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Precompetitive State Anxiety, Objective and Subjective Performance, and Causal Attributions in Competitive Swimmers

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This study investigated the nature of the relationship between precompetitive state anxiety (CSAI-2C), subjective (race position) and objective (satisfaction) performance outcomes, and self-rated causal attributions (CDS-IIC) for performance in competitive child swimmers. Race position, subjective satisfaction, self-confidence, and, to a lesser extent, cognitive state anxiety (but not somatic state anxiety) were associated with the attributions provided by the children for their swimming performance. The study partially supported the self-serving bias hypothesis; winners used the ego-enhancing attributional strategy, but the losers did not use an ego-protecting attributional style. Age but not gender appeared to influence the attributions provided in achievement situations.

Key Words: gender, CSAI-2C, CDS-IIC, children

Anxiety has been one of the most extensively researched topics in sport psychology (27). Although there have been many theories and models that have tried to clarify the relationship between anxiety and performance, there appears to be only consensus on the notion that anxiety is a multidimensional concept. That is, anxiety consists of three independent but interacting components: somatic (emotionality), cognitive (worry), and behavioral (overt response). The relationship between the behavioral component of anxiety and performance is unclear. It is suggested, however, that cognitive anxiety might influence all forms of athletic performance in a negative linear fashion, whereas somatic anxiety tends to disrupt fine motor skill in a quadratic way (27).

The level of precompetitive anxiety has been shown to differ depending on certain characteristics, such as sport type, experience, gender, and age (17). For example, individual athletes have been shown to have higher levels of anxiety than team athletes, and experienced athletes have lower levels of cognitive and

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somatic anxiety than do less experienced athletes (17,23). In addition, in a recent meta-analysis it was found that gender and level of performance were important moderator variables in the anxiety–performance relationship (28). Overall findings revealed that cognitive anxiety had a low but significant negative effect on performance ($r = –.10$), and self-confidence had a low to moderate positive effect ($r = .24$). Males were found to be more affected than females, and higher standard athletes were more affected than lower standard athletes, by cognitive anxiety or self-confidence. In the same study it was argued that somatic anxiety was of limited value in explaining sport performance (28).

In swimming, the sport under investigation in this study, it has been found that state anxiety can have either a positive or negative effect on performance. Furst and Tenenbaum (14) found that higher levels of anxiety facilitated swimming performance, whereas Burton (8) found that anxious swimmers swam more slowly. In the latter study a negative linear trend was found between cognitive anxiety and swimming performance and a positive linear trend between self-confidence and performance. Very few studies have looked at the anxiety–performance relationship in child athletes. Psychountaki and Zervas (20) found that 11- to 12-year-old competitive swimmers who doubted their abilities scored high in state competitive anxiety and low in state sport confidence. In addition, self-confidence was related to the participants' performances.

If anxiety has an impact on performance, it is also possible that it influences the cognitive process that generates causal attributions for outcomes in sport. This is an important issue because attributions have been shown to influence expectations for future success, affective responses, persistence, self-confidence, and motivation for further involvement (2). For example, in a study by Chase (9) on 8- to 14-year-old children it was found that if failure in physical education and sport was attributed to lack of ability, it was likely to lead to dropout.

Attribution theory (26) suggests that there are three causal dimensions—locus of causality, stability, and control—that individuals use for explaining why they behaved in a certain way. Locus of causality refers to whether an outcome was caused by some characteristic of the individual or the environment. Locus of stability is concerned with whether the cause of performance is similar or variable in the future. Control focuses on who is responsible for the performance outcome; it rates whether the cause is under control of the attributor or something or someone else.

Research on attributions to date has been hampered by a narrow focus (2). For example, a significant number of studies have been conducted in nonsport or laboratory settings using novel tasks with little meaning to the participants or experimenter-defined attributions. Thus far, researchers have mainly used objective outcomes as performance indicators (win/loss) rather than subjective performance ratings, satisfaction scores, or the interaction between objective and subjective performance (1,11,22). In this respect, it is believed that winners make internal, stable, and controllable attributions, and losers will make external, unstable, and uncontrollable attributions (self-serving bias) (1,3). Attribution research has generally supported this ego-enhancing style for winners (3,12). The findings on the ego-protecting attributional style for losers have been less clear. This might be because athletes are encouraged to accept responsibility for the outcome of a sporting event, and externalization of failure is discouraged (1).

Most of the research has also focused on the consequences of attributions for behavior and emotions, despite the notion that many antecedents could potentially influence the attribution process. For instance, past experiences and attitudes of performance have been shown to influence participants' attributions (6). Most studies to date have also tended to use college students or adults, with relatively few studies examining children's causal attributions for performance in sport situations (1,9). Developmental stages have been shown to be related to use of the ability and effort dimensions (19). In a cross-sectional study, Bird and Williams (5) found that 7- to 9-year-olds used effort and luck to explain outcomes, 10- to 12-year-olds saw a relationship between effort and outcome and luck and outcome, and 13- to 15-year-olds saw a relationship between effort and outcome. Furthermore, for the 16- to 18-year-olds, stereotypical gender attributions became apparent, with males using effort as an attribute and females using luck. Chase (9), however, recently did not find age differences in a group of 8- to 14-year-olds. It should be noted that in both studies participants made attributions based on hypothetical situations rather than actual events, which brings into question the ecological validity of these studies.

In addition to age, it has been suggested that gender and years of experience act as moderator variables in causal attributions. More recent research, however, has failed to find gender differences in children. As suggested earlier, Chase (9) did not find any gender differences for younger children, supporting work by Bird and Williams (5), who suggested that gender differences in attributions only start to develop at the ages of 16–18, when gender stereotypes emerge. There appears to be no research to date that has investigated the influence of experience on the attributions provided by children.

Only a few studies have investigated the relationship between anxiety and attributions, despite the time-to-event studies that have shown that cognitive state anxiety still increases shortly after competing and thus is able to affect the attributional process (10). In addition, the studies that have investigated the anxiety–attribution relationship have only used adult participants and lacked ecological validity. For example, it is questionable that the staged table-tennis task in the Biddle and Jamieson (4) study generated levels of anxiety similar to those experienced in real competitive situations. The authors of that study suggested that research on this topic should be conducted in more naturalistic and personally meaningful environments.

The attributional processes in children who participate in competitive sport have not been adequately researched in ecologically valid settings. It is important for coaches, teachers, and parents to identify the development of maladaptive attributions because of its impact on satisfaction and future participation motivation. Therefore, this study investigated the relationship between precompetitive anxiety, actual and subjective performance, and the causal attributions provided for performance in children competitive swimmers. Second, it examined the relationship between precompetitive anxiety and objective (race position) and subjective performance (in terms of satisfaction). Finally, it explored the influence of gender, age, and experience on levels of anxiety and attributions.

Three explicit predictions were made based on the current understanding of the literature. It was predicted that higher levels of cognitive and somatic state anxiety would result in more external attributions (13,15). Second, we expected

an ego-enhancing attributional style for the winners. Third, it was predicted that cognitive anxiety would have a negative relationship with performance and a positive relationship with self-confidence, and this effect would be stronger for boys than for the girls (28). To avoid some of the methodological pitfalls identified in previous research and to ensure ecological validity, the study was conducted in a real-life sporting situation (regional swimming gala) that had meaning for the participants and was expected to elicit state anxiety.

Method

Participants

Children swimmers (47 boys, 54 girls) from three regional swimming clubs located in the southwest of England participated in this study. Participants' ages ranged from 9 to 15 years (M age = 12.11 years, SD = 2.06), and swimming experience ranged from 1 to 8 years (M = 4.51, SD = 2.05). In accordance with ethical guidelines, ethical approval was obtained from a university ethics committee. In addition, all participants and their parents or guardians completed standard informed-consent procedures.

Instruments

The Competitive State Anxiety Inventory-2 modified for children (CSAI–2C) was used to assess perceived intensity of the swimmers' cognitive and somatic state anxiety and self-confidence before their swimming event (23). The CSAI–2C is a self-administered questionnaire consisting of 15 items on a 4-point Likert scale ranging from 1 (*not at all)* to 4 (*very much)*. Responses were scored and totaled for each subscale. Scores could range from 5 to 20, with higher scores indicating higher intensities in cognitive and somatic anxiety and higher levels of self-confidence. Satisfactory validity and reliability have been reported for the CSAI-2C (23).

The swimmers' causal attributions were measured using the Revised Causal Dimension Scale for Children (CDS-IIC) (18,25). The CDS-IIC allows the participants to make an open-ended attribution for perceived success or failure and then classify the cause in the form of eight Likert-type questions (scale ranging from 1 to 5) along the dimensions of locus of causality, stability, personal control, and external control. Scores for each dimension could range from 2 to 10, with higher scores meaning more internal, stable, and controllable attributions. Vlachopoulos et al. (24) and Vlachopoulos and Biddle (25) found evidence for adequate factorial structure and discriminant validity between the subscales of the CDS-IIC. Interitem correlations for the locus-of-causality scale, however, were found to be low.

Finally, participants rated the satisfaction of their performance on a scale ranging from 0 to 10 (with 0 being *completely unsatisfied* and 10 being *completely satisfied*) (2). Actual race position was also recorded.

Procedures

Before the study was conducted all questionnaires were successfully piloted by five child volunteers covering the actual participants' age range. Questionnaires

were explicitly tested for understanding and ease of completion. Before commencement of the swimming gala all consenting participants were called together at a questionnaire station sectioned off from the main pool and competing area to have the procedure explained and any remaining questions clarified. Participants reported approximately 10 min before their race to complete the CSAI-2C at the questionnaire station. Completed questionnaires were collected, and participants were reminded to return to the station immediately after their event (within 10 min). After participants finished their races they completed the subjective performance question (how satisfied they were with their performance), followed by the CDS-IIC. This also included information regarding the event in which they had just competed and their place in the race they had just completed (objective performance). Three local swim teams competed at the swimming gala, and each event was a straight final with 1 participant from each club. Thus, there were only 3 participants in each race.

Data Analysis

First, Pearson product–moment correlations were calculated for age and years of experience in swimming as possible confounding influences on anxiety intensity and attributional interpretation of the outcome (12). Years of swimming experience was not correlated with any of the dependent variables. For age, a negative relationship was found with self-confidence ($r = –.197$, $p = .048$) and stability ($r = –.252$, $p = .011$). Based on those results, it was decided to statistically control for age.

Second, we examined whether gender was a confounding moderating factor. Independent sample t tests were run for the subscales of the CSAI-2C and the CDS-IIC. Because of the number of dependent variables, the significance level for this manipulation check was set at $p = .01$. No significant differences were found between genders for any of the dependent variables.

In order to test the relationships between state anxiety, objective and subjective performance, and attributions provided, hierarchical multiple linear-regression models were used for each of the four causal attributional scales (locus of causality, stability, personal control, and external control) separately. Age was entered first, followed by the anxiety subscales (cognitive anxiety, somatic anxiety, and self-confidence), objective performance, and then the subjective performance satisfaction score. Standardized regression (β) coefficients described the independent contribution of each predictor to the total regression models. We also calculated Pearson product–moment correlations between the anxiety subscales and the attribution subscales.

To investigate whether winners used an ego-enhancing attributional style, and losers an ego-protecting attributional style, separate regression analyses were conducted for the winners and the losers (Numbers 2 and 3).

To test the relationship between anxiety and performance, Pearson product–moment correlations were calculated between the anxiety subscales and objective performance and subjective performance satisfaction. This was done for the group as a whole and for the boys and girls separately.

Data were screened for normality and Cronbach alphas were calculated for the subscales of the CSAI-2C. Finally, we calculated correlations between the subscales of the CDS-IIC. Strong correlations have been found for the subscales of the CDS

and CDSII (18). The significance level was set at $p = .05$. The statistical package SPSS was used to analyze the data.

Results

Descriptive statistics for anxiety and attributions are displayed in Table 1. The Cronbach alphas for the CSAI-2C were satisfactory and ranged from .71 (self-confidence) to .78 (somatic anxiety). No significant correlations were obtained between the four subscales of the CDS-IIC.

To ensure that the regional swimming gala induced increased levels of anxiety, we compared the obtained scores with those in previous studies. The scores obtained for cognitive and somatic anxiety and self-confidence where similar to those found by Stadulis et al. (23) in their validation of the CSAI-2C (obtained in physical education class competitions) and the norming of the CSAI-2 for high school athletes (obtained in competitive sport settings) (17). For the CSAI-2C and the CSAI-2, as well as the scores obtained in the present study, *somewhat* is the median for cognitive and somatic anxiety, and *somewhat* to *moderate,* the median for self-confidence (23). In addition, the present study found that 9% of the sample had a median higher than 3, which is similar to the norm samples for both the CSAI-2C (23) and the CSAI-2 (17). Therefore, we believe that the swimming competition induced sufficient levels of precompetitive anxiety to test our predictions.

The hierarchical multiple-regression model for locus of causality showed that only self-confidence contributed significantly to the prediction of the magnitude of this variable (see Tables 2 and 3). With regard to stability, it was found that age, self-confidence, and race position all contributed to the prediction of stability attributions. Personal control was best predicted by subjective performance satisfaction, whereas external control was best predicted by levels of self-confidence. Results of the correlational analysis between anxiety and attributions are displayed in Table 4. Cognitive anxiety was found to be negatively correlated with external control, and self-confidence was positively correlated with locus of control, stability, and external control.

Results of the regression analysis for the winners were not significant, $F(7, 42) = 1.75$, $p = .12$, $R = .48$, $R^2 = .23$. Only the personal-control subscale reached significance ($\beta = 0.16$, $p = .03$). A similar result was obtained for the regression for the Number 2 and 3s, $F(7, 43) = 0.85$, $p = .55$, $R = .35$, $R^2 = .12$. In this instance only the external-control subscale reached significance ($\beta = 0.21$. $p = .03$).

Correlations between anxiety and objective and subjective performance are displayed in Table 4. No significant association was found between anxiety and performance, and no differences were found between the boys and the girls.

Discussion

The main aim of the present study was to investigate the relationship between precompetitive state anxiety, objective (race position) and subjective (in terms of satisfaction) performance, and the attributions provided in a sample of children competitive swimmers. Higher levels of self-confidence were found to be associated with higher attributions for external control, internal locus of causality, and

Table 1 The Anxiety and Attribution Dimensions, *M* (*SD*)

Dependent variable	Overall	Boys	Girls	Winners	Losers
Cognitive anxiety	2.16 (0.68)	2.30 (0.62)	1.99 (0.73)	2.11 (0.78)	2.21 (0.57)
Somatic anxiety	2.08 (0.78)	2.08 (0.75)	2.09 (0.80)	2.10 (0.82)	2.07 (0.75)
Self-confidence	2.56 (0.69)	2.56 (0.69)	2.62 (0.79)	2.64 (0.82)	2.53 (0.54)
Locus of causality	5.75 (1.43)	5.49 (1.35)	5.98 (1.47)	5.64 (1.40)	5.86 (2.16)
Stability	6.67 (1.22)	6.64 (1.33)	6.70 (1.13)	7.10 (1.42)	6.25 (0.80)
Personal control	6.51 (2.56)	6.19 (2.72)	6.80 (2.41)	7.24 (2.36)	5.80 (2.58)
External control	5.17 (1.53)	5.40 (2.79)	4.96 (2.28)	5.36 (2.55)	4.98 (2.51)

Table 2 Hierarchical Multiple-Regression Change Analysis for the Locus of Causality, Stability, Personal Control, and External Control Subscales of the CDS-IIC

	Locus of Causality		Stability		Personal Control		External Control	
	Sign. *F* change	R^2	Sign. *F* change	R^2	Sign. *F* change	R^2	Sign. *F* change	R^2
Step 1	0.10	.03	0.01	.06	0.83	.00	0.45	.01
Step 2	0.03	.11	0.04	.14	0.51	.02	0.02	.10
Step 3	0.18	.13	0.00	.25	0.01	.10	0.49	.11
Step 4	0.74	.13	0.16	.26	0.04	.14	0.32	.12

Note. Step 1 = age; Step 2 = state cognitive anxiety, state somatic anxiety, state self-confidence; Step 3 = objective performance; Step 4 = subjective performance satisfaction.

Table 3 Beta Value and Significance of the Dependent Variables for the Best Hierarchical Multiple-Regression Model for the Locus of Causality, Stability, Personal Control, and External Control Subscales of the CDS-IIC

	Locus of causality, beta, Step 2	Stability, beta, Step 3	Personal control, beta, Step 4	External control, beta, Step 2
Age	–0.11	–0.24*	–0.05	–0.02
Cognitive anxiety	0.15	0.06	–0.06	–0.10
Somatic anxiety	–0.22	0.21	–0.09	–0.03
Self-confidence	0.24*	0.20*	–0.01	0.25*
Objective performance		–0.33**	–0.01	
Subjective performance			0.33*	

*$p < .05$. **$p < .01$.

Table 4 Correlation Values Between CSAI-2C Subscales and the Attribution Subscales and Objective (Race Position) and Subjective Performance Satisfaction

	Cognitive anxiety	Somatic anxiety	Self-confidence
Locus of causality	–.06	–.19	.26**
Stability	.05	.18	.21**
Personal control	–.14	–.13	.07
External control	–.21*	–.14	.30**
Objective performance, boys	.04	–.01	–.02
Subjective performance, boys	.03	.02	.07
Objective performance, girls	.17	.08	–.13
Subjective performance, girls	–.15	–.04	.12
Objective performance, all	.13	.03	.08
Subjective performance, all	–.09	–.01	.10

*Correlation significant at .05. **Correlation significant at .01.

stability. Actual race position and subjective performance satisfaction resulted in higher perceptions that performance would be maintained in the future (stability dimension) and were under more personal control. Age appeared to be a moderating factor, resulting in an inverse relationship with perceptions of the stability of future performance. No influence was found for gender or years of swimming experience on the causal attributions provided by the swimmers or the level of anxiety and self-confidence experienced. The results therefore did not support the hypothesis that higher cognitive or somatic state anxiety would be associated

with more external attributions, but they partially support the notion that winning results in an ego-enhancing attributional style. Finally, no relationship was found between cognitive anxiety, self-confidence, and objective and subjective swimming performance.

Previous research that considered the temporal patterns of anxiety has revealed that somatic anxiety decreases significantly immediately after commencing an activity, whereas cognitive anxiety remains high for a longer period of time (10,17). This would potentially suggest different relationships between somatic and cognitive anxiety and attributions. This research did not, however, find an association between somatic and cognitive anxiety and the attributions provided by the children swimmers. Higher levels of cognitive anxiety were associated with lower levels of perceived external control. This result was in disagreement with the a priori hypothesis and earlier findings by Fink et al. (13) and Kerr and Goss (15), who found that higher levels of anxiety resulted in more external attributions. The nature of the task used in the present investigation might explain these contradictory findings. The swimming competition in the current study is very much a closed activity in which athletes are ultimately responsible for their own actions. In comparison, Kerr and Goss (15) used a gymnastics task. In this sport the participants' performances are determined by judges, allowing the athletes the opportunity to make more external attributions for their achievements. The implication would be that the circumstances of the competition would moderate the attributional process.

The present study found that higher levels of self-confidence resulted in participants' attributing their performance to internal factors (locus of causality). In addition, the swimmers judged that their current performance would happen again in the future (stability) and felt more control over external factors. Therefore, self-confidence should be considered an important factor influencing the participants' attributions in achievement situations. Future research should explore whether self-confidence might have a reciprocal relationship with attributions (6).

It is difficult to compare the present results with those of previous research on the relationship between state anxiety and attributions. In particular, past research (13,15) has not used sport-specific multidimensional instruments to assess the participants' level of state anxiety. The findings of the present study reveal that self-confidence and, to a lesser extent, cognitive state anxiety were associated with the attributions provided by the participants, but somatic anxiety was not.

It has been suggested that the interpretation of perceived anxiety is important. The current study only considered anxiety intensity and not the possible debilitative or facilitative aspects (anxiety direction) (27). Currently, there is no validated inventory for children to measure anxiety direction. This is an important issue because it is unclear whether children can make a distinction between possible facilitative or debilitative effects of anxiety. On the other hand, it has been argued that anxiety by definition cannot be facilitative in nature (7).

The results of the present study support the notion that people formulate a different set of explanations after failure and success. A higher position in the race (winning) was associated with more stable attributions, whereas higher performance satisfaction scores were associated with more personally controlled causal attributions (3,16). This partially supports the self-serving bias hypothesis, which predicts that winners are more likely to attribute their success to themselves and believe that they can achieve similar or better performances in the future

(3,21). In principle, this ego-enhancing, self-serving attribution style is a healthy one, preventing the development of maladaptive attributions and, ultimately, the development of a learned helplessness style of attributions. The present study did not support the second aspect of the self-serving-bias hypothesis, however, in that unsuccessful individuals were more likely to attribute their achievement to external and uncontrollable factors when explaining their performance. Rather, losers and participants with lower subjective performance scores showed more unstable and less personally controllable attributions. This has been a more commonly observed self-serving bias in sport and supports Mark et al.'s (16) suggestion that in sport, depending on the outcome of the event, athletes alter their attributions along the controllability and stability dimensions rather than the locus-of-causality dimension. The implications of this are more positive because recurrence of failure would not be regarded as inevitable. In addition, athletes need to understand the causes of their performance if they are going to continue and try to improve after their failure. This study found a more adaptive attributional style for the losers in that the perceived controllability of performance provides more perceived behavioral control in the future. Taken together, the results of the present study do support Spink and Roberts's (22) assertion that both objective and subjective performance outcomes are related to attributions, and they provide partial support for self-serving bias. Winners displayed an ego-enhancing attributional style, but the losers did not display a traditional ego-protecting style.

No gender differences in the attributions provided by the children for their performance were found in the present study, supporting previous findings (5,9). Swimming was selected for this study because it has been considered a gender-appropriate sport for both boys and girls. Similar events (e.g., distances) without gender competition allow us to compare psychological functioning and provide gender-independent attribution (1). This is important because gender differences in attributions have generally only been found when males and females compete against each other in artificially created tasks. In such situations, males overshadowed females and changed their attribution styles (1).

It has been suggested that developmental stages influence the understanding of attributions (ability) and effort (stability) (19). The present study supported this notion. An inverse relationship was found between age and the stability subscale, indicating that when the swimmers got older they provided less stable attributions. This suggests that, with age, children become more aware that their results could be influenced by both the amount of effort produced and the level of ability achieved by themselves and other competitors. Although the research on the influence of age on attributions in sport is still limited and equivocal, the results of the present study show that there are age differences in causal attributions in children.

The third hypothesis was not supported by the findings. Cognitive anxiety and self-confidence were not associated with performance, and there were no gender differences. Given the contradictory findings of Furst and Tennenbaum (14) and Burton (8), it is still unclear whether high anxiety scores are facilitatory or detrimental to performance. The findings of this study suggest that, for children competing in swimming, anxiety intensity does not affect objective or subjective performance, but we only considered a linear relationship between anxiety and performance. This is an area that warrants further investigation.

This study did not support the notion that less experienced athletes perceived higher levels of anxiety (24). Therefore, years of experience might not be the most appropriate measure to use. We would suggest that the number of previous high-level competitions completed by child athletes is a more relevant mediating variable because they might not have competed often but might have been involved in their sport for a significant period of time.

In conclusion, the child competitive swimmers in this study gave favorable attributions that were adaptive in nature. Other important findings were that self-confidence and, to a lesser extent, cognitive state anxiety influenced the attributional process, and the losers did not employ an ego-protecting attributional style. Finally, anxiety was not associated with objective or subjective performance.

Based on the findings of this study, people who work with children in competitive sport should create an environment that, in particular, fosters self-confidence, reduces cognitive-state anxiety, and provides successful experiences. This could be achieved by setting attainable goals and giving appropriate feedback. In addition, attributional retraining should focus on the appropriate use of stability and personal control and emphasize the fact that failure is the consequence of a lack of effort rather than ability.

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