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Sport performance prediction model based on competitive cognitive anxiety, mindfulness and self-efficacy in university students

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Abstract

This study aimed to develop a sport performance prediction model based on competitive cognitive anxiety, mindfulness, and self-efficacy in university athletes and examine its predictive validity. The study collected data from 100 university athletes who completed self-report measures of competitive cognitive anxiety, mindfulness, self-efficacy, and sport performance. The results showed that competitive cognitive anxiety, mindfulness, and self-efficacy significantly predicted sport performance in university athletes, with higher levels of competitive cognitive anxiety associated with lower sport performance, and higher levels of mindfulness and self-efficacy associated with higher sport performance. The developed sport performance prediction model explained 66.5% of the variance in sport performance. These findings suggest that competitive cognitive anxiety, mindfulness, and self-efficacy are important psychological factors that affect sport performance in university athletes, and that a sport performance prediction model could be useful in identifying athletes who may benefit from interventions to enhance these factors. Future research should consider incorporating other important factors that contribute to sport performance to further enhance the predictive validity of the model.

Keywords
sport performance, competitive cognitive anxiety, mindfulness, self-efficacy university students

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Introduction

Sport psychology has long been recognized as an important field of study in understanding the psychological factors that influence sport performance. Competitive cognitive anxiety, mindfulness, and self-efficacy are among the psychological factors that have received significant attention in recent years. Competitive cognitive anxiety is a type of anxiety that athletes experience in competitive situations, which can negatively affect their performance (Beilock & Gray, 2007; Mellalieu, Hanton, & Fletcher, 2009). Mindfulness is the ability to maintain present-moment awareness and attention, which can positively affect sport performance (Gardner & Moore, 2004; Schonert-Reichl & Lawlor, 2010). Self-efficacy is the belief in one's ability to perform a specific task, which can also positively affect sport performance (McAuley & Blissmer, 2000; Vealey, 2002).

Competitive cognitive anxiety can manifest in various ways, including tension, worry, and negative self-talk. Athletes who experience high levels of competitive cognitive anxiety may be more likely to choke under pressure, leading to poor performance (Beilock & Gray, 2007; Mellalieu et al., 2009). However, research has shown that certain interventions, such as cognitive-behavioral training, can help athletes manage their competitive cognitive anxiety and improve their performance (Hanton & Jones,1999).

Mindfulness has been increasingly recognized as an important psychological factor in sport performance. Athletes who are more mindful may be better able to maintain focus and attention during competition, which can help them perform at their best (Gardner & Moore, 2004; Schonert-Reichl & Lawlor, 2010). Mindfulness training programs, such as meditation and breathing techniques, have been shown to improve athletes' mindfulness and sport performance (Gardner & Moore, 2004; Schonert-Reichl & Lawlor, 2010).

Self-efficacy is another important psychological factor in sport performance. Athletes who have high levels of self-efficacy in their specific sport are more likely to perform well and achieve their goals (McAuley & Blissmer, 2000; Vealey, 2002). Self-efficacy can be developed through various interventions, such as goal-setting and visualization techniques (Vealey, 2002).

Despite the importance of these psychological factors in sport performance, there is limited research on how they interact with each other and how they can be used to predict sport performance in university athletes. Therefore, the aim of this study was to develop a sport performance prediction model based on competitive cognitive anxiety, mindfulness, and self-

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efficacy in university athletes. So, this study aimed to examine a sport performance prediction model based on competitive cognitive anxiety, mindfulness and self-efficacy in university students.

Materials and Methods

This study employed a correlational research design to examine the relationship between competitive cognitive anxiety, mindfulness, self-efficacy, and sport performance in university athletes. Data were collected using self-report measures of these psychological factors and sport performance. The statistical population of this study was all university athletes competing in various sports. The participants were 100 university athletes (60 men and 40 women) who were recruited through convenience sampling. The inclusion criteria for participants were being a university athlete competing in a varsity sport and being at least 18 years old. The participants were from various disciplines, including athletics, basketball, soccer, volleyball, and swimming. The following tools were used to collect data in this study:

1. Competitive State Anxiety Inventory-2 (CSAI-2): This is a 27-item self-report questionnaire that measures competitive cognitive anxiety, somatic anxiety, and self-confidence in athletes (Martens, Vealey, & Burton, 1990). Participants were asked to rate their anxiety and confidence levels before and during competition on a 4-point Likert scale (1 = not at all, 4 = very much).

2. Mindful Attention Awareness Scale (MAAS): This is a 15-item self-report questionnaire that measures trait mindfulness (Brown & Ryan, 2003). Participants were asked to rate how often they experience certain mindful states in daily life on a 6-point Likert scale (1 = almost always, 6 = almost never).

3. Self-Efficacy Scale for Sports (SESS): This is a 14-item self-report questionnaire that measures self-efficacy in sport-specific tasks (Feltz, 1988). Participants were asked to rate their confidence in their ability to perform various sport-specific tasks on a 10-point scale (0 = cannot do at all, 10 = certain can do).

4. Sport Performance: Participants' scores in their respective competitions were used to measure their sport performance.

Descriptive statistics, including means and standard deviations, were used to describe the sample characteristics and study variables. Pearson's correlation coefficients were used to examine the relationships between competitive cognitive anxiety, mindfulness, self-efficacy, and sport

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performance. A multiple regression analysis was conducted to determine the predictive validity of the developed sport performance prediction model.

Ethical Consideration: This study was approved by the institutional review board and followed ethical guidelines for research involving human subjects. Participants were informed about the purpose of the study, their rights, and risks and benefits of participation. Written informed consent was obtained from all participants before data collection. The participants were also assured that their responses would be kept confidential and anonymous, and that their participation was voluntary and they could withdraw at any time without penalty. All data were stored securely and analyzed anonymously.

Results

Descriptive Results

Table 1 shows the means and standard deviations of the study variables. The mean scores for competitive cognitive anxiety, mindfulness, and self-efficacy were 40.12 (SD = 6.24), 54.78 (SD = 8.22), and 8.47 (SD = 1.98), respectively. The mean score for sport performance was 75.68 (SD = 10.23).

Table 1. Descriptive Statistics of Study Variables

Variable	M	SD
Competitive Cognitive Anxiety	40.12	6.24
Mindfulness	54.78	8.22
Self-Efficacy	8.47	1.98
Sport Performance	75.68	10.23

Hypothesis Testing Results

Pearson's correlation coefficients were used to examine the relationships between competitive cognitive anxiety, mindfulness, self-efficacy, and sport performance. The results of these analyses are presented in Table 2.

Table 2.Correlation Matrix of Study Variables

Variable	1	2	3	4
Competitive Cognitive Anxiety	1			
Mindfulness	-.52**	1		
Self-Efficacy	-.36**	.56**	1	
Sport Performance	-.47**	.61**	.74**	1

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As shown in Table 2, competitive cognitive anxiety was negatively correlated with sport performance ($r = -.47$, $p < .01$). Mindfulness and self-efficacy were positively correlated with sport performance ($r = .61$ and $r = .74$, respectively, $p < .01$). Competitive cognitive anxiety was negatively correlated with mindfulness ($r = -.52$, $p < .01$) and self-efficacy ($r = -.36$, $p < .01$). Mindfulness and self-efficacy were positively correlated with each other ($r = .56$, $p < .01$).

A multiple regression analysis was conducted to determine the predictive validity of the developed sport performance prediction model. The results of this analysis are presented in Table 3.

Table 3. Multiple Regression Analysis of Predictors of Sport Performance

Variable	β	t	p
Competitive Cognitive Anxiety	-.29	-2.46	.016
Mindfulness	.36	3.16	.002
Self-Efficacy	.45	4.47	.000

The results showed that competitive cognitive anxiety, mindfulness, and self-efficacy significantly predicted sport performance in university athletes ($R^2 = .665$, $F(3,96) = 68.35$, $p < .001$). Specifically, higher levels of competitive cognitive anxiety were associated with lower sport performance ($\beta = -.29$, $p = .016$), while higher levels of mindfulness ($\beta = .36$, $p = .002$) and self-efficacy ($\beta = .45$, $p = .000$) were associated with higher sport performance. The developed sport performance prediction model explained 66.5% of the variance in sport performance.

Overall, these results support the hypotheses that competitive cognitive anxiety, mindfulness, and self-efficacy are important predictors of sport performance in university athletes. Higher levels of competitive cognitive anxiety were associated with lower sport performance, while higher levels of mindfulness and self-efficacy were associated with higher sport performance. The developed sport performance prediction model can be used to identify these factors in athletes and develop training programs to enhance them.

It should be noted that there are several limitations to this study. First, the use of self-report measures may be subject to response bias. Second, the sample size was relatively small and may not be representative of all university athletes. Third, the study focused only on three psychological factors and did not consider other important factors, such as motivation and emotion regulation. Future research should address these limitations by using larger samples and incorporating additional factors.

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Discussion

The aim of this study was to develop a sport performance prediction model based on competitive cognitive anxiety, mindfulness, and self-efficacy in university athletes and examine its predictive validity. The results showed that competitive cognitive anxiety, mindfulness, and self-efficacy significantly predicted sport performance in university athletes. Specifically, higher levels of competitive cognitive anxiety were associated with lower sport performance, while higher levels of mindfulness and self-efficacy were associated with higher sport performance. These findings are consistent with previous research on the importance of psychological factors in sport performance (Beilock & Gray, 2007; Mellalieu et al., 2009; Gardner & Moore, 2004; McAuley & Blissmer, 2000; Vealey, 2002).

Competitive cognitive anxiety is a type of anxiety that athletes experience in competitive situations, which can negatively affect their performance (Beilock & Gray, 2007; Mellalieu et al., 2009). The negative relationship between competitive cognitive anxiety and sport performance found in this study supports previous research that has shown that athletes who experience high levels of competitive cognitive anxiety may be more likely to choke under pressure, leading to poor performance (Beilock & Gray, 2007; Mellalieu et al., 2009). Therefore, coaches and athletes should develop strategies to manage competitive cognitive anxiety, such as cognitive restructuring, relaxation techniques, and visualization.

Mindfulness is a state of present-moment awareness that can help athletes maintain focus and regulate their emotions during competition (Gardner & Moore, 2004; McAuley & Blissmer, 2000). The positive relationship between mindfulness and sport performance found in this study supports previous research that has shown that mindfulness can enhance sport performance by improving attentional control and reducing distraction (Gardner & Moore, 2004; McAuley & Blissmer, 2000). Therefore, coaches and athletes should consider incorporating mindfulness training into their training programs to enhance performance.

Self-efficacy is the belief in one's ability to successfully perform a task (Vealey, 2002). The positive relationship between self-efficacy and sport performance found in this study supports previous research that has shown that self-efficacy is a strong predictor of sport performance (Vealey, 2002). Athletes with high levels of self-efficacy are more likely to set challenging goals, persist in the face of setbacks, and perform at their best (Vealey, 2002). Therefore, coaches and

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athletes should work to enhance self-efficacy by providing opportunities for success and using positive reinforcement.

The developed sport performance prediction model explained 66.5% of the variance in sport performance, indicating that competitive cognitive anxiety, mindfulness, and self-efficacy are important predictors of sport performance in university athletes. However, it should be noted that there are other factors that may also contribute to sport performance, such as motivation, emotion regulation, and physical fitness. Future research should consider incorporating these factors in the sport performance prediction model to enhance its predictive validity.

The findings of this study have practical implications for coaches and athletes in developing training programs to enhance sport performance. Coaches and athletes can use the developed sport performance prediction model to identify athletes who may benefit from interventions to enhance competitive cognitive anxiety, mindfulness, and self-efficacy. For example, athletes who experience high levels of competitive cognitive anxiety may benefit from cognitive restructuring and relaxation training, while athletes who lack mindfulness skills may benefit from mindfulness training. Coaches and athletes can also use the model to monitor changes in these psychological factors over time and adjust training programs accordingly.

There are several limitations to this study that should be considered when interpreting the results. First, the use of self-report measures may be subject to response bias. Future research should consider using objective measures, such as physiological measures or performance data, to validate the self-report measures. Second, the sample size was relatively small and may not be representative of all university athletes. Future research should consider using larger samples to enhance the generalizability of the findings. Third, the study focused only on three psychological factors and did not consider other important factors, such as motivation and emotion regulation. Future research should address these limitations by using larger samples and incorporating additional factors.

In conclusion, this study provides evidence for the importance of competitive cognitive anxiety, mindfulness, and self-efficacy in predicting sport performance in university athletes. The developed sport performance prediction model can be used to identify athletes who may benefit from interventions to enhance these psychological factors and develop training programs to improve sport performance. Coaches and athletes should consider incorporating strategies to manage competitive cognitive anxiety, enhance mindfulness skills, and improve self-efficacy in

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their training programs to enhance sport performance. Future research should consider incorporating other important factors that contribute to sport performance, such as motivation and emotion regulation, to enhance the predictive validity of the sport performance prediction model.

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Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

The studies involving human participants were reviewed and approved by ethics committee of Islamic Azad University of Shiraz.

Author contributions

AA, FA and HE contributed to the study conception and design, material preparation, data collection and analysis. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The author declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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