Psychological Predictors of Athletic Performance: Emotional Intelligence, Coping Style, and

Mental Toughness

Abby Carr

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Under the Direction of Dr. Craig Smith and Dr. Leslie Kirby

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Abstract

The present study examined the psychological predictors of success as they relate to performance levels. To this end, study 1 was conducted investigating the foremost psychological constructs athletes employ while in a competitive environment. Qualitative questions were asked to a sample of collegiate athletes and after the analysis of their responses, the emerging psychological constructs as potential predictors of performance were emotional intelligence, coping style, and mental toughness. These three constructs formed the basis of study 2, in which the three constructs were hypothesized to be predictors of performance. Measures of each construct were taken along with measures of performance. They were then analyzed to assess any significant correlations or interactions between them. Results indicated only a slight number of significant findings, failing to support the main hypothesis, despite previous literature indicating that these three constructs have a mediating effect on performance.

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The world of sports is highly diverse and in this environment, people of all types succeed

and fail. In a locker room before a game, one athlete sits in their locker with their headphones on,

eyes shut, nodding their head to the music as they mentally prepare to compete. Meanwhile, the

locker room is buzzing around them. A teammate turns the music playing over the sound system

to its highest volume and begins to dance. Everyone in the locker room is preparing to go play in

the same game, yet the differences in how they prepare can be strikingly dissimilar. During the

competition, many stressors will arise, but little is known about the overall stressful experience

of athletes (Nicholls, Polman, & Levy, 2012). This article discusses different psychological

constructs that can influence an individuals' ability to perform within an adverse setting, as

sports often are. By better understanding how they play a role in human performance, and to

what degree, a more complete picture can be built within the literature to inform athletes

regarding the best way to improve their performance.

In nature, athletic events involve many adverse events that lead to extreme emotions,

which makes understanding how to interpret and manage emotions during competition critical

for athletes. It is important to learn not only how to prevent emotions from impeding

performance, but also to utilize emotions to create a performance advantage. When thinking of

emotions in such a way, the construct of emotional intelligence arises. Emotional intelligence

(EI) is the ability to monitor one's own and others feelings and emotions, discriminate among

them, and use this information to guide one's thinking and actions (Salovey & Mayer, 1990).

Broadly, high measures of EI are associated with enhanced performance and, as concluded from

a meta-analysis on the construct by Van Rooy & Viswesvaran (2004), the overall predictive

validity of EI appears to hold across all performance domains. This effect is particularly robust in assessing performance in employment settings. There are also findings that relate business and sports, indicating successful individuals in each environment possess similar forms of attributes (Jones, 2002; Weinberg & McDermiott, 2002). Research concentrated on EI and sports has only recently begun, beginning in the early 2000's. In that time, researchers have utilized both qualitative and quantitative methods and multiple assessment inventories in their studies of EI and sport (Meyer & Fletcher, 2007). Since it is clear EI has an impact on performance in employment settings, it is conceivable that individuals with higher EI will also perform better in a sporting environment.

In the same way that the predictive ability of EI holds across all performance domains, it is possible that other psychological constructs also have predictive ability across multiple domains, including the adverse setting of sports. To this end, there is value in broadly exploring the psychological constructs athletes use while performing with the hope of finding some that prove valuable in predicting performance.

Study One

To gain a better understanding of exactly which psychological constructs relate to performance in the adverse setting of athletics, a qualitative study was conducted. The questions asked were focused towards attaining a comprehensive picture of athlete's psychological thinking during competition. This included questions about prior, during, and after competitions and practices from the athlete's perspective in regards to their thoughts about themselves, their teammates, and their coaches. The goal of doing this was to determine the underlying psychological constructs an athlete uses to function in their competitive environment. It was hypothesized that EI would appear as a psychological construct, and additionally, that other

psychological constructs would emerge as influential to performance, particularly emotional response and regulation efforts, in a competitive environment as well.

Methods

A qualitative survey was conducted among members of the Vanderbilt women's soccer team (n=10) and the Vanderbilt men's football team (n=20). Participants were asked open-ended questions focused around the following psychologically driven aspects of competition: *individual game preparation* (e.g., what is your most common emotion before a game?), *team interaction game preparation* (e.g., how do pregame speeches affect your performance?), *individual during the game* (e.g., when you make a mistake, what is the first thing you think of?), *team interaction during the game* (e.g., you hear your teammates cheering you on after making a great play, how does this make you feel/affect you?), *individual post-game* (e.g., how do you evaluate your performance after a game?), *team interaction post-game* (e.g., your team loses, what's the best way for coach to address the team?), *individual practice* (e.g., do you feel like being focused while warming up is important to your performance during practice?), *team interaction practice* (e.g., you're put 1v1 with your best friend on the team, how does this affect your mentality?), and *home vs. away games* (how would you say your mentality differs between playing at home and playing away games?). Participant interviews were conducted in-person and responses recorded by the researcher. The full set of questions can be found in Appendix A.

Data Analysis. Participant's responses were analyzed in sets based upon the aforementioned aspects of competition. Within each aspect, congruencies and incongruences were looked for among responses. That is, when participant's responses were similar, particular notice was taken and likewise, when participant's responses to the same question showed great variation, particular notice was also taken. Questions were then subdivided into those that showed great

response variation, moderate variation, and little to no variation. Questions in which response diversity was great, the polarity of responses was also noted, resulting in some that were highly polarized, some showing variation across a spectrum, and others showing no clear pattern at all. After doing this, psychological constructs began to emerge among the categories. These were typically found upon close examination of stark contrasts in participant responses to a question or polarizations of responses either together or on the two extremes of a spectrum.

Results

Participant's responses were examined for trends towards psychological constructs. Three prevailing constructs emerged: emotional intelligence (EI), coping strategy, and mental toughness (MT).

In support of EI were responses to the question, "You see a teammate not touching the lines while doing a drill. Would you address this, and if so, what would you say?" Across a spectrum, some participants said they would not address the issue, while others said they would address it through multiple methods, some yelling, others preaching accountability and making general comments to the group. This is indicative of EI, given that participants were required to evaluate their own feelings of the situation, and then required to react in a way sensitive to how others would perceive it; those acting in favorable and constructive ways would be seen as having higher EI than those acting in destructive ways. Other similar examples exist among the data categories, this particular example coming from the team interaction practice category and showing variation across a spectrum.

In support of coping strategy as an emerging psychological construct were responses to the question, "Do you have any pregame rituals and what happens if you forget to do them?" Participant responses were polarized in either having or not having pregame rituals as well as

how they would be affected if they forgot them. Some participants said in forgetting them they "don't care" or "make do", whereas others note they will "worry about it", "feel nervous and anxious", and "feel unprepared". Responses like so are indicative of coping strategy, being that participants who adjust positively when they forget their pregame ritual are showing use of a positive coping strategy whereas those unable to adjust are using a negative coping strategy. Additionally, pregame rituals are a coping strategy in themselves to deal with the stressors that arise with competition. Examples similar to this in support of the importance of coping style exist among the data. The aforementioned example in particular came from the individual game preparation category and responses among participants showed polarization.

The emergence of MT as a psychological construct was supported by participant responses to question, "What do you do, if anything, to get inside an opponents head?" As in the coping strategy example, responses were polarized on the yes/no spectrum, yet of those that did do something, their responses had no clear pattern. Some examples that would indicate higher MT include, "turn up the intensity" and "work tirelessly", whereas those indicating lower levels of MT include, "trash talk", "step on their throat", and "cheap shots and illegal things". Others that did not fall clearly into employing higher or lower levels of MT include, "not my goal" and "send a message that it won't be an easy game for them". This particular example was taken from the individual during the game category and responses showed initially polarization (yes/no), and secondarily no clear pattern.

After deriving psychological constructs from participant responses, it was noted that each aspect of competition (e.g. individual game preparation) had multiple indicators of psychological constructs, with no one aspect of competition indicating one construct alone. Participant responses from game preparation, during the game, and practice aspects of competition

incorporated all three prevailing constructs. However, in assessing both individual and team post-game responses, only EI and coping constructs were observed. Multiple constructs were also found within some of the same questions. For example, "How much does a pregame speech affect you versus if you hadn't heard it?" generated responses that indicated various coping styles in dealing with having heard or not heard it, and MT levels in how an athlete would allow it to affect their performance thereafter.

Finally, participant's responses to questions also yielded indications towards all three emerging psychological constructs. For example, to the question, "You make a mistake. What's the best thing your coach could say to you?" participants responded "makes me question if it was actually a good play" and "probably wasn't as good as I thought" which indicate level of EI, "I don't care" and "makes me feel frustrated but kind of accepting because it has happened before" which indicate coping style, and "I'm unaffected" and "it upsets me" which indicates level of MT.

Taken together, participant's responses indicate trends towards employing the psychological constructs of EI, coping style, and MT within their sporting environment.

Conclusion

Based upon athlete's responses, three psychological constructs emerged: EI, coping, and MT. The prevalence of these constructs indicates they play a role in the emotional responses and emotional regulation of athletes during performance and are influential to success in a competitive environment. The absence of MT displayed in post-game responses follows logical thought, being that once the game is over, athletes no longer need to maintain their competitive mentality and can transition into coping with the outcome on both an individual and team level.

Research on the influence of these constructs with regard to performance is limited and should be expanded.

The emergence of EI as a psychological construct seems expected since previous research has indicated it is correlated with performance outcomes (Van Rooy & Viswesvaran, 2004; Crombie, Lombard, & Noakes, 2009). Furthermore, the finding of coping as a psychological construct important in a competitive environment, like sports, is supported by findings by Nicholls et al. (2012). After having 557 athletes complete a coping questionnaire and subjective performance measure after competing, they concluded that stress appraisals, emotions, and coping style are highly related constructs that are also associated with performance satisfaction. Since this is the case, it is possible that coping style also may be associated with actual performance as well.

Lastly, the appearance of MT as a prevalent psychological construct to performance reinforces the importance of studying it, which researchers have only done sparingly until recently. This is despite athletes, coaches, and applied sports psychologists consistently referencing it as one of the most important psychological characteristics related to outcomes and success in elite sport (Crust, 2007). The absence of athlete responses referencing MT post-game alludes to a potential timing effect of when this construct is most important, which further research should explore. Rightfully, there is a growing sense of importance being given to MT in regards to success in the competitive environment of sports, backed by findings like that of Golby, Sheard, and Lavallee (2003) that elite athletes have higher levels of MT than lower level performers.

Overview of Study Two

Based on the findings of Study 1, the goal of this research is to more closely examine the predictive value the psychological constructs of EI, coping, and MT have on performance in a competitive environment. Findings from the literature regarding EI are mentioned above. With the introduction of coping and MT as additional constructs influential to performance, additional understanding of each was sought.

According to Lazarus and Folkman (1984), coping can be defined as how an individual manages the internal and external demands encountered during a stressful situation with both their cognitive and behavioral efforts. They suggest that coping strategies either change or eliminate the stressor, or manage the emotional responses caused by the stressor. Initially, coping was categorized into two primary types, (a) problem-focused coping, which predominates more often when an individual feels something constructive can be done, and (b) emotion-focused coping, which prevails when people see the stressor as something that just has to be endured and focus on managing the emotions that arise from it (Folkman & Lazarus, 1980). Yet in further research on coping, Folkman and Lazarus (1988; Lazarus, 1991) indicate the range of coping responses is not accurately expressed with just two broad factors and instead, at least eight types of coping exist: confrontive, distancing, self-controlling, seeking social support, accepting responsibility, escape avoidance, planful problem solving, and positive reappraisal. Coping has since been classified into three broad 'higher order' functions of coping, those being problem-focused coping (strategy to minimize distress by reducing or eliminating the stressor), emotion-focused coping (strategy to regulate emotional arousal and distress), and avoidance coping (behavioral and psychological efforts to disengage from a stressful situation) (Krohne, 1993). Dependent on both individual and situational factors, the type of coping an individual engages in when they face adversity, or a stressor, will affect their success thereafter. Consequently it is an

important factor to examine when looking at the relationship between psychological constructs and performance.

In regards to MT, literature has not come to a consensus in defining the construct. One of the foremost definitions is given by Crust (2007), defining MT as "multidimensional and most often associated with unshakeable self-belief, the ability to rebound after failures (resilience), persistence or refusal to quit, coping effectively with adversity and pressure, and retaining concentration in the face of many potential distractions". The effect of MT on performance was clearly demonstrated in a study conducted by Clough et al. (2002). In this study, they investigated participants ability to "bounce back" following negative feedback. Overall, participants with high MT performed better on the task, and remained consistent regardless of feedback, whereas those with lower levels of MT performed significantly worse following negative feedback.

Taking into account previous research (e.g., Kaiseler, Polman, & Nicholls, 2009) and the findings of Study 1, we hypothesized for Study 2 that level of EI, the use of more problem-focused coping, more emotion-focused coping, and less avoidance coping, and level of MT all mediate an individual's ability to perform physically while under adversity. Secondarily, we hypothesize that individuals with more athletic experience will show higher levels of the psychological constructs that we believe will predict performance.

Study Two

Methods

A mixed-methods design was used to examine the psychological constructs of EI, coping, and MT on performance. Previously validated leading measures of each construct were selected after a thorough literature review.

Participants. Fifty-seven Vanderbilt University undergraduates participated (9 male, 48 female). All participants signed up using the university research tool, SONA, and received course credit for their participation. Participants age ranged from 18-22 (m=19.23 years, SD=.93). 86% of participants previously participated in organized sports while the remaining 14% did not. The breakdown of experience level among those who had previously participated in organized sports was the following: high school varsity or below (42.2%), club travel sports (15.8%), collegiate intramurals (3.5%), collegiate club sports (12.3%), and collegiate NCAA sports (12.3%).

Measures. Each of the following measures, with the exception of the Appraisal of Task Difficulty Questionnaire and the BALLS Vigilance Performance Task, were collected and managed by the Research Electronic Data Capture, also known as REDCap, which is a secure web based application designed for research (Harris et al., 2009).

Demographics and Assessment of Sporting Experience. An assessment of participant demographics and previous sporting experience was included in the main study questionnaire participants completed. This was to understand previous sporting experience of each participant and the level at which they played. The questions asked regarding sporting experience can be found in Appendix A.

Trait Meta-Mood Scale (TMMS). The TMMS is a 48-item self-report measure designed to assess relatively stable individual differences in three distinct facets of emotional intelligence: their attention to their mood states (Attention), the clarity of their own perceptions of their moods (Clarity), and their ability to regulate and repair their negative mood states (Repair) (Salovey, Mayer, Goldman, Turvey, & Palfai, 1995). All items are assessed on a 5-point Likert scale (1=strongly disagree, 5=strongly agree).

The *attention to mood* subscale catalogs how important an individual feels attention to mood is as well as the amount of attention they feel they allot to experienced emotions. An example item from the TMMS that evaluates this construct (in this case indicating low levels of attention) is: "People would be better off if they felt less and thought more". Attention to feelings was associated with private and public self-consciousness; to some extent, attention to one's own feelings indicates attention to other aspects of their conscious experience (Salovey et al., 1995). In the present sample, the TMMS-Attention measure had a Cronbach's alpha reliability of 0.82.

The second subscale, *clarity* in the discrimination of feelings measures how clear and distinct individuals feel they experience their emotions. An example item from the TMMS that evaluates this construct (in this case indicating low levels of clarity) is: "Sometimes I can't tell what my feelings are". It has been indicated in the literature that those with greater clarity in the discrimination of their feelings experience less ambivalence over the amount and quality of emotional expression they share with others as well as less depression (Salovey et al., 1995). In the present sample, the TMMS-Clarity measure had a Cronbach's alpha reliability of 0.87.

Lastly, *mood repair* details how an individual deals with repairing negative mood states and maintaining a generally positive outlook. An example item from the TMMS that evaluates this construct (in this case indicating high levels of mood repair) is: "I try to think good thoughts no matter how badly I feel". The literature indicates that mood repair is positively associated with optimism and beliefs about negative mood regulation and negatively associated with depression (Salovey et al., 1995). In the present sample, the TMMS-Repair measure had a Cronbach's alpha reliability of 0.85.

COPE Inventory (COPE). The COPE Inventory was designed by Carver, Scheier, and Weintraub (1989) and assesses people's coping efforts in response to stress in terms of a number

of different coping strategies. The version of the inventory used in the present study was modified from the version presented by Carver et al. (1989), and was designed to assess 14 different coping strategies using 67 items. Participants responded to each item on a 4-point Likert scale (1=I usually don't do this at all, 2=I usually do this a little bit, 3=I usually do this a medium amount, 4=I usually do this a lot).

The individual coping strategies assessed by the COPE have been described as each corresponding to one of three distinct functions reviewed above: Active Problem-Focused Coping, Emotion-Focused Coping, and Disengagement Coping (e.g., Smith & Kirby, 2011). In the present study, three subscales from each distinct function of coping were retained. The ones included, and their Cronbach's alpha reliablities in the present sample are as follows: Problem-focused Coping—planful problem solving ($\alpha=0.80$), use of social support ($\alpha=0.91$), use of prayer ($\alpha=0.97$); Emotion-Focused Coping—acceptance ($\alpha=0.51$), positive reinterpretation ($\alpha=0.75$), self-encouragement ($\alpha=0.75$); Disengagement (Avoidant) Coping—behavioral disengagement ($\alpha=0.57$), alcohol/drug use ($\alpha=0.85$), and denial ($\alpha=0.82$).

Mental Toughness Questionnaire 48 (MTQ48). Designed by Clough, et al. (2002), the MTQ48 is a 48-item questionnaire to assess total mental toughness and is comprised of four main components: challenge, commitment, confidence, and control. These components can be combined into a single scale reflecting overall mental toughness, and this overall score was used in the present study. Examples of statements from the MTQ48 are, "challenges usually bring out the best in me" and "I don't usually give up under pressure". Items are rated on a 5-point Likert scale (1= strongly disagree, 5= strongly agree). The MTQ48 had an overall Cronbach's alpha reliability of $\alpha=0.90$ in the present sample. Additionally, the psychometric properties have been shown to be adequate by Horsburgh et al. (2009).

Appraisal of Task Difficulty Questionnaire. After the completion of the reaction time test,

participants were asked to rate their appraisal of task difficulty. The task involved an initial phase

that served as a baseline and a second, more experimental phase under which participants

performed under experimentally manipulated conditions to different crowd sounds. A more

complete description of the exact procedure is below. Task difficulty for each phase was

assessed on a 7-point Likert scale. After both the baseline measure and the experimental

measure, participants were asked the following: "How difficult did you find this round of the

attention task to be?" and "Compared to other participants, how well do you think you performed

on this round of the attention task?" After performing the reaction time task in the experimental

condition, participants were asked the previous questions as well as, "If at all, did the crowd

sounds affect your performance on this round of the attention task?" These questions were

included to evaluate participants appraisal of their performance on the task both independently

and how they compared themselves to others against the actual results.

BALLS Vigilance Performance Task. This task required participants to respond as quickly as

possible whenever a small red ball appeared at random on a computer screen. The task included

4 frames of 25 trials each. Each trial was randomized regarding the location of the dot on the

screen, which appeared in one of 25 locations, and the wait time after the previous trial, which

ranged from 100-2000 milliseconds. Participants were presented with the first two frames in the

baseline condition and the third and fourth frames in the experimental condition. Mean RT's

were computed by averaging across the 25 trials. Data was collected on participant reaction time

(measured in milliseconds), error rate (anytime they indicated they saw the ball before it had

appeared), and outlier rate (the number of trials in which the RT was excessively long, defined as

RTs greater than 1500ms; for such trials an RT of 1500ms was used in the computation of the

mean).

Procedure. Participants were brought into the lab and provided with a consent form. Once

consent was obtained, participants were sat down at the lab computer and told the premise of the

study was to test how people perform under various conditions on basic tasks. The were told the

first task would be performed on their own and the second in front of an imagined audience by

listening to a soundtrack played out loud through speakers. Participants then began the baseline

BALLS Vigilance Performance Task, which was done in silence. After this, they answered the

Appraisal of Task Difficulty Questionnaire about the first trials. Following this, participants then

began the experimental condition. In this condition, they listened to a soundtrack while

performing the experimental BALLS Vigilance Performance Task with either people chattering

(a neutral control condition), cheering, or booing, as a perceived audience, based upon their

random assignment to an experimental condition (cheering, n=19; neutral, n=18; booing, n=20).

After this was completed, participants completed another questionnaire that assessed perceived

task difficulty during the experimental BALLS Vigilance Performance Task. Once completed,

participants were moved to another computer in the lab that offered more modern access to the

Internet survey developed. This survey included an assessment of participant demographics and

sporting experience and the psychological construct measures (TMMS, COPE, and MTQ48).

When participants finished responding, they were debriefed, thanked for their time, and allowed

to leave.

Results

Preliminary Analyses. Before conducting the main analyses to evaluate the influences of EI,

coping style, and MT on performance variables and task appraisal, preliminary analyses were

conducted to examine the effectiveness of the experimental manipulation of sound feedback. It was expected to find that all three experimental conditions would perform similarly during the first two trials of Time 1 and Time 2 (baseline period), and a divergence in performance would be found in Time 3 and Time 4 (experimental period) according to experimental condition. That is, participants exposed to cheering would improve their performance relative to the other groups while participants exposed to booing would show lower performance relative to the other groups.

Table 1 presents the descriptive statistics from the data, broken down by the performance variables (reaction time, errors, outliers) and task appraisal (rated difficulty, rated performance, effect of crowd) across the four different time points. Time 1 and 2 represent baseline measures and time 3 and 4 represent experimental measures. Reaction time (RT) revealed a significant effect of time, $F(3, 52)=13.48$, $p<.001$, such that RT decreased over time (mean change of 34.67ms between the baseline and experimental measures), no effect of condition, $F(2)=.33$, $p=ns$, and no time by condition interaction, $F(6, 106)=1.01$, $p=ns$. Errors showed no effect of time, $F(3, 52)=1.86$, $p=ns$, condition, $F(2)=.29$, $p=ns$, or time by condition interaction, $F(3, 51)=1.27$, $p=ns$, indicating the amount of errors made by participants was consistent throughout. Outliers revealed a significant effect of time, $F(3, 51)=3.79$, $p<.05$, but not condition, $F(2)=1.72$, $p=ns$, or time by condition interaction, $F(3, 51)=.96$, $p=ns$, such that the number of outliers found decreased over time. Task appraisal was also evaluated using an ANOVA, revealing a significant difference between pre- and post- ratings of perceived difficulty, indicating an effect of time, $F(1, 54)=31.90$, $p<.001$, but no variation by condition, $F(2)=2.37$, $p=ns$, or time by condition interaction, $F(2, 54)=.87$, $p=ns$. The average pre- perceived difficulty rating was 2.0, whereas the average post- perceived difficulty rating was 3.07, thus indicating a significant average 1.07-point increase between pre- to post- ratings. Perceived performance ratings did not vary based on

either time, $F(1, 54)=.03$, $p=ns$, condition, $F(2)=.48$, $p=ns$, or time by condition, $F(2, 54)=.74$,

$p=ns$. Lastly, perceived impact of sound did not vary across condition, $F(2)=1.25$, $p=ns$, but

participants did perceive the sound manipulation to have impacted their performance ($m=4.42$,

$SD=1.24$). In short, some effect of time was found, which mainly appears to be practice effects,

yet this improvement was not reflected in the perceived difficulty reported by participants. This

interaction is shown in Figure 1. Additionally, experimental condition did not affect performance

differentially, as indicated by the absence of condition main effects, or condition by time

interactions.

Primary Analyses. The primary analyses examined the effects of psychological constructs (EI,

COPE, and MT) as well as athletic experience on participant's performance and appraisals of the

task. First, collapsing across the three conditions, the psychological constructs were correlated

with the performance and appraisal variables combined across the task time-periods. The

psychological constructs were correlated with the difference between the baseline versus

experimental measures in order to test whether they were related to how participants responded

to the introduction of sound overall. In addition, these variables were correlated with the

performance and appraisal variables averaged across all four time periods to see if the

psychological constructs were related to overall performance. Finally, hierarchical regressions

were used to test whether there were any cases in which the sound manipulation interacted with

the psychological constructs in predicting responses to the experimental condition. This was

accomplished by using a two-step regression procedure in which two dummy coded variables for

the experimental condition and the psychological constructs were used in the first step to predict

the performance difference score, and then in the second step interaction was evaluated by

entering the cross products of the condition terms with the psychological constructs into the regression equation.

In examining the relations between the psychological constructs and changes in performance from the baseline condition to the experimental condition, very few statistically reliable correlations were observed. In particular, no significant correlations were found between the psychological constructs and changes in reaction time, error rate, perceived performance, or perceived impact of the sound on performance. However, changes in the number of outlier observations from the baseline to experimental condition were correlated with COPE use of prayer (-.30), COPE self-encouragement (.30), and MT (.30), with higher outlier change scores indicating that fewer outliers were observed in the experimental period than in the initial baseline period. Thus, habitual use of self-encouragement and overall mental toughness were associated with improvement on the task over time, as indicated by a decrease in outliers, where as habitual use of prayer as a coping style was associated with a lack of improvement across the task. Change in difficulty score was also significantly correlated with COPE self-encouragement (.40), with self-encouragement associated with greater reductions in perceived difficulty from the baseline to experimental periods. This is represented in Table 2.

Overall performance across the four measurement periods were found to be correlated with the following variables: error mean was correlated with COPE use of social support (.27) and COPE self-encouragement (.28), indicating that those who use social support and self-encouragement when stressed tended to make more errors. Outlier mean was correlated with MT (.27), indicating that those with higher MT scores had more outliers. Considering these findings with the above ones suggests that both the use of self-encouragement and being mentally tough were initially associated with relatively poor performance on the task, but were also associated

with relatively high levels of improvement as the experiment progressed. Difficulty mean was correlated with COPE use of social support, indicating that those who are more likely to use social support when stressed saw the task as more difficult. These results are represented in Table 3.

Sporting experience was also correlated with two performance measures, error change and difficulty change. Highest level of participation was positively correlated with error change (.31) and difficulty change (.34). That is, participants who had achieved higher levels of participation in sports had the greatest margin of improvement in regards to errors and were more likely to minimize the difficulty of the task as the task went on.

Of the regressions testing for whether the sound manipulation moderated any relations between the personality and athletic experience variables and changes in performance in response to the manipulation, only one statistically reliable interaction was observed. Specifically, COPE use of social support interacted with condition in predicting changes in how well participants thought they did on the task. The form of this interaction was examined by solving the resulting regression equation for representative values of the dummy coded experimental effects (to represent all three sound conditions) and of the social support variables (with the mean for this variable [2.97] representing "medium" values, and one standard deviation [+/- .86] above and below the mean representing high and low values, respectively). The resulting depiction of the interaction is presented in Figure 2. In particular, as participants use of social support in coping increased, those who heard cheering rated the task as getting harder, whereas those who heard booing or chatter (neutral) sounds rated the task as getting easier.

Given the scarcity of significant results among the psychological constructs and experimental conditions, these results, and especially the interaction just described, need to be

interpreted with a great deal of caution. This is because of the risk in making type 1 errors as a result of the large number of correlations and interactions examined.

Discussion

The hypothesis tested in this study was that high levels of EI, using more problem-focused coping and less avoidance coping, and MT all mediate an individuals ability to perform physically while under adversity. The secondary hypothesis was that higher levels of the psychological constructs believed to predict performance would be found in individuals with more athletic experience. Accordingly, the results showed significant differences between individuals in a very low number of the psychological constructs assessed, The results appear to suggest that generally, the psychological constructs of EI, coping, and MT do not predict performance in the context studied, save a small handful of sporadic correlations. Therefore, this study failed to support the hypotheses it was designed to examine.

The few that did show to be predictive of performance point towards some light conclusions that can be made. One of these is the notion that those who cope using prayer were less likely to improve as time passed, and those who cope using self-encouragement and have higher levels of MT were more likely to improve. This indicates a decrease in performance among participants using a particular form of problem-focused coping (prayer) and an increase in performance among participants who used a particular form of emotion-focused coping (self-encouragement), and also a performance increase in those who had more MT than their counterparts. Yet, it should be mentioned that this finding was observed for only one of the three main performance measures. Given that these results do not extend to the other forms of coping in these categories, the relations observed seem to affirm that only some forms of coping were associated with performance in this experimental context. Furthermore, the improvement in

performance among those engaging in some form of emotion-focused coping and those with

higher levels of MT is supported by current literature which states that having high levels of MT

improves the ability of one to advance their performance on a given task (e.g. Crust, 2007;

Nicholls, Pollman, Levy, & Backhouse, 2008; Thomas, Schlinker, & Over, 1996). Lastly, results

indicated no correlation of EI with performance measures, a finding that also runs counter to

with much of the current literature on the matter (e.g. Crombie, Lombard, & Noakes, 2009;

Perlini & Halverson, 2006; Thelwell, Lane, Westion, & Greenless, 2008). Worthy of note is the

possibility that these findings are due to a type 1 error, so they should be taken lightly.

In addition to the aforementioned correlations of central interest, additional correlations

of interest were found in regards to the measured psychological constructs and perceived

difficulty. That is, those who engage in more emotion-focused coping (self-encouragement)

perceived the addition of a stressor (crowd sound) as least debilitating to their performance. It is

possible that using emotion-focused coping diminishes the stressful effect and allows individuals

to maintain their performance level despite it. This follows much of the premise of emotion-

focused coping, being that it is aimed at regulating emotions tied to the stress without changing

the realities of the situation. In this, one may try to reappraise the importance of the task as a

coping method, in ways such as viewing the task as not difficult (Cerin, Hunt, Szabo, &

Williams).

Sporting experience did not predict any of the psychological constructs evaluated, thus

not supporting our secondary hypothesis. However, sporting experience did impact elements of

performance (error rate) and perception of difficulty on the task. That is, based upon the highest

level of sporting participation achieved, participants error rate and perceived difficulty rating

were affected. Participants who had achieved higher levels of sporting participation made fewer

errors; they also minimized the difficulty of the task more than those who participated at only

lower levels. This alludes to the idea that prolonged participation in sports builds the ability to

improve at a faster rate than one otherwise would and also the ability to find tasks easier.

Lastly, a soft conclusion can be drawn from the interaction of the COPE use of social

support on perceived performance based on condition. Participants who use social support in

coping thought the task got harder if they heard cheering, but if they heard booing or chatter

(neutral) sounds, they rated the task as getting easier. In making sense of this finding, it could be

that individuals who were cheered on felt a higher expectation for their performance because of

the perceived social support that came from hearing the crowd cheering, thus making them feel

as if the task was harder. However, those who felt the crowd was not encouraging them (chatter)

or against them (booing) may not have felt the same performance expectation as their

counterparts. In fact, they may have even felt the pressure lifted, therefore leading to them rating

the task not as difficult as their counterparts. Yet again, these results must be taken with caution

due to the threat of a type 1 error.

In all, these findings leave many questions unanswered. This is due, in part, to the

conflicting conclusions drawn by previous studies that give the psychological constructs of EI,

coping, and MT importance to elements of performance. However, inconsistent findings in this

regard are not entirely unheard of, as Beedie, Terry, and Lane (2000) mention that research

findings on the link between emotions and sports performance are conflicting.

Limitations

Given the lack of strength in the experimental findings, there are certainly some

limitations that may suggest an explanation for this. The first of these is the experimental

manipulation of condition, which showed no significant differences in all but one aspect. It is

suggested that future research create a stronger experimental manipulation that induces a sense of pressure, so that participants are required to draw more strongly on the psychological constructs studied while performing. Additionally, it is likely that the measure of physical performance was inadequate given its specificity and one-dimensionality. That is, a straightforward reaction time test may not require enough of participants to adequately assess performance in a big-picture context. Future research conducted in this realm should ensure that measures involve multiple, directly quantifiable measures of performance. In competitive settings, success often requires a multi-component performance, which the present study did not require in the evaluation of performance.

Conclusion

As previous literature indicates, the psychological constructs of EI, coping style, and MT are important to performance, yet slim findings contrary to the hypothesized effect indicate only a marginal level of importance of EI, coping style, and MT in the present performance setting. Given the aforementioned limitations, a similar study done with stronger manipulations has the potential to yield results more congruent with current literature on the psychological constructs and their effect on performance.

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Tables

Table 1 Descriptive Data

	Time 1	Time 2	Time 3	Time 4	Overall Mean	Overall Change
Reaction Time	406.44	375.29	356.25	356.08	373.5	34.67
Errors	0.37	0.44	0.3	0.23	0.33	0.14
Outliers	0.48	0.18	0.14	0.14	0.24	0.19
Perceived Difficulty	-	2	-	3.07	2.54	-1.07
Perceived Performance	-	5.42	-	5.65	5.54	0.04
Effect of Crowd	-	-	-	4.42	4.42	-

Table 2 Psychological Constructs and Changes in Performance

	Outlier Change	Difficulty Change
COPE self-encouragement	.30	.40*
COPE religion	-.30	-
MT full	.30	-

p<0.05, *p<0.01

Table 3 Psychological Constructs and Overall Performance

	Error Mean	Outlier Mean	Difficulty Mean
COPE social support	.27	-	.32
COPE self encouragement	.28	-	-
MT full	-	.27	-

p<0.05

Figures

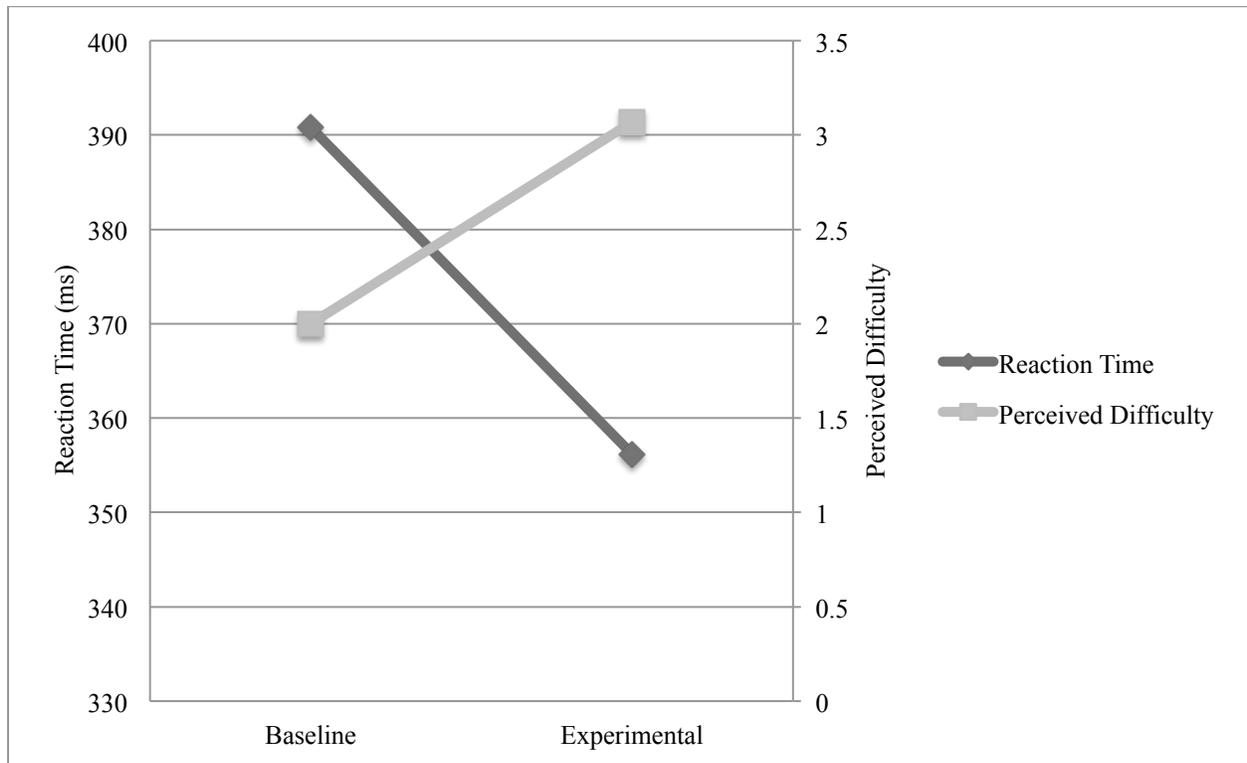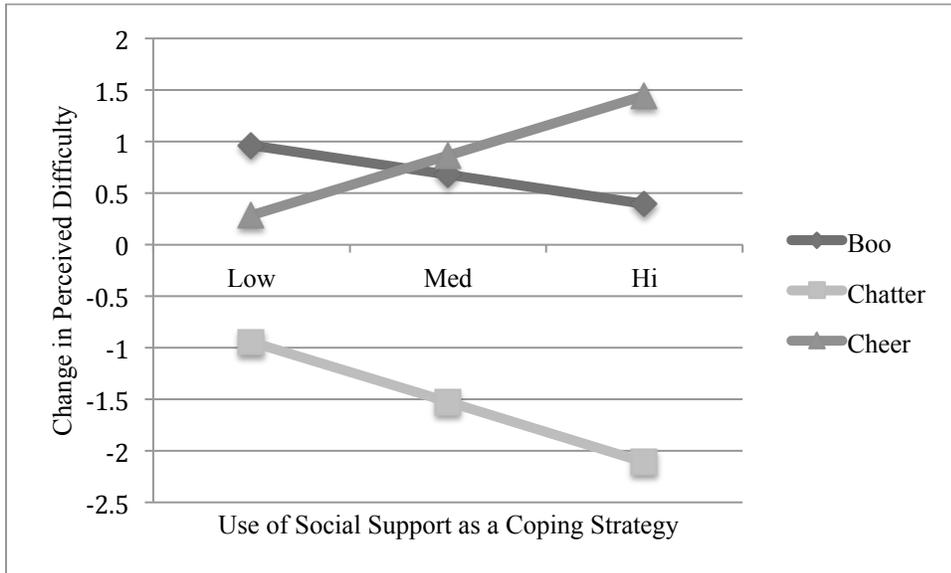**Figure 1** Reaction Time and Perceived Difficulty

Figure 2 Social Support by Condition on Change in Perceived Difficulty

Appendices

Appendix A

Questions Used for Qualitative Interview in Study One

Individual game preparation

1. Do you listen to music and if yes, what kind?

2. What is your most common emotion before a game?

3. How often before a game do your emotions fluctuate?

4. 15 minutes before warm-ups are you usually standing or sitting? If you stand, do you walk around or stand still?

5. 15 minutes before warm-ups, what are you usually thinking about? If you think about things other than the game, what else?

6. Do you normally tap your foot or shake your leg?

7. Do you have any pregame rituals? If yes, what happens when you forget to do them?

8. How many hours before a game do you begin mentally preparing

Team interaction game preparation

1. Are you often talking with others 15 minutes before warm-ups? If yes, what do you talk about?

2. Are you often talking with others 15 minutes before kick-off? If yes, what do you talk about?

3. What do you think pregame huddles should consist of?

4. How do pregame speeches affect your performance?

5. When coach talks to you one-on-one during warm-ups, how are you affected?

6. What do you think the coach should say or do during their pregame speech?

7. How much does a pregame speech affect you versus if you had not heard it?

Individual during the game

1. Just before kickoff, what are you thinking about?

2. Just before kickoff, what do you look at?

3. When you make a mistake, (ex. lose the ball, miss a shot), what is the first thing you think of?

4. When the game is on the line, do you want the ball?

5. When someone on the other team trash talks to you, what is your first thought? Reaction?

6. What do you do, if anything, to get inside your opponents head?

7. How often do you look at the fans during the game?

8. How do big crowds make you feel?

9. How does the crowd affect your play, if at all?

Team interaction during the game

1. You make a mistake. What is the best thing coach could say to you?

2. You make a mistake. What is the best thing your teammate(s) could say to you?

3. You hear your teammates cheering you on after making a great play. How does this make you feel or affect you?

4. You make what you believe to be a big play and it goes unacknowledged by your coaches and teammates. How does this make you feel or affect you?

5. How often are your mistakes in a game your fault?

6. When you want the ball and don't get it, how do you feel?

Individual post-game

1. How do you evaluate your performance after a game?

2. Your team loses but you played well, how responsible for the loss do you feel?

3. Your team loses and you played poorly, how responsible for the loss do you feel?

4. Your team wins and you played well, how responsible for the win do you feel?

5. Your team wins and you played poorly, how responsible for the win do you feel?

6. How long does it take you to "forget the game" when you win? What about when you lose?

7. Your team loses and the locker room is lively and upbeat after the game. What do you think of this?

8. Your team loses and the locker room is quiet and somber after the game. What do you think of this?

9. Your team wins and the locker room is lively and upbeat after the game. What do you think of this?

10. Your team wins and the locker room is quiet and somber after the game. What do you think of this?

11. After beating a team you should have beat, how satisfied does this result make you?

12. After beating a team you should not have beat, how satisfied does this result make you?

13. After losing to a team you should not have beat, how satisfied does this result make you?

14. After losing to a team you should have beat, how satisfied does this result make you?

Team interaction post-game

1. Would you approach a teammate after the game that played well? How would you do this and what would you say?

2. Would you approach a teammate after the game that played poorly? How would you do this and what would you say?

3. Would you approach a teammate after the game that didn't play? How would you do this and what would you say?

4. Your team wins. What is the best way for coach to address the team?

5. Your team loses. What is the best way for coach to address the team?

6. How long do you think postgame speeches from a coach should last?

7. You play the entire game. How responsible are you for this?

8. You don't play at all. How responsible are you for this?

Individual practice

1. Do you think that practices help you prepare for games?

2. When practice gets cancelled, how does this make you feel?

3. Do you feel like being focused while warming up is important to your performance during practice?

4. Do you think mental preparation is necessary for you to get the most out of practice?

5. Do you ever become disinterested during practice?

6. Is going to practice ever a burden? If so, when do you find going to practice a burden?

7. How often would you say you are "100% there" during practice?

Team interaction practice

1. How willing are you to ask a practice during practice to your coach?

2. You see a teammate not touching the lines while doing a drill. If at all, how would you address this?

3. You make a play and right after, someone else does the same thing and gets complimented for it. How does this make you feel?

4. Everything at practice is a competition. Do you like this?

5. You're put 1v1 with your best friend on the team. How does this affect your mentality?

6. You're put 1v1 with your least favorite person on the team. How does this affect your mentality?

7. Coach corrects you during practice and you agree with his criticism. How does this make you feel?

8. Coach corrects you during practice and you disagree with his criticism. How does this make you feel?

9. How comfortable are you approaching your coach after practice to talk about your performance?

Home vs. away games

1. How would you say your mentality differs between playing at home and playing in an away game?

2. Do you ever consider the mental state of the other team?

Appendix B

Demographics and Assessment of Sporting Experience

1. Have you ever participated in organized sports?

   (If the response is 'yes', participants are asked the following questions as well)

2. What is the highest level of organized sports you have participated in?

   a. Youth recreational sports

   b. High school junior varsity

   c. High school varsity

   d. Club "travel" sports

   e. Collegiate intramurals

   f. Collegiate club sports

   g. Collegiate NCAA sports

   h. Professional sports

3. Please list all organized sports you have completed in and the amount of years you have participated in it.

4. Which of the above sports, if any, are you currently competing in?

5. At what age did you begin competing in organized sports?