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WATER DOES NOT COOL THE MIND: INDIVIDUAL AND TEAM SPORTS ATHELTES DO NOT DIFFER IN PERCEIVED PRECOMPETETIVE ANXIETY

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Abstract

Previous studies suggest conflicting evidence regarding differences in competitive anxiety between athletes participating in individual and team sports. One possibility for these unclear findings is that previous work did not consider the specificity of youth-level sport. We aimed to compare the levels of competitive anxiety on a sample of 28 swimmers (M_{age} = 14.75, SD_{age} = 1.32) and 32 basketball players (M_{age} = 16.94, SD_{age} = .91) competing at youth-level in their respective sports. All participants completed the Competetive State Anxiety Inventory-2 (CSAI-2) 30 minutes before the start of their competitive events. No group differences were found between team and individual sport athletes in the Cognitive and Somatic Anxiety subscales, as well as the Self-confidence subscale. Furthermore, age was not a significant moderator in the relationship between sport type and all three CSAI-2 subscales. Our results indicate that different experiences present in the later development of athletes competing in individual and team sports might contribute to varying levels of competitive anxiety at the senior level.

Keywords: *youth athletes, individual and team sports, cognitive anxiety, somatic anxiety*

1. INTRODUCTION

The role of anxiety in sports performance and behavior is a well-studied area in sport psychology (Ford et al., 2017; Wadey & Hanton, 2008). This research strand aims to understand the underlying mechanisms through which anxiety affects performance and identify situational factors contributing to different anxiety experience of athletes. In general, anxiety is linked to several relevant outcomes in sport such as performance (Craft et al., 2003; Woodman & Harvey, 2011), sports injury occurrence (Cagle et al., 2017; Kolt & Kirby, 1994; Lavallée & Flint, 1996) and injury rehabilitation (Utley, 2010, Walker et al., 2010). Although much is known

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about how anxiety affects athletes on the intrapersonal level (for a review, see Hanton et al., 2008), the role of situational factors in developing, maintaining, and facilitating anxiety in the sport context is still a widely debated topic (Martin & Hall, 1997; Rocha et al., 2018). In this paper, we examine the effect of one such factor, sport type. Specifically, we aim to understand if reported competitive anxiety levels differ between adolescent athletes participating in individual and team sports.

Researchers have proposed different theoretical models in their attempts to explain the relationship between competitive anxiety and performance. One of the most used frameworks is the Multidimensional anxiety theory (Martens et al., 1990). By following the state-trait (Spielberger, 1966) and cognitive-somatic anxiety distinctions (Liebert & Morris, 1967), Martens and colleagues (1990) define competitive anxiety as a specific negative response that regularly appears when anticipating or facing a competitive situation. According to the Multidimensional anxiety theory, athletes can experience anxiety on a cognitive and somatic level. Cognitive anxiety refers to a mental state of worry characterized by fear of negative evaluation, failure, and self-esteem loss. Somatic anxiety represents the physical component of anxiety and includes the perception of different autonomic symptoms (e.g., muscle tension, rapid heartbeat, breathing difficulties, stomach cramps, and sweating). While developing their Competetive State Anxiety Inventory-2 (CSAI-2), Martens and associates (1990) identified self-confidence as the third component of competitive anxiety. It was defined as the opposite of cognitive anxiety because it is related to positive expectations of success.

It is within reason to think that athletes' different experiences elicit varying levels of perceived anxiety. For example, Mellalieu and colleagues (2004) found that athletes competing in fine-motor sports reported lower cognitive anxiety levels and higher self-confidence levels, while gross-motor athletes perceived that competitive anxiety is more facilitative to their performance. Also, some studies indicate that elite athletes report higher competitive anxiety than their counterparts participating on the sub-elite level (Hanton et al., 2008; Lundqvist et al., 2011).

In general, it seems that participation in different competitive situations might explain why some athletes experience higher anxiety than others. One possibility to study how distinct sports experiences might affect competitive anxiety is by making a differentiation between individual and group sports. Martens and colleagues (1990) posit that athletes participating in individual sports are exposed to higher levels of success-related expectations and pressure. On the other hand, group sport could be associated with lower levels of competitive anxiety due to the diffusion of accountability for individual performance-related errors. As a result, these athletes should react with more worry when expecting or participating in a competitive event. To be more specific, the Multidimensional anxiety theory expects that group sport participants should report lower levels of cognitive anxiety while being more self-confident at the same time (Martens et al., 1990). This hypothesis has been partly

supported in the literature. While some evidence indicates that participation in individual sports events is related to higher cognitive anxiety and lower self-confidence, these studies have also found that athletes in individual sport unexpectedly report higher levels of somatic anxiety (Martens et al., 1990; Terry et al., 1996). Furthermore, newer studies report that cognitive anxiety is higher in team sports (Gimenes Fernandes et al., 2013; Parnabas et al., 2014). Finally, in a meta-analysis, Woodman and Hardy (2003) found that the effect cognitive anxiety and self-confidence achieve on performance does not differ between team and individual sports.

Two explanations for these conflicting findings can be found in the literature. First, all sports may differ based on the physiological and psychological arousal needed for optimal performance (Martens et al., 1990). When interpreting the results of the mentioned studies in this way, one implies the specificity of each sport situation confounds the effect sport type has on competitive anxiety. Similarly, the other clarification emphasizes that the mentioned studies did not consider sport factors and individual differences, which might mask the relationship between sports type and competitive anxiety (Martin & Hall, 1997).

Previous studies did not focus on different characteristics of the competitive situation that might explain the mentioned unclear results (for an exception, see Martin & Hall, 1997). Here, we are focusing on one of these situational factors: youth-level sports. There is an agreement that experiences in youth- and senior-level sport participation are qualitatively different (Barreiros et al., 2014; Bell et al., 2020; Malina et al., 2015; McCarthy et al., 2010). For example, adolescent boys perceive higher pressure to achieve success in their respective sport (Brustad, 1988; Dohrety et al., 2016; Pineda-Espejel, 2019). Youth-level athletes also seem to express greater concerns about negative evaluation (Passer, 1983). Cognitive anxiety was related to performance-related worries, while somatic symptoms were correlated with non-performance evaluative concerns (2000). On the other hand, young athletes' experience is mainly shaped by the social support received from their coaches, parents, and peers (Sheridan et al., 2014).

Understanding how different team and individual sports experiences relate to adolescent athletes' competitive anxiety seems to be justified when considering the specificity of youth-level sport. Our research fills the gap in the literature about competitive anxiety in three ways. First, previous studies did not compare sport type differences in competitive anxiety on the youth level. Second, by examining these differences, it is possible to understand whether sport-specific experiences in the later development of athletes contribute to the conflicting results the mentioned studies reported. Differences between individual and team sports (e.g., higher responsibility for personal performance-related errors in individual sports, Hanrahan & Cerin, 2009) might become more prevalent during the transition on the adult level. Third, we aim to include age as a moderator variable for the relationship between

sport type and all three competitive anxiety components to gain insight if some specific developmental changes contribute to differences in reported anxiety levels based on sport type. In that regard, we conducted a comparative analysis of competitive anxiety among young individual and team sport athletes.

2. OBJECTIVE AND HYPOTHESES

2.1. OBJECTIVE

We aim to study the differences in reported levels of cognitive and somatic anxiety and self-confidence between youth individual and team sports athletes.

2.2. HYPOTHESES

1. H1: Individual and team sport athletes differ in perceived cognitive anxiety
2. H2: Individual and team sport athletes differ in perceived somatic anxiety
3. H3: Individual and team sport athletes differ in perceived self-esteem
4. H4: Age is a significant moderator in the relationship between sport type and precompetitive anxiety

3. METHOD

3.1. PARTICIPANTS

Male athletes that were actively competing in youth-level sport were eligible for participation. Our sample consisted of 60 Bosnian athletes with an average age of 16 (M = 15.92, SD = 1.57, Min = 13.00, Max = 18.00). Participants competing in individual sports were 28 swimmers who were 15 years old on average (M = 14.75, SD = 1.32, Min = 13.00, Max = 18.00), while group sport participants were 32 basketball players with an average age of 17 (M = 16.94, SD = .91, Min = 15.00, Max = 18.00). All athletes participated at junior-level events in their respective sports.

3.2 MATERIALS AND PROCEDURE

After obtaining permission from the event organizers, we informed the participants of the aim of our study and asked them to provide written consent that guaranteed confidentiality of collected data. Participants received a questionnaire form 30 minutes before the start of their competitive events: a national swimming meet for swimmers and a junior league game for basketball players. We measured precompetitive anxiety half an hour before the competition because it is a general

standard in the literature (see Cox et al., 2003). Participants were first asked to indicate their age and whether they practice a team or group sport. Then, participants completed the CSAI-2. A brief description of this measure follows.

Competetive State Anxiety Inventory-2 (Martens et al., 1990). CSAI-2 measures three facets of competitive anxiety that were proposed by the Multidimensional anxiety theory. The instrument consists of three subscales: somatic anxiety (9 items, e.g. "I am concerned about this competition."), cognitive anxiety (9 items, e.g. "My body feels tense.") and self-confidence (9 items, e.g. "I feel self-confident".) Participants are asked to indicate their level of agreement with the items on a four-point Likert scale. We have calculated the mean scores for each participant by dividing their full score by four. For the somatic and cognitive anxiety subscales, higher scores indicate a greater perception of precompetitive anxiety before the sporting event. Higher scores on the self-confidence subscale reflect higher positive expectations of competitive success. The Cronbach's alpha coefficients for all three subscales ranged between .78 and .88 and were in line with the coefficients reported by the original authors (Martens et al., 1990).

4. RESULTS

We conducted three separate t-tests for independent samples to compare individual and team sport athletes on all three CSAI-2 subscales. The results of our analysis are presented in Table 1, along with the descriptive statistics of the study variables. Athletes coming from both sports reported relatively low levels of cognitive and somatic anxiety and moderate levels of self-confidence. As can be seen from Table 1, groups did not differ based on their reported cognitive and somatic anxiety levels, as well as self-confidence (all *p*s > .163).

To explore if age moderates the relationship between sport type and competitive anxiety, we have performed three moderated regression analyses. All three models included sport type as the predictor, age as a moderator variable, and their interaction, while cognitive anxiety (Model 1), somatic anxiety (Model 2), and self-confidence (Model 3) served as dependent variables in each model separately. In all three models, the interaction between sport type and age did not reach significance (all ps > .717). In other words, we detected no moderation effect of age for all three models.

4.1. TABLES AND FIGURES

Table 1 - Descriptive statistics for the three CSAI-2 subscales for individual and team sport athletes.

CSAI-2 subscale	*Sport type*	*M*	*SD*	*Min*	*Max*	*Sk*	*Ku*	*t*	*d*
Cognitive anxiety	Individual	1.84	.58	1.00	3.11	0.44	-0.89	1.41	0.25
	Team	2.07	.68	1.00	3.11	0.17	-1.44		
Somatic anxiety	Individual	1.77	.50	1.11	2.89	0.24	-1.07	.58	0.15
	Team	1.84	.49	1.11	3.22	0.43	0.01		
Self-confidence	Individual	2.79	.74	1.56	4.00	0.13	-1.19	.67	0.18
	Team	2.90	.40	2.00	3.89	0.42	1.00		

Note. * $p < .05$, ** $p < .01$. Due to the small sample size employed in this study, the effect sizes for all comparisons were corrected by following Ivarsson et al. (2013).

5. CONCLUSIONS

We conducted a study to explore the relationship between sport type and competitive anxiety among youth athletes. Our results suggest that youth individual and team sport athletes report different levels of cognitive and somatic anxiety and perceived self-confidence. In other words, the groups did not differ based on their expressed worry of competitive failure and physical symptoms of anxiety. The expected positive beliefs of success were also not different among athletes participating in individual and team sports. Finally, it seems that age did not affect the relationship between sport type and competitive anxiety. The effect of sport type on cognitive and somatic anxiety and self-confidence, was not conditional on the athletes' age.

The results presented in this study are not in line with the conclusions suggested by previous work. Our results are not in line with the initial theoretical expectations that competitive anxiety should be higher in individual sport athletes (Martens et al., 1990). Although conflicting evidence about the direction of the relationship between sport type and competitive anxiety exists in the literature, previous studies have found that individual and group athletes differ based on their reported anxiety levels before the start of a competitive event (Gimenes Fernandes et al., 2013; Martens et al., 1990; Parnabas et al., 2014; Soltani et al., 2016; Terry et al., 1996; Woodman & Hardy, 2003). However, our results can be interpreted by understanding the characteristics of the participants in our study. The sample was composed out of adolescent participants competing at junior-level events in their respective sports. There exists some difference in how adolescents perceive and react to potentially stressful events. Adults rely more on different cognitive coping strategies when managing anxiety than adolescents (Garnefski et al., 2002). This is also evident in

sports where youth athletes express more worry about their eventual negative performance than adults (Passer, 1983). As previously stated, the competitive situation and sport environment are more organized and influenced by significant others in pre-senior categories (Sheridan et al., 2014). No differences in competitive anxiety on the youth level might reflect developmental and contextual similarities of adolescent athletes. For example, basketball players might similarly express worry about their performances as swimmers because they perceive an equal amount of pressure from their environment to succeed.

By showing that individual sport athletes do not differ based on competitive anxiety, our results have one important implication: experiences that occur later in athletes' development might result in different levels of competitive anxiety expressed by individual and team sports athletes. This is particularly relevant for two reasons. First, considering different competitive contexts and potential confounding variables (Martin & Hall, 1997) seems to be a good approach in understanding the complex relationship between sport type and competitive anxiety. Second, our results are relevant for planning and implementing interventions to decrease competitive anxiety in sports. Participants coming from individual and team sports reported relatively low levels of competitive anxiety. There should be a need for interventions to develop effective anxiety management skills that could be used later in career and life during athletes' early development.

This study is not without its limitations. First, our sample size was relatively small, and this might have resulted in low power to detect a significant effect[1]. Second, we employed a cross-sectional design which hinders the possibility of making causal inferences. Third, our participants came from one individual (swimming) and one team (basketball) sport. Fourth, our sample consisted of athletes living and training in Bosnia and Herzegovina. One should approach with caution when generalizing these results to other individual and team sports and sport environments in other countries.

Suggestions for future studies can be derived from the limitations of ours. We have found that individual and team sport athletes do not differ on competitive anxiety at the youth level. However, when the differences reported in studies with adult participants start to emerge was left unanswered. Furthermore, we did not identify variables that could explain these differences. Future work should employ more complex longitudinal designs to study a) when competitive anxiety starts to differ between individual and team sport athletes and b) which variables might explain the conflicting findings of the relationship between sport type and competitive anxiety.

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[1] A sensitivity power analysis showed that when considering our sample size, a two-tailed independent t-test could detect a relatively large effect size (d = .74) when power is set at .80 and α = .05.

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