



Technical Note

Mood and Performance Anxiety in High School Basketball Players: A Pilot Study

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ABSTRACT

International Journal of Exercise Science 10(4): 604-618, 2017. Participation in competitive sport may impact psychological measures, such as mood and performance anxiety, which in turn may impact enjoyment, adherence, continued participation, and so on. This study assessed the feasibility – in terms of process, resources, management, and potential scientific value– of measuring the effect of varying competitive challenges upon the mood and performance anxiety measures of high school athletes. The participants (n=12) consisted of the boys' varsity basketball team at a high school in a rural Midwestern community. Participants completed the Profile of Mood States (POMS) to assess mood and the Sport Anxiety Scale-2 (SAS-2) to assess performance anxiety, respectively. Survey administration occurred at *baseline* and prior to games designated as *non-conference*, *conference*, and *state tournament*. *A-priori* feasibility measures were achieved in this prospective design. Significant correlations on the subscale measures were found on the POMS and SAS-2 administered before the four conditions in this study; Chronbach's alpha ranged from 0.54- 0.94 across conditions for POMS subscales, and Chronbach's alpha ranged from 0.73-0.97 across all conditions for SAS-2 subscales, respectively. Significant differences were found across conditions in the POMS subscale *confusion* [$F(3,33) = 5.71, p = 0.01$] and in the SAS-2 subscale *worry* [$F(3,33) = 6.13, p=0.01$]. These preliminary findings suggest that the competitive conditions in this study significantly affected some measures of mood and performance anxiety in high school basketball players. These findings warrant further investigation, as well as suggest coaches could gather such information from their players, ultimately aiding in player development and team performance.

KEY WORDS: Scholastic sport, coaching, evidence-based teaching

INTRODUCTION

It is widely acknowledged that sport participation promotes healthier lifestyles (14), increases self-esteem (38), and enhances peer acceptance (44). Sport participation has also been positively linked to psychological development (10). Scholastic sport participation represents one community-based environment for adolescents to engage in competitive activity. However, participation in competitive sport may also adversely affect psychological measures (25, 42). Thus more study on the influence of competition upon sport participants is warranted.

Numerous authors have reported that sport participation promotes healthy lifestyles in adolescents. For example, in one study assessing the impact of organized leisure-time activities upon the physical and mental health of 10,503 European adolescents, researchers found that participants reported higher self-rated health and life satisfaction measures regardless of sex or age (2). A study on US adolescents similarly found a positive relationship between number of physical activity modes and measures of perceived enjoyment and participation (24). The impact of sport participation upon self-esteem has also been widely reported in the scientific literature. To illustrate, Wagnsson et al., found in a longitudinal study conducted from a developmental perspective that sport participation, self-esteem, and perceived sport competence were all positively related in adolescents (42). Balaguer et al., similarly found that higher levels of sport participation were positively associated with self-perceptions, particularly among adolescent boys (4). These and other studies suggest that sport participation often has positive implications in the social development of youth.

However, participation in competitive sports such as basketball may also impact psychological measures, such as mood and performance anxiety, which in turn may affect aspects like enjoyment, continued participation, self-efficacy, and so on. Anxiety is one of the more frequently measured variables within sport psychology. This variable is typically conceptualized as a negative emotional state characterized by apprehension, nervousness, and worry, and it is associated with physiological arousal (43). Anxiety is therefore also recognized as a multidimensional construct consisting of cognitive and somatic components (23), and it also can be viewed as a rather stable personality characteristic (i.e., trait anxiety) or as a response to a given situation (i.e., state anxiety). Previous research has suggested that performance anxiety, defined as the tendency to respond to competitive situations as threatening or anxiety-producing (22), may be greater in individual sports (e.g., diving) than in team sports (e.g., basketball) (47). Although several measures exist for measuring trait and state anxiety within sport and adults, validated measures of performance anxiety within children and adolescents are limited (13, 33, 36).

Interscholastic competition may present overlays that influence the sport participation experience in nuanced ways (19, 21, 41). For example, the “locker room” represents a sports culture where adolescent behaviors, such as teasing, can take on highly unique characteristics (1, 5, 34), which ultimately may influence the satisfaction derived from sport participation (25, 42). The cultural influences of scholastic sport participation may be further impacted in rural communities in which high school teams are highly encouraged to beat school teams from neighboring communities. The pressures exerted by coaches and family in such environments can influence the youth sport experience (26). Such environmental pressures may subtly

influence the experiences of athletes engaging in scholastic sport participation. Lastly, it also is recognized that the event importance (e.g., practice, conference game, state tournament game) is a variable potentially impacting anxiety and mood responses within participants.

Consequently, the purpose of this study was to assess the feasibility -- in respect to process, resources, management, and potential scientific value -- of collecting relevant psychometric data on scholastic athletes during their competitive season (9, 40). A related purpose was to investigate the influence of varying competitive challenges upon the mood and performance anxiety measures within high school athletes. More specifically, this investigation was accomplished by assessing mood and performance anxiety measures of varsity basketball players at key points during the competitive season. It was hypothesized that such measures reasonably could be collected on high school athletes, which is an under-studied population, and such measures gathered via validated psychometric instruments collected at key points during the competitive season may have value for coaches working with high school athletes.

METHODS

Participants

This study used a quasi-experimental design, as it compared measures gathered on one group of participants on multiple occasions. The participants (n=12) in this study were comprised of a sample of convenience. The boys' varsity basketball team at a high school in a rural Midwestern community was asked to complete validated surveys for assessment of mood and performance anxiety, respectively. The implemented design was evaluated regarding its feasibility toward the larger goal of implementing a similar study with a larger participant pool (9,40). Chronbach's alpha was used to evaluate internal consistency of the POMS and SAS-2 subscales within and across conditions, and analysis of variance (ANOVA) was used to assess significant differences within and across conditions, as well as for relevance in practical application.

Protocol

Mood state of the participants was assessed using the Profile of Mood States (POMS). Research suggests that the 65-item POMS is a valid and reliable questionnaire for assessing changes in mood in a variety of populations (39). This instrument assesses six mood states from the participants: *tension*, *depression*, *anger*, *vigor*, *fatigue*, and *confusion*. Each is assessed using a five-point scoring system from 0 (*not at all*) to 4 (*extremely*). Total Mood Disturbance (TMD) is calculated by adding the five negative mood states (i.e., *tension*, *depression*, *anger*, *fatigue*, *confusion*), subtracting the one positive mood state (i.e., *vigor*) and adding 100. Participants were prompted to complete the POMS based on "how you feel right now". This instrument was administered immediately before the selected basketball practice and games to assess participant mood states as their team progressed through the competitive season.

Performance anxiety of the participants was assessed using the Sport Anxiety Scale-2 (SAS-2). Research suggests that the SAS-2 is a valid and reliable questionnaire for assessing performance anxiety (36) and has been validated for use with youth ranging from 7-18 years of

age (31). This instrument consists of 15 questions that assess anxiety that participants may experience during competition. Each question is assessed using a scoring system from 1 (*not at all*) to 4 (*very much*). The multidimensional SAS-2 consists of three subscales measuring *somatic anxiety*, *worry*, and *concentration disruption*. A total performance anxiety score can be obtained by summing scores from each of the three subscales. This instrument was also used before the selected basketball practice and games to assess participant performance anxiety as their team moved through the competitive season. Participants were prompted to also complete the SAS-2 based upon “how you feel right now”.

Times for administration of the instruments used were identified and verified through discussion with the coaching staff of the boys’ basketball team who agreed to participate in this study. Baseline data collection occurred before a practice scheduled early in the week, given that boys’ high school basketball games in this Midwestern state are typically scheduled on Friday and/or Saturday evenings.

All participants had an informed consent signed by a parent or guardian on file before data collection began. The informed consent complied with the guidelines set forth by the administrators of the Tri-State Science Fair hosted by the University of Southern Indiana. Members of the research team gave copies of the informed consent to the head basketball coach to distribute to all team members, who then took these copies home for signature by a parent or guardian and subsequently returned them to the head basketball coach. The participants (and their parents) were notified via the informed consent that their participation in the study was voluntary, they would not receive any compensation for their participation, and they were free to withdraw from the study at any time without retribution.

Administration of each survey took five minutes or less to complete. Each team member was asked to take the test on four occasions: 1) *baseline*, prior to a practice, 2) prior to a game against a *non-conference* opponent (e.g. “high stakes competition”), 3) prior to a game against a *conference* opponent (e.g. “higher stakes competition”), and 4) prior to the first game of the *Indiana state tournament*, or *Sectional* (e.g. “highest stakes competition”). Participants were prompted to complete each survey based upon “how you feel right now” (36). All surveys were administered to the varsity basketball team in the locker room thirty minutes prior to the practice or game conditions over the duration of the final month of the 2015-2016 season.

The rationale for this study was assessed using the following feasibility criteria recommended in the scientific literature: process, resources, management, and scientific value (9,40). *Process* measures pertain to the feasibility steps that need to take place as part of the main study (40), and in the present study included the following: 1) Recruiting one or more high school varsity basketball teams to participate in the pilot; 2) 75% or more of all participants on the state tournament roster (i.e., at least 9 of 12) completing all surveys administered; and 3) Retaining 75% or more of all participants (i.e., at least 9 of 12) throughout the duration of the entire study. *Resource* measures pertain to assessing time and budget issues that might occur as part of the main study (40) and in the present study included determining the minimum amount of time necessary to administer the surveys prior to practice and games so as to minimize the

potential of intrusion upon team preparations for the impending competition. *Management* measures pertain to assessing potential human and data optimization issues that might occur as part of the main study (40) and in the present study included the following: 1) Printing an adequate number of surveys prior to each administration; 2) properly coding the completed surveys following administration; and 3) entering the data into a spreadsheet for use in a data analysis software application. *Scientific* measures pertain to assessing potential design issues necessary to implement the main study (40), and in the present study included the following: 1) Examining the varsity basketball schedule of the participating team so as to coordinate data collection with the four conditions used in this prospective study; 2) analyzing the collected data using widely accepted statistical tests of difference and correlation; and 3) assessing the results for statistical significance and potential practical meaningfulness.

Statistical Analysis

Data collected from each administration of the POMS and SAS-2 was entered into a data analysis software application (Google Sheets, Google, Mountain View, CA). All data collected within this study used standard methods to ensure confidentiality of participants. Code numbers were used to de-identify the participants. Statistical analysis was conducted using SPSS 21.0 (IBM SPSS, Armonk, New York). Chronbach's alpha was used to assess for internal consistency of POMS and SAS-2 subscale measures. Repeated measures ANOVA was used to assess for differences in player responses between and within the four conditions in this study (e.g. *baseline, non-conference game, conference game, state tournament game*). When significant main effects were found in the ANOVA, post hoc testing was done with pairwise comparisons using the Bonferroni correction. Statistical significance was set at the customary level ($p \leq 0.05$).

RESULTS

All *a-priori* feasibility measures developed prior to implementation were achieved in this prospective design. More specifically, regarding the process feasibility measures, one high school basketball team was recruited to participate in this study, 12 athletes on the state tournament roster (100%) completed the surveys for the 4 conditions within this pilot, and zero participants dropped out of the study (100% retention). As for the resource feasibility measure, many participants demonstrated a capacity to complete both surveys in 5 minutes or less, and all participants required less than 10 minutes to complete both surveys. Regarding the management feasibility measure, the research team – which included secondary school students – successfully administered the surveys, coded the data, and entered it into a spreadsheet application as needed for statistical analysis. As for the potential scientific value feasibility measure, the collected data underwent analysis for statistical significance, practical meaningfulness, and potential value if the study were to be implemented on a broader sample of high school basketball players.

More specifically regarding the potential scientific value, reliability analyses were conducted for each of the measures and respective subscales across the four conditions used in this study (i.e., *baseline, non-conference game, conference game, and state tournament game*). Table 1 includes Cronbach's alpha/ICC and 95% confidence intervals for POMS subscales (i.e., *tension,*

depression, anger, vigor, fatigue, confusion, and total mood disturbance [TMD]) across each condition. Cronbach's alpha values ranged from 0.54-0.94 across all conditions for POMS subscales. Table 2 includes Cronbach alphas/ICC and 95% confidence intervals for SAS-2 subscales (i.e. somatic, worry, and concentration disruption). Cronbach alpha values ranged from 0.73-0.97 across all conditions for SAS-2 subscales. Because the Cronbach's alpha values were acceptable, subsequent parametric analyses using repeated measures ANOVA were used to examine differences in POMS and SAS-2 subscales across conditions (8).

Table 1. POMS Reliability: Cronbach's Alpha/Intraclass correlation coefficient (ICC) and 95% confidence intervals (CI) by condition.

Profile of Mood States	Subscale	Baseline	Non-Conference Game	Conference Game	State Tournament Game
		ICC(95% CI)	ICC(95% CI)	ICC(95% CI)	ICC(95% CI)
Profile of Mood States	Tension	0.809 (0.591, 0.936)	0.698 (0.353, 0.898)	0.839 (0.655, 0.946)	0.775 (0.519, 0.924)
	Vigor	0.757 (0.475, 0.919)	0.542 (0.009, 0.846)	0.867 (0.712, 0.955)	0.792 (0.550, 0.930)
	Confusion	0.617 (0.160, 0.872)	0.657 (0.248, 0.886)	0.656 (0.245, 0.885)	0.665 (0.265, 0.88)
	Depression	0.920 (0.833, 0.973)	0.942 (0.880, 0.980)	0.926 (0.846, 0.975)	0.829 (0.644, 0.942)
	Fatigue	0.871 (0.717, 0.957)	0.922 (0.829, 0.974)	0.894 (0.768, 0.965)	0.853 (0.677, 0.951)
	Anger	0.894 (0.77, 0.964)	0.927 (0.847, 0.975)	0.872 (0.731, 0.957)	0.800 (0.581, 0.932)

Table 2. Sport Anxiety Scale -2 Reliability: Cronbach's Alpha/Intraclass correlation coefficient (ICC) and 95% confidence intervals (CI) by condition.

Sports Anxiety Scale 2	Subscale	Baseline	Non-Conference Game	Conference Game	State Tournament Game
		ICC(95% CI)	ICC(95% CI)	ICC(95% CI)	ICC(95% CI)
Sports Anxiety Scale 2	Concentration disruption	0.967 (0.646, 0.933)	0.907 (0.785, 0.969)	0.973 (0.938, 0.991)	0.949 (0.600, 0.921)
	Somatic anxiety	0.788 (0.512, 0.930)	0.878 (0.720, 0.960)	0.910 (0.792, 0.970)	0.856 (0.669, 0.953)
	Worry	0.747 (0.418, 0.917)	0.727 (0.371, 0.910)	0.735 (0.391, 0.913)	0.841 (0.634, 0.948)

Repeated measures ANOVA were conducted to examine POMS differences within and across each condition. Table 3 presents POMS subscale scores within and across each condition. Mauchly's test indicated acceptance of sphericity $X^2(5) = 5.33$, $p = 0.38$. Repeated measures ANOVA (sphericity assumed) revealed no significant differences in tension, anger, depression, fatigue, or vigor across conditions. However, there were differences in confusion across conditions [$F(3,33) = 5.71$, $p = 0.01$], post hoc tests revealed the state tournament game (9.08 ± 2.68) differed from the non-conference game (11.25 ± 3.17) and the baseline (11.83 ± 4.02).

Table 3. Profile of Mood States (POMS) by condition.

	Baseline Mean ± SD	Non-Conference Game Mean ± SD	Conference Game Mean ± SD	State Tournament Game Mean ± SD	F	p
Fatigue	12.75 ± 4.69	13.00 ± 5.43	11.42 ± 4.91	10.92 ± 3.47	0.982	0.413
Anger	20.17 ± 6.65	22.42 ± 7.59	19.25 ± 7.46	19.00 ± 5.10	1.582	0.212
Vigor	22.67 ± 5.03	19.67 ± 5.83	20.67 ± 3.63	19.08 ± 4.98	2.553	0.072
Confusion*	11.83 ± 4.02	11.25 ± 3.17	10.08 ± 3.17	9.08 ± 2.68	5.708	0.003
Depression	22.08 ± 7.81	23.00 ± 7.87	21.08 ± 9.80	19.75 ± 4.67	0.805	0.500
Tension	16.67 ± 4.65	16.92 ± 3.87	18.67 ± 6.12	17.42 ± 4.66	0.85	0.48
Total Mood Disturbance (TMD)	60.83 ± 23.43	66.92 ± 20.62	59.83 ± 25.99	57.08 ± 15.25	0.44	0.73

Note: Comparison of dependent measures by condition (n=12). *Significant at the $p \leq 0.05$ level.

Table 4. Sport Anxiety Scale-2 (SAS-2) across conditions.

	Baseline Mean ± SD	Non-Conference Game Mean ± SD	Conference Game Mean ± SD	State Tournament Game Mean ± SD	F	P
Somatic anxiety	9.25 ± 2.89	8.42 ± 2.78	9.33 ± 3.39	8.00 ± 2.73	2.002	0.133
Worry*	12.83 ± 3.99	10.92 ± 4.23	12.25 ± 3.86	11.50 ± 3.98	6.133	0.002
Concentration Disruption	5.92 ± 1.38	6.33 ± 1.67	6.08 ± 1.56	6.00 ± 1.51	0.379	0.769
SAS-2 Total	28.00 ± 6.00	25.67 ± 5.43	27.67 ± 5.29	25.50 ± 5.04	0.690	0.563

Note: Comparison of dependent measures by condition (n=12). *Significant at the $p \leq 0.05$ level.

Repeated measures ANOVAs were conducted to examine SAS-2 differences within and across each condition (Table 4). Examining SAS-2 subscales within conditions, ANOVA revealed numerous significant differences. Within the *baseline* condition [$F(2,22) = 20.14, p = 0.01$] post hoc comparisons revealed that *concentration disruption* differed significantly from *somatic* and *worry* subscales, and the *somatic* subscale differed from the *worry*. Within the *conference game* condition there were also differences among the SAS-2 subscales [$F(2,22) = 11.69, p = 0.01$]; post hoc comparisons revealed that the *concentration disruption* subscale differed from the *somatic* and *worry* subscales. Within the *non-conference game* condition there were differences among SAS-2 subscales [$F(2,22) = 6.81, p = 0.01$]; post hoc comparisons revealed that the *concentration disruption* subscale differed from the *worry* subscale. Lastly within the *state tournament game* condition, the *concentration disruption* subscale differed from the *worry* and *somatic* subscales and the *somatic* differed from *worry*, [$F(2,22) = 10.66, p = 0.01$]. These differences between SAS-2 subscales within the conditions support the notion that this instrument measured distinct dimensions of anxiety within this sample of participants.

Examining SAS-2 subscales across conditions, Mauchly's test indicated acceptance of sphericity $X^2(20) = 25.37, p = 0.21$. Repeated measures ANOVA (sphericity assumed) revealed no significant differences in *concentration disruption* or *somatic* subscales. However, there were differences in *worry* across conditions [$F(3,33) = 6.13, p=0.01$], with post hoc tests revealing

worry differed between the *baseline* (12.83 ± 3.99) and *non-conference game* (10.92 ± 4.23) conditions.

DISCUSSION

The primary purpose of this study was to assess the feasibility of measuring the mood and performance anxiety of scholastic athletes under competitive conditions commonly experienced during the course of a typical high school basketball season. This study suggests that these characteristics can be assessed in light of criteria noted in the scientific literature (9,40). Given that the present findings suggest that competitive conditions had a statistically significant impact upon subscale measures of mood and performance anxiety, the findings also suggest that implementation of a similar design on a larger sample of high school players may have clinical meaningfulness for coaches working with scholastic athletes. These findings also enable the researchers to hypothesize that these athletes may have high levels of enjoyment and self-efficacy based on previous research (43), which demonstrates a positive implication for this direct sample.

As noted above, all *a-priori* feasibility measures developed prior to implementation were achieved in this prospective design. The process feasibility measures may be attributed, either partially or wholly, to the cooperation of the coaching staff who agreed to open participation in this study to their players. In addition, participants were able to complete both surveys in 10 minutes or less. Therefore, the coaching staff likely viewed the data collection aspects of this study to possess few, if any, negative drawbacks to their overall goals for leading the team. This consideration is important for extending this type of investigation to a broader sample of teams, as there may be poorer participation and attrition by varsity players if their coaches perceive the time set aside for survey administration in a negative manner.

Turning to the statistical analysis of this prospective study, the results of the Chronbach's alpha analyses suggest that the acceptable levels of internal consistency (.70 and above) were evident within the present findings (29). These results support the notion that these validated psychometric instruments adequately differentiated and consistently measured mood and performance anxiety measures within the participants in this sample.

Results of this pilot study suggest the high school basketball players' reports showed significant differences between the four conditions, as measured by subscales on the POMS and the SAS-2. Specifically, the participants in the present study showed significant differences between conditions for the *confusion* subscale on the POMS and *worry* subscale on the SAS-2, respectively. These results are dissimilar to a study involving adolescent swimmers, in which Papadopoulas and his colleagues (2014) found no differences between SAS-2 scores at the different time points during a competitive season (28). In that investigation, the adolescent swimmers completed the SAS-2 one time during a week with no competition and again during a week where they had a competition (28). However, the disparity between the study Papadopoulas et al. noted above and the present findings of differences in the *confusion* and *worry* subscales is intriguing, particularly in light of the stark differences in decision-making

required of basketball players during competition and those of swimmers. Gentile's *Taxonomy of Motor Activities* (11) helps to explain that high school basketball is a highly complex neuromotor activity, one of the most complex neuromotor activities possible in interscholastic sports. In basketball, the environmental context as defined by Gentile is highly dynamic, given that the regulatory conditions and inter-trial variability are constantly changing for each of the ten competitors on the court. Similarly, in basketball the function of action as defined by Gentile is also constantly changing, as each player is moving within the environment and he or she may or may not manipulate an object (i.e. the basketball) while doing so. In other words, basketball players need to make countless instantaneous decisions during the course of a high school game, and the present findings of differences in the *confusion* and *worry* subscales between the competitive conditions in this study is something most high school basketball coaches likely would find interesting, given the relationship of these two subscales to on-court decision-making during the course of a game. In short, wins and losses matter in scholastic sports, and thus it stands to reason that most high school coaches likely would have interest in instruments that may detect differences in these psychometric subscales from game to game, based on the notion that identification of a given psychological state is the first step in further shaping it, or extinguishing it.

Nonetheless, a review of electronic databases found no previous studies on mood and anxiety among adolescent basketball players for further comparison within this age group. This limitation in the existing literature presents challenges toward the goal of placing the current findings within a larger context. However, some authors have studied performance anxiety among adult basketball players. Leon-Prados et al., (2012) investigated the correlation between intensity and direction of anxiety and self-confidence and competitive performance in adult basketball teams using the Competitive State Anxiety Inventory-2 (CSAI-2). These authors found an inverted-U-shaped curvilinear relationship between somatic anxiety intensity and individual performance in women basketball players and a negative linear relationship between cognitive anxiety and individual performance in men basketball players. They found no correlation between directional perceptions of anxiety and self-confidence and individual performance in either women or men players. While differences in age group and instruments make direct comparison difficult between this previous study and the present one, some evidence exists in the literature that perceived anxiety may have an impact upon performance in basketball. More specifically, theoretically speaking perceived anxiety may also have an impact upon decision-making during a basketball game (15,20), as well as efficacy of somatic execution of sport-specific skills (27,45). However, the lack of significant findings between perceived anxiety and basketball in previous studies and the current study may be explained by previous research stating that performance anxiety is likely greater in individual sports than in team sports (47). Thus, because this study measured a basketball team and their mood and performance anxiety measures, previous researchers suggest that no significant scores may be expected. Again, further research is needed to potentially better explain the role of performance anxiety measures in team sports such as basketball.

While the term "anxiety" is commonly associated with unpleasantness and considered a pejorative term, some athletes experience positive rather than negative pre-performance

psychological stress. Prior to games, athletes have time to compare themselves to their competitors. If players are confident that they can win the game, such comparisons can increase their assurances and the resultant psychological stress works in their favor (6). Conversely, if the player evaluates the situation and determines that he or she may not be able to handle the task, the competitive endeavor may be viewed as a threat. In the latter situations, the player reacts in ways that are debilitating to high intensity performance, both physically and cognitively. An understanding of such psychological mechanisms within an individual player or larger team is clearly valuable information for any coach intent on maximizing the performance of his players.

Given the importance of balancing the stressors of training and competition with athletes' ability to recover physiologically (16), the present findings suggest that scholastic coaches should consider using the POMS and SAS-2 on a consistent basis throughout the competitive season as a means of monitoring mood and anxiety states. More specifically, these instruments might be used by coaches to assess measures of psychological fatigue exhibited by individuals or the team. This process would likely aid in the tapering process many coaches employ as the regular season draws to a close and the team transitions to the state tournament. However, more research is needed to best help coaches interpret data they might gather through such means.

Similarly, coaches who might regularly use the POMS or the SAS-2 to monitor their teams may reasonably develop a competitive advantage in player development that they might otherwise not enjoy, given the premise that at a foundational level effective coaching depends heavily upon effective teaching strategies (12,30). To illustrate more fully, the sport science literature clearly shows that instruction based in positive feedback consistently leads to performance improvements to a greater extent than does negative feedback (17,46). Thus, coaches are generally encouraged to utilize positive reinforcement across the board when working with their players (35). In turn, there is evidence in the literature that suggests coaches who are able to regularly use more positive teaching methods tend to demonstrate higher outcome measures (e.g. wins, conference championships, player satisfaction ratings)(3). Thus, another way of viewing the relationships between positive versus negative feedback and effective sport-specific teaching is the real possibility that -- given the tendency of all athletes to respond better to positive reinforcement -- some athletes may be more negatively affected cognitively by negative feedback from coaches than others on the team (37). In the present study involving twelve members of a high school varsity basketball team, qualitative assessment of the collected data suggested that three individuals consistently demonstrated a positive skew in their scores on the POMS and SAS-2 across the four conditions included in this study. These results suggest that these three players (or 25% of the team) may possess higher mood and anxiety "sensitivity" than their teammates. Practically speaking, these three athletes may be even more negatively affected than their teammates by commonly used coaching techniques clearly rooted in negative feedback methods (e.g., a "quick hook" upon a mistake on the floor and followed by subsequent "bench time", yelling at the player immediately following a mistake, running "sprints" for mistakes made during scrimmages,

and so on). At first glance, some coaches, based upon their respective personal clinical gestalts (7,18), might bristle that negative feedback methods tend to lead to lesser performance outcomes in general, as well as the notion that some individuals who make up any given team may tend to respond even less well to such coaching methods. Nonetheless, the present findings suggest that more research studies are needed to help coaches better identify the mood and anxiety profiles of their athletes and select instructional methods more likely to lead to the desired educational outcomes (e.g., heightened individual performance, wins, conference championships, etc.).

This pilot study is novel in several ways based upon the population and design. High school athletes are an understudied population, and this study adds to the wider body of knowledge on their mood and performance anxiety during practice and competition. Further, the researchers could find no other published study which compared mood states to different levels of competition within the same athletes. These unique attributes in design notwithstanding, the current results suggest a difference in subscale measures of mood or anxiety states across the varying levels of competition as has been shown in previous research (26). The present findings warrant further study in a larger sample, as scholastic coaches might collect these measures and reasonably work the results into the overall coaching curriculum without undue burden. To illustrate more fully the link between this study and practical application, the present findings demonstrated a significant difference in the *confusion* subscale on the POMS across conditions, as well as with *worry* subscale on the SAS-2. A coach who discovers that his or her athletes are confused or worried may decide to ask the athletes about these associated emotions, as the present findings suggest these attributes may be present in conjunction with each other. Such discovery may help the athletes' mental health, strengthen the athlete-coach relationship, foster a more positive sporting culture, and perhaps lead to greater performance outcomes.

This prospective study also has limitations. The present findings may not be generalizable beyond the current sample of a high school basketball team from a small, rural, Midwestern community. Further, the small number of participants in this study may have lowered the power of the study and thus may not have been able to detect significant differences in all measures, again suggesting that the study may prove insightful if replicated on a larger sample. Since the participants completed the surveys several times within a month (due to the logistical challenge of designing and implementing a study around the typical holiday break afforded to secondary school students), it is possible they became habituated to the instruments, or perhaps experienced heightened anxiety related to the completion of the surveys, consequently making it difficult to get a "true" score from the participants. Lastly, there may be other confounding variables in the coaching environment that may have impacted the results of the study that were not accounted for during data collection. For example, it is possible the athletes were given strategies by the coaches through individual and team counselling to best deal with their emotions/anxiety throughout the season since they were preparing for high level performance in scholastic competition.

In future research, it may be important to take a baseline measure prior to the first game of the season. This step may ensure a more accurate measure of the players' baseline measures on mood and anxiety instruments and provide stronger comparisons during the competitive season, which typically lasts four months for varsity basketball. Assessing baseline prior to the first game of the season would also afford a longer timeline, perhaps assisting in gaining a more accurate picture of how high school athletes may vary in mood and anxiety over the course of an entire season. Further, it may be of some utility to assess sex differences in the measured topics as previous research has indicated that females tend to demonstrate higher variability in psychometric measures, including anxiety disorders, when compared to males (32). Finally, it may be beneficial to utilize additional schools, as this may help to add necessary statistical power, better account for confounding variables that may exist in a single coaching environment, and add depth to the research findings.

Participation in scholastic sport has been linked to many positive attributes of psychosocial development. However, participation may also negatively impact psychological measures such as mood and performance anxiety. Coaches working with scholastic athletes may use the findings from this prospective study to benefit their athletes' success in their respective sports. More specifically, basketball coaches may use psychometric instruments to monitor the mood and performance anxiety of their athletes. Using these instruments may help coaches identify correlates between self-reported measures of fatigue and other indices of mood and anxiety. Coaches then may adjust instructional methods and/or the training and competitive environments as needed so as to facilitate attainment of individual and team outcome goals.

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