship between EI and health, workplace/business settings, and sport.

Educational Settings. According to Zeidner et al. (2008), EI appears to be a fairly weak predictor of academic success. A limited number of studies have been conducted in this area that provide minimal predictive validity for the relationship between EI and academic success. On the other hand, EI skills learned in emotional learning programs may have benefits for motivating students to achieve, increase social and emotional competence, and become more responsible members of society (Zeidner et al., 2008). For the most part, research findings in this area have been inconclusive. For example, Zeidner et al. (2005) conducted a study in which gifted and non-gifted high school kids were compared using the MSCEIT and EIS. The "gifted" determination was based on a two-step process including an initial aptitude test (those scoring in the top 15% moving on), followed by advanced placement tests of general cognitive ability (that heavily emphasized verbal and numerical ability). Results showed that gifted students scored higher on the MSCEIT, but lower on the EIS, suggesting that the relationship between academic performance and EI is measure dependent.

Other researchers have claimed that EI can improve academic success (Zins et al., 2004), promote well-being and adjustment (Weissberg, 2000), and reduce the risk of substance abuse, delinquency and mental health problems (Humphrey et al., 2007). Despite these findings, research in other domains has shown more consensus in regards to a relationship to EI.

Health and Wellness. There has been a large amount of research dedicated to understanding the relationship between EI and health. So much so, in fact, that two meta-analyses have been conducted in the last five years (Schutte et al., 2007; Martins,

Ramalho, & Morin, 2010) examining the relationship between EI and specific health indicators, i.e. physical, mental, and psychosomatic. Two studies that preceded these meta-analyses claimed that EI could be useful for reducing stress and improving health, well-being and performance (Slaski & Cartwright, 2003); and that EI may protect people from stress and lead to better adaptation (Ciarrochi, Deane, & Anderson, 2002).

In their meta-analysis Schutte and colleagues (2007) estimated the overall association between EI and the health indicators listed above, and identified moderators of this relationship such as ability vs. trait models and measures of EI, gender, and age. This meta-analysis consisted of 35 studies between 1995 and 2006, coded to produce 44 effect sizes based on 7898 men and women, mean ages ranging from 11-51 years. Studies were included if they were identified using the keywords, a) emotional intelligence, and b) health, mental health, and specific disorders.

The findings indicated that higher EI is significantly associated with better health. The strongest connection was found with health outcomes of a psychosomatic nature (r= 0.31). Mental health showed a significant and only slightly lower association with EI (r=0.29). This relationship between EI and mental health supports their rationale that better perception, understanding, and managing of emotions would be associated with a lower likelihood of mental health problems. Finally, physical health and EI showed a smaller significant relationship (r= 0.22) than those for psychosomatic and mental health, and the authors attributed this smaller effect to the impact of other causal factors in physical health.

The other interesting finding of this meta-analysis lies in the moderating effect of ability vs. trait models/measures in the relationship with the mental health indicators. The authors found that EI measured as a trait, and assessed through self-report was more strongly associated with mental health than EI conceptualized as an ability and assessed through a performance measure. Schutte and colleagues concede that this could be because of a common method bias since measures of perceived trait EI and mental health were all based on self-report. They also give the explanation that this difference may be due to the possibility that trait EI has more relevance to mental health functioning than EI ability. Recall that Van Rooy et al. (2005) stated that both models may have utility and the relative value of each could depend on the context in which it is used.

As a follow-up, Martins et al. (2010) conducted another meta-analysis to corroborate the findings of Schutte et al. (2007) as well as to include studies published since the last analysis. This meta-analysis included a total of 80 studies with 19,815 men and women, (mean age ranged from 15-53 years) with a search range (years) of 1995-2010. Selection criteria were similar to Schutte et al. (2007), but the authors excluded studies that did not provide precise statistical tests of the link between EI and health, used only studies with participants older than 11years, included only studies that used predictors specifically referred to as EI tests, and included non-English studies (Portuguese, Spanish, and French).

Martins et al. (2010) used the same three health indicators (physical, mental, psychosomatic) in order to maintain congruency between the two analyses. Martins and colleagues found results that suggest the same direction and strength as reported in the

previous review (significant, moderate, positive relationship between EI and health) including added strength in a few areas. Compared to the previous meta-analysis, mental health showed the largest increase in effect size (r^2= 0.36, compared with 0.29 in the previous analysis), while the effect size for psychosomatic health stayed about the same (r^2= 0.33, compared to 0.31). Physical health also showed a slight increase in effect size (r^2= 0.27, compared to 0.22). These increases in effect sizes from the first meta-analysis could be a result of more specific selection criteria. Overall, this supports the previous claim by Schutte et al. (2007) that EI is significantly associated with all three health indicators.

Martins et al. (2010) also explored the trait vs. ability models as possible moderators in the EI and health relationship. They also found that EI measured as a trait is a better health predictor. Unlike the Schutte et al. (2007) meta-analysis, however, studies that used the trait approach demonstrated significant associations with all three health indicators, not just mental health. In addition, Martins et al. (2010) found that the studies using the ability model also showed significant associations with mental health, but at a lower magnitude than was observed in studies using the trait approach.

Clearly, the relationship between EI and health outcomes is much more established and consistent than that of EI and academic performance. EI has also been said to be predictive of individual performance at the workplace, particularly in those jobs requiring leadership, teamwork, or effective communication (Zeidner et al., 2008).

Workplace/Business Domains. There has been as much, if not more, interest in exploring the connection between EI and business as for EI and health. O'Boyle Jr. et al.

(2011) report that EI has received substantial attention in the Organizational Behavior, Human Resources, and Management (OBHRM) literature in recent years. In the area of EI and job performance two meta-analyses have been published (Joseph & Newman, 2010; O'Boyle Jr. et al., 2011) attempting to describe this relationship. In both meta-analyses job performance was operationalized similarly. Studies of job performance were included if, a) enough information to calculate a correlation between EI and job performance was included, b) ratings of job performance were provided by a supervisor (not self-report), and c) the study involved employed individuals. Studies were excluded if job performance was manipulated or if academic performance was considered job performance

Joseph and Newman (2010) sought to answer specific questions about the differences in predicting job performance and incremental validity over cognitive ability and Big Five personality traits. The meta-analysis compared performance-based ability model measures, self-report ability model measures, and self-report mixed model measures. Their analysis consisted of 118 total studies with 30,077 participants (male and female, age 16 or older) from studies conducted during the years 1996-2008. Study selection criteria included keyword searches for *emotional intelligence, cognitive ability, personality, job performance, race and sex.* The authors also obtained studies from reference lists of previous meta-analyses (e.g. Van Rooy & Viswesvaran, 2004).

Results indicated that mixed model EI is an empirically stronger (albeit theoretically weaker) predictor of job performance than is ability-based EI (Joseph & Newman, 2010). The authors hypothesized that studies measuring EI from an ability

model perspective would not offer any incremental predictive value for EI above cognitive ability, but that EI would have predictive capabilities above the Big Five personality traits.

In support of the previous research, results showed that use of the mixed model provided the only substantial incremental validity above the Big Five and cognitive ability (β=.51, $p<.05$), with ability model measures showing moderate incremental validity (β =.05 and β =.18, $p<.05$ for performance and self-report measures respectively). Contrary to expectations, the ability model measures showed incremental validity over cognitive ability, though not as much as over the Big Five, (β =.09, cognitive; β =.13, personality). Moreover, results supported many critics' claim that the mixed model measures are significantly correlated with some Big Five personality traits (Openness r=.26, Extraversion r=.40). Joseph and Newman (2010) go so far as to claim that the only construct in their analysis that appears to fit the term "emotional intelligence" is the performance based measure of EI. Finally, Joseph and Newman (2010) warn against the use of mixed model measures of EI due to their unknown content and theoretical value, despite the fact that they appear to offer the strongest predictive power.

O'Boyle Jr. and colleagues (2011) expanded on the previous meta-analysis and sought to improve upon the Joseph and Newman (2010) review by including a larger number of studies (190) and using a newer statistical technique called dominance analysis. Dominance analysis allows for better estimates of the relative importance of EI, cognitive ability, and personality in predicting job performance. Selection methods for

the studies included using EI in combination with the following search terms: neuroticism, emotional stability, extraversion, openness, agreeableness, conscientiousness, cognitive ability, intelligence, and job performance. Studies were excluded if they were not empirical and quantitative or if an EI measure was not included as a variable. The authors did not report a year range for their search. They reported sample size in a range from 5,795 to 17,088.

In this meta-analysis the authors included performance-based ability measures (e.g. MSCEIT), self-report ability measures (e.g. EIS), and mixed model self-report measures (e.g. EQi) as a central focus of comparison in their relationship to job performance. In addition, O'Boyle and colleagues hypothesized that performance measures would be more highly correlated with cognitive measures and show a lower correlation with personality measures than the self-report, ability measures and self-report mixed model measures. Finally, they hypothesized that all three measures would exhibit incremental validity in predicting job performance above and beyond the Big Five and cognitive ability.

Results of the meta-analysis found that all three types of EI measures predict job performance equally well ($r=.206$, $p<.001$ [performance], $r= .256$, $p<.001$ [self-report/ability], $r=.235$ [self-report/mixed], $p<.001$), as well as finding that all three measures provided incremental validity above cognitive and personality measures ($b=.066$ [performance], $b=.253$, $p<.05$ [self-report/ability], $b=.326$, $p<.01$ [self-report/mixed] in predicting job performance. They also found performance measures to have the highest correlation with cognitive measures ($r=0.26$), compared to mixed

measures (r= 0.05) and performance measures had the lowest correlation with Big Five factors, (i.e. extraversion r= 0.09), compared to (r= 0.42) for mixed measures.

Finally, O'Boyle Jr. and colleagues (2011) found that mixed measures had the greatest incremental predictive value (r^2=.068, p<.01), compared to self-report/ability measures (r^2=.052, p<.05) and performance measures (r^2=.004), for job performance. The authors qualified this finding by stating that those parties interested in predicting job performance without concern for overlap with other variables should consider the mixed, self-report measures, which have the greatest incremental predictive value. The authors concluded that these measures may be more useful to practitioners and theorists comfortable with a broad definition of emotional competencies.

The conclusions from the two meta-analyses seem clear. EI is associated with job performance in the workplace. Findings also seem to support the claim that mixed model measures have the highest incremental predictive validity above personality and cognitive ability measures. However, there is also some consensus that caution must be used with these measures due a weak theoretical framework and a large overlap with measures of personality. Another performance arena that shares similar features with workplace performance is sports (Meyer & Fletcher, 2007). A qualitative analysis by Weinberg and McDermott (2002) found that sport and business leaders identified leadership, group cohesion, and communication as essential pieces to organizational success. These similarities could provide a logical connection between the utility of EI in business and the usefulness of EI in sport.

Sport Domain. The lack of consensus regarding the use of the ability model or mixed model theory and measures of EI in most other domains permeates the sports domain as well. There have been eleven studies examining EI in sport to date. Of these eleven studies, three used the Bar-On (1997) mixed model of EI and his EQi measure, four used the Schutte et al. (1998) EIS (which was originally based on the ability model, but as was discussed earlier, is more akin to the mixed model), one study used the Genos EI (Palmer et al., 2009), and two studies used the Mayer and Salovey (1997) ability model and the MSCEIT V2.0. One recent study used an instrument called the EIQ16 to measure EI. While the authors contend that this measure is based on the Mayer and Salovey (1997) ability model, no psychometric studies were reported to support this claim.

Other differences amongst these studies include design and outcome measures. Different designs include one qualitative design (Devonport, 2007), one intervention study (Crombie et al., 2011), one validity study (Lane et al., 2009a), one cross-sectional study (Bal et al., 2011) and the other seven fall in the category of correlational designs. In terms of outcome measures, only three of the studies (Zizzi et al., 2003; Perlini & Halverson, 2006; Stough et al., 2009) measure individual, objective performance outcomes, with one study (Crombie et al., 2009) examining team performance outcomes. The other studies explore relationships between EI and existing mental skills measures (Lane et al., 2009b), pre-competition anxiety (Lu et al. 2010), optimal and dysfunctional perceived performance (Lane et al., 2010), differences in levels of EI between open- and closed-skill athletes (Bal et al., 2011) and coping (Devonport, 2007). A brief summary of

the methods and results of each study may aid in understanding EI in sport; starting with mixed model studies, then ability-based self-report studies, and finally ability model studies.

Mixed Model Studies

Perlini and Halverson (2006) conducted a study using a sample (N=79) of NHL hockey players and measured EI using the EQi (Bar-On, 1997) to explore the relationship between EI and objective performance measures (total points, years in the league, draft rank, and games played). There were no significant correlations found between overall EI and any of the four outcome variables. There were also no significant correlations found between outcome measures and the Bar-On model subscales: interpersonal, intrapersonal, or adaptability (e.g. r= -.01 [draft rank/interpersonal]). However, significant correlations were found between Stress management and years since draft ($r= -.26$, $p<.05$), as well as between General mood and games played ($r= -.23$, $p<.05$) and total points ($r= -.25$, $p<.05$).

This study seemed poorly designed in terms of outcome measures. Total points (goals and assists) represented the only measure relevant to performance. Draft rank and games played are questionable measures of performance. In addition, the differentiation between forwards and defensemen makes drawing general conclusions difficult, as forwards will have more points than defensemen (this is discussed as a limitation). In conclusion, the authors suggest the use of other measures of EI to measure athletic performance.

Devonport (2006) conducted a qualitative study of junior netball players (female, age= 15-18 years). This was an intervention study using a program design based on Bar-On's (1997) model of EI. Each netball player was paired with a mentor and given a packet, containing a series of activities intended to address the components of EI as defined by the Bar-On model, to complete on their own. The author recognized the flaw in this as she mentions how a number of the participants did not use the packet. Those who did reported better ability to lead and manage emotions of other as well as better self-regulatory skills. This study may have been premature in terms of using an EI intervention as the relationship between EI and sport performance has yet to be empirically supported. However, the use of a qualitative design may be useful to identify the specific, individual benefits of EI on sport performance.

Lu et al. (2010) conducted a study which examined the relationship between the Bar-On (1997; 2002) model of EI (using the EQi) and perceived somatic and cognitive anxiety before competitions. After the participants (Taiwanese intercollegiate track and field athletes; N=111; 64 men, 47 women) took the EQi, they were divided into three groups relative to their EI scores (low, medium, high). Four one-way ANOVAS were conducted to examine group differences using EI as the independent variable and the anxiety variables (somatic intensity, somatic direction, cognitive intensity, and cognitive direction) as the dependent variables. The results showed that the Low EI group perceived greater cognitive anxiety than the high EI group. No other significant differences were found.

Scores for the 5 aspects of the Bar-On model (interpersonal, intrapersonal, adaptability, stress management, and general mood) were then used in a regression model to predict pre-competition levels of cognitive and somatic anxiety. Stress management was found to explain 13% of the variance in somatic anxiety, as well as explaining 20% of the variance in cognitive anxiety with interpersonal adding an additional 12% of variance explained in cognitive anxiety. Interestingly, Lu and colleagues questioned the use of a general measure of EI, stating that the current measure provide limited understanding of precompetition anxiety. The authors concluded that a sport specific measure of EI needs to be developed to examine athletes.

Ability-based Self-Report Studies

Zizzi et al. (2003) conducted the first study exploring the relationship between EI and sport performance. Division I baseball players (N=61; age=18-23 years) were used to explore the relationship between EI and specific performance outcome measures. The authors used a correlational design to explore this relationship. The participants were divided into hitters and pitchers. The outcome measures included batting average, hits, doubles, home runs, strikeouts, Earned Run Average (ERA), and strikeouts (for pitchers). The EI measure used was the EIS. Results showed no significant relationships between the outcome measures and EI with hitters, but did demonstrate a significant, moderate relationship between EI and strikeouts for pitchers ($r=.484$, $p<.05$). Although the results of the study provided only modest support for the link between EI and athletic performance, it set the stage for future research in the field by establishing that there are connections between EI and sport performance. The authors recommended that future

research include additional inventories and examine the relationship between mental skills use and EI.

Lane et al. (2009b) conducted such a study to examine the relationship between EI and the use of mental skills, assessed by the Test of Performance Strategies (TOPS; Thomas, Murphy, & Hardy, 1999). The TOPS measures eight psychological skills used in competition and eight used in practice. EI was measured using the EIS and was further broken down into 6 subcomponents: appraisal of other's emotions, appraisal of one's own emotions, optimism, regulation, social skills, and utilization. The sample consisted of a group of 54 male athletes (age: M=21.7) from soccer (n=36), hockey (n=15), and rugby (n=3).

The results of this study showed significant correlations between the EIS and the TOPS ($r=.67$, $p<.0004$ [Competition]; $r=.69$, $p<.001$ [Practice]). In addition, significant relationships (all at $p<.05$) were found between subcomponents of the EIS and specific psychological skills (in competition) from the TOPS including: Imagery/Regulation ($r=.49$), Self-talk/Appraisal of other's emotions ($r=.30$), Self-talk/Appraisal of own emotions ($r=.36$), Goal setting/Utilization ($r=.31$), and Relaxation skills/Regulation ($r=.31$). Similar results were found with the TOPS practice skills (e.g. Imagery/Regulation, $r=.44$; Self-talk/Regulation, $r=.44$). These results demonstrate a strong relationship between self-report EI and use of psychological skills in both practice and competition.

In the same year, Lane et al. (2009a) conducted a validity study of the EIS using an athletic sample. This represents the first investigation of the factorial validity of a

measure of EI using athletes. Lane and colleagues focused on two types of validity: content validity and factorial validity. They addressed this with two separate studies. In an initial qualitative study a group of experts in the field of EI and sport scrutinized the items on the EIS for their relevance to emotion and relation to the ability model of EI (e.g. Mayer & Salovey, 1990). During this evaluation, it was determined that 13 of the 33 items were irrelevant to emotion in general. They then discarded the 13 irrelevant items based on their lack of emotional content.

After the qualitative analysis of content validity, a factor validity study was conducted using university students ranging in skill level from elite to recreational (N=1,681; university athletes, n=1072; exercisers, n=275; runners, n=80; judo players, n=254). They conducted a Confirmatory Factor Analysis (CFA) on both the original 1 factor model (all 33 items) and the revamped 6 factor model (appraisal of other's emotions, appraisal of own emotions, regulation, social skills, utilization, optimism), excluding the 13 irrelevant items. They found that the 1 factor model was a bad fit for the data with a Normative Fit Index (NFI=.82) and Comparative Fit Index (CFI=.84), (Criterion levels should be >.95), and did not represent the theoretical model behind the measure (Lane et al. 2009a). However, they did find a good fit for the data with the 6 factor model (NFI=.92, CFI=.95). They concluded based on a number of fit models that the revised 6 factor model was acceptable for use with an athletic population.

As a follow up to the validity study, Lane et al. (2010) used 284 athletes from 16 different sports to examine the connection between EI (measured by the modified, sport version of the EIS) and recalled emotional memories before optimal and dysfunctional

performances. Recalled emotions before performances were measured using a shortened version of the Profile of Mood States (POMS). Results of this study showed that EI is correlated with pleasant emotional states (vigor, happiness, and calmness) before optimal performances, and interestingly before dysfunctional performances as well. Thus, EI correlates with positive emotions even when performance is perceived as below the athlete's standards. The authors, however, recognized a limitation concerning whether individuals low in EI are providing accurate data when given a self-report measure of EI; proposing that people who are emotionally intelligent should demonstrate higher consistency with recalled emotions from memory and actual emotions.

Ability Model Studies

Stough et al. (2009) conducted one of the three EI and sport studies that examined objective performance outcomes. This study was unique in its use of the Genos EI, a measure of EI behaviors originally developed for use in the workplace (Palmer et al., 2009). The authors looked at correlations between EI and a variety of objective measures of basketball performance (i.e. shots taken, shots made, free throws taken, free throws made, 3-pointers taken, 3-pointers made). The authors found no significant relationships between overall EI and performance outcomes. However, results did show moderate to strong relationships between the emotional control aspect of EI and shots taken and shots made ($r= 0.59$ and 0.62, $p=.000$, respectively) as well as total points scored ($r= 0.63$, $p=.000$), as well as to the emotional management subscale and shots made ($r= 0.41$, $p=.015$), as well as total points scored ($r= 0.44$, $p=.009$). This demonstrates that while overall EI may not be correlated with various objective measures of performance, the

subscale components may. This is supported by Meyer and Zizzi (2006) in their recommendation to explore the relationship of specific branches of EI and objective/subjective sport outcomes.

Crombie et al. (2009) examined the relationship to, and predictive ability of EI and team performance using an ability model measure of EI (MSCEIT). Using professional cricket teams (N=141) in South Africa they measured individual EI scores for members of the team, then used the team mean EI scores to compare to team performance outcomes (i.e. wins, losses, and points scored) at the end of the season.

A significant relationship was found between team EI and team performance ($r=.69$, $p<.05$). These results were consistent over two consecutive seasons. Particularly important, significant relationships were also found between team performance and the Understanding and Managing Emotions branches ($r=.69$, $p<.05$ in both cases). Although the authors used EI scores based on team means, these results lend strong support to the use of ability-based measures for performance outcomes, as well as the further examination of specific branches of EI as they relate to performance. Crombie et al. (2009) claim that the ability model of EI assumes that the greater the ability level in the 4 branches (perceiving, facilitating, understanding, managing emotions), the greater the capacity to exercise emotional control and demonstrate effective behavioral responses.

Crombie et al. (2011) conducted a two-year follow-up, intervention study using a randomized control design to measure increases in EI (as measured by the MSCEIT) of individual cricketers (N=24). The intervention was based on the Mayer and Salovey (1997) four branch model. The intervention included ten 3-hour sessions in which players

analyzed case study situations in cricket that dealt with the different branches of EI. They were encouraged to share their own experiences, feelings, and situations during these sessions. In addition, they kept emotion journals throughout the season. Different cohorts of players were used for each of the two seasons.

Results indicated that in the first season the intervention group showed a 13.7% increase in EI score from 84.9 at baseline to 96.6 at post-intervention), while the control group showed an increase of only 2% (81.8 to 83.4). The second season yielded similar results with the intervention group increasing by 13.8%, while the control group decreased by 3.1% (Crombie et al., 2009). The authors conclude that this significant change indicates that EI training and development contributed to increases in EI for cricketers.

Bal et al. (2011) examined differences between groups of open- and closed-skill athletes in EI scores using the EIQ16. The EIQ16 is made up of 4 dimensions: reading emotions, using emotions, understanding emotions, and managing emotions (very similar to the Mayer and Salovey model). The EIQ16, however, is further broken down in 16 sub-categories (4 in each dimension): self-analysis, analysis of others, self-expression, discrimination (reading emotions), thinking, judgment, sensitivity, problem-solving (using emotions), symptoms, outcomes, complexity, transitions (understanding emotions), and openness, monitoring, self-control, others (managing emotions).

Forty male varsity college athletes from India, 20 footballers (representing the open-skill athletes) and 20 gymnasts (closed-skill athletes) participated in the study. Independent sample t-tests were conducted with each of the 16 sub-categories.

Significant group differences were found for self-analysis, analysis of others, self-expression, thinking, judgment, problem solving, complexity, transitions, openness, and self-control.

The conclusions that can be drawn from this study are limited because the authors used a weak, unsubstantiated measure of EI as well as a poor statistical design. The use of so many t-tests increases the chance of a type I error with every test. Furthermore, without an explanation of what each subcategory represents it is impossible to draw conceptual conclusions from the results. For example, transitions and complexity were all found to be significantly different between the two groups of athletes. However, because there is no theoretical grounding behind any of those labels, no meaningful information can be derived from the fact that open-skill athletes scored significantly higher in "transitions" for example. The idea, however, that different branches of the Mayer and Salovey (1997) model may be more relevant or essential to athletes based upon their sport could have implications for designing sport-specific EI interventions for athletes.

The results from the studies on EI in sport contribute to an understanding of the relationship between EI and different aspects of sport performance. Specifically, these findings suggest relationships between EI and objective measures of sport performance (Zizzi et al., 2003; Stough et al., 2009; Perlini & Halverson, 2006), the perception of optimal and dysfunctional performances (Lane et al., 2010), team performance (Crombie et al., 2009), pre-competition anxiety (Lu et al., 2010), and an athlete's use of mental skills (Lane et al., 2009b). Based on the literature to date, it does appear that a relationship between EI and sport performance exists. The question remains whether that

relationship is a direct one, or instead, related to aspects such as perceived emotional states, performance anxiety, and/or the use of mental skills.

How does EI fit into Sport Psychology?

Emotions in sport. The impact of emotions in sport has been studied and emotion and emotional control have been found to play an essential role in the performance, growth, and advancement of athletes (Jones, 2002; Vallerand & Blanchard, 2000). Some of these roles include the areas of peak emotional experience, emotional management, the adaptational function of emotions, using emotion to channel attention, and using emotion to maintain optimal energy levels (Jones, 2003; Lazarus, 2000; Hanin, 2000; Vallerand & Blanchard, 2000). Hanin (2000) and (Jones, 2003) emphasized factors such as emotional control and peak emotional experience as possible influences on sport relevant factors such as motivation and anxiety. In addition, Hanin (2000) suggests that optimal emotions for performance can effectively regulate the amount of energy required for a task, whereas dysfunctional emotions can create inappropriate energy levels (too high or too low).

Emotions also serve as an adaptational tool that can allow an athlete to channel extra physical and mental resources toward a task (Jones, 2003). Totterdell and Leach (2001) showed that emotional regulation skills are connected to emotional states associated with successful performance in cricket. According to Lane et al. (2009b), individuals who can manage their emotions successfully can use emotions experienced during competition to aid performance.

Based upon theory and empirical evidence, it has been stated that emotions play a key role in sport performance (Jones, 2003). Although the existence of this role seems clear, the need still exists to better comprehend how emotions work to influence outcomes in sport performance (Meyer & Fletcher, 2007). This is further supported by Botterill and Brown (2002) who make the claim that in general athletes simply experience an emotional response, but do not take the time to reflect upon those responses constructively. According to Hanin's (2000) Individual Zones of Optimal Functioning (IZOF) model, athletes can achieve optimal levels of performance through retrospective analyses of positive and negative emotional states. One aspect of EI theory is the ability to perceive emotions in oneself and use that information to respond effectively to different situations.

D'Urso, Petrosso, and Robazza (2002) believe that the majority of theories on the role of emotion in sport are limited to one aspect of emotion, such as optimal levels of arousal or balance between positive and negative emotions. Thus, while each theory adds to our understanding of the role of emotion in sport, according to Stough and colleagues (2009), there is no overarching model of emotion that can be used to explain the relationship between an athlete's full range of emotions and sporting performance. This kind of theory may be needed to explain the relationship between the full range of emotion and sport performance, and could prove essential in establishing a directional relationship between emotions, specifically the factors mentioned above such as emotional control, peak emotional experience, and sport performance.

Links between EI and sport psychology theory. Before continuing with a discussion of the usefulness of EI in sport, an analysis of the proposed links between EI and sport psychology theory is essential. The first step in this process is illustrated by Stough et al. (2009), who claim that in order to link sport psychology variables to a model of EI useful to both practice and research the adoption of a single model is essential. For the purposes of this review, the Mayer and Salovey model of EI will be used to discuss this theoretical link.

Theoretical connections between EI and sport performance were proposed by Stough et al. (2009). Despite their use of a different model of EI (Genos EI), a few dimensions of that model (emotional reasoning, emotional management, emotional control) relate to the branches of the Mayer and Salovey model (perceiving, facilitating, understanding, managing emotions), and thus will be considered applicable to this discussion.

Stough et al. (2009) suggest two major theoretical links between sport psychology theory and EI. These two major links are, Hanin's (2000) model of Individual Zones of Optimal Functioning (IZOF) and Nideffer's (1976; 1989) work on attentional styles, awareness, and shifting attention. In addition to these theories, proposed links have been drawn between EI and sport psychology theory in the areas of sport confidence (Vealey, 2001), attribution theory (Weiner, 1986), and full-engagement leadership (Loehr, 2005). Based on the rationale that follows, Hanin's IZOF may have the strongest theoretical link with EI, and therefore is reviewed here. The remaining theories in sport psychology and their connections to EI are reviewed in Appendix C.

Hanin: IZOF. Hanin's (2000) IZOF is an idiosyncratic model that examines emotional patterns associated with optimal and dysfunctional athletic performances. Hanin (1997) proposed that each athlete has a unique emotional state that makes successful performances more likely. Central to the IZOF model is the idea of optimal and dysfunctional "zones", which describe the relationship between the intensity of each athlete's emotional experience and actual performance outcomes (Robazza et al., 2008). When the athlete's emotional level falls inside the optimal zone, good performance is likely to occur; whereas, if the emotional level of the athlete falls outside the optimal zone and inside the dysfunctional zone, poor performance is more likely.

As these emotional states are unique to the individual, it is up to the athlete to identify these emotional states. This idea relates very closely to Mayer and Salovey's (1997) perceiving emotion branch, i.e. the ability to identify emotion in one's physical states, feelings, and thoughts. Moreover, the ability to accurately assess one's own emotions and effectively communicate those feelings assumes that an athlete is organizing his or her emotional content to increase performance (Hanin, 2000). This relates to two different aspects of the ability model of EI. First, this aspect of Hanin's theory resembles Branch 1 (perceiving emotion), specifically the ability to express emotions accurately, and to express needs related to those feelings. The second connection is with Branch 2 (facilitating emotion), specifically the ability to use emotions to prioritize thinking by directing attention to important information (Mayer & Salovey, 1997).

Another key component to the IZOF model lies in the interaction of two factors: hedonic tone (pleasant vs. unpleasant) and performance functionality (optimal vs. dysfunctional) (Robazza et al., 2008). Emotions are categorized into one of four classifications: pleasant-optimal, pleasant-dysfunctional, unpleasant-optimal, and unpleasant-dysfunctional. Pleasant and unpleasant optimal emotions are typically related to successful performances, while pleasant and unpleasant dysfunctional emotions are more likely to produce poor performances (Robazza et al., 2008). The concept that unpleasant, as well as pleasant emotions, can be effectively utilized mirrors two aspects of the managing emotion branch of the Mayer and Salovey (1997) ability model. One is the ability to stay open to feelings, both those that are pleasant and those that are unpleasant, and two is the ability to reflectively engage or detach from an emotion depending upon its judged informativeness or utility.

Overall the IZOF model provides an excellent conceptual fit with the ability model of EI as it proposes the ability to identify subjective zones, levels of anxiety, the presence of certain emotions, and arousal levels that each athlete must recognize in order to recreate those emotional states that produce optimal performance. This seems to be well aligned with the Mayer and Salovey (1997) branches of perceiving emotion, facilitating emotion for thought, understanding the cause emotions, and being able to manage emotions and bring them about at the desired time. Mayer and Salovey (1990) describe a situation involving EI in which a pleasant mood is brought about by dancing. If the cause of that mood could be discovered, it could be sought after in the future to bring about that mood again. This seems to mirror Hanin's idea of using an athlete's

ability to recollect emotions and arousal levels before positive and negative performances (Hanin, 2000).

Role of EI in Sport

The potential for the importance of EI in the field of sport psychology is made clear by Stough et al. (2009):

> EI could provide additional information about sporting performance to other psychological models offering a comprehensive description about the role of emotions in competitive performance and training. Yet, perhaps what makes EI a useful addition to other psychological constructs to date is that it proposes ways to improve an athlete's capacity to deal effectively with his or her own and others' emotions. It is conceivable that in the near future, sporting bodies will integrate EI into traditional sport psychology and mental training programs so as to gain that competitive edge over competitors (p. 300).

The links between EI and several theories in sport psychology speak to the potential role of EI in sport, both as a comprehensive theory to explain emotions in sport, as well as an avenue for integrating EI into mental skills training programs as a means of enhancing performance. Therefore, a necessary step to moving in this direction is to take a closer look at the possible moderators between EI and aspects of sport performance and how they may impact this relationship.

Moderators of EI and Sport Performance

From a review of the literature on EI in general, and in sport, two main moderators emerged that may affect the strength or direction of the relationship between EI and sport performance. Those are gender and sport.

Gender may be another possible moderator variable in the area of EI and sport, as findings outside of sport suggest this may be a factor (Mayer et al., 2002; Palmer et al., 2005). Of the 9 major studies of EI and sport, only 4 of those used both males and females in their sample (Devonport, 2006; Lane et al., 2009; Lu et al., 2010; Stough et al., 2009). None of those 4 studies discuss gender differences in EI and sport. There are two non-sport specific studies of EI that do address this issue. Livingstone and Day (2005) reported that women scored significantly higher on the MSCEIT than men on the perceiving emotions branch (but not the facilitating, understanding, or managing emotions branches). This indicates that women may be better than men at perceiving emotions both in themselves and in others. Palmer et al. (2005) examined similar outcomes and found that on the MSCEIT, women scored ½ a standard deviation higher than men. This is consistent with the results reported in the MSCEIT user manual (Mayer et al., 2002).

Gender differences on other measures of EI were also examined. Livingstone and Day (2005) found that women did score higher than men on the Interpersonal Skills subscale, but no differences on any of the other four scales. This supports Bar-On's (1997) claim that there are small differences in EI based on gender. Schutte et al. (1998), however, showed that women scored significantly higher on the EIS than men, $t(327)= 3.39$, $p<.001$. This provides further evidence of the differences between mixed model and ability model measures (MSCEIT and EIS vs. EQ-i). Due to the significant differences in gender on the MSCEIT, as demonstrated by previous research, gender was considered to be a worthwhile moderator to consider.

Sport is another possible moderator of the EI/performance relationship that has received little to no attention. The majority of research in this area included participants from only one sport (Zizzi et al., 2003; Perlini & Halverson, 2006; Crombie et al., 2009, 2011; Devonport, 2006: Lu et al., 2011; Stough et al., 2009). The remainder used athletes from a variety of sports (Lane et al., 2009b; Lane et al., 2010), but did not explore sport as a possible moderator. Stough et al. (2009) introduced the idea that the connection with EI may be stronger or weaker in athletes of varying sport skill types: Open-Skilled Individual (OSI), Open-Skilled Team (OST), and Closed-Skilled (CS). The authors suggested hypothetical relationships between different aspects of EI and different sport-skill types based on the type of skill being performed. Sport-skill type was not identified as a moderator in this study. However, it is possible that the sporting environment and the team vs. individual component, for example, could affect the EI and performance relationship.

Based on a review of the literature, the purpose of this study was (Research Questions 1) to examine the relationship between the MSCEIT (and subscales) and the TOPS (and subscales). In addition, the extent to which gender (Research Question 2) and sport (Exploratory Question 3) impacted the relationship between MSCEIT total and TOPS totals in practice and competition were also examined. It was hypothesized that significant, positive relationships would be found between EI (both total and the four-branch scores) and the use of mental skills (16 TOPS subscales). In addition, it was hypothesized that gender and sport would impact the relationship between EI scores (total) and mental skill use in practice and competition.

CHAPTER III

METHODS

A pilot study was conducted to precede this study. The pilot provided support for using the MSCEIT vs. the EIS as there was very low correlation between the two measures. This was important for conducting original research, and not simply replicating the study by Lane et al. (2009b). In addition, the pilot offered a good initial procedure for administering the MSCEIT to a group of athletes. Finally, the results of the pilot suggested some relationships between the MSCEIT and the TOPS. For more detail on complete procedures and findings, see Appendix E.

Participants

Sixty-seven men and women competing at a NCAA Division III university in four different sports (baseball, softball, men's and women's tennis, men's and women's swimming) were recruited. Athletes were recruited from one institution to reduce differences in geographical and environmental factors across university campuses. In addition, each sport team was contacted during their competitive season to maintain an equivalent competitive environment, thereby being as consistent as possible in terms of the athletes' perceived use of mental skill. Although their college season had ended, the swim team was included due to the year-round competitive nature of college swimming and their continued training and preparation for summer club team competition. Inclusion criteria for participants included being at least 18 years of age and native English

speakers. Informed consent was obtained from all participants. Athletes did not receive any compensation for participating, or any consequence for declining to participate.

Measures

Emotional intelligence. Performance-based (or ability-based) EI was measured using The Mayer-Salovey-Caruso Emotional Intelligence Test or MSCEIT V2.0 (Mayer & Salovey, 1997). Responses on the MSCEIT represent actual abilities to solve emotional problems and are unaffected by issues such as self-concept, emotional state, or social desirability bias (Mayer, Salovey, & Caruso, 2002). The MSCEIT consists of 141 items measuring an individual's abilities across four branches of EI: 1) perceiving emotions, 2) facilitating thinking, problem-solving, and creativity using emotions, 3) understanding emotions, and 4) managing emotions for personal growth. The MSCEIT also yields two Area scores: Experiential, comprised of Branches 1 and 2, and Reasoning (sometimes called Strategic), comprised of Branches 3 and 4. These Area scores are derived from the combined means of each area's branches.

The instrument is further broken down into 8 subscales, 2 pertaining to each of the 4 branches. Branch 1, Perceiving Emotion, includes a *Faces Task* and a *Pictures Task*. Respondents are asked to identify different emotions expressed in either the image of a person's face or in a picture of a landscape or abstract design. For example, a photograph of an actual person's face or a landscape appears on the screen and participants are asked to gauge the amount (from 1-5, where 1 is no amount of that emotion, and 5 is an extreme amount of that emotion) of happiness, sadness, fear, anger, or disgust.

Branch 2, Facilitating Emotion, contains a *Sensations Task* and *Facilitation Task*. Participants are asked to match different emotions to different sensations such as light, color, and temperature. For example, a question may ask something like, "How does purple make you feel?" The facilitation task measures their knowledge of how moods interact and support thinking and reasoning. A question in this task may ask participants to gauge how useful a specific emotion (e.g. tension, surprise, or sadness) is to accomplishing a certain task such as planning a birthday party.

Branch 3, Understanding Emotion, consists of the *Blends Task* and *Changes Task* where respondents are asked to analyze blends of emotions into their parts, or to assemble simple emotions together into complex feelings (Blends). In the Blends task, the participant may be asked what emotion would be most like the combination of love and suspicion, with a list of emotion options from which to choose. The Changes task measures the participants' knowledge of how emotions transition from one to another, i.e. how anger can change into rage (Changes).

Branch 4, Managing Emotion, includes the *Emotional Management Task* and *Emotional Relations Task*. The first task measures the test taker's ability to incorporate his or her own emotions into decision-making and rate the effectiveness of an action in order to regulate his or her own emotion. For example, a question may present a scenario in which a person is feeling a certain way (e.g. "Woke up feeling well rested, with no particular cares or concerns"), then asks the participant to gauge how a specific action (e.g. "Got up and enjoyed the day") would help preserve the person's mood. The second task is similar to the former, but instead, assesses how the test taker would make

decisions and regulate emotions in other people (i.e. how would you help preserve the presented mood in another person).

There are two scoring options for the MSCEIT, consensus (sometimes referred to as general) and expert. Using the consensus methods, scores are based on the correctness as judged by the majority of test takers. Using the expert scoring method, judgments of the correctness of a response are based on the responses of a panel of experts. Consensus scoring utilizes a normative sample of 5000 to score response, whereas the expert scoring methods draws on the knowledge of 21 experts in the field of emotion research. The correlation between consensus and expert scoring on the MSCEIT (total and branches) range from .93 to .98 (Mayer et al., 2002). For this study, consensus scoring was used as recommended in the *MSCEIT User's Manual* (Mayer et al., 2002).

For this sample (N=67), acceptable levels of internal reliability were found for all scales. Cronbach's alpha for Branch 1, Perceiving Emotion (α=.883), Branch 2, Facilitating Emotion (α=.728), Branch 3 (α=.690), and Branch 4 (α=.77) were consistent with findings by Palmer (2005) of α=.90 and α=.73, α=.71, and α=.76, respectively. In addition, Areas 1 (α=.882) and 2 (α=.818), as well as overall EI (α=.891) were found to be at acceptable levels and consistent with Palmer and colleagues, α=.91, α= .78, and α=.91, respectively.

Use of mental skills. The Test of Performance Strategies (TOPS; Thomas, Murphy, & Hardy, 1999) is a 64-item self-report measure of mental skills use. The TOPS items are rated on a scale from 1-5 (anchors, 1=*never,* 5=*always).* Participants respond as to how often they use these skills in practice and competition, where higher scores reflect

more frequent use of the skill. Items are organized across 8 different mental strategies used during practice (activation, automaticity, emotional control, goal-setting, imagery, relaxation, self-talk, and attentional control) and competition (same as practice except for negative thinking replaces attentional control). "Practice" and "Competition" represent the two scales of the TOPS, each yielding a separate score. Exploratory factor analyses of the TOPS in past research showed a clear factor structure for both practice and competition items with Cronbach alphas ranging from α= .66 to .81 (Thomas, Murphy, & Hardy, 1999).

Thomas, Hardy, and Murphy (1999) found internal reliabilities ranging from α= .66-.81. For this sample, all subscale reliabilities were consistent with the findings of Thomas, Murphy, and Hardy (1999) as Cronbach alphas ranged from .673 to .885.

Procedure

After obtaining Institutional Review Board approval, the Athletic Director of the college was notified in order to gain approval at the administrative level. Once approval was obtained, coaches for each team were contacted via phone or email, and with a letter of intent. Approval and willingness to participate was received from all coaches. Then, a research assistant on-site set up team and individual testing times with the athletes and coaches. After obtaining informed consent from each participant, athletes completed the online version of the MSCEIT with step by step instruction from the researcher (who was present during all testing) on how to code their test, as well as instructions on answering method (i.e. multiple choice, Likert scales, etc…) and navigating through the instrument. For the MSCEIT, participants were read scripted sections from the MSCEIT *User's*

Manual (Mayer, Salovey, & Caruso, 2002); specifically the sections on "Purpose," "Contents," and "Taking" the test (p. 12; See Appendix A). Informed consent was obtained and the survey was administered by the lead researcher.

At the same testing session, participants took a paper and pencil version of the TOPS with similar step by step instruction on response method. For the TOPS, participants were told to answer every question, and that there are no right or wrong answers. All participants took the MSCEIT first and the TOPS second.

The total testing time ranged between 35-50 minutes, which included 10-15 minutes for completion of the TOPS and approximately 25-35 minutes for completion of the MSCEIT. Athletes were assigned participant identification numbers as follows: Baseball = 1-99, Softball = 100-199, Men's Swimming = 200-299, Women's Swimming = 300-399, Men's Tennis = 400-499, Women's Tennis = 500-599. Participants recorded this number in the "last name" area of the MSCEIT demographic information page (online) and in the upper left hand corner of the TOPS written packet. This provided a system to match their MSCEIT and TOPS scores. In addition, the athlete's sport was recorded in the "first name" area of the MSCEIT demographic page. Sport was also recorded on the written TOPS packet to further ensure that the instruments were matched correctly.

Participants also completed a demographic page (See Appendix D). The MSCEIT online has a demographics page that the athletes used to record their age and gender. The paper-and-pencil TOPS had an area at the top of the first page in which to record this information manually (See Appendix B).

Data Analysis

Descriptive data was examined for participants' mental skill use (TOPS Competition and Practice Totals and respective subscales) and EI scores (MSCEIT Total, Areas, and Branches).

Research question (RQ) 1 examined the association between ability EI (total scores and branch scores) and use of mental skills in practice and competition. It was hypothesized that significant, positive relationships would be found between EI (both total and the four-branch scores), and the use of mental skills (16 TOPS subscales). Pearson correlations were used to explore the relationship between MSCEIT total score, and four branches and the TOPS Practice and Competition totals and the eight subscales that fall under each total. To control for Type I error, probability was set at $p<.001$.

Research question (RQ) 2 examined the extent to which gender moderated the relationship between EI scores (total) and mental skill use in practice and in competition. It was hypothesized that gender would impact the relationship between EI scores (total) and mental skill use in practice and competition.

A third, exploratory question (EQ) 3 examined the extent to which sport moderated the relationship between EI scores (total) and mental skill use in practice and in competition. It was hypothesized that sport would impact the relationship between EI scores (total) and mental skill use in practice and in competition.

To test hypotheses for RQ2 and EQ3, four regressions were used to predict the two total TOPS scores (practice and competition) using the MSCEIT, one of two moderator variables (sport or gender), and an interaction term as predictors. Sport was

dummy-coded in order to effectively compare two of the sports against the third. Two dummy codes were used; one in which baseball/softball and swimming were coded as "0" and tennis as "1" (Dummy Code 1) and another with baseball/softball coded as "1" and swimming and tennis coded as "0" (Dummy Code 2). Multiple regressions using a hierarchical method of entering predictors were used, putting main effects in first, followed by interaction terms. For RQ2 and EQ3, probability was set at $p<.05$. SPSS version 17.0 was used for all analyses.

CHAPTER IV

RESULTS

Sixty-seven male and female athletes representing four different sports (baseball, softball, swimming and tennis) participated in the study. For the purposes of analysis, baseball and softball players were grouped into the same category. Frequency data for gender and sport are included in Table 2.

Table 2

Participant Frequencies by Sport and Gender

Sport	Male	Female	Total
Baseball/Softball	27	10	37
Swimming	10	9	19
Tennis	6	5	11
Total	43	24	67

Participation rates were determined by examining the full team rosters and were as follows: Baseball (85%), Softball (83%), Swimming (42%), and Tennis (55%). No athletes dropped out of the study once begun and there were no cases of missing data as the research was conducted in small groups to ensure completion. Participant age varied between 18-22 years with a mean age of 19.9 years, SD= 1.3. Participant ethnicity was predominantly Caucasian (94%). Descriptive data including MSCEIT and TOPS scores are included in Table 3. Descriptive data of MSCEIT and TOPS scores by sport and gender are included in Table 4.

Table 3

Descriptive Data for MSCEIT and TOPS Scores and their Subscales

Measure	Min	Max	Mean	SD	α
MSCEIT Branch 1 (Perceiving)	63.61	131.10	100.70	13.73	.862
MSCEIT Branch 2 (Facilitating)	68.95	122.80	96.25	12.14	.728
MSCEIT Branch 3 (Understanding)	73.41	112.96	97.74	9.79	.192
MSCEIT Branch 4 (Managing)	51.86	115.04	96.28	10.46	.088
MSCEIT Total	59.03	123.21	97.94	11.72	.740
MSCEIT Area 1 (Experiential)	62.17	126.62	98.38	13.17	.863
MSCEIT Area 2 (Strategic)	65.39	116.88	97.37	9.42	.120
TOPS Activation-Practice	6	19	12.49	2.64	.662
TOPS Activation-Competition	6	20	15.34	2.86	.770
TOPS-Relaxation-Practice	5	18	10.60	2.85	.673
TOPS Relaxation-Competition	5	20	14.06	3.07	.865
TOPS Imagery-Practice	4	20	12.82	3.59	.795
TOPS Imagery-Competition	4	20	14.04	3.60	.885
TOPS Goal Setting-Practice	7	20	13.37	2.88	.738
TOPS Goal Setting-Competition	6	20	15.27	3.52	.816
TOPS Self Talk-Practice	7	20	14.27	2.59	.678
TOPS Self Talk-Competition	8	20	14.34	2.79	.705
TOPS Automaticity-Practice	8	19	13.88	2.29	.591
TOPS Automaticity-Competition	5	19	12.66	3.05	.746
TOPS Emotional Control-Practice	6	20	13.78	2.89	.746
TOPS Emotional Control-Competition	6	19	14.53	2.85	.851
TOPS-Attention Control-Practice	6	18	13.54	2.65	.744
TOPS Negative Thinking-Competition	4	19	9.37	2.92	.780
TOPS Practice Total	69	130	104.74	12.76	.843
TOPS Competition Total	83	131	109.63	12.59	.836

Table 4

Descriptive Data of Total Scores by Sport and Gender

	Min	Max	Mean	SD
Baseball/Softball				
MSCEIT Total	78.52	116.69	96.46	10.94
TOPS Practice Total	79	130	105.54	12.54
TOPS Competition Total	86	131	111.08	12.92
Swimming				
MSCEIT Total	83.08	123.21	101.37	10.27
TOPS Practice Total	75	124	105.05	12.22
TOPS Competition Total	85	127	108.74	11.91
Tennis				
MSCEIT Total	59.03	111.87	96.96	15.98
TOPS Practice Total	69	121	101.55	15.02
TOPS Competition Total	83	128	106.27	13.00
Men				
MSCEIT Total	59.03	117.95	95.53	12.00
TOPS Practice Total	89	130	107.93	10.15
TOPS Competition Total	89	130	113.70	10.16
Women				
MSCEIT Total	83.99	123.21	102.24	10.07
TOPS Practice Total	69	126	99.04	15.05
TOPS Competition Total	83	131	102.33	13.42

It was hypothesized that significant, positive relationships would be found between EI (both total and the four-branch scores), and the use of mental skills (16 TOPS subscales). Results show that at the confidence level ($p<.001$) set for this research question, no significant, positive correlations were found between MSCEIT Total (or subscales) and the TOPS (or subscales). One significant, negative correlation was found between Branch 2, Facilitating Emotions, and Goal Setting in Practice ($r= -.382$, $p<.001$). Correlational data for the MSCEIT (total and branches) and TOPS (totals and subscales) can be found in Table 7.

It was hypothesized that sport would impact the relationship between EI scores (total) and mental skill use in practice and in competition. Results of the regression showed that there were no main effects or interaction effects of different sports on the relationship between the TOPS (in practice or competition) and the MSCEIT Total. No main effects were significant for TOPS Practice Total: $F(3,63)=.878$, $p=.457$, $R^2=.040$, nor was the interaction effect significant for TOPS Practice Total: $F(2,61)=.775$, $p=.465$, $R^2=.024$. Similarly, no main effect was significant for TOPS Competition Total: $F(3,63)=1.388$, $p=.255$, $R^2=.062$, nor was the interaction effect significant for TOPS Competition Total: $F(2,61)=.514$, $p=.600$, $R^2=.016$. Regression table and model summary can be found in Table 5 (TOPS Practice Total) and Table 6 (TOPS Competition Total).

Table 5

Regression Table and Model Summary: TOPS Practice Total and Sport

TOPS Practice Total	r	r^2	F	p	b	t	P
Model 1	.200	.040	.878	.457			
Constant					123.609	8.724	.000
DC 1					.410	-.112	.911
DC 2					-4.314	-.883	.381
MSCEIT Total					-.183	-1.34	.185
Model 2	.253	.064	.775	.465			
DC1					34.794	.979	.331
DC2					42.791	1.10	.277
MSCEIT Total					.126	.428	.670
MSCEIT x DC1 (Interaction)					-.349	-.987	.328
MSCEIT x DC2 (Interaction)					-.472	-1.21	.230

Note: DC stands for Dummy Code

Table 6

Regression Table and Model Summary: TOPS Competition Total and Sport

TOPS Competition Total	r	r^2	F	p	b	t	P
Model 1	.249	.062	1.388	.255			
Constant					131.243	9.495	.000
DC 1					1.255	.350	.727
DC 2					-3.442	-.722	.473
MSCEIT Area 1					-.222	-1.66	.101
Model 2	.278	.078	.514	.600			
DC1					34.082	.979	.331
DC2					30.385	.794	.430
MSCEIT Area 1					.037	.129	.898
MSCEIT x DC1 (Interaction)					-.327	-.944	.349
MSCEIT x DC2 (Interaction)					-.337	-.884	.380

It was hypothesized that gender would impact the relationship between EI scores (Area 1) and mental skill use in practice and competition. Results of the regression showed that the main effects were significant predictors of TOPS practice and competition totals, [TOPS Practice Total: $F(2,64)=4.29$, $p=.018$, $R^2=.118$: TOPS Competition Total: $F(2,64)=7.94$, $p=.001$, $R^2=.199$]. Examination of the coefficients indicated that this effect was due to the main effects of gender (See Tables 8 and 9). Specifically, men scored significantly higher on the TOPS (both practice and competition) than women. However, there were no interaction effects [TOPS Practice Total: $F(1,63)=.031$, $p=.861$, $R^2=.000$: TOPS Competition Total: $F(1,63)=.112$, $p=.739$, $R^2=.001$]. Regression table and model summary can be found in Tables 8 (TOPS Practice Total) and 9 (TOPS Competition Total).

Table 7

Correlation Table: MSCEIT and TOPS Totals and Subscales

	TOPS	Activation Practice	Activation Competition	Relaxation Practice	Relaxation Competition	Imagery Practice	Imagery Competition	Goal Setting Practice	Goal Setting Competition	Self Talk Practice	Self Talk Competition	Automaticity Practice	Automaticity Competition	Emotional Control Practice	Emotional Control Competition	Attention Control Practice	Negative Thinking Competition	Practice TOTAL	Competition TOTAL
MSCEIT																			
Branch 1		-.070	.002	-.090	-.186	-.033	-.046	-.071	-.082	.194	.128	-.141	-.205	.045	-.077	-.148	-.041	-.067	-.129
Branch 2		-.121	-.140	-.095	-.108	-.248*	-.286*	-.382**	-.094	.101	.033	.096	.146	-.134	-.171	-.051	.025	-.025	-.156
Branch 3		.011	.021	.035	.002	-.183	-.129	-.270*	-.136	.035	-.096	-.003	.092	.057	-.056	-.060	.113	-.096	-.055
Branch 4		-.104	-.125	-.143	-.193	-.091	-.088	-.152	-.230	.168	.054	-.208	-.133	.080	-.268*	-.048	.095	-.019	-.224
Area 1		-.085	-.050	-.096	-.169	-.153	-.184	-.247*	-.108	.177	.107	-.030	-.034	-.040	-.122	-.126	-.024	-.143	-.153
Area 2		-.050	-.065	-.091	-.117	-.161	-.138	-.249*	-.231	.164	.006	-.124	-.013	.085	-.208	-.061	.109	-.115	-.171
Total		-.079	-.068	-.121	-.188	-.201	-.203	-.305*	-.208	.201	.060	-.089	-.051	.022	-.198	-.106	.050	-.161	-.210

*Significant at .05 level
**Significant at .001 level

Table 8

Regression Table and Model Summary: TOPS Practice Total and Gender

TOPS Practice Total	r	r^2	F	p	b	t	P
Model 1	.344	.118	4.29	.018			
Constant					115.615	9.008	.000
Gender					-8.35	-2.59	.012
MSCEIT Total					-.093	-.809	.421
Model 2	.345	.119	.031	.861			
Gender					-13.62	-.451	.653
MSCEIT Total					-.095	-.603	.549
MSCEIT x Gender (Interaction)					.053	.176	.861

Table 9

Regression Table and Model Summary: TOPS Competition Total and Gender

TOPS Practice Total	r	r^2	F	p	b	t	P
Model 1	.446	.199	7.94	.001			
Constant					123.638	10.24	.000
Gender					-10.666	-3.51	.001
MSCEIT Total					-.104	-.832	.408
Model 2	.447	.200	.112	.739			
Gender					-1.213	-.043	.966
MSCEIT Total					-.078	-.525	.601
MSCEIT x Gender (Interaction)					-.094	-.335	.739

Due to results found in studies using the general population (e.g. Brackett & Mayer, 2003; Palmer, 2005), a one-way ANOVA was run to determine if there is a significant group difference between men and women on the MSCEIT. Results of the ANOVA support that women score significantly higher on the MSCEIT than men: $F(1,65)= 5.374$, $p=.024$.

CHAPTER V

DISCUSSION

The primary purpose of this study was to examine the relationship between performance-based EI and the use of mental skills in athletes. In addition, the extent to which gender and sport impacted the relationship between MSCEIT total and TOPS totals in practice and competition were also examined. Specifically, this study was designed to determine if athletes' performance-based EI is related to their use of mental skills, and to explore whether those relationships vary across gender or sport.

Relationships Between EI and Use of Mental Skills

The primary hypothesis, that the MSCEIT (and subscales) would be positively, significantly correlated to the TOPS (and subscales), was not supported. On the contrary, one significant, negative relationship was found between Facilitating Emotion (B2) and Goal Setting in practice. It may be the case that as Branch 2, or the ability to use emotion to facilitate problem-solving decreases, the perceived need to use a higher quantity of goal setting skills increases. As this relationship was the only significant one found, the interpretation of this result is difficult. However, a discussion of the TOPS as a measure of perceived frequency of mental skill use, as opposed to efficacy of mental skill use will follow later.

This was the first attempt to compare performance-based EI and an athlete's use of mental skills. A previous study which used a self-report measure of EI, the EIS (Lane et al., 2009b), found a number of significant, positive relationships between the EIS and TOPS subscales of self-talk, goal setting, and imagery, which are inconsistent with findings of this study.

Moderators of the Relationship Between EI and Use of Mental Skills

Using multiple regression to explore interaction effects, a secondary purpose of this study was to examine the extent to which gender and sport (baseball/softball, swimming, tennis) moderate the relationship between EI scores (total) and mental skill use in practice and in competition. It was hypothesized that both gender and sport would impact the relationship between EI scores (total) and mental skill use in practice and in competition. This hypothesis was not supported for gender or sport. No interaction effects of gender or sport and MSCEIT on predicting TOPS scores were found.

No main effects were found with sport and TOPS scores. However, main effects were found with gender, indicating that men scored significantly higher on the TOPS (both in practice and competition) than women. These results showed that, in general, men report using mental skills in practice and competition significantly more than women.

General Discussion

The main theme that arose from the results of this study involved questioning the mechanisms connecting EI and sport performance. For this study, the mechanism chosen

was mental skill use. However, it may be prudent to look at a more direct relationship between EI and sport performance (e.g. Zizzi et al., 2003; Stough et al., 2009; Perlini & Halverson, 2006), to look at other possible mechanisms such as aspects of the IZOF (Hanin, 1997), or to examine this relationship using a qualitative design (e.g. Devonport, 2006). A secondary theme that emerged from the findings of this study involved possible measurement issues with the TOPS, concerning the self-report nature of the instrument and the type of information which can be gleaned from the results, as well as support for the use of the MSCEIT with an athlete population.

Relationship between EI and performance. The results of this study prompt a closer look at how EI may impact sport performance. The lack of significance between performance-based EI and frequency of mental skill use found in this study could lead research in a number of different directions. As previously stated, there are possible measurement issues with the TOPS when looking at the relationship between EI and sport performance. However, it may also be the case that the relationship between performance-based EI and mental skill use does not exist. For that reason, other possible explanations and methods for measuring the EI/sport performance relationship must be discussed.

Researchers using the MSCEIT to measure EI may consider including objective performance outcome variables to examine the extent to which performance-based EI may be related to performance itself. Crombie et al. (2009) showed positive results when exploring the relationship between team averaged MSCEIT scores and team performance

in South African cricket players. Zizzi et al. (2003) compared objective performance measures of baseball players to a self-report measure of EI, but found only modest support for that relationship. However, no study has been conducted to date exploring performance-based EI to individual sport performance. Using a performance-based measure of EI to explore objective performance outcomes may provide a more direct explanation of the relationship between EI and sport performance. However, the relationship between EI and other models related to performance must also be considered.

One of the theories connected to sport performance, and discussed earlier as sharing components with the ability model of EI is the IZOF (Hanin, 1997). As opposed to mental skill use, Hanin's model deals directly with the recognition and use of emotion, as well as the ability to bring about certain emotions to optimize performance. Zizzi et al. (2003) also support the exploration of the potential link between IZOF and EI. This line of research could provide a way to examine the relationship between EI and sport performance from a different perspective, more closely tied to emotion itself. More specifically, a qualitative research design incorporating aspects of EI and IZOF might be useful in determining if such a relationship exists. Focus groups or semi-structured interviews, for example, may help define how an athlete's ability to perceive emotions in oneself and others, to use emotions to facilitate problem-solving, and managing ones emotions is connected to the process of recognizing what emotions bring about an optimal state of performance in oneself and how to recreate those emotional states.

As stated previously, the relationship between performance-based EI and sport performance may be better measured using a qualitative design approach. As stated earlier, Devonport (2006) used focus groups and interviews to examine the effects of an EI intervention on coping skills and aspects of enhanced performance using adolescent athletes. While the integration of an EI intervention with athletes may be premature, a qualitative examination of how EI plays a role in sport performance could provide valuable information about this relationship. There may be aspects of the EI/performance relationship that are difficult to ascertain using a mental skills or coping skills questionnaire, such as how aspects of EI contribute to social support, communication skills, and the ability to deal with and lead others (Devonport, 2006).

Future research using a qualitative or mixed design could also focus on aspects of coaching efficacy (Thelwell et al., 2008), leadership (Magyar et al., 2007; Chan & Mallett, 2011), coping (Devonport, 2006), or burnout (Moon & Hur, 2011). The studies previously cited were mostly quantitative, and all found significant relationships with EI. These studies provide some groundwork for exploring aspects like burnout, leadership, and coaching efficacy that relate to performance using a qualitative approach. A qualitative research design could provide a useful avenue to explore these mechanisms using a method that is not confined by a questionnaire. This would allow the athlete to expand on how aspects of EI, such as managing emotions, relate to leadership or burnout and how they affect performance.

For a more general approach to exploring the EI and sport performance relationship qualitatively, the ability model of EI could be useful for constructing interview or focus groups questions related to the branches EI. For example, athletes could be asked about the importance of being able to perceive emotions in oneself or others, use emotion to facilitate thought and problem-solving, and manage emotions in oneself and others to optimal performance. This line of questions could provide a more direct link between EI and athletic performance.

Measurement discussion. There were some possible measurement issues with the TOPS. A self-report measure, such as the TOPS, is based on people's endorsements of descriptive statements about themselves. If a person's self-concept is accurate, then the measure will be accurate; however, most people lack accuracy when reporting on their own abilities (Brackett & Mayer, 2003). This notion is offered within the sport literature on EI as well. Meyer and Fletcher (2007) stated that self-report measures are susceptible to social desirability bias, and more accurately provide an individual's perception of ability rather than their actual ability.

The other possible issue with the TOPS lies in the information that can be gathered from its results. The TOPS is a measure of frequency of mental skill use, not efficacy. As stated earlier, this could be an explanation of the significant, negative relationship between Facilitating Emotion (B2) and Goal Setting in practice. So, the lower the ability to use emotions to prioritize thinking, direct attention to important information, and solve emotion-laden problems, the more frequently an athlete perceives

the need to use a mental skill like goal setting, which addresses similar skills to B2 such as maintaining focus, directing attention to important elements of technical skills, and mobilizing effort. For this reason, future research may consider using a different measure of mental skills such as the Athletic Coping Skills Inventory (ACSI: Smith & Smoll, 1995), which measures an athlete's coping skills. Devonport (2006) explored the contribution of EI to the coping process using focus groups and semi-structured interviews. Despite similar self-report issues, the ACSI measures individual differences in specific coping skills as opposed to how often those skills are used.

In terms of the MSCEIT, this is the first study to show that the MSCEIT is a reliable measure to use with athletes at the area and branch levels. Crombie et al. (2009; 2011) both used the MSCEIT with athletes, but neither reported alpha reliabilities at the area and branch levels. This study showed alpha reliabilities to be consistent with those found in the general population (Palmer et al., 2005; Mayer et al., 2002) at the whole scale, area, and branch levels. This is an important step for continued use of the MSCEIT with athletes.

Limitations

The current study does include several limitations. Many of these limitations were addressed earlier in this discussion. In summary, there may be possible limitations in the use of the TOPS to explain the EI and sport performance relationship. Furthermore, mechanisms related to sport performance other than mental skill use need to be examined, such as IZOF, direct relationships to performance, and other research designs.

There were also a number of limitations based on the sample. First, a larger sample would have been preferred due to the high number of variables in the correlational design (i.e. MSCEIT and TOPS subscales). In addition, a more evenly distributed sample, both in terms of gender and sport, would have strengthened the study (See Table 2). This was especially salient as gender and sport were both moderators being examined specifically.

Future Recommendations

First and foremost, more research needs to be conducted using the MSCEIT with athletes. As previously stated, this study provides support for the reliability of using the MSCEIT with this population. However, more studies should be conducted to confirm these findings and to examine other aspects of sport performance as it relates to performance-based EI. Furthermore, it may also be beneficial to conduct a factor analysis of the MSCEIT using athletes to determine whether the factor structure of the MSCEIT fits well with this population.

As previously discussed, future research should explore different theories and measures related to sport performance, as well as other research designs to help explain the relationship between EI and sport performance. Moreover, further studies need to be conducted to explore the impact of moderators such as gender and sport on the EI and performance relationship. Additional moderators such as age and skill level should also be included in these studies to determine whether EI is a more salient factor in elite vs. recreational athletes.

Conclusions

The results from this study, as well as previous studies to explore the connection between EI and sports over the last 10 years, suggest that a relationship between sport performance and EI does exist. Whether EI is directly related to performance, related to the use of mental skills, better explained using other models related to performance, or moderated by factors such as gender or sport is still unclear. The results of this study showed that the MSCEIT is, at the whole scale and branch level, a reliable measure to use with athletes. Because of this study, as well as those studies previously mentioned, particularly the most recent studies and reviews using (or suggesting the use of) performance-based EI in relation to sport performance, further study of this relationship using the MSCEIT, is warranted.

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APPENDIX A

MSCEIT INSTRUCTIONS

Purpose of the Test:

The MSCEIT is designed to measure the abilities that make up emotional intelligence. The test provides feedback in four areas:

-*Perceiving Emotions*=> your ability to recognize how you and those around you are feeling.

-*Facilitating Emotions*=> your ability to generate emotions, and use them to enhance reasoning and other cognitive tasks.

-*Understanding Emotions*=> your ability to understand simple and complex emotions.

-*Managing Emotions*=> your ability to manage emotions in yourself and others.

Contents of the Test:

You will be asked to solve a series of emotional problems. These problems are arranged in eight clusters, labeled from "A" to "H." The questions involve identifying emotions in faces and pictures, comparing emotional feelings to other sensations such as those of heat and colors, and many others. No personal questions are asked beyond a few questions such as your age and gender, which are necessary for scoring the test.

Taking the Test:

The MSCEIT takes about 30 to 45 minutes to complete. Some test takers will take a little less time, some a little more. The test is untimed, and there is no penalty for taking a break during the test.

The MSCEIT is an ability test, so some answers get higher scores than others; for some items, partial credit is given. It is in your best interest to answer all the questions. Please work carefully, but also work as quickly as you can. If two answers appear correct, it is possible that either one will provide you with equivalent credit. Partial credit is given for many answers. For that reason, finish a question as soon as you have found the answer which you are most satisfied. Be sure to answer all the questions. Guessing on items is allowed; you do not lose points for incorrect answers.

(Mayer, Salovey, & Caruso, 2002)
Participant # Coding:
Baseball = 1-99
Softball = 100-199
Men's Swimming = 200-299
Women's Swimming = 300-399
Men's Tennis = 400-499
Women's Tennis = 500-599

APPENDIX B

THEORETICAL CONNECTIONS BETWEEN EI AND SPORT PSYCHOLOGY

Nideffer: Attention and Awareness. Nideffer (1976) proposed the theory of attentional styles along two dimensions; width (broad or narrow) and direction (internal or external). The combinations of these dimensions represent four different attentional styles including broad-internal, broad-external, narrow-internal, and narrow-external. Each style is said to be important in different sports, different position, and even during different tasks within a competition. For example, a soccer player may need to have a broad-external focus when deciding where to pass the ball, but may need to use a narrow-external focus when trying to win the ball back by making a slide tackle. This requires the athlete to shift attention across the different dimensions (Nideffer & Sagal, 2006).

Nideffer and Sagal (2006) describe an athlete's ability to shift his or her focus of concentration in response to changes in performance demands, as well as the ability to control emotions that affect muscle tension, coordination and timing as crucial to any performance situation. The connection between the ability to shift focus and control emotion, and the ability model of EI is clear. The ability to shift focus through emotional control fits well with Branch 2 (Facilitating Emotion) concept of using emotions to prioritize thinking by directing attention to important information (Mayer & Salovey, 1997). Similarly, Nideffer and Sagal's (2006) emphasis on the ability to control emotions fits well with all of Branch 4 (Managing Emotion).

A final connection can be seen in relation to distractions. Stough et al. (2009) state that effectively managing one's own emotions increases an individual's ability to remain focused and avoid external and internal distractions. According to Nideffer and Bond (1989), by shifting attention from a negative internal or external source to a more positive internal focus, an athlete is less likely to make mistakes. This concept appears to be directly related to an aspect of the Managing Emotion branch, i.e. the ability to manage emotion in oneself (and others) by moderating negative emotions and enhancing pleasant ones, without repressing or exaggerating information they may convey (Salovey et al., 2004).

Vealey: Sport Confidence. Another important area of sport psychology where EI permeates is the theory of sport confidence. Vealey (2001) discusses sources of sport confidence, which include some of the original origins of self-efficacy (Bandura, 1977), such as past successes, vicarious experience, encouragement, and physiological cues. One of the abilities of Branch 1, Perceiving Emotion, is recognizing, not only psychological, but also physical signs of emotion (Mayer & Salovey, 1997). Also included in this theory is 3 ways to increase sport confidence: 1) improve training and perceived accomplishment, 2) increase self-regulatory skills, and 3) provide a supportive environment (Vealey, 2001). Perceived accomplishment speaks to aspects of both understanding (branch 3) and managing (branch 4) emotions in the ability to interpret and understand complex emotions as well as the ability to monitor those emotions in oneself and recognize how influential or reasonable they are (Mayer and Salovey, 1997). The

connection with self-regulatory skills can involve emotional self-regulation, which has ties to branch 4 and the ability to manage emotions in oneself. Providing a supportive environment speaks to the ability to manage and recognize emotions in others, and the idea of empathy, which is highly related to EI (Mayer & Salovey, 1990). In support of the connection between EI and self-regulatory strategies (and to social support as well), Lane et al. (2009b) contend that enhancing EI increases an individual's awareness of the benefits to using self-regulatory strategies. These regulatory strategies include those typified in many mental skills training programs, such as self-talk, imagery, and an array of coping strategies (planning, utilizing social support).

Weiner: Attribution Theory. Another sport psychology theory to consider is attribution theory (Weiner, 1986), which describes the evaluation and attribution of successes and failures in terms of three categories: Stability (unstable or stable), Controllability (uncontrollable, controllable), and as Internal or External. In Duda and Treasure (2006), research has shown that motivated, successful athletes attribute success to internal, stable, and controllable factors, while those same athletes attribute failures to internal, controllable, and unstable factors. Mayer and Salovey (1990) describe a situation in which an evaluation of a negative mood which is seen as unacceptable (internal) and long lasting (stable) can be devastating, but when the evaluation is reversed and the mood is seen as controllable and soon to pass (unstable), the effect is much less harmful. This ability of an emotionally intelligent person has profound implications for the motivation

of an athlete; creating a strong link between attribution theory and the ability to understand emotion and manage emotion.

Loehr: Full Engagement Leadership. The area of EI and leadership has already received some attention (Meyer & Zizzi, 2007), suggesting that EI accounts for a significant amount of variance in leadership experiences. Theoretically speaking, Loehr's (2005) model of full engagement leadership seems to fit well with the ability model of EI. Loehr's model of full engagement leadership describes leadership as consisting of four domains: Spiritual, Mental, Emotional, Physical. These domains are arranged in a pyramid with physical at the base, emotional on the next level, mental, and spiritual at the top. Spiritual leaders are described as having the ability to secure commitment and motivation toward a goal. Mental leaders are described as being able to think rationally and logically under pressure. Physical leaders are described as holding people accountable for maintaining personal and team ethics. Emotional leaders are able to communicate effectively, show empathy, and instill confidence and hope.

Mayer and Salovey (1990) describe managing emotions in others as the ability to motivate others toward a worthwhile end. They also describe empathy and managing emotions in others as key aspects of their model. These descriptions seem to follow the same path and reflect the importance of a strong emotional leadership, as described by Loehr's model.

The link between the Mayer and Salovey (1990; 1997) ability model of EI and sport psychology theories such as Hanin's (2000) IZOF, Nideffer's (1976) attentional styles, attribution theory (Weiner, 1986), sport confidence (Vealey, 2001), and Loehr's (2005) full engagement leadership model seems clear.

APPENDIX C

DEMOGRAPHIC FORM

Participant #: _____

Age: _____ Date of Birth: _____ Sex: Male Female

Ethnic Background (Optional): African American/Black Asian/Pacific Islander

Caucasian/White Hispanic

Native American Other: _____

Year in college: Freshman Sophomore

Junior Senior

Sport: _____

Baseball/Softball only

Position: _____

Starter: (circle) Yes No If Pitcher (# in rotation): _____

Swimming only

List Top 3 Events/Distance:				
List Team Rank in each event:				

Tennis only

Singles Seed: (*circle one*) 1 2 3 4 5 6 None of the above

Doubles Seed: (*circle one*) 1 2 3 None of the above

APPENDIX D

PILOT STUDY

The purpose of the pilot study was to explore possible connections between two common measures of EI (MSCEIT and EIS), which are based on two different frameworks, (i.e. abilities and mixed models) and an athlete's use of mental skills as measured by the TOPS. A significant relationship between EI and use of mental skills could provide insight into interventions to increase use of mental skills by increasing EI, or vice versa; possibly providing positive effects on performance.

The Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT) is a performance-based test and was developed by Mayer, Salovey, and Caruso (2002) based on the ability model of EI. To date, no prior study has examined athletes' use of mental skills and their EI using the MSCEIT. The Emotional Intelligence Scale (EIS) is a self-report measure and was developed by Schutte et al. (1998); while it was based on the ability model, it has been argued (see Meyer & Fletcher, 2007) that it is more appropriately described as a mixed model measure. Only one prior study has examined athletes' mental skills use and their EI using the EIS. Lane et al. (2009) examined the relationship between athletes' scores on a common measure of mental skill use (Test of Performance Strategies: TOPS; Thomas & Hardy, 1999) and the EIS. Results demonstrated a number of significant correlations to the TOPS including ($r=.67$, $p<.0004$ [Competition]; $r=.69$, $p<.001$ [Practice]). In addition, significant relationships (all at $p<.05$) were found between the EIS and specific psychological skills (in competition)

from the TOP; Imagery (r=.49), Self-talk (r=.30), Goal setting (r=.31), and Relaxation skills (r=.31). Similar results were found with the TOPS practice skills (e.g. Imagery, r=.44; Self-talk, r=.44).

To further explore the relationship between athletes' mental skills use and their EI, instruments representing both models were used. Therefore, the purpose of the present study is twofold. First, relationships between mental skills use and EI were examined for both the MSCEIT and the EIS. Findings provide insight as to whether or not individuals who are high in self-reported EI (EIS) or in performance-based EI (MSCEIT) are more effective at using mental skills such as imagery, relaxation, goal setting, and self-talk as measured by the TOPS.

Secondly, between group differences on EI scores were examined (for both the self-report and performance-based measures of EI) across gender, skill level, and age. This will help identify possible significant differences in gender, age, and/or skill level between EIS and MSCEIT scores. These findings may suggest potential moderators of EI. Also, results would further clarify findings from the previous research suggesting there are gender differences (Palmer et al., 2005; Brackett & Mayer, 2003; Schutte et al., 1998) as well as age related differences in the performance-based measure of EI (Mayer et al., 2002). No studies were found exploring age-related differences in the EIS; nor were any studies found exploring skill level differences in EI scores. It is important to note that no study to date has examined any of these moderator variables in an athlete population.

Finally, and as a secondary inquiry, correlations between the EIS and MSCEIT were examined to validate and support other research that has found self-report and performance measures of EI to demonstrate low to moderate correlation (e.g. Brackett & Mayer, 2003; Livingstone and Day, 2005; Conte, 2005). These findings support the claim that self-report and performance-based measures of EI may not be measuring the same construct.

Participants. After obtaining Institutional Review Board approval, competitive youth swimmers were recruited from a local age-group swim club. The owner of the team was contacted first to obtain his support of the project. The inclusion criteria for the study consisted of boys and girls between the ages of 15-18 who provided their informed assent and informed parental consent. Swimmers did not receive any compensation for participating, or any consequence for declining to participate. Of 50 eligible participants, 32 swimmers completed the study. The participants included 18 males and 14 females, all between the ages of 15-18 (M= 16.09 years). Participants were classified into two skill levels; a developmental elite and elite groups (Senior 1=16, Senior Sectional=16, respectively).

Measures. Self-reported EI was assessed using the Emotional Intelligence Scale (EIS; Schutte et al., 1998). The EIS is based on the original ability model of EI (Salovey & Mayer, 1990). Due, however, to its conceptualization as a trait-like characteristic, as well as its moderate correlation to personality traits (e.g. r[22]= 0.54, $p< 0.009$; Schutte et al., 1998) it was considered a mixed model measure. The EIS is a 33-item self-report

measure, which is rated on a 5-point scale ranging from 1=*strongly disagree* to 5=*strongly agree*. The instrument assesses an individual's capacity to identify, understand, harness, and regulate emotions in the self and others. While the EIS was developed as a multi-dimensional construct, it has been more recently suggested that the EIS provides only an overall score of EI (Meyer & Fletcher, 2007).

Descriptions of the MSCEIT and the TOPS can be found in detail in Chapter 3.

Procedure. In two groups of 16, on two separate days, participants gathered in a quiet computer lab on the UNCG campus. After obtaining consent and assent forms from the participants, the researcher gave explicit directions on how to access, code, and begin the online version of the MSCEIT. In addition, the participants were given clear instruction on how to complete the paper and pencil versions of the EIS and TOPS. They were informed that the MCSEIT would take between 30-45 minutes, and 20-30 minutes for the two paper and pencil assessments. They were also told, however, that there was no time limit; to take their time and make sure to answer all questions on all the assessments. Participants were given a number (1-32) which was coded on their written packet as well as on the MSCEIT in place of "last name," in order to match MSCEIT scores with those of the written instruments. Demographic data such as age, gender, and skill level was also recorded for each participant, but names were left off all assessments to maintain anonymity.

Data Analysis. Pearson's correlations were used to examine relationships between each of the EI measures and both EI measures with the TOPS. ANOVAs were conducted to examine group differences (gender, skill level) on each EI measure.

Results. No significant correlations were found between the two measures of EI. Findings demonstrated significant relationships between TOPS subscales and both the EIS and MSCEIT. Specifically, significant correlations emerged between EIS total and TOPS total Practice ($r=.392$, $p<.05$), as well as Imagery and Self-talk in practice and competition (r's ranged between .365, $p<.05$ and .490, $p<.01$). Significant correlations were found with one MSCEIT subscale (Branch 2, Facilitating emotions) and Goal-setting in competition ($r=.370$, $p<.05$). No significant gender differences on EIS or MSCEIT were detected, but skill level differences emerged on the MSCEIT. Specifically, skill level groups differed significantly on MSCEIT total score, $F(1,30)=6.85$, $p=.014$. After covarying for age, the senior sectional group scored higher on the MSCEIT total than the senior 1 group.