Journal of Sport & Exercise Psychology, 2007, *29,* 39-59

Effects of a Motivational Climate Intervention for Coaches on Young Athletes' Sport Performance Anxiety

Ronald E. Smith, Frank L. Smoll, and Sean P. Cumming
University of Washington

The mastery approach to coaching is a cognitive-behavioral intervention designed to promote a mastery-involving motivational climate, shown in previous research to be related to lower anxiety in athletes. We tested the effects of this intervention on motivational climate and on changes in male and female athletes' cognitive and somatic performance anxiety over the course of a basketball season. Hierarchical linear modeling analyses revealed that the athletes in the intervention condition perceived their coaches as being more mastery-involving on the Motivational Climate Scale for Youth Sports when compared to athletes in an untreated control condition. Relative to athletes who played for untrained coaches, those who played for the trained coaches exhibited decreases on all subscales of the Sport Anxiety Scale-2 and on total anxiety score from preseason to late season. Control group athletes reported increases in anxiety over the season. The intervention had equally positive effects on boys and girls teams.

Key Words: coach training, motivational climate, sport performance anxiety, mastery approach to coaching

Because coaches occupy a central and influential role in youth sports, a variety of training programs have emerged over the years. Some are broad-spectrum programs that cover diverse and important topics ranging from instructional strategies to risk management, whereas others are briefer and more focused on helping coaches create a more positive interpersonal environment (see Smith & Smoll, 2005, for a review). Whatever their focus, however, it is important to know what effects these coach training programs have on coaches and athletes. This study describes the effects of a cognitive-behavioral intervention for coaches on performance anxiety changes in young athletes. The intervention is designed to reduce anxiety by helping coaches to create a mastery (task)-involving motivational climate, which has been shown in correlational studies to be associated with lower levels of anxiety in athletes. A mastery climate counteracts anxiety by reducing social comparison

Smith and Smoll are with the Department of Psychology, University of Washington, Seattle, Washington 98195-1525, and Cumming is now with the School for Health, University of Bath, Bath, England, BA2 7AY.

pressures, by focusing on controllable effort rather than incompletely controllable outcome, and by creating a mutually supportive team environment (McArdle & Duda, 2002; Vazou, Ntoumanis, & Duda, 2006).

Sport performance trait anxiety is a predisposition to appraise sport situations in which athletic performance can be evaluated as threatening and to respond with state anxiety reactions of varying intensity. These reactions include high levels of autonomic arousal, worry, and self-oriented cognitions that can disrupt attentional processes and other cognitive functions (Smith, Smoll, & Wiechman, 1998; Smith, Smoll, & Passer, 2002). Although some athletes report that anxiety facilitates task performance (Jones & Swain, 1995), a growing body of research indicates that performance anxiety can have deleterious effects on performance, enjoyment of sport participation, and physical well-being in both adults and children (Mahoney & Meyers, 1989; Scanlan, Babkes, & Scanlan, 2005; Scanlan & Lewthwaite, 1986; Smith et al., 1998). It has also been linked to young athletes' avoidance of organized sport experiences, to athletic burnout, and to sport attrition (Gould, Feltz, Horn, & Weiss, 1982; Gould, Tuffey, Udry, & Loehr, 1996; Orlick & Botterill, 1975). High levels of performance trait anxiety can also affect physical well-being, serving as a risk factor for physical injury in performers who are experiencing significant negative life events (Smith, Ptacek, & Patterson, 2000).

Children who are high in sport performance anxiety appear to be especially sensitive to fears of failure and resulting negative social- and self-evaluation. Passer (1983) found that high anxiety children worried more frequently about making mistakes, not playing well, and losing than did their low-anxiety counterparts. They also were more concerned than low anxiety children about how they would be evaluated by their coaches, peers, and parents, and they had stronger expectancies that failure would elicit criticism from these significant others. Other studies have yielded similar findings (Gould, Horn, & Spreeman, 1983; Rainey, Conklin, & Rainey, 1987; Smith et al., 2002).

Within the youth sport environment, coaches strongly influence the nature and quality of the sport experience. The goal priorities they promote, the attitudes and values they transmit, and the nature of their interactions with athletes can markedly influence the effects of sport participation on children and youth. Coaches can play an especially influential role in the processes that affect the development and maintenance of performance anxiety, for they provide athletes with extensive evaluative feedback about their ability and performance and they administer response-contingent approval and disapproval. Critical or punitive feedback from coaches can evoke high levels of negative affect in children who fear failure and disapproval, thereby contributing to a threatening athletic environment (Passer, 1988). In contrast with children who have negative interactions with their coaches, children who perceive their coaches as supportive of their efforts experience higher levels of sport enjoyment and lower anxiety (Scanlan & Lewthwaite, 1986; Scanlan & Passer, 1978; Smoll, Smith, Barnett, & Everett, 1993).

Personalized criteria for success are linked to anxiety as well. Advances in achievement goal theory indicate that coaching behaviors can have important effects on how children define success and on a host of motivational factors, including anxiety (Chi, 2004; Duda & Hall, 2001; Roberts, Treasure, & Kuvassanu, 1997). Of special significance is the motivational climate that coaches establish through their communication of goal priorities (e.g., skill development, having fun, winning) and the pattern of rewards and punishments for specific athlete behaviors, such as successful or unsuccessful effort and performance. Much research has focused on mastery and ego climates. Ames (1992) described a mastery climate as one in which coaches define success in terms of self-improvement, task mastery, and exhibiting maximum effort and persistence. In such a climate, athletes are reinforced for selecting challenging tasks, giving maximum effort, persisting in the face of setbacks, encouraging and supporting teammates, and demonstrating personal improvement. Mistakes are viewed as a potentially valuable source of feedback that can facilitate improvement. In contrast, an ego-involving climate promotes social comparison as a basis for success judgments. When coaches create an ego climate, they tend to give differential attention and focus positive reinforcement on athletes who are most competent and instrumental to winning, the importance of which is emphasized. Skill development is in the service of besting others rather than personal improvement, and mistakes may evoke punitive behaviors from the coach (Chi, 2002; Duda & Ntoumanis, 2005).

A mastery climate would be expected to reduce the anxiety-arousing potential of the sport environment for several reasons. First, whereas a conception of success as outperforming and comparing oneself with others (characteristic of ego-involving climates) heightens evaluation apprehension and fosters worry and anxiety, a mastery climate minimizes social comparison and focuses athletes' attention on self-referenced goals, personal development, and task mastery (Duda & Ntoumanis, 2005; Walling, Duda, & Chi, 1993). Mistakes are regarded as a natural part of the learning process, not as something to be dreaded and avoided because of fear of punishment from the coach. In such an environment, athletes should be less likely to experience threat concerning their ability to outperform others and therefore experience less anxiety (McArdle & Duda, 2002; Roberts, 1986). Moreover, a mastery climate also increases enjoyment of sport activities, which is negatively associated with anxiety (Carpenter & Morgan, 1999; Newton & Duda, 1999; Seifriz, Duda, & Chi, 1992). It is not surprising, therefore, that correlational studies indicate that athlete perceptions of a mastery involving climate are associated with lower anxiety (Papaiannou & Kouli, 1999; Walling et al., 1993; Yoo, 2003), and that perceptions of an ego climate are positively correlated with performance anxiety (Vazou et al., 2006).

Given the critical role that coaching behaviors can have on the emotional reactions of young athletes and on their continuation in sports, the potential value of educational interventions designed to train coaches to provide a positive and supportive athletic environment seems self-evident. For that reason, it is important to determine whether appropriate interventions directed at coaches might reduce the degree to which athletes experience performance anxiety. One educational intervention that has been evaluated in this regard is coach effectiveness training (CET; Smith, Smoll, & Curtis, 1979; Smoll, Smith, Curtis, & Hunt, 1978). The program was derived from basic research on relations between observed coaching behaviors, athletes' perceptions of those behaviors, and the athletes' evaluative reactions to their coaches and sport experience (Curtis, Smith, & Smoll, 1979; Smith & Smoll, 1990; Smith Smoll, & Curtis, 1978; Smith, Zane, Smoll, & Coppel, 1983). It provides coaches with specific behavioral guidelines for fostering positive coach-athlete relationships, reducing evaluation apprehension, and enhancing team cohesion. Controlled outcome studies have demonstrated that implementation of CET principles results in observed behavioral differences between trained and untrained coaches that are consistent with the guidelines (Conroy & Coatsworth, 2004; Smith et al., 1979). Youngsters who play for trained coaches enjoy their sport experience more, evaluate their coach and teammates more positively, show significant increases in general self-esteem over the course of the sport season, and are roughly five times less likely than those playing for untrained coaches to drop out of the sport program the following season (Barnett, Smoll, & Smith, 1992; Smith et al., 1979; Smoll et al., 1993).

Several features of the CET program might be expected to reduce the anxiety-arousing potential of the competitive sport environment. First, the program promotes positive behavioral interactions among coaches and athletes, a factor increasingly cited as an important component of a mastery climate. There is considerable empirical evidence that social support has anxiety-reducing properties (Sarason, Sarason, & Pierce, 1990). Second, by encouraging coaches to focus on personal effort and skill development rather than on winning, the CET guidelines emphasize an area over which athletes have relatively greater personal control. This might also serve to reduce performance anxiety, as it is generally recognized that increasing individuals' perceptions of personal control is one method of reducing anxiety (Folkman, 1984; Holahan & Moos, 1990). Third, the emphasis on self-referenced personal improvement, coupled with effective instructional strategies learned by coaches during the training program, may increase the skill levels of the athletes and create a more favorable balance between the demands of the situation and the personal coping resources of the athletes, thereby reducing fear of failure (Lazarus & Folkman, 1984). Finally, a strong emphasis is placed on the outcome of "having fun," a factor that has been found to be inversely related to competitive stress (Scanlan & Lewthwaite, 1986; Scanlan & Passer, 1978).

Although CET was developed before the emergence of achievement goal theory, the CET guidelines that promote a focus on furthering the skill and personal development of athletes over a focus on winning at all costs, together with an emphasis on reinforcing effort as well as outcome and promoting a cooperative learning environment, are clearly consistent with a mastery motivational climate. However, achievement goal theory articulates these principles in a more systematic manner and has a body of empirical support that did not exist when CET was originally developed in the 1970s. Likewise, the supportive team atmosphere promoted by CET guidelines is consistent with recent additions of this element to conceptions of a mastery climate (Allen, 2003; Vazou et al., 2006). As a result, we have placed a more explicit emphasis on describing and providing behavioral guidelines for a mastery-involving motivational climate in a newly evolved intervention called the mastery approach to coaching (MAC). The effects of this intervention on motivational climate and performance anxiety are the focus of the present study.

Although this is the first test of the MAC program in relation to anxiety, two previous studies have tested the efficacy of CET principles for reducing performance anxiety and fear of failure in young athletes, with discrepant results. Smith, Smoll, and Barnett (1995) assessed CET's effects on performance trait anxiety in 152 male 10- to 12-year-old baseball players who played for 8 experimental and 10 control group coaches. Outcome measures included the Sport Anxiety Scale (SAS; Smith et al., 1990) and the Children's Sport Competition Anxiety Test (SCAT-C; Martens, 1979). On both of the trait anxiety scales, significant reductions in anxiety occurred in children who played for the CET-trained coaches but not in a control condition.

In a more recent study, Conroy and Coatsworth (2004) tested CET principles in a sample of seven coaches and 135 male and female swimmers ranging in age from 7 to 18 years, using the Performance Failure Appraisal Inventory, which correlates .47 with the SAS (Conroy, Willow, & Metzler, 2002), as the outcome measure. They also used the Coaching Behavior Assessment System (Smith, Smoll, & Hunt, 1977) to code the observed behaviors of coaches and thereby assess compliance with the CET behavioral guidelines. Although the four trained coaches' observed behaviors were more consistent with CET guidelines than were those of the three control coaches, no evidence for reduced fear of failure was found, nor did sex of athlete affect the outcome.

Several important issues arise from these initial intervention studies. As Conroy and Coatsworth (2004) correctly note, their results constitute a failure to replicate the Smith et al. (1995) results with a measure that taps a fear of failure construct that seems conceptually related to the SAS and SCAT performance anxiety construct. They concluded that this failure raises questions about the generality of intervention effects in athletic samples other than the male baseball population that has been the focus of previous CET studies. For example, no previous study has explicitly assessed the effects of the coach intervention on girls teams. It should be noted, however, that Conroy and Coatsworth's failure to replicate the findings of the previous CET study may have been the result of methodological shortcomings associated with the research design, sample, and measures. Conroy and Coatsworth examined a heterogeneous sample of youth swimmers (7 to 18 years of age, distribution unreported) and a relatively small sample of seven coaches. In addition, the suitability of their scales, developed with college students, for the youngest children in their sample is unclear. Flesch-Kincaid readability scores on their five-item scale were as high as grade 9.6, which may affect the scale's validity for the younger portion of their sample. Thus, a need exists for a more explicit study of intervention effects in young athletes, using an age-appropriate measure. In the present study, we assessed outcomes in basketball, a different sport than studied previously, and we compared intervention effects for a larger number of boys and girls teams and coaches.

A second important issue addressed in the present study is the unanswered question of how the coach intervention affects the somatic and cognitive components of performance anxiety. Previous motivational climate studies (e.g., Harwood & Swain, 2002; Papaioannou & Kouli, 1999) have shown possible relations to the cognitive components of anxiety. Although the SAS contains separate scales for Somatic Anxiety, Worry, and Concentration Disruption, the three-factor structure of the SAS, confirmed repeatedly in older samples, was not replicated in Smith et al.'s 10- to 12-year-old sample. Total SAS score was therefore used as the outcome measure. Moreover, the SCAT-C, also used in that study, measures only global anxiety.

Because previous research has shown that cognitive and somatic anxiety have differing relations with other variables, such as quality of motor performance, cognitive processing, and psychophysiological measures (Burton, 1998; Smith et al., 2002), it is important to know which anxiety components are influenced by a given intervention. For example, were a coach intervention to influence some anxiety components but not others, effects of the intervention on certain outcomes (e.g., motor performance, information processing) might be affected. Moreover, it might be possible to add additional elements to an intervention in order to target unaffected components. The ability to measure multidimensional trait anxiety in children is now possible because a revised measure, the Sport Anxiety Scale-2, reproduces the somatic, worry, and concentration disruption factors in both child and adult populations (Smith, Smoll, Cumming, & Grossbard, 2006).

On theoretical and empirical grounds described above, we therefore predicted that the MAC intervention would promote the development of a mastery-involving motivational climate. We reasoned further that reduced fear of negative social evaluation, lessened social comparison pressures, and enhanced social support associated with a mastery-involving climate would result in lower levels of both cognitive and somatic performance anxiety over the course of the season in athletes who played for trained coaches.

Method

Participants

Participants were 37 coaches (33 males and 4 females) and 216 athletes (117 boys and 99 girls) between the ages of 10 and 14 years who participated in community-based basketball programs in a city in the western United States. The mean age of the coaches was 45.0 years (*SD* = 6.17), and the mean number of years of basketball coaching experience was 6.1 (*SD* = 5.44). The mean age of the athletes was 11.5 years (*SD* = 1.63), and the mean number of years that they had played basketball for their current coach was 1.4 (*SD* = 1.59).

To minimize the possibility that coaches in the experimental condition might interact with and potentially share MAC guidelines with the coaches in the control group, we utilized a matched quasi-experimental design so as to ensure the integrity of the intervention (Campbell & Stanley, 1966). On the basis of U.S. Census Bureau (2000) tract data, we selected from among several possible catchment areas two youth sport programs that drew participants from households that were similar to one another in socioeconomic status (mean family income between $65,000 and $70,000) and educational attainment (between 64% and 69% of adults in each community possessed a bachelor's degree or higher). The two programs were in separate community leagues and therefore did not compete against one another. The programs had similar sex and age distributions across the 10- to 14-year age range, and coaches in the two conditions did not differ on any of the background variables. Both programs had two hour-long practices and one game per week, thereby equalizing athletes' exposure to the coaches. The two programs were among six programs that participated in the development of a new age-appropriate achievement goal orientation scale. Given the possibility that achievement goal orientation might affect responses to a motivational climate intervention, we compared the children in the intervention and control conditions on the Achievement Goal Scale for Youth Sports (AGSYS; Cumming, Smith, Smoll, & Grossbard, 2006). Multilevel linear modeling showed no significant group differences on the Mastery and Ego goal orientation scales.

Given evidence that the coaches and athletes in the matched programs were sufficiently similar to one another to preclude systematic bias on the measured variables, we assigned the larger of the two programs to the intervention condition on the expectation that not all the coaches would participate. Were that to occur, we wished to ensure that we would have enough teams for a viable intervention condition and for the use of hierarchical linear (multilevel) modeling to appropriately assess intervention effects. In fact, all coaches in the intervention program chose to participate. The intervention condition therefore comprised 10 boys and 10 girls teams, and the control condition contained 11 boys and 6 girls teams, $\chi^2_{(1)} = .81$, $p > .40$. Teams in the two programs did not differ in mean won-lost percentages during the season in which the study was conducted.

Athletes who participated in the study did so with their parents' signed consent and with signed assent obtained from them before each data collection session. During the end-of-season assessment period, 11% of the athletes in the intervention condition and 26% of those in the control condition missed three consecutive practices and therefore did not provide outcome data, $\chi^2_{(1)} = 5.58$, $p < .025$). This attrition/involvement difference is consistent with previous research showing appreciably lower attrition in athletes whose coaches received CET (Barnett et al., 1992). The untested athletes did not differ significantly in preseason age, anxiety, or achievement goal orientation scores from those who completed both preseason and late-season measures. Complete preseason and late-season data were collected from 147 children in the intervention condition and 69 children in the control condition. Data from two boys in the intervention condition were discarded because of obvious random responding on the second anxiety measure, resulting in an intervention sample of 145 children.

Measures

Sport Performance Anxiety. Sport performance was measured using the Sport Anxiety Scale-2 (SAS-2; Smith et al., 2006). The SAS-2 has five-item subscales for Somatic Anxiety, Worry, and Concentration Disruption. Participants respond to items with the stem, "Before or while I compete in sports . . ." (e.g., "my body feels tense;" "I worry that I will not play well;" "it is hard for me to focus on what I am supposed to do."). Each item is answered on a 4-point scale ranging from *not at all* to *very much*. Scores on each subscale can range between 5 and 20, and a total score based on the sum of all items can range from 15 to 60. In this study's sample, internal consistency alpha coefficients for the Somatic Anxiety, Worry, and Concentration Disruption subscales were .81, .87, and .75, respectively, for the preseason assessment and .92, .92, and .85 for the late-season administration. Total score alpha was .87 preseason and .94 late season.

Because the SAS-2 was designed to measure anxiety in children as well as adults, SAS items were revised and all items were required to have a reading level below grade 4 (mean level = grade 2.3). With a child-appropriate reading level, the Somatic Anxiety, Worry, and Concentration Disruption factors measured in older samples with the SAS were reproduced in the younger population. In a sample of 188 young athletes, exploratory factor analysis revealed high item loadings on the three scales ranging from .62 to .88 and no loadings on other scales exceeding .22. Confirmatory factor analyses (CFAs) using an independent sample of 850 athletes yielded fit indices supporting the factorial validity of the new scale. In the 9-to-14 age sample, non-normed and comparative fit indices were both .96, and root mean square errors of approximation were less than .051 for both a 3-factor model and a 3-factor model with a second-order global anxiety factor corresponding to the SAS-2 total score. The SAS-2 also demonstrated factorial invariance across 9-10, 11-12, and 13-14 year-old groups of athletes plus a college athlete sample, as well as convergent and discriminant validity with other variables such as SAS scores, achievement goal orientations, self-esteem, and social desirability (Smith et al., 2006).

Motivational Climate. To ensure age-appropriate measurement of motivational climate, we used the Motivational Climate Scale for Youth Sports (MCSYS; Smith, Cumming, & Smoll, in press). The scale, based on the content of the Perceived Motivational Climate in Sport-2 (PMCSQ-2; Newton, Duda, & Yin, 2000), consists of six items indexing a mastery climate and six items assessing an ego climate. The Mastery subscale contained items reflecting the PMCSQ-2 subscales of Cooperative Learning, Effort/Improvement, and Important Role, and the Ego subscale contained prototypic items indexing Intra-Team Member Rivalry, Unequal Recognition, and Punishment for Mistakes. Inclusion of these facets was for the purpose of achieving content validity; attempting to generate subscales was not consistent with the goal of scale brevity. Items range in Flesch-Kincaid reading level from grade 1.8 to 4.0, with an average grade level of 3.30. Sample mastery items are, "The coach made players feel good when they improved a skill" and "The coach told us that trying our best was the most important thing." Sample ego items are, "Winning games was the most important thing for the coach" and "The coach paid most attention to the best players." The athletes indicated their level of agreement with each item on a 5-point Likert scale (1 = *not at all true*; 5 = *very true*). Scores thus range from 6 to 30 on each scale.

Smith et al. (in press) report evidence for a 2-factor MCSYS structure representing mastery and ego climates in a sample of 582 10- to 14-year-old athletes. A CFA yielded goodness-of-fit and comparative fit indices of .97 and a root mean square error of approximation of .037, indicating acceptable data fit to the hypothesized 2-factor model. In a sample of 574 athletes, coaches' postseason Mastery climate scores correlated .43 with Mastery goal orientation scores on the AGSYS and −.22 with ego goal orientation scores. Ego climate scores correlated .41 with ego goal orientation scores on the AGSYS and −.21 with mastery orientation scores. Consistent with previous findings regarding the PMCSQ-2 (Newton et al., 2000), the Mastery and Ego climate scales were negatively correlated with one another ($r = -.38$). In the present sample, internal consistency as measured by Cronbach's alpha was .72 for both MCSYS subscales, an acceptable figure given scale length and the intrascale content diversity of the items based on the PMCSQ-2 facet subscales.

Intervention

The 20 coaches in the experimental condition participated in a 75-min MAC workshop presented by the second author, who has extensive experience in conducting psychologically oriented coaching workshops. The training session provided coaches with behavioral guidelines derived from previous research on coaching behaviors and their effects on athletes (Smith, Smoll, & Curtis, 1978) and from more recent research inspired by achievement goal theory (McArdle & Duda, 2002; Roberts et al., 1997). Accordingly, MAC behavioral guidelines focused on two major themes. First, in the tradition of CET, strong emphasis was placed on the distinction between positive versus aversive control of behavior (Smoll & Smith, 2006). In a series of coaching dos and don'ts derived from Smith et al.'s (1978) foundational research and consistent with establishment of a mastery climate, coaches were encouraged to increase four specific behaviors—positive reinforcement, mistake-contingent encouragement, corrective instruction given in a positive and encouraging fashion, and sound technical instruction. Coaches were urged to avoid nonreinforcement of positive behaviors and effort, to encourage athletes to learn from mistakes, and to avoid mistake-contingent punishment. They were also shown how to establish team rules early and reinforce compliance with them to avoid discipline problems. These guidelines, consistent with a mastery motivational climate, were designed to increase positive coach-athlete interactions, enhance team solidarity and mutual supportiveness, reduce fear of failure, and promote a positive atmosphere for skill development (Smoll & Smith, 2002).

The second important theme in MAC guidelines, also derived from CET principles and from achievement goal theory and research, is a conception of success as giving maximum effort and becoming the best one can be, rather than an emphasis on winning or outperforming others. Coaches are encouraged to emphasize and reinforce effort as well as outcome; to help their athletes become the best they can be by giving individualized attention to all athletes and by setting personalized goals for improvement; to define success as maximizing one's athletic potential; and to emphasize the importance of having fun and getting better as opposed to winning at all costs. Like the guidelines that foster positive coach-athlete relations and team solidarity, these guidelines are designed to reduce fear of failure, to foster self-esteem enhancement by allowing athletes to take personal pride in effort and improvement, and to create a more enjoyable leaning environment that increases intrinsic motivation for the activity. The behavioral guidelines are consistent with the procedures designed by Ames (1992) and Epstein (1988) to create a mastery learning climate in the classroom. During the experimental MAC workshop, a mastery climate was explicitly described, its creation was strongly recommended, and a list of established salutary effects derived from research was presented. The didactic presentation of MAC principles was augmented by modeling both desirable and undesirable methods of responding to specific situations (e.g., athlete mistakes, reinforcing good performance and effort, setting mastery goals). Coaches were invited to role-play desired responses.[1]

To reinforce the didactic portions of the workshop, coaches were given a revised manual entitled *Coaches Who Never Lose* (Smoll & Smith, 2005). The 28-page booklet includes new sections on (a) mastery- and ego-involving climates and their effects on athletes, and (b) principles to follow in dealing with the dual roles of coach-parent. Coaches were also given self-monitoring forms containing nine items related to the behavioral guidelines. On the form, they were asked how often they engaged in the recommended behaviors in relevant situations. For example, coaches were asked, "When athletes gave good effort (regardless of the outcome), what percentage of the times did you respond with reinforcement?" They were asked to complete the forms immediately after the next 10 practices or games. The behavioral self-monitoring component of the intervention was intended to increase coaches' awareness of their behavior and to encourage their compliance with the guidelines. To promote compliance with the self-monitoring procedure, the coaches were told that the completed forms would be collected at the end of the season.[2]

Procedure

As part of a larger test battery, the multidimensional SAS-2 was administered to athletes during team practice sessions on two separate occasions. The first session occurred in the week preceding the administration of the MAC workshop and early in the preseason practice period. The second administration occurred at a team practice approximately 12 weeks later during the final week of the competitive season as teams were preparing for postseason playoffs. The MCSYS measure of motivational climate, which served as a manipulation check on the intervention, was also administered during this second assessment session. This variable was assessed only at this point because athletes who had not played for the coach in the past would have no realistic basis for rating the coaches' behaviors prior to the season, and those who had played for the same coach in the past would be giving potentially unreliable retrospective responses spanning a year or more. Such intervals have been shown to result in highly unreliable motivational climate data (Whitehead & Andrée, 1997). Our interest was in the athletes' perceptions of coaching behaviors during the season in which this study was conducted.

Trained research assistants made arrangements with the coaches to conduct the two data collection sessions. Coaches in both conditions were told that the purpose of the research was to assess factors related to athletes' attitudes and outcomes from youth sport participation. To increase the likelihood of obtaining valid data, the brief scales described above were administered in sessions that lasted approximately 20 min in duration. Athletes were also told during the preseason session that if they answered the questionnaire items carefully and accurately, they would be given a $4 Baskin-Robbins ice cream gift certificate redeemable at local franchise stores at the end of the season. The certificates were given to the athletes after they completed the second set of questionnaires.

Results

Because athletes are nested within teams, teammates who play for the same coach are not statistically independent data points. To examine the effect of nesting of athletes within teams, we first tested a series of unconditional hierarchical linear models with no predictor variables. Separate models were tested for motivational climate and performance anxiety. The intraclass correlation (i.e., shared intrateam variance) for each variable was estimated by dividing the variance associated with the intercept by the sum of the residual variance plus the variance associated with the intercept (Singer & Willett, 2003). For MCSYS scores, the intraclass correlations were .10 for Mastery climate and .25 for Ego climate, indicating modest within-team homogeneity. The estimated variance associated with the intercept was significant for Ego (but not Mastery) climate, indicating that variation due to within-team nonindependence could result in inaccurate statistical tests without appropriate data modeling (Bryk & Raudenbush, 1992). For SAS-2 scores, the intraclass correlations were considerably lower than they were for the ego climate measure, ranging from .02 to .09 for total score and for the Somatic, Worry, and Concentration Disruption preseason and late-season measures. This suggests less within-team homogeneity for anxiety than for motivational climate (which is shared to some extent by all members of a team) and indicates more of an individually based dispositional status for anxiety.

Preliminary multilevel analyses with time, conditions, and sex as predictor variables indicated that athletes' sex did not yield main or interaction effects for any of the outcome variables. Therefore, male and female teams were combined to increase the suitability of the data for multilevel analyses, whose power depends more on the number of Level-2 (team) data points than on the number of individual athletes within teams (Singer & Willett, 2003).

Raw means and standard deviations for the dependent variable measures as a function of time and condition are presented in Table 1. In multilevel analyses, however, the major interest is in estimated means generated as the result of the hierarchical modeling procedures, together with the significance tests associated with them. Hereafter, our presentation of results will focus on the estimated means produced by the hierarchical linear modeling analyses.

In our multilevel analyses, conducted using the SPSS Version 11.5 linear mixed model program, the lowest level of the model involves changes in athletes' scores on the preseason and late-season measures of anxiety (i.e., a time factor). At the next hierarchy level, athletes are nested within teams because multiple athletes play for the same coach. The athletes within teams are, in turn, nested within experimental

Table 1 Means and Standard Deviations of Preseason and Late-Season SAS-2 Total and Subscale Scores for Intervention and Control Conditions

		Preseason		Late Season	
Variable	***n***	***M***	***SD***	***M***	***SD***
SAS-2 total score					
MAC trained	145	25.04	7.45	23.64	8.62
Control	69	24.12	6.52	27.01	9.87
Somatic					
MAC trained	145	8.23	3.12	7.72	3.50
Control	69	7.48	2.23	8.62	3.71
Worry					
MAC trained	145	9.49	3.28	8.82	3.72
Control	69	9.46	3.34	10.08	3.90
Concentration Disruption					
MAC trained	145	7.32	2.47	7.10	2.69
Control	69	7.17	2.19	8.31	3.37

conditions at a third level. In the language of multilevel linear modeling, athletes and teams were treated as random variables, whereas time, conditions (coded 1 and 0 for intervention and control conditions, respectively), and the Time × Conditions interaction were treated as fixed variables (Bryk & Raudenbush, 1992; Singer & Willett, 2003). The statistical tests of the intervention's effects on the anxiety scores are to be found in the cross-level Time × Conditions interactions, which tell us whether different slopes and intercepts for the individual athletes occurred in the regression of anxiety scores on time as a function of intervention or control conditions.

Motivational Climate Manipulation Check

One objective of the intervention was to promote a coach-initiated mastery climate. As a manipulation check of the effects of the intervention, we examined differences between the MAC and control conditions in athletes' perceptions of a coach-initiated motivational climate. Separate multilevel models were computed for Mastery and Ego climate scores on the MCSYS. Because motivational climate was measured only at the end of the season, the Level-1 component of the model was the athletes, who were, in turn, nested within teams and teams within conditions. Condition (i.e., intervention vs. control) was treated as a fixed effect and the regression coefficient was entered as a random variable and allowed to vary at the level of the team.

The estimated means for the perceived motivational climate created by the coaches were consistent with our a priori hypothesis that the intervention would result in higher Mastery scores and lower Ego scores. Multilevel analyses revealed that athletes who played for MAC-trained coaches reported significantly higher levels of mastery-climate coaching behaviors and lower levels of ego climate behaviors. For the MAC condition, the estimated mean for Mastery Climate (M = 26.23, SE = .36) was significantly higher than in the control condition (M = 25.08, SE = .48), t = 1.91, p < .03, one-tailed. On the Ego Climate scale, the MAC coaches (M = 9.79, SE = .51), were lower than the control group coaches (M = 11.03, SE = .64), but this difference did not attain significance, t = −1.52, p < .07, one-tailed. Thus, the intervention was associated with a stronger mastery climate and less of an ego climate, although only the former difference was significant. It should be noted, however, that coaches in both conditions created motivational climates that were, on average, more mastery-oriented than ego-oriented.

Intervention Effects on Athletes' Performance Anxiety

Preliminary multilevel analyses of baseline scores indicated that the intervention and control conditions did not differ significantly in SAS-2 total score or on any of its subscales at the beginning of the season, further indicating preintervention group similarity in anxiety.

Given that trained coaches created a stronger mastery climate, achievement goal theory and previous research would predict lower anxiety in the intervention condition. Moreover, the MCSYS Ego scale contains several items concerning use of mistake-contingent punishment by coaches, which is contrary to MAC guidelines. Multilevel analyses were carried out to test this hypothesis. As indicated in Table 2, a significant effect was found for time for SAS-2 Worry and total score, indicat-

Table 2 Main and Interactive Effects of Time and Condition Upon Change in SAS-2 Scores: Parameter Estimates from Multilevel Linear Models

Variable	Estimate	*SE*	*t*	*p*
SAS-2 total score				
Intercept	23.66	.74	32.00	.001
Condition	3.32	1.27	2.61	.012
Time	1.40	.62	2.24	.026
Time × Condition	–4.29	1.10	–3.91	.001
Somatic Anxiety				
Intercept	7.74	.30	25.92	.001
Condition	.87	.51	1.70	.094
Time	.51	.27	1.91	.057
Time × Condition	–1.65	.47	–3.51	.001
Worry				
Intercept	8.82	.33	26.41	.001
Condition	1.23	.57	2.16	.035
Time	.67	.27	2.44	.016
Time × Condition	–1.29	.48	–2.67	.008
Concentration Disruption				
Intercept	7.11	.23	30.28	.001
Condition	1.20	.41	2.96	.004
Time	.22	.23	.97	.334
Time × Condition	–1.36	.40	–3.38	.001

ing an overall tendency for trait anxiety to increase from preseason to the second administration prior to league playoffs, when competitive pressures were higher.

Intervention effects were formally tested by the Time × Conditions interactions in Table 2. These interactions were significant for SAS-2 total score and for each of its subscales. The interactions involving the expected means generated by the multilevel analyses for each subscale are illustrated in Figure 1, which shows divergent patterns of change in the intervention and control groups. Athletes who played for the control coaches exhibited higher scores late in the season than at the beginning, whereas athletes who played for coaches who underwent the MAC intervention exhibited decreases in anxiety scores from preseason to late season.

Separate tests of time differences within each condition were performed using multilevel analyses of the nested athletes-within-teams data. Because significant increases in anxiety in the control condition were not predicted on an a priori basis in the control condition, significance was assessed using two-tailed tests. These analyses of time differences (late-season score minus preseason score) revealed that athletes in the control condition increased significantly in SAS-2 total score ($t = 2.68$, $p < .01$), and on the Somatic Anxiety ($t = 3.85$, $p <= .001$) and Concentration Disruption

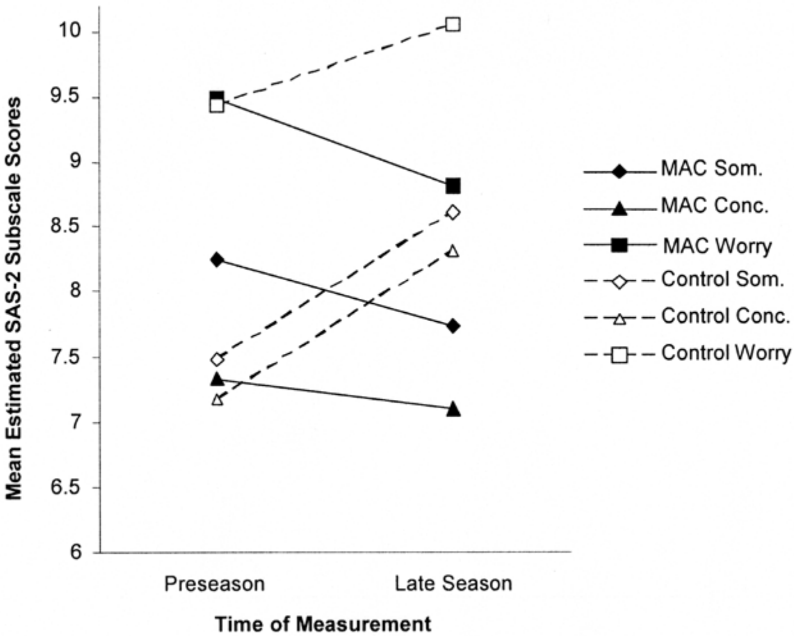

Figure 1 — Preseason and late-season estimated means for the intervention (MAC) and control conditions on the Somatic Anxiety, Concentration Disruption, and Worry subscales of the Sport Anxiety Scale-2 (SAS-2). Som. = Somatic Anxiety and Conc. = Concentration Disruption.

($t = 2.80$, $p < .01$) scales, but the increase on the Worry scale ($t = 1.40$) was not significant. One-tailed significance tests of the predicted decreases in anxiety within the intervention condition revealed significant effects for SAS-2 total score ($t = -2.51$, $p < .01$) and for the Somatic ($t = -1.97$, $p < .025$) and Worry ($t = -2.60$, $p < .01$) scales, but the decrease on Concentration Disruption ($t = -1.12$) was not significant.

Discussion

To the extent that the MAC program was successful in establishing a stronger mastery-oriented motivational climate, youngsters would be expected to manifest lower levels of performance anxiety as a result of their season-long athletic experience. The late-season manipulation check of motivational climate revealed that athletes in the intervention group reported a significantly higher coach-initiated mastery climate than did the control group. Coaches in the intervention condition also had lower Ego climate scores than the control group coaches, but this difference was not statistically significant. Thus, the climate-initiating behaviors of the two groups of coaches were perceived differently by their athletes.

Although the Smith et al. (1995) study demonstrated significant global anxiety reduction on both the SAS total score and on the SCAT, it was not possible to assess intervention effects on the somatic and cognitive anxiety components. The recent development of the age-appropriate SAS-2 allowed us to assess the cognitive and somatic components of anxiety as well as global anxiety. The statistically significant Time × Condition interactions indicate different patterns of anxiety responses in the intervention and control conditions for all anxiety components. Whereas the control condition yielded higher scores on all subscales and on total score late in the season than they had at the beginning, athletes in the intervention condition decreased on all SAS-2 scores and demonstrated significant reductions on SAS-2 total score, Somatic Anxiety, and Worry. The decrease in the Concentration Disruption score was not significant, but even here, there is evidence of a protective effect of the intervention in that Concentration Disruption scores did not *increase* significantly, as in the control group.

We did not anticipate the significant increase in trait anxiety that occurred in the control group, as this was not observed in the Smith et al. (1995) study. The difference between studies might be attributable to the timing of the second administration of the anxiety scale. In the Smith et al. (1995) study, the second measurement occurred after the end of the season, when the athletes were no longer exposed to competitive pressures. In the present study, the second administration occurred late in the season while teams were still competing for positions in the postseason championship playoffs, which could account for higher anxiety scores in the control condition. Changes in coaching behaviors prompted by the intervention may have had a palliative influence on the athletes who played for the trained coaches.

As noted above, we did not find sex differences in the effects of the program. Previous research has focused almost entirely on male samples, leaving it unclear how programs like CET and MAC would affect female athletes. A notable exception is a study by Coatsworth and Conroy (2006), who found positive intervention effects for low self-esteem girls but not for boys. In our study, the nonsignificant Sex × Time × Condition interaction (and visual inspection of means) suggest that the MAC intervention was as effective for the girls teams as for the boys. We should note, however, that because the numbers of boys and girls teams (10 or fewer in each condition) was small, our study was limited in its power to show significant effects when we broke down the teams on that basis. Therefore, there remains a need to conduct large-scale intervention studies involving girls programs, particularly those coached by women.

Of additional interest was the late-season participation group differences. In the absence of differences in won-lost records in the two conditions, 26% of the control group athletes from whom we obtained preseason data were not regularly attending team practices, compared with a figure of 11% in the MAC condition. In the absence of preseason differences on the anxiety and achievement goal orientation measures and in team success, the significant attendance difference may reflect responsiveness to the motivational climates established by the coaches. We did not track attendance over the course of the season because of logistical challenges (the teams played at 10 different sites, which varied from session to session), nor did we ask the coaches to do so. In future studies, however, it would be of interest to relate attrition to motivational climate measures obtained periodically over the course of the season, particularly in light of findings by Barnett et al. (1995) that coaches trained in CET had only a 5% dropout rate compared with 26% attrition in a control condition that did not differ in overall team success. Given the potential advantages of keeping youngsters involved in healthy physical activity and out of potentially negative alternatives, assessment of involvement and attrition as outcome measures is desirable.

Several limitations of this study relating to the measurement of motivational climate should be noted. Our ability to demonstrate mastery effects is limited by two factors. First, the climates created by coaches at this youth sport level were far more mastery-initiating than ego-initiating, creating a near-ceiling effect for mastery climate (and a floor effect for ego climate scores). Nonetheless, it is encouraging that despite the bias toward a mastery climate in the control group and a restricted range of scores on the motivational climate scales, the intervention was associated with a stronger mastery climate and reduced anxiety relative to the control condition.

A second issue involves the measurement of motivational climate on only one occasion. Our preseason anxiety assessment occurred after only a few practice sessions, so that athletes had little basis for completing the MCSYS in a valid fashion at that time. Whereas end-of-season measurement (as occurs in most motivational climate studies) certainly provides the most reasonable basis for assessing how athletes experienced the coaches' behavior over the course of the season, our procedure did not allow us to assess potential changes in motivational climate that would be possible if climate scores were assessed at several junctures during the sport season. In the present study, we cannot be certain that the coaches did not differ before the study began in the climate they typically create. Likewise, concurrent and repeated assessment of motivational climate and anxiety over the course of the season would provide a basis for more definitive tests of mediational influences of motivational climate on outcome measures like anxiety and achievement goal orientations. Ideally, motivational climate should be measured using a multimethod approach involving both athlete perceptions and observational methods. Morgan, Sproule, Weigand, and Carpenter (2005) have developed an observational coding system for motivational climate within physical educational classes. Behavioral assessment could be useful in obtaining a more reliable team-level measure of motivational climate that could supplement athletes' reports. The modest magnitudes of the intraclass correlations we obtained on our climate scales, together with even lower intraclass correlations obtained by Papaioannou, Marsh, and Theodorakis (2004), indicate that athletes' perceptions of motivational climate do not show high levels of concurrence within teams, possibly because coaches respond differentially to their athletes. Behavioral assessment of climate-relevant coaching behaviors would provide a more objective index of the climate being initiated by the coach.

The MAC program is a multifaceted one that includes a variety of behavioral guidelines, as well as the use of modeling, role playing, and training in self-monitoring of coaching behaviors. The relative contribution of these components to outcome is unknown at this time. Future dismantling studies may clarify relations between particular intervention elements and various outcome measures. With appropriate caution, we choose to attribute the decreases in anxiety associated with MAC training to a supportive mastery climate that emphasizes personal skill development and fun, rather than winning, but we do not know the relative importance that the many MAC elements may have in producing the outcomes in this study. We should also note that motivational climate is itself a multifaceted phenomenon (Newton et al., 2000), and research is needed to establish how its various components influence athletes' anxiety.

Finally, we wish to address an important statistical issue that arises in the analysis of data from intervention studies involving sport teams, where individual athletes are nested within different teams (coaches), and the latter are, in turn, nested within experimental conditions. Because common experiences create within-team homogeneity, the assumption that athletes' data constitute independent observations is usually violated, and traditional analytic procedures such as analysis of variance (e.g., Barnett et al., 1992; Smith et al., 1979, 1995) and latent growth analysis (e.g., Coatsworth & Conroy, 2006; Conroy & Coatsworth, 2004) of individual athletes' data can be inappropriate (see Bryk & Raudenbush, 1992; Singer & Willett, 2003). Hierarchical linear modeling (also referred to as multilevel modeling) is designed for the analysis of nested data like ours. In multilevel modeling, data are analyzed at successive levels of the hierarchically arranged data using linear regression to generate and test level-specific parameters. This approach to data analysis has not been employed previously in coach intervention outcome studies, but it is the accepted analytic approach in educational research, where students are nested within classrooms (and teachers), and classrooms within interventions.

Within the limitations noted above, our results indicate that it is possible, through a relatively brief and economical educational program for coaches, to effect changes in young athletes' trait anxiety over the course of a sport season. Moreover, both somatic and cognitive components of trait anxiety were influenced. The fact that the intervention was associated not only with late-season group differences in motivational climate, but also with changes in anxiety, strengthens the theoretically predicted link between a mastery-initiating motivational climate and lowered anxiety, previously demonstrated only in correlational research.

Acknowledgments

This research was supported in part by Grant #2297 from the William T. Grant Foundation. We express our appreciation to youth sport administrators Mike Balicki, Frank Cammarano, Chris Corr, Mike Domingo, and Tracy Read for their cooperation; to Lesa Hoffman and Judith Singer for their assistance with the statistical analyses; and to the following for their assistance in data collection: Erica Coppel, Polo DeCano, Kira Elste, Christopher Harris, Leslie Lombardo, Kim Matz, Cheree Monroe-Wilson, Olivia Morrow, Tori Nutsch, Dana Ryan, Jason Victor, and Nathalie Walker.

References

Allen, J.B. (2003). Social motivation in youth sport. *Journal of Sport & Exercise Psychology, 25*, 551-567.

Ames, C. (1992). Achievement goals, motivational climate, and motivational processes. In G.C. Roberts (Ed.), *Motivation in sport and exercise* (pp. 161-176). Champaign, IL: Human Kinetics.

Barnett, N.P., Smoll, F.L., & Smith, R.E. (1992). Effects of enhancing coach-athlete relationships on youth sport attrition. *The Sport Psychologist, 6*, 111-127.

Bryk, A.S., & Raudenbush, S.W. (1992). *Hierarchical linear models: Applications and data analysis methods*. Thousand Oaks, CA: Sage.

Burton, D. (1998). Measuring competitive state anxiety. In J.L. Duda (Ed.), *Advances in sport and exercise psychology measurement* (pp. 129-148). Morgantown, WV: Fitness Information Technology.

Campbell, D.T., & Stanley, J.C. (1966). *Experimental and quasi-experimental designs for research.* Chicago: Rand McNally.

Carpenter, P.J., & Morgan, K. (1999). Motivational climate, personal goal perspectives, and cognitive and affective responses in physical education classes. *European Journal of Physical Education, 4,* 31-44.

Chi, L. (2004). Achievement goal theory. In T. Morris & J. Summers (Eds.), *Sport psychology: Theory, applications, and issues* (2nd ed., pp. 152-174). Milton, Australia: Wiley.

Coatsworth, J.D., & Conroy, D.E. (2006). Enhancing the self-esteem of youth swimmers through coach training: Gender and age effects. *Psychology of Sport and Exercise, 7,* 173-192.

Conroy, D.E., & Coatsworth, J.D. (2004). The effects of coach training on fear of failure in youth swimmers: A latent growth curve analysis from a randomized, controlled trial. *Journal of Applied Developmental Psychology, 25,* 193-214.

Conroy, D.E., Willow, J.P., & Metzler, J.N. (2002). Multidimensional fear of failure measurement: The Performance Failure Appraisal Inventory. *Journal of Applied Sport Psychology, 14,* 76-90.

Cumming, S.P., Smith, R.E., Smoll, F.L., & Grossbard, J.R. (2006). *Development and validation of the Achievement Goal Scale for Youth Sports*. Manuscript submitted for publication.

Curtis, B., Smith, R.E., & Smoll, F.L. (1979). Scrutinizing the skipper: A study of leadership behaviors in the dugout. *Journal of Applied Psychology, 64*, 391-400.

Duda, J.L., & Hall, H.K. (2001). Achievement goal theory in sport: Recent extensions and future directions. In R. Singer, H. Hausenblas, & C. Janelle (Eds.), *Handbook of sport psychology* (2nd ed., pp. 417-443). New York: Wiley.

Duda, J.L., & Ntoumanis, N. (2005). After-school sport for children: Implications of a task-involving motivational climate. In J.L. Mahoney, R.W. Larson, & J.S. Eccles (Eds.), *Organized activities as contexts of development: Extracurricular activities, after school, and community programs* (pp. 311-330). Mahwah, NJ: Erlbaum.

Epstein, J. (1988). Effective schools or effective students? Dealing with diversity. In R. Haskins & B. MacRae (Eds.), *Policies for America's public schools* (pp. 89-126). Norwood, NJ: Ablex.

Folkman, S. (1984). Personal control and coping processes: A theoretical analysis. *Journal of Personality and Social Psychology, 46,* 839-852.

Gould, D., Feltz, D., Horn, T., & Weiss, M. (1982). Reasons for discontinuing involvement in competitive youth swimming. *Journal of Sport Behavior, 5,* 155-165.

Gould, D., Horn, T., & Spreeman, J. (1983). Sources of stress in junior elite wrestlers. *Journal of Sport Psychology, 5,* 159-171.

Gould, D., Tuffey, S., Udry, E., & Loehr, J. (1996). Burnout in junior tennis players: II. A qualitative analysis. *The Sport Psychologist, 10,* 341-366.

Harwood, C., & Swain, A. (2002). The development and activation of achievement goals within tennis: II. A player, parent, and coach intervention. *The Sport Psychologist, 16,* 111-137.

Holahan, C.J., & Moos, R.H. (1990). Life stressors, resistance factors, and improved psychological functioning: An extension of the stress resistance paradigm. *Journal of Personality and Social Psychology, 58,* 909-917.

Jones G., & Swain, A. (1995). Predisposition to experience debilitative and facilitative anxiety in elite and non-elite performers. *The Sport Psychologist, 9,* 201-211.

Lazarus, R.S., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York: Springer.

Mahoney, M.J., & Meyers, A.W. (1989). Anxiety and athletic performance: Traditional and cognitive-developmental perspectives. In D. Hackfort & C.D. Spielberger (Eds.), *Anxiety in sports: An international perspective*. Washington, D. C.: Hemisphere.

Martens, R. (1977). *Sport Competition Anxiety Test*. Champaign, IL: Human Kinetics.

McArdle, S., & Duda, J.K. (2002). Implications of the motivational climate in youth sports. In F.L. Smoll & R.E. Smith (Eds.), *Children and youth in sport: A biopsychosocial perspective* (2nd ed., pp. 409-434). Dubuque, IA: Kendall/Hunt.

Morgan, K., Sproule, J., Weigand, D., & Carpenter, P. (2005). A computer-based observational assessment of the teaching behaviours that influence motivational climate in physical education. *Physical Education and Sport Psychology, 10,* 113-135.

Newton, M.L., & Duda, J.L. (1999) The interaction of motivational climate, dispositional goal orientation and perceived ability in predicting indices of motivation. *International Journal of Sport Psychology, 30,* 63-82.

Newton, M., Duda, J.L., & Yin, Z. (2000). Examination of the psychometric properties of the Perceived Motivational Climate in Sport Questionnaire-2 in a sample of female athletes. *Journal of Sport Sciences, 18,* 275-290.

Orlick, T.D., & Botterill, C. (1975). *Every kid can win*. Chicago: Nelson-Hall.

Papaioannou, A., & Kouli, O. (1999). The effect of task structure, perceived motivational climate and goal orientations on students' task involvement and anxiety. *Journal of Applied Sport Psychology, 11,* 51-71.

Papaioannou, A., Marsh, H.W., & Theodorakis, Y. (2004). A multilevel approach to motivational climate in physical education and sport settings: An individual or a group level construct? *Journal of Sport & Exercise Psychology, 26,* 90-118.

Passer, M.W. (1983). Fear of failure, fear of evaluation, perceived competence, and self-esteem in competitive-trait-anxious children. *Journal of Sport Psychology, 5*, 172-188.

Passer, M.W. (1988). Determinants and consequences of children's competitive stress. In F.L. Smoll, R.A. Magill, & M.J. Ash (Eds.), *Children in sport* (3rd ed., pp. 203-227). Champaign, IL, Human Kinetics.

Rainey, D.W., Conklin, W.E., & Rainey, K.W. (1987). Competitive trait anxiety among male and female junior high school athletes. *International Journal of Sport Psychology, 18*, 171-180.

Roberts, G.C. (1986). The perception of stress: A potential source and its development. In M.R. Weiss & D. Gould (Eds.), *Sport for children and youths* (pp. 119-126). Champaign, IL: Human Kinetics.

Roberts, G.C., Treasure, D.C., & Kavussanu, M. (1997). Motivation in physical activity contexts: An achievement goal perspective. In M.L. Maehr & P.R. Pintrich (Eds.), *Advances in motivation and achievement* (Vol. 10, pp. 413-447). Greenwich, CT: JAI.

Sarason, B.R., Sarason, I.G., & Pierce, G.R. (Eds.). (1990). *Social support: An interactional view.* New York: Wiley.

Scanlan, T.K., Babkes, M.L., & Scanlan, L.A. (2005). Participation in sport: A developmental glimpse at emotion. In J.L. Mahoney, R.W. Larson, & J.S. Eccles (Eds.), *Organized activities as contexts of development: Extracurricular activities, after school, and community programs*. (pp. 275-309). Mahwah, NJ: Erlbaum.

Scanlan, T.K., & Lewthwaite, R. (1986). Social psychological aspects of competition for male youth sport participants: IV. Predictors of enjoyment. *Journal of Sport Psychology, 8*, 25-35.

Scanlan, T.K., & Passer, M.W. (1978). Factors related to competitive stress among male youth sports participants. *Medicine and Science in Sports, 10*, 103-108.

Seifriz, J.J., Duda, J.L., & Chi, L. (1992). The relationship of perceived motivational climate to intrinsic motivation and beliefs about success in basketball. *Journal of Sport and Exercise Psychology, 14*, 375-391.

Singer, J.D., & Willett, J.B. (2003). *Applied longitudinal data analysis: Modeling change and event occurrence*. New York: Oxford University Press.

Smith, R.E., Cumming, S.P., & Smoll, F.L. (in press). Development and validation of the Motivational Climate Scale for Youth Sports. *Journal of Applied Sport Psychology*.

Smith, R.E., Ptacek, J.T., & Patterson, E. (2000). Moderator effects of cognitive and somatic trait anxiety on the relation between life stress and physical injuries. *Anxiety, Stress, and Coping, 13,* 269-288.

Smith, R.E., & Smoll, F.L. (2005). Assessing psychosocial outcomes in coach training programs. In D. Hackfort, J.L. Duda, & R. Lidor (Eds.), *Handbook of research in applied sport and exercise psychology: International perspectives* (pp. 293-316). Morgantown, WV: Fitness Information Technology.

Smith, R.E., & Smoll, F.L. (1990). Self-esteem and children's reactions to youth sport coaching behaviors: A field study of self-enhancement processes. *Developmental Psychology, 26*, 987-993.

Smith, R.E., Smoll, F.L., & Barnett, N.P. (1995). Reduction of children's sport performance anxiety through social support and stress-reduction training for coaches. *Journal of Applied Developmental Psychology, 16*, 125-142.

Smith, R.E., Smoll, F.L., Cumming, S.P., & Grossbard, J.R. (2006). Measurement of multidimensional sport performance anxiety in children and adults: The Sport Anxiety Scale-2. *Journal of Sport & Exercise Psychology, 28,* 479-501.

Smith, R.E., Smoll, F.L., & Curtis, B. (1978). Coaching behaviors in Little League Baseball. In F.L. Smoll & R.E. Smith (Eds.), *Psychological perspectives in youth sports* (pp. 173-201). Washington, DC: Hemisphere.

Smith, R.E., Smoll, F.L., & Curtis, B. (1979). Coach Effectiveness Training: A cognitive-behavioral approach to enhancing relationship skills in youth sport coaches. *Journal of Sport Psychology, 1*, 59-75.

Smith, R.E., Smoll, F.L., & Hunt, E. (1977). A system for the behavioral assessment of athletic coaches. *Research Quarterly, 48*, 401-407.

Smith, R.E., Smoll, F.L., & Passer, M.W. (2002). Sport performance anxiety in children and youth. In F.L. Smoll & R.E. Smith (Eds.), *Children and youth in sports: A biopsychosocial perspective* (2nd ed., pp. 501-536). Dubuque, IA: Kendall/Hunt.

Smith, R.E., Smoll, F.L., & Schutz, R.W. (1990). Measurement and correlates of sport-specific cognitive and somatic trait anxiety: The Sport Anxiety Scale. *Anxiety Research, 2*, 263-280.

Smith, R.E., Smoll, F.L., & Wiechman, S. (1998). Measurement of trait anxiety in sport. In J.L. Duda (Ed.), *Advances in sport and exercise psychology measurement.* Morgantown, WV: Fitness Information Technology.

Smith, R.E., Zane, N.W.S., Smoll, F.L., & Coppel, D.B. (1983). Behavioral assessment in youth sports: Coaching behaviors and children's attitudes. *Medicine and Science in Sports and Exercise, 15*, 208-214.

Smoll, F.L., & Smith, R.E. (2002). Coaching behavior research and intervention in youth sports. In F.L. Smoll & R.E. Smith (Eds.), *Children and youth in sport: A biopsychosocial perspective* (2nd ed., pp. 211-231). Dubuque, IA: Kendall/Hunt.

Smoll, F.L., & Smith, R.E. (2005). *Coaches who never lose: Making sure athletes win, no matter what the score* (2nd ed.). Palo Alto, CA: Warde.

Smoll, F.L., & Smith, R.E. (2006). Conducting sport psychology training programs for coaches: Cognitive-behavioral principles and techniques. In J.M. Williams (Ed.), *Applied sport psychology: Personal growth to peak performance* (5th ed., pp. 458-480). Boston: McGraw-Hill.

Smoll, F.L., Smith, R.E., Barnett, N.P., & Everett, J.J. (1993). Enhancement of children's self-esteem through social support training for youth sport coaches. *Journal of Applied Psychology, 78*, 602-610.

Smoll, F.L., Smith, R.E., Curtis, B., & Hunt, E. (1978). Toward a mediational model of coach-player relationships. *Research Quarterly, 49*, 528-541.

U.S. Census Bureau. (2000). Profile of Selected Economic Characteristics: Census 2000 Summary File. Retrieved July 30, 2003, from http://factfinder.census.gov

Vazou, S., Ntoumanis, N., & Duda, J.L. (2006). Predicting young athletes' motivational indices as a function of their perceptions of the coach- and peer-created climate. *Psychology of Sport and Exercise, 7*, 215-233.

Walling, M.D., Duda, J.L., & Chi, L. (1993). The Perceived Motivational Climate in Sport Questionnaire: Construct and predictive validity. *Journal of Sport & Exercise Psychology, 15*, 172-183.

Whitehead, J., & and Andrée, K.V. (1997). Interactive effects of dispositional and situational goals and perceived ability on intrinsic motivation in young athletes. *Journal of Sport Sciences, 15*, 110-111.

Yoo, J. (2003). Motivational climate and perceived competence in anxiety and tennis performance. *Perceptual and Motor Skills, 96*, 403-413.

Manuscript submitted: February 23, 2006

Revision accepted: August 30, 2006

Notes

1. Several notable differences exist between the 75-min experimental MAC workshop and the traditional 2-hour CET workshop. Each of the differentiating features contributed to the more expedient presentation of MAC. First, we deleted CET sections on (a) the cognitive-behavioral model of coach-athlete interactions that guided our earlier research (Smoll et al., 1978), (b) the Coaching Behavior Assessment System (Smith et al., 1977) and its use in developing scientifically derived coaching guidelines, and (c) a summary of applied research testing the efficacy of CET. Second, several of the CET behavioral guidelines (e.g., "Set a good example of behavior." "When giving instructions, be clear and concise.") were deemed to be pedagogically sound but not essential to establishing a mastery-oriented motivational climate. In MAC, these principles were presented with a lecture approach rather than in a discussion format. Third, in MAC, animated PowerPoint slides were used to present key principles and enhance the flow of the session. Fourth, the experimental CET workshops included a 15-min intermission, whereas the MAC workshop did not. Finally, the CET workshops concluded with a relatively long question-and-answer session focusing on problems encountered by coaches in their relations with parents. This was replaced in MAC by the topic "Coaching Your Child."

2. Although coaches were instructed to retain their completed self-monitoring forms, few of the completed forms were available to us at the end of the season, so we could not use them to assess degree of compliance.