# The Effects of Motivational Goal Priming on Cortisol and Psychological Responses in Males Exposed to an Ego-Involving Climate

By

Michael P. Breske

Submitted to the graduate degree program in Health, Sport, and Exercise Sciences and the Graduate Faculty of the University of Kansas in partial fulfillment of the requirements for the degree of Master of Science in Education.

_____

Chairperson Mary Fry, Ph.D.

_____

Andrew Fry, Ph.D.

_____

Nancy Hamilton, Ph.D.

The Thesis Committee for Michael Breske certifies that this is the approved version of the following thesis:

The Effects of Motivational Goal Priming on Cortisol and Psychological Responses in Males Exposed to an Ego-Involving Climate

Chairperson Mary Fry, Ph.D.

Date approved: July 12, 2016

Abstract

Research in Achievement Goal Perspective Theory (AGPT) suggests that creating a caring/task-involving climate can have many beneficial effects on participants in physical activity settings, even buffering the physiological response to stress. However, less is known about how individuals might buffer that response when an ego-involving climate is out of their control. This study examined the potential for a motivational priming session to buffer the psychophysiological stress response to an ego-involving climate in a physical activity setting. Male college students (N = 38) between the ages of 18 and 30 years ($M_{\text{age}} = 20.68, SD = 2.66$) participated in a juggling session characterized by an ego-involving climate. Prior to juggling, the experimental group received a motivational priming session that briefly reviewed the body of AGPT literature, while the control group received information on the history of Sport Psychology. Cortisol was measured at five time points throughout the study via saliva samples. Participants also completed pre- and post-measures of self-reported anxiety and self-confidence (CSAI-2). After controlling for background characteristics that may affect cortisol levels, results showed a marked increase (as measured by percent change from baseline) in the control group, but not the experimental group. However, psychological responses were stable across groups.

*Keywords:* Achievement Goal Theory, Stress, Cortisol, Priming,.

77 Table of Contents

# The Effects of Motivational Goal Priming on Cortisol and Psychological Responses in Males Exposed to an Ego-Involving Climate

Between 2008-2013, roughly 2.5 million fewer children (ages 6-12) participated in organized sports (Aspen Institute, Project Play, 2015). Additionally, less than 3 in 10 high schoolers get the recommended 60 minutes of physical activity per day (Centers for Disease Control and Prevention, Division of Nutrition, Physical Activity, and Obesity [CDC], 2014). With U.S. childhood obesity rates (ages 6-19) stagnating at just over a third of the population in 2012, our youths' physical inactivity is a significant public health concern (Ogden, Carroll, Kit, & Flegal, 2014).

Aside from the physical health benefits, adolescents who are inactive or unhappy during physical activity also miss out on the numerous, noted benefits that youth sport can have for their psychosocial development (Smoll, Smith, Barnett, & Everett, 1993). Research shows that these positive outcomes are highly dependent on the interactions between group members and group leaders (Mageau & Vallerand, 2003) and the overall environment of a group as it is defined by leader behavior (Gano-Overway, 2013; Smoll et al., 1993). A significant factor in the decline of youth sport participation is the high percentage of participants that are exposed to ineffective coaching practices. In fact Barnett, Smoll, and Smith (1992) found that young athletes exposed to coaches who were not trained in creating effective coach-athlete relationships, were five times more likely to quit the team the next season. Negative developmental experiences are happening to young athletes, and they are happening at every level of sport participation (Gearity, 2012).

## Achievement Goal Perspective Theory

Research in Achievement Goal Perspective Theory (AGPT; Nicholls, 1984, 1989) has provided valuable insight as to how coaches, physical educators, and parents can keep their children engaged in, and benefitting from involvement in sport and physical activity.

Specifically, research on motivational climates (i.e., caring, task-, and ego-involving climates) has shed light on effective and ineffective leader behaviors. Nicholls (1989) suggests two types of motivational climate. A task-involving climate (TIC) is characterized by a focus on effort, personal improvement, mastery of skills, and seeing mistakes as part of the learning process. An ego-involving climate (EIC) places greater importance on performance outcomes and demonstrating abilities, encourages rivalry, and punishes mistakes. Additionally, Newton, Fry, and colleagues (2007) found evidence for a third climate dimension that is distinct but highly positively correlated with TIC. This additional dimension, referred to as a "caring climate," communicates to group members that they are respected, valued, and in a safe and secure place when among each other. These combined features create a caring/task-involving climate (C/TIC), which is optimal.

Individuals exposed to C/TIC reported more satisfaction and enjoyment (Fry & Gano-Overway, 2010), more positive psychobiosocial states (Bortoli, Bertollo, Vitali, Filho & Robazza, 2015), reduced anxiety (Smith, Smoll, & Cumming, 2007), and greater effort (Ntoumanis & Biddle, 1999), than those exposed to EICs. In contrast, individuals exposed to leader behaviors consistent with EICs showed evidence of reduced self-esteem and depressive symptoms (Gervis & Dunn, 2004), use of maladaptive coping strategies (Kristiansen, Roberts, & Abrahamsen, 2008), amotivation, and antisocial attitudes (see Harwood, Keegan, Smith, & Raine, 2015 for review).

Similar to motivational climate, Nicholls (1989) also described two possible achievement goal orientations, which can be conceptualized as individuals' personal definitions of success. Individuals who are high in task orientation tend to define success in terms of their own effort and improvement, while individuals high in ego orientation tend to define success in normative

terms. Highly ego oriented individuals may only feel successful when they are the best and/or perform the best in a group at a particular task.

Research on goal orientations has shown similar outcomes to those of climate research. Individuals high in task orientation tend to experience more pleasant psychobiosocial states (Bortoli, Bertollo, Comani, & Robazza, 2011), utilize more positive coping strategies (Doron, Stephan, Maiano, & Le Scanff, 2011), and report greater enjoyment in their activity (Smith, Balaguer, & Duda, 2006). Additionally, studies have shown that goal orientations tend to be relatively stable (Duda & Nicholls, 1992), though they are susceptible to gradual changes in accordance with the motivational climate (Anderman & Anderman, 1999). Finally, it is important to note that unlike the different motivational climates, goal orientations are orthogonal, meaning individuals can be high or low in both orientations simultaneously (Nicholls, 1989).

According to Nicholls (1989) the motivational climate and individuals' personal goal orientations, interact to influence their state of being either task- or ego-involved. This state is fluid, meaning individuals can fluctuate between task- and ego-involvement moment to moment during an activity. The dynamic nature of these states of involvement makes them difficult to measure, thus little is known as to which factor—climate or goal orientation—has a greater influence on individuals being task- or ego-involved.

Due to evidence of the benefits associated with positive motivational climates, much attention has been paid to the development and evaluation of strategies for creating these climates (Brown & Fry, 2014; Li, 2015). Despite this, EICs are still prevalent throughout youth sport as evidenced by research (Gearity, 2012) and the increasing attention given to ineffective and/or damaging coaching behaviors in the media (Cohen, 2015a, 2015b).

The ubiquity of EICs in these settings is of major concern. Adolescents who are exposed to EICs in their sport not only miss out on many of the potential benefits of participation, but can also suffer detrimental consequences. Aside from the negative psychological outcomes described earlier, perhaps the most tangible example of these consequences is chronic stress. In fact, stress from training is believed to be largely responsible for the number of collegiate athletes reporting experiences with burnout symptoms; as high as 47% in one study (Kaufman, 2013)

**Stress**

**Cortisol**. Chronic stress is of particular importance when considering the potential negative experiences in youth sport and physical activity. One of the most well documented markers of stress is the cortisol response (Kirschbaum & Hellhammer, 1994). Cortisol is significant in stress research, as it has been shown to be a significant contributor to the negative effects of chronic stress on overall health. Increased levels of cortisol have been associated with impaired immunological, cardiovascular, and neurological functioning and have been identified as a factor in the expression of disease (Burg & Pickering, 2011; McEwen & Stellar, 1993). Heightened cortisol levels have also been associated with increased use of protein in metabolic functioning (Dickerson & Kemeny, 2004) as well as impairments to the body's ability to build muscle and recover from physical exertion (Kraemer et al., 2004; 2009). For these reasons, reducing stress and subsequently reducing cortisol levels should be a priority for every individual and perhaps especially for those in the athletic and physical activity domains.

**Motivational Theories of Stress.** Lazarus (1993) proposes a conceptualization of stress that takes individuals' motivations into account. Stress should be thought of in terms of individuals' interactions with their environment (usually in the form of other people) and how

individuals appraise those interactions as they relate to personal goals (e.g., is the interaction relevant to a personal goal, and if so, which one and in what way?).

Lazarus and Folkman (1984) identified three main types of primary appraisal: (a) harm/loss, in which the individual has already sustained some damage (in the context of physical activity, this may be an injury or damage to the social self), (b) threat, wherein an individual anticipates some sort of harm or loss, and (c) challenge, in which an individual perceives stress but focuses on the potential for gain or inherent growth. In line with Lazarus and Folkman, Dickerson and Kemeny's (2004) social self-preservation theory posits that threats to the social self can activate the physiological stress response in much the same way that threats to the physical self can do so.

One of the most common emotions resulting from a perceived threat, and of particular relevance to sport and physical activity, is anxiety. According to Lazarus, and central to social self-preservation theory, one of the most common sources of anxiety is to undergo some type of evaluation. An evaluative aspect of a performance means there is a chance an individual will be judged negatively, which can be detrimental to the social self (Dickerson & Kemeny, 2004). In the context of sport, this evaluation is in regard to competencies that are important to athletes' perceptions of their social self (Lazarus, 2000). In addition to social evaluation, perceptions of uncontrollability play a significant role in the appraisal of a threat and consequently in feelings of anxiety.

Dickerson and Kemeny (2004) found support for these positions in their meta-analysis of experiments utilizing measures of cortisol in response to "acute psychological laboratory stressor tasks." Meta-analysis revealed that—assuming subjects were motivated to perform well—if no evaluative or uncontrollable elements were present in the task, performance elicited non-

significant cortisol responses. However, when tasks included elements of social-evaluation (e.g., the presence of an audience) *or* uncontrollability (e.g., impossible tasks or false feedback) cortisol response effect sizes were significantly different, indicating a spike. Finally, analysis revealed that social-evaluation *combined with* uncontrollability had additive effects on cortisol responses. Tasks that involved both elements resulted in effect sizes 3 times the size of those including only one element.

In the context of sport and physical activity, individuals are presumably highly motivated to perform well. Additionally, the potential for social-evaluation is essentially constant due to the presence of coaches and teammates or teachers and classmates. Finally, the presence of an opponent over which one has no control results in an inherent uncontrollability over outcomes in any typical sport or game. For these reasons, youth sport and physical education represent perfect environments for appraisals of threat to the social self and thus can be breeding grounds for chronic psychological stress and feelings of anxiety.

This dynamic is especially evident for those in EICs and/or for individuals high in ego orientation for whom evaluations of performance and outcomes are emphasized. Conversely, highly task-involved individuals have been shown to exhibit lower cortisol responses (Hogue, Fry, Fry, & Pressman, 2013) and more adaptive coping strategies (Kristiansen, Roberts, & Abrahamsen, 2008; Ntoumanis, Biddle, & Haddock, 1999; Pensgaard & Roberts, 2003). AGPT would suggest these findings are likely due to highly task oriented individuals' focus on effort and personal improvement, and the C/TIC's emphasis on social support and treatment of mistakes as a part of the learning process (Nicholls, 1989). Both of these characteristics would serve to minimize if not eliminate perceptions of a social-evaluative threat and uncontrollability. In fact, in a recent study by Nicholls, Perry, and Calmeiro (2014), results showed support for a

model hypothesizing that more task-involved athletes would be more likely to appraise competition related stressors as challenges, generally leading to more adaptive coping processes.

The aforementioned studies on the benefits of C/TICs and task-involvement have contributed significantly to the cause of improving the experiences of youngsters in sport and physical activity settings. However, as mentioned earlier when it comes to youth sport and physical activity, C/TICs are known to be less prevalent than the research suggests they ought to be (Gearity, 2012; Todorovich, 2009). That being the case, the questions remains of how best to equip youngsters to cope with stressful environments when we are unable to adjust the motivational climate. One avenue of research that may offer answers to this question is that of motivational priming.

**Motivational Priming**

Priming individual's motivational goals, while unlikely to change goal orientations in the short term, may offer a means for adopting more adaptive coping strategies and more positive reappraisals of achievement settings that can be perceived as threatening. However, priming participants to be task-involved without overtly affecting the motivational climate can be a difficult task, and if not controlled for carefully, the affects of the climate can cause priming affects to be impossible to isolate. Few studies on motivational priming have properly isolated the priming effects. For example, Bereby-Meyer and Kaplan (2005) found that priming mastery (task-involving) goals allowed for participants to transfer problem-solving strategies more effectively between analogous tasks. However, their priming interventions as described were more likely to be manipulations of the motivational climate than anything else, as explicit instruction was used.

In contrast, studies conducted using less direct forms of priming with controlled motivational climates have offered promising results. For example, Niiya, Crocker, and Bartmess (2004) primed their participants' learning orientations via informational reading disguised as the reading comprehension section of a fake practice GRE exam. For participants self-reporting their self-worth as contingent on academic performance, self-esteem was buffered from the negative effects of the failure condition (scoring in the 45$^{th}$ percentile). However, this buffering effect was only present for those who read information stating that abilities like intelligence were flexible and dependent on effort. The important difference here is that participants were simply given information on the nature of intelligence, rather than any explicit instruction as to what their goals should be.

While Niiya and colleagues' study is a good example of priming without affecting the motivational climate, the study only looks at buffering the effects of failure on a personally important task. While this study does include an element of uncontrollability on the task (via false feedback), a social-evaluative threat is less present if at all so. Few studies have examined possible buffering effects in settings that include both social-evaluation and uncontrollability.

Therefore, the purpose of this study is to examine the effects of a neutral or C/TI priming session on the physiological (i.e. salivary cortisol) responses of male college students after exposure to psychosocial stress (i.e. ego-involving climate) during a juggling activity. It is hypothesized that participants exposed to the neutral priming session will experience greater cortisol responses than those exposed to the C/TI priming session. A secondary purpose of this study is to examine possible differences in the students' perceived psychological responses (e.g., anxiety, effort, enjoyment) to the EI climate based on their priming condition.

## Method

### Participants

Male college students (N = 38) between the ages of 18 and 30 years ($M_{\text{age}} = 20.68, SD = 2.66$) from a Midwestern University were recruited directly from undergraduate classes or with the use of flyers. Participants were randomly assigned to either a control (neutral prime; *n* = 19) or experimental group [Caring/Task-Involving (C/TI) prime; *n* = 19]. The sample population was predominantly Caucasian (76%). Participants were screened for confounding factors such as illness or medications that may interfere with cortisol collection. Participants were also instructed to avoid certain pre-study behaviors that may affect physiological data samples such as abnormal sleeping patterns, food consumption within two hours prior to participating, and caffeine consumption within one hour prior to participating. Approval for the use of human subjects was obtained from the Institutional Review Board of the researcher's university.

### Physiological Assessment

**Salivary cortisol.** Cotton oral swabs and plastic tubes were used for the collection of salivary cortisol (SC) samples (Salivettes and storage tubes, Salimetrics, LLC, State College, PA, USA). Each participant provided five samples of SC during the study. Students were instructed to place salivettes under their tongue by pouring the swab directly into their mouth from the collection tube, without using their hands. After the swab was saturated with saliva, students were instructed to place the swabs directly back into the collections tubes, again without using their hands. The swab used during the initial instructions was treated as Sample 1 and provided a baseline measurement of SC (time from onset of stressor = -40 min). Participants then completed the pre-intervention questionnaires after which they were exposed to their respective priming

interventions. Participants provided Sample 2 immediately before the onset of the stressor i.e. the instructional juggling session (time = 0). Sample 3 was collected following the juggling session (time = +30 min). Finally, Samples 4 (time = +45 min) and 5 (time = +60 min) were collected at 15-minute intervals as the participants returned to baseline. All samples were spun at 3000 rpm for 15 min. after collection and stored at -60°C until assayed. SC was measured and analyzed in the Applied Physiology Lab at the University of Kansas, using Enzyme Immunoassay Kits (Salimetrics, LLC, State College, PA, USA) and microplate readings. Salivary samples from each participant were assayed in duplicate in the same assay lot to prevent systematic variation due to error. Inter- and intra-assay coefficients of variance were 11.2% and 4.2% respectively. Standard Curves were significant at $R^2 \geq .997$

**Psychological Assessment**

**Anxiety and Self-Confidence.** The Competitive State Anxiety Inventory-2 (CSAI-2; Martens, Burton, Vealey, Bump, & Smith, 1990) was used to measure competitive state anxiety both before and after the juggling session. The inventory consists of 27 items across three subscales that were modified for use in both pre- and post-session assessment. The somatic state anxiety (e.g., “I feel/felt nervous.”), cognitive anxiety (e.g., “I am/was concerned about performing poorly.”), and self-confidence (e.g., “I am/was confident about performing well.”) subscales have each been shown to be reliable measures of the respective constructs (Martens et al., 1990). In line with Hogue, Fry et al. (2013), four items were omitted, as they are irrelevant to the current study (e.g., “I’m concerned about losing.”).

**Post-Session Measures**

These measures were completed only in the post-session questionnaire and wordings were modified to be specific to the juggling session.

**Perceived Motivational Climate.** The participants' perceptions of the motivational climate during the juggling session were examined using the 12-item abbreviated Perceived Motivational Climate in Exercise Questionnaire (PMCEQ-A; Moore, Fry, & Brown, 2015). "During the juggling session…" was the stem for the items and sample items include, "Jugglers of all skill levels were made to feel valued" (task) and "Jugglers felt embarrassed if they didn't know how to perform the skill"(ego). The abbreviated PMCEQ has been shown to have high levels of reliability and validity (Moore, et al., 2015)

**Perceptions of a Caring Climate.** The Caring Climate Scale (CCS; Newton et al., 2007) was used to examine the perceptions of elements contributing to a caring climate (i.e. support, concern, respect) during the juggling session. The 13-item scale included the stem, "During the juggling session…" for each item. A sample CCS item is, "Everyone liked the participants for who they are." The CCS has shown high levels of reliability and validity (Newton et al., 2007).

**Procedures**

**Caring/Task-involved priming.** Upon providing consent, participants were randomly assigned to a TI priming group or a neutral priming group. The TI group was exposed to a 10-15 minute informational session about AGPT. Participants were told that such a presentation is the standard procedure whenever any data is collected by the Sport & Exercise Psychology Lab (SPLab) at KU, ensuring that participants did not perceive the information as explicit instruction pertaining to the impending juggling session. Instructors briefly covered the basics of AGPT (Nicholls, 1989) with emphasis on the researched benefits of being task-involved (e.g., greater enjoyment, reduced stress and anxiety, improved performance, etc.). It is important to note that at no point during the priming intervention, did instructors explicitly encourage participants to be

task-involved, nor were participants provided with specific strategies through which they could reduce anxiety, improve general performance, or adjust personal goal orientations.

**Neutral priming.** The control group of participants received a priming session that was neutral in regards to their achievement goals. The neutral priming session consisted of an approximately 10-15 minute presentation of basic information about the field of Sport Psychology. As in the C/TI condition, participants were told that the presentation is a part of the standard procedure used by anyone conducting research within the SPLab. This informational session included information on the history and development of the profession, and some very basic descriptions of some of the sub-disciplines in the field.

**Ego-involving juggling session.** After exposure to the respective priming conditions, the students in both groups participated in an instructional juggling session in the context of an ego-involving motivational climate. The juggling session followed the protocol used by Hogue et al. (2013), as described in Table 1. Sessions began with participants sharing their greatest achievement in sport. Instructors then explained, step-by-step, how to perform the skill and allowed participants to practice and receive feedback. Participants were then asked to line up in order to rank them by their ability from 1 (best) to 10 (worst). Participants were then separated into groups and asked to perform the skill one-by-one for 30 seconds each in front of their group after which they were re-ranked. Finally, participants competed against each other in an effort to improve their ranking. Instructors encouraged serious competition and praised/attended to only the more skilled participants.

## Results

### Background Characteristics

Prior to conducting analysis on SC, independent sample t-tests were employed to assess any significant differences between groups for any of the background variables that might affect cortisol responses (i.e., age, race, total hours of sleep, and wake time). Results were non-significant for each variable.

### Climate Perceptions

Measures of the perceived motivational climate were included as a manipulation check to determine instructors' efficacy in creating an EI climate. Both the control and experimental groups perceived the climate as more ego-involving (*m* = 3.83; 3.89, respectively) than task-involving (*m* = 2.24; 2.61, respectively) with neither group perceiving a caring climate (*m* = 2.29; 2.51). Independent t-tests showed that the groups did not differ significantly in their perceptions of any climate factors.

### Cortisol Responses

Cortisol concentrations are reported in Table 2 (mean ± SD). All concentrations were within expected physiological ranges for the population. Missing values (time = +60 for three participants) were replaced with the value from the prior sample for that participant. Due to the substantial variability that is typical for endocrine values, all data was converted to percent changes from baseline (%△), with baseline values set at 100%. The %△ values were then assessed using a 2 (Group) X 4 (Time) repeated-measures ANCOVA. Group (experimental or control) was treated as the between-subjects variable, while Time (four %△ values) acted as the within-subjects variable. Because demographic variables have been shown to potentially affect cortisol (Nicolson, 2008), age, race, hours slept, and wake times were treated as covariates.

Results from the statistical analysis are illustrated in Figure 1 (mean ± SE). Mauchly's test indicated that our data did not satisfy the assumption of sphericity ($\chi^2(5) = 33.85, p < .001$), thus the Greenhouse-Geisser correction was used. The interaction effect was significant $F(1.92, 61.58) = 4.867$, $p = .012$, $\eta^2 = .132$. Confidence intervals (95%) using Bonferroni adjustments were used to determine which %△ values were different from the initial value (%△ from baseline to pre-juggling). The control group exhibited significant increases in SC concentrations at 30, 45, and 60 minutes from the start of the juggling session. The experimental group exhibited no significant changes in SC concentrations.

**Psychological Responses**

Each CSAI-2 subscale on both the pre- and post-measure showed acceptable reliability (Cronbach's $\alpha \geq .70$). Means for each pre- and post-measure variable are presented in Table 2. Paired-sample t-tests, were used to determine if the ego-involving climate would produce the expected effects. These tests revealed a significant increase in cognitive anxiety, somatic anxiety, and a decrease in self-confidence for both groups from their respective baseline means $t(18) \geq 2.425$, $p \leq .03$. These results indicated that participants did experience more anxiety during the juggling session than they typically would during a physical activity. A MANOVA was used to assess any effect that the priming sessions may have had on the severity of the increases. Results showed no main effect based upon group $F(6, 31) = 1.030$, $p = .425$, $\eta^2 = .166$, as well as non-significant differences between groups for each variable ($p \geq .243$).

## Discussion

The purpose of this study was to examine the effects of a C/TI priming session on the physiological stress response of those exposed to an ego-involving climate. Researchers hypothesized that a brief presentation on the benefits of being task-involved would attenuate the

physiological stress response associated with the competitive learning environment. The findings support the hypothesis in that the experimentally primed group exhibited a significantly reduced stress response via SC.

Similar to the work of Hogue and colleagues (2013), the ego-involving climate that was created for the juggling task elicited a self-reported stress response in both conditions. These results again showed that instructors were effective in creating an ego-involving climate. However, contrary to the hypothesis, no differences were observed between the groups on the post-measures of cognitive anxiety, somatic anxiety, or self-confidence. Although it should be noted that sample sizes may have been too small to detect differences in these self-report variables.

Again, in line with Hogue et al. (2013), the climate manipulation elicited a physiological response to stress in the neutrally primed condition as expected. Specifically, the neutral group showed significantly greater SC responses at the three time points immediately following the juggling session, similar to participants exposed to the EI climate in Hogue et al.'s (2013) study. However, results for the primed group differed from the C/TI group in Hogue et al.'s study. Where Hogue and colleagues found actual reductions in SC levels in their C/TI group, the primed participants in the current study showed no significant change in their SC levels. This finding is expected though, as despite being primed, the experimental group was still exposed to an EI climate, making any *reduction* in SC from baseline levels highly unlikely.

Additionally, results were in line with Niiya et al. (2004) who found that participants primed to think of intelligence as improvable reported less of a negative reaction—in terms of their reported self-esteem—to negative feedback (in the form of a failing score on their practice GRE). Participants in the current study showed similar outcomes in that the primed participants

exhibited a lessened SC response to the general, skill-related negative feedback they received during the experiment. Similar to Niiya et al. (2004), these findings suggest that priming can alter individuals' responses to negative outcomes or environments by directing their mindset to be more positive and adaptive—and in the case of the current study, directing their task-related goals to be more self-referenced.

In relation to motivational theories of stress, by highlighting the benefits of pursuing more self-referenced goals, the C/TI priming session may have caused participants in the experimental group to perceive the negative judgments of instructors as less of a threat to their social selves, or it may even be the case that these participants also appraised the environment as a challenge, in line with the model proposed by Nicholls et al. (2014). Similarly, the description of a caring environment may have caused participants to focus more on relational aspects of the climate despite the theme of intragroup rivalry made salient by our instructors.

Anecdotally, some of the participants judged to be in the bottom third of the experimental group (in terms of their juggling ability), were enthusiastic in encouraging their fellow "Group C" members during the "On the Spot" competitive activity. For example, leaders noted that when one member of Group C showed improvement and was subsequently re-ranked into a higher group, he tapped his chest and assured the rest of the group that his heart would always be with Group C. This action, while in light jest, stood out as a very positive and caring behavior. It is noteworthy that the primed group scored higher (although not statistically significantly higher) on the C/TI climate scales, while the EI climate mean scores were nearly identical between groups. This trend to perceive the C/TI features of the climate as slightly higher may reflect the primed participants' effort to influence the climate in a positive way regardless of instructor attitudes. These types of supportive group behaviors were absent in the control group,

especially—as noted by leaders—among those with the lowest ability. The similar scores on the EI climate were expected as participants all experienced the distinct ego-involving features of the climate established by the instructors.

While differences were observed in participants' SC responses and behaviors (anecdotally) between the priming and control groups, the psychological measures of stress did not reveal significant differences between groups as expected. Hogue et al. (2013) found that an EI climate, when compared with a C/TI climate, related to increases in self-reported anxiety, shame, and self-consciousness, and also decreases in effort, enjoyment, and intent/excitement to continue juggling in the future. However, in the present study all participants were exposed to an EI climate, and it appears that the priming session was not strong enough to have an impact on cognitive anxiety, somatic anxiety, or self-confidence. While the effect on cortisol was evident, an effect on the cognitive appraisals on the part of the participants may have been more difficult to detect. As Lazarus and Folkman (1984) explained, appraisals of threat and challenge could often coincide, as individuals in novel situations may perceive the potential for gains or growth while simultaneously perceiving the risk of being overwhelmed and performing poorly. It's possible, as well, that the small sample size in this study made it difficult to detect group differences on the psychological variables.

Many AGPT studies have focused on understanding the benefits of and how best to implement a C/TI climate (Brown & Fry, 2014; Claunch & Fry, in press; Smith et al., 2007; 1979). As mentioned earlier, research has shown that EI climates are common in the physical activity domain (Gearity, 2012; Gervis & Dunn, 2004; Todorovich, 2009). As such, this study represents a new direction in achievement goal research in that we sought to examine ways in which individuals could better cope with EI climates when they (almost inevitably) find

themselves in one. The current study also continued an important line of research established by Hogue and colleagues (2013) by examining the physiological repercussions of exposure to an EI climate. This remains an important line of questioning in the field of Sport and Exercise Psychology as the negative effects of heightened cortisol have been extensively researched. As heightened cortisol is related to expression of disease and a decreased ability to build muscle and recover, indeed the reduction of chronically heightened cortisol is essential to promoting peak performance (Kraemer et al., 2004; 2009; McEwen & Stellar, 1993).

**Limitations**

While this study adds a new aspect to AGPT research, it was not without limitations. First, the all-young adult male sample makes these results difficult to generalize to females or individuals in youth or senior populations. From a theoretical perspective there is no reason to expect gender or age differences across samples, but future research should consider this possibility. Second, while the sample size was sufficient to detect SC differences between the priming and control groups, it was likely too small to reveal significant differences on the psychological measures (i.e., cognitive anxiety, somatic anxiety, and self-confidence). Cortisol analyses are expensive and thus, limited the sample size included in this study, but future studies would benefit from including a larger sample to examine participants' psychological responses.

Another limitation that is important to note is the laboratory like setting of the current study. While the juggling task was chosen because it was a novel task for the participants and provides an even playing ground for learning a new skill (only individuals who did not know how to juggle were recruited), it is possible that the sample was less invested in performing well during the session. Athletes and exercisers who are highly committed to their respective sport or physical activity would likely experience more intense responses (i.e., both physiological and

psychological) to negative outcomes during training and/or competitions. Similarly, the EI climate created by instructors may not perfectly mirror those seen in an actual sport or physical activity setting. While the instructor behaviors employed in the current study were able to dictate participants' perceptions of the climate, it is not uncommon for athlete-coach interactions to take a more severe and personal tone than was ethically allowable for this study (Gearity, 2012; Gervis & Dunn, 2004), and it is likely that SC responses might be more intense in real world settings.

Finally, though not necessarily a limitation as both groups perceived EI climates, the ratio of instructors to participants may have attenuated the instructor's ability to create the EI climate to the fullest extent. While instructor to participant ratios were similar to what would be seen in most sporting or exercise settings, group sizes were large enough that it was difficult for instructors to give the ideal amount of ego-involving feedback to each participant in a single 30-minute juggling session. Though results showed that an EI climate was perceived by both groups, employing additional instructors and/or confederate jugglers may have improved the ability to create the EI climate to a greater degree, in order to elicit more pronounced stress responses both physiologically and psychologically.

**Future Directions**

Researchers in the future should consider examining these effects in more real-word contexts. One approach may be to examine these priming effects during a more common physical activity. It is unclear how effective the priming session may be with regard to a task/skill that is more personally and socially valuable to individuals. An activity in which participants are more invested may increase the possibility of a perceived threat to their social self. Additionally, were the task more common to participants, there may be an increased

likelihood that each participant would have a stable motivational orientation in the given context, and may be less affected by motivational priming if incongruent.

Furthermore, it would interesting to see if this type of priming would still be effective in attenuating the response to a more chronic stressor. Future research may address this question by examining responses to multiple stressors over several sessions, a scenario more often observed in in-season athletes or regular exercisers who experience EI climates. Similarly, the effects of priming administered regularly over longer periods of time should be examined. While generally stable, Nicholls (1989) believed and studies have shown that regular exposure to a certain motivational climate can influence individuals to exhibit more of the corresponding goal orientation (Anderman & Anderman, 1999). Thus, it would be interesting to study how priming over multiple time points, might affect an individual's personal goal orientation.

Another interesting future avenue would be to examine different methods of delivering the motivational priming. Some motivational research has supported the efficacy of scrambled sentence tasks (Banting, Dimmock, & Grove, 2011). However, this type of priming, though perhaps more reliable, is less practically applicable. Therefore, it would be enlightening to examine the efficacy of more direct forms of priming, like that of the current study, when delivered by other key adults (e.g., teachers, coaches, or parents). Finally, more diverse samples should be examined in the future to test the effects of priming between groups of varying education levels and athletic experience, between sexes, and between different age groups.

**Conclusion**

This study showed support for the hypothesis that motivational goal priming can have a buffering effect on participants' SC stress response in EI climates, suggesting that states of achievement involvement may potentially be primed regardless of the perceived motivational

climate. These results are exciting because they offer insight into possible short-term solutions for the some of the numerous detrimental effects of EI climates. However, it is likely that motivational priming is unable to offset all of the negative consequences of exposure to EI climates. These negative climates remain harmful both psychologically and physiologically to a majority of the individuals exposed to them. Therefore, it is still important to continue encouraging all leaders (teachers, coaches, fitness instructors, parents, etc.) to adopt behaviors that foster more caring and task-involving climates in order to ensure positive outcomes in physical activity settings for all individuals, regardless of their age, sex, or ability levels.

605 References

606 Anderman, L. H., & Anderman, E. M. (1999). Social predictors of changes in students'
607 achievement goal orientations. *Contemporary Educational Psychology, 25*, 21-37.
608 Aspen Institute, Project Play. (2015). *Sport for all, play for life: A playbook to get every kid in*
609 *the game.* Retrieved from http://www.aspeninstitute.org/publications/sport-all-play-life-
610 playbook-get-every-kid-game
611 Banting, L. K., Dimmock, J. A., & Grove, J. R. (2011). The impact of automatically activated
612 motivation on exercise-related outcomes. *Journal of Sport & Exercise Psychology, 33*,
613 569-585.
614 Barnett, N. P., Smoll, F. L., & Smith, R. E. (1992). Effects of enhancing coach-athlete
615 relationships on youth sport attrition. *The Sport Psychologist, 6*, 111-127.
616 Bereby-Meyer, Y. & Kaplan, A. (2005). Motivational influences on transfer of problem-solving
617 strategies. *Contemporary Educational Psychology, 30*, 1-22.
618 Bortoli, L., Bertollo, M., Comani, S., & Robazza, C. (2011). Competence, achievement goals,
619 motivational climate, and pleasant psychobiosocial states in youth sport. *Journal of*
620 *Sports Sciences, 29*(2), 171-180.
621 Bortoli, L., Bertollo, M., Vitali, F., Filho, E., & Robazza, C. (2015). The effects of motivational
622 climate interventions on psychobiosocial states in high school physical education.
623 *Research Quarterly for Exercise and Sport, 86*, 196-204.
624 Brown, T. C., & Fry, M. D. (2014). Evaluating the pilot of Strong Girls: A life skills/physical
625 activity program for third and fourth grade girls. *Journal of Applied Sport Psychology,*
626 *26*, 52-65.

Burg, M. M., & Pickering, T. G. (2011). The cardiovascular system. In A. Baum & R. Contrada (Eds.), *Handbook of stress science: Biology, psychology, and health* (pp. 61-87). New York: Springer.

Centers for Disease Control and Prevention, Division of Nutrition, Physical Activity, and Obesity. (2014). *Facts about physical activity.* Retrieved from http://www.cdc.gov/physicalactivity/data/facts.htm

Claunch, J. L., & Fry, M. D. (in press). Native American football coaches' experience of a motivational climate collaboration with sport psychology researchers. *International Journal of Sports Science & Coaching.*

Cohen, E. (2015, July 21). 5 telltale signs the coach is a bully. [Web log post]. Retrieved September 2, 2015, from http://www.huffingtonpost.com/emily-g-cohen/5-telltale-signs-the-coach-is-a-bully_b_7836026.html

Cohen, E. (2015, September 1). The coach is a bully: Now what? [Web log post]. Retrieved September 2, 2015, from http://www.huffingtonpost.com/emily-g-cohen/the-coach-is-a-bully-now-_b_8067838.html

Dickerson, S. S., & Kemeny, M. E. (2004). Acute stressors and cortisol responses: A theoretical integration and synthesis of laboratory research. *Psychological Bulletin, 130*(3), 355-391. doi:10.1037/0033-2909.130.3.355

Doron, J., Stephan, Y., Maiano, C., & Le Scanff. (2011). Motivational predictors of coping with academic examination. *The Journal of Social Psychology, 15*(1), 87-104.

Duda, J. L., & Nicholls, J. G. (1992). Dimensions of achievement motivation in schoolwork and sport. *Journal of Educational Psychology, 84*(3), 290-299.

Fry, M. D., & Gano-Overway, L. A. (2010). Exploring the contribution of the caring climate to the youth sport experience. *Journal of Applied Sport Psychology, 22*, 294-304. doi:10.1080/10413201003776352

Gano-Overway, L. A. (2013). Exploring the connections between caring and social behaviors in physical education. *Research Quarterly for Exercise and Sport, 84*, 104-114. doi:10.1080/02701367.2013.762322

Gearity, B. T. (2012). Poor teaching by the coach: A phenomenological description from athletes' experience of poor coaching. *Physical Education and Sport Pedagogy, 17*(1), 79-96.

Gervis, M., & Dunn, N. (2004). The emotional abuse of elite child athletes by their coaches. *Child Abuse Review, 13*, 215-233.

Harwood, C. G., Keegan, R. J., Smith, J. M. J., & Raine, A. S. (2015). A systematic review of the intrapersonal correlates of motivational climate perceptions in sport and physical activity. *Psychology of Sport and Exercise,18*, 9-25.

Hogue, C. M., Fry, M. D., Fry, A. C., & Pressman, S. D. (2013). The influence of a motivational climate intervention on participants' salivary cortisol and psychological responses. *Journal of Sport & Exercise Psychology, 35*, 85-97.

Kaufman, K. A. (2014, December 10). Understanding student-athlete burnout. *NCAA Sport Science Institute.* Retrieved from http://www.ncaa.org/health-and-safety/sport-science-institute/understanding-student-athlete-burnout

Kirschbaum, C. C. & Hellhammer, D. H. (1994). Salivary cortisol in psychoneuroendocrine research: Recent developments and applications. *Psychoneuroendocrinology, 19*(4), 313-333.

Kraemer, W. J., French, D. N., Paxton, N. J., Häkkinen, K., Volek, J. S., Sebastianelli, W. J.,… Knuttgen, H. G. (2004). Changes in exercise performance and hormonal concentrations over a Big Ten soccer season in starters and nonstarters. *Journal of Strength and Conditioning Research, 18*(1), 121-128.

Kraemer, W. J., Spiering, B. A., Volek, J. S., Martin, G. J., Howard, R. L., Ratamess, N. A.,… Maresh, C. M. (2009). Recovery from a National Collegiate Athletic Association Division I football game: Muscle damage and hormonal status. *Journal of Strength and Conditioning Research, 23*(1), 2-10.

Kristiansen, E., Roberts, G. C., & Abrahamsen, F. E. (2008). Achievement involvement and stress coping in elite wrestling. *Scandinavian Journal of Medicine and Science in Sports, 18*, 526-538. doi:10.1111/j.1600-0838.2007.00646.x

Lazarus, R. S. (1993). Why we should think of stress as a subset of emotion. In L. Goldberger & S. Breznitz (Eds.), *Handbook of stress: Theoretical and clinical aspects* (pp. 21-39). New York: Free Press.

Lazarus, R. S. (2000). How emotions influence performance in competitive sports. *The Sport Psychologist, 14*, 229-252.

Lazarus, R.S. & Folkman, S. (1984). Cognitive Appraisal Processes. In R. S. Lazarus & S. Folkman, *Stress, appraisal, and coping* (pp. 22-52). New York: Springer.

Li, W. (2015). Strategies for creating a caring learning climate in physical education. *Journal of Physical Education, Recreation & Dance, 86*(4), 34-41.

Mageau, G. A., & Vallerand, R. J. (2003). The coach-athlete relationship: A motivational model. *Journal of Sport Sciences, 21*, 883-904.

Martens, R., Burton, D., Vealey, R., Bump, L., & Smith, D. (1990). Development and validation of the competitive state anxiety inventory-2. In R. Martens, R. S. Vealey, & D. Burton (Eds.), *Competitive Anxiety in Sport*, 117-190. Champaign, IL: Human Kinetics, Inc.

McEwen, B. S., & Stellar, E. (1993). Stress and the individual: Mechanisms leading to disease. *Archives of Internal Medicine, 153*(18), 2093-2101.

Moore, E. W. G., Fry, M. D., & Brown, T. C. (2015). Psychometric properties of the Abbreviated Perceived Motivational Climate in Exercise Questionnaire. *Measurement in Physical Education and Exercise Science, 19*(4), 184-200. doi:10.1080/1091367X.2015.1072819

Newton, M., Fry, M. D., Watson, D., Gano-Overway, L., Kim, M. –S., Magyar, M., & Guivernau, M. (2007). Psychometric properties of the caring climate scale in a physical activity setting. *Revista de Psicologia del Deporte, 16*(1), 67-84.

Nicholls, A. R., Perry, J. L., & Calmeiro, L. (2014). Precompetitive achievement goals, stress appraisals, emotions, and coping among athletes. *Journal of Sport & Exercise, 36*, 433-445. Retrieved from: http://dx.doi.org/10.1123/jsep.2013-0266

Nicholls, J. G. (1984). Achievement motivation: Conceptions of ability, subjective experience, task choice, and performance. *Psychological Review, 91*(3), 328-346.

Nicholls, J. G. (1989). *The Competitive Ethos and Democratic Education.* Harvard University Press.

Nicolson, N. A. (2008). Measurement of cortisol. In L. J. Luecken & L. C. Gallo (Eds.), *Handbook of physiological research methods in health psychology* (pp. 37-74). Los Angeles: Sage.

Niiya, Y., Crocker, J., & Bartmess, E. N. (2004). From vulnerability to resilience: Learning orientations buffer contingent self-esteem from failure. *Psychological Science, 15*(12), 801-805.

Ntoumanis, N., & Biddle, S. (1999). A review of motivational climate in physical activity. *Journal of Sport Sciences, 17*(8), 643-665.

Ntoumanis, N., Biddle, S. J. H., & Haddock, G. (1999). The mediating role of coping strategies on the relationship between achievement motivation and affect in sport. *Anxiety, Stress, and Coping, 12*, 299-327.

Ogden, C. L., Carroll, M. D., Kit, B. K., & Flegal, K. M. (2014). Prevalence of childhood and adult obesity in the United States, 2011-2012. *JAMA, 311*(8), 806-814. doi:10.1001/jama.2014.732

Pensgaard, A. M. & Roberts, G. C. (2003). Achievement goal orientations and the use of coping strategies among Winter Olympians. *Psychology of Sport and Exercise, 4*, 101-116. doi:10.1016/SI469-0292(01)00031-0

Smith, A. L., Balaguer, I., & Duda, J. L. (2006). Goal orientation profile differences on perceived motivational climate, perceieved peer relationships, and motivation-related responses of youth athletes. *Journal of Sport Sciences, 24*(12), 1315-1327.

Smith, R. E., Smoll, F. L., & Cumming, S. P. (2007). Effects of motivational climate intervention for coaches on young athletes' sport performance anxiety. *Journal of Sport & Exercise Psychology, 29*, 39-59.

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*(4), 602-610.

Todorovich, J. R. (2008). Extremely ego-oriented preservice teachers' perspectives on teaching physical education. *Journal of Teaching in Physical Education, 28*, 155-172.

Table 1

*Ego-involving Climate Manipulation (Hogue et al., 2013)*

| Time | Activity |
|---|---|
| | **Icebreaker** |
| 5 min | Glory Days: Group members took turns introducing themselves and sharing their greatest sport accomplishment with the group. |
| | **Instruction & Feedback** |
| 3 min | Introduction to juggling and breakdown of steps. Participants were given tips to start to learn to juggle. |
| | **Practice Activity #1** |
| 5 min | Rank Order: While participants practice juggling, Instructors ranked the participants based on their performance and compared each one to the best performer. |
| | **Practice Activity #2** |
| 6 min | On the Spot: Participants were split into three groups (A, B, or C) based on their rank. Participants then took turns juggling in front of their respective groups for 30 seconds each, while their peers keep track of their successful juggles. |
| | **Practice Activity #3** |
| 6 min | Championship Match: Teams were formed based on the final rankings and juggled against one another in a one-on-one format until a winning team was determined. |

765

Table 2

*Means (SD) for Pre- and Post-juggling Psychological Variables by Group*

| Variable | | Primed Group (*n* = 19) | Control Group (*n* = 19) | Total (*n* = 38) |
|---|---|---|---|---|
| 1. Cognitive Anxiety | pre-juggling | 1.53 (.53) | 1.53 (.51) | 1.53 (.51) |
| | post-juggling | 1.96 (.79) | 2.25 (.69) | 2.10 (.75) |
| 2. Somatic Anxiety | pre-juggling | 1.27 (.29) | 1.24 (.25) | 1.25 (.27) |
| | post-juggling | 1.71 (.62) | 1.77 (.74) | 1.74 (.67) |
| 3. Self-Confidence | pre-juggling | 2.84 (.63) | 2.99 (.61) | 2.92 (.62) |
| | post-juggling | 2.20 (.61) | 2.39 (.68) | 2.30 (.64) |

766
767
768
769
770
771
772
773
774
775

Table 3
*Means (SD) for Cortisol by group (nmol/L)*

| Variable | Primed Group (*n* = 19) | Control Group (*n* = 19) | Total (*n* = 38) |
|---|---|---|---|
| 1. Baseline (time = -40 min) | 7.33 (3.95) | 4.35 (2.07) | 5.84 (3.46) |
| 2. Immediate Pre (time = 0 min) | 5.38 (2.32) | 4.01 (2.24) | 4.70 (2.35) |
| 3. Immediate Post (time = +30 min) | 6.94 (5.41) | 7.99 (7.24) | 7.47 (6.33) |
| 4. Rest 1 (time = +45 min) | 6.70 (4.17) | 7.38 (6.14) | 7.04 (5.19) |
| 5. Rest 2 (time = +60 min) | 6.13 (3.18) | 6.41 (4.47) | 6.27 (3.83) |

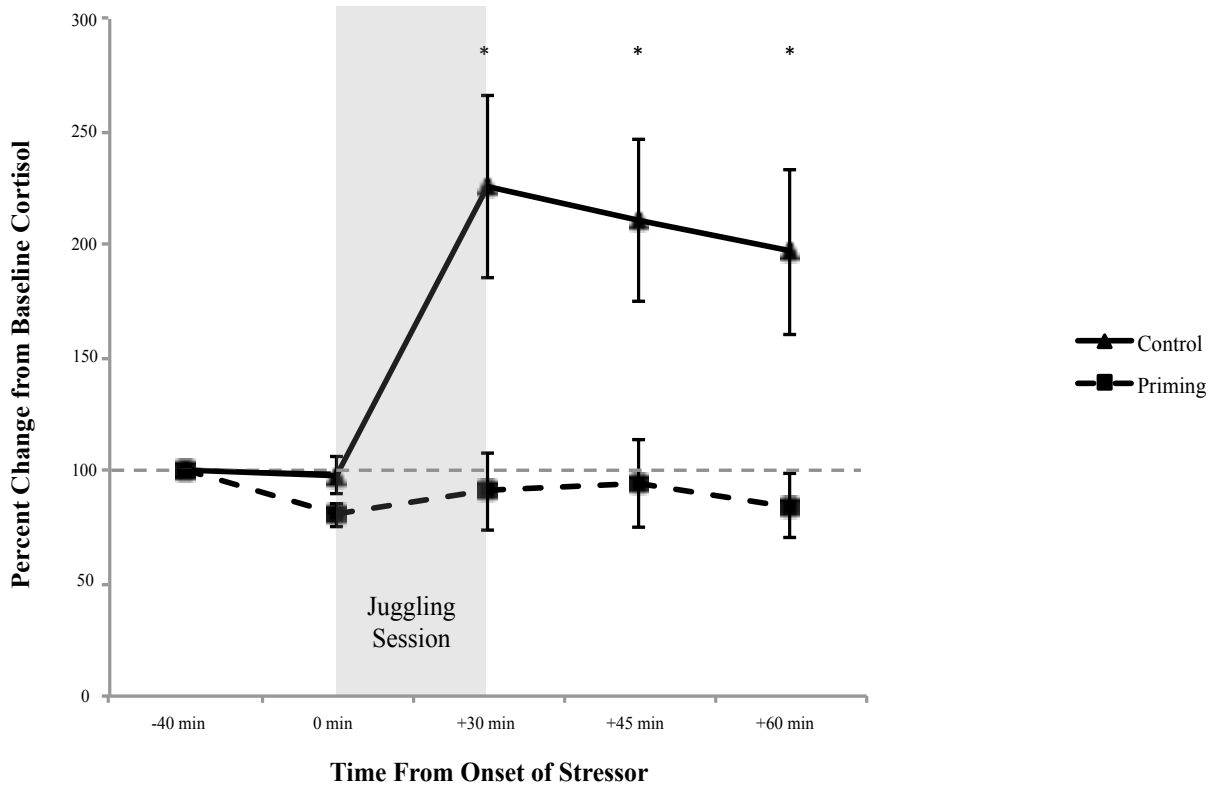


Figure 1. Mean %△ of salivary cortisol in response to the ego-involving climate. Vertical lines with crossbars represent ± 1 standard error. *Indicates significant ($p < .05$) differences between groups.

THE UNIVERSITY OF KANSAS
Research

**APPROVAL OF PROTOCOL**

February 5, 2016

Michael Breske
m739b807@ku.edu

Dear Michael Breske:

On 2/5/2016, the IRB reviewed the following submission:

| | |
|---|---|
| Type of Review: | Initial Study |
| Title of Study: | The Effects of Motivational Goal Priming on Cortisol and Psychological Responses in Adolescent Males Exposed to an Ego-Involving Climate |
| Investigator: | Michael Breske |
| IRB ID: | STUDY00003461 |
| Funding: | Name: Health Sport &Exercise Science |
| Grant ID: | |
| Documents Reviewed: | • Informed Consent (with changes in bold), • Informed Consent (Final Version), • Information Statement for Consent Form, • Initial Submission form, • Initial Submission form, • Initial Submission form, • Assent Script for Recruitment, • Debriefing Statement (Final version), • Debriefing Statement (Final version), • Pre-Study Instructions, • Debriefing Statement (Changes in bold), • Health Screening Questionnaire, • Study Questionnaire |

The IRB approved the submission from 2/5/2016 to 2/4/2017.

1. Before 2/4/2017 submit a Continuing Review request and required attachments to request continuing approval or closure.
2. Any significant change to the protocol requires a modification approval prior to altering the project.
3. Notify HSCL about any new investigators not named in original application. Note that new investigators must take the online tutorial at https://rgs.drupal.ku.edu/human_subjects_compliance_training.
4. Any injury to a subject because of the research procedure must be reported immediately.
5. When signed consent documents are required, the primary investigator must retain the signed consent documents for at least three years past completion of the research activity.

If continuing review approval is not granted before the expiration date of 2/4/2017 approval of this protocol expires on that date.

Please note university data security and handling requirements for your project:
https://documents.ku.edu/policies/IT/DataClassificationandHandlingProceduresGuide.htm

You must use the final, watermarked version of the consent form, available under the "Documents" tab in eCompliance.

Sincerely,

Stephanie Dyson Elms, MPA
IRB Administrator, KU Lawrence Campus

Human Subjects Committee Lawrence
Youngberg Hall | 2385 Irving Hill Road | Lawrence, KS 66045-7568 | (785) 864-7429 | www.research.ku.edu

## Extended Literature Review

It is no secret that sport and exercise can have a positive impact on those who participate. Research has shown that regular physical activity provides a range of experiences from which children and adolescents can reap many benefits for their self-esteem, self-efficacy, and psychosocial development (Calfas & Taylor, 1994; Smoll, Smith, Barnett, & Everett, 1993). However, the psychological and social benefits of regular physical activity are not guaranteed. In fact, the likelihood of enjoying these benefits can be largely influenced by environmental factors in a particular context (Gano-Overway, 2013; Gearity, 2012). The inability of many leaders in sport and exercise (i.e. physical educators, trainers, coaches, and team administrators) to ensure positive experiences for greater numbers of their constituents is causing problems with participation. At the youth sport level, participation rates are down nearly 4% in the U.S. (Aspen Institute, Project Play). At the collegiate level, though statistics are relatively sparse, one study found that as much as 47% of surveyed collegiate athletes from a major conference had experienced symptoms of burnout at some point in their career (Silva, 1990). These statistics may be unsurprising to some given the prevalence of poor coaching practices in elite sport at every level (Gearity, 2012).

Though the current state of elite sport cannot be changed overnight, it is important to understand the reasons behind the prevalence of burnout symptoms and declining participation, and propose long-term solutions. In the sport and exercise psychology literature, a theory that originated in educational psychology, known as Achievement Goal Perspective Theory (AGPT), is offering explanations and providing future directions for positive youth development through sport and physical activity. Through developing an understanding of this and other positive psychology theories, organizations like the Positive Coaches Alliance are taking significant steps

to improve coaching education, specifically when it comes to positive development and well being for young athletes. However, in addition to informing research about more effective coaching practices, AGPT can offer alternative research directions that are less prevalent in the sporting realm, but would provide new angles from which to approach the current issues with many sport experiences.

## Achievement Goal Perspective Theory

John Nicholls developed Achievement Goal Perspective Theory (AGPT) after reviewing a large body of research that had been conducted with children of varying ages in mostly educational settings (Nicholls, 1989). Nicholls, using AGPT, wanted to figure out how to optimally motivate the most people in an "achievement setting" (i.e. school, sport, or any other achievement environment). Aside from the obvious impact that an answer to this question could have on youth sport, AGPT also offers an explanation as to why so many children are abandoning youth sport in middle school.

### Cognitive Development

Individuals' "level" of cognitive ability plays an integral role in their achievement motivation. Studies have shown that contrary to earlier assumptions, understandings of effort and ability can vary substantially between children and adults (Nicholls, 1989). Nicholls and colleagues conducted a series of studies to examine the process by which children develop concepts of effort, ability, skill, and luck. In doing so, they were able to describe this development in clear, hierarchical stages.

Nicholls (1989) stated that, unlike adults, individuals in the earliest stages of development (anywhere from 2 – 7 years old) tend to judge a task's difficulty in purely self-referenced terms, where task difficulty and perceptions of ability are based solely on their

expectations of success with the task. Additionally, Nicholls (1989) claims that the distinction between luck and skill is essentially absent and accomplishment through higher effort is seen as indicative of ability. This imperfect distinction is contrary to the understanding of most adolescents and adults, who tend to believe that accomplishment through higher effort than a peer is an indicator of lower ability. It is also relevant to note that despite the capability to do so, children in these earlier stages generally will not tend to make explicit self-evaluations through comparison with more advanced peers. In the absence of any cues to do otherwise, children in early developmental stages use their ability to identify their more advanced peers in an effort to learn from them by observation (Morrison & Kuhn, 1983).

According to Nicholls (1989), as children continue to develop, their distinctions of the concepts of luck, skill, ability, and effort, develop as well. During the second stage—usually reached by the age of 7-11 years—these concepts become better understood, as does their relationship with each other. Children in this stage, for example, may still believe that they can influence the outcomes of tasks that are dependent on chance. However, they also tend to believe that effort will improve performance on skill tasks and that these tasks are more affected by effort than luck tasks. In terms of difficulty and ability, children in the second stage will begin to reference their perceptions based on peers. Tasks that few can complete are seen as difficult, and completion of such tasks is indicative of high ability. Finally, children in this stage tend to expect that equal effort by two of them will lead to equal outcomes; ability is at best only partially differentiated from effort as a cause of outcomes (Nicholls, 1989).

Finally, in Nicholls' (1989) most developed stage—generally reached around the age of 12—a majority of children can completely differentiate tasks with outcomes dictated by luck or chance from those with outcomes that can be influenced by effort and/or ability. Furthermore,

children at this stage of development were able to completely differentiate the concepts of effort and ability; the effects of effort on performance of a specific task are seen as limited by one's ability. Additionally, research has suggested that when children attempt to differentiate between effort, luck, ability, and between high and low task difficulty in the physical as opposed to the cognitive domain, they were able to do so at ages as young as 9 (Fry, 2000a; Fry, 2000b; Fry & Duda, 1997). It is at this point, with completely differentiated concepts of luck, ability, skill, difficulty, and effort that youth become capable of being what Nicholls (1989) refers to as "ego-involved." This developmental hierarchy may shed light as to why so many children are dropping out of sport at or before 12 years of age (Aspen Institute, Project Play).

While developing these differentiated concepts is basically inevitable, it is important to remember that cognitively advanced individuals are not necessarily fixed in the most advanced stage of cognitive ability, practically speaking. Nicholls (1989) asserted that those in the most advanced cognitive stage can choose to focus more on their effort and incremental improvement, a state Nicholls referred to as being "task-involved." Certain elements salient to an achievement setting can cue individuals to utilize more or less differentiated conceptions of ability and thus influence cognitive, affective, and behavioral functioning in that setting. The characteristics of a setting that influence these functions ultimately constitute the motivational climate for that setting. The nature of individuals concepts of effort and ability, their achievement goal orientation (discussed in a later section), and the motivational climate to which they are exposed will all interact and lead them to be in a state of either ego- or task-involvement (Nicholls, 1989).

**Motivational Climate**

When studying achievement motivation, the structure of the environment and its effects on the subjective cognitive and affective experiences of those being studied, must be considered.

Specifically, elements such as situational demands and constraints, psychosocial dynamics among the group, and even the task itself can influence individuals' perceptions of salient goals (Ames, 1992). These elements contribute to what is referred to as the "motivational climate." Though somewhat dependent on the nature of interactions with other group members, the motivational climate is primarily dictated by the group leader (e.g., a parent, teacher, or coach). Nicholls (1989) describes two possible climates, a task-involving climate (TIC) and an ego-involving climate (EIC). These two opposing climates can directly influence individuals' achievement motivation and thus their cognitive, affective, and behavioral outcomes. A TIC will generally encourage individuals to focus on applying their best effort and on incremental improvements in the mastery of a task. TICs are often characterized by choice regarding tasks or skills, a clearly understood personal relevance for learning a skill, and positive informational feedback. In contrast, an EIC will encourage a focus on interpersonal comparisons and competition. EICs are characterized by performance contingent rewards, non-specific negative feedback, and threats of punishment (Ames, 1992; Duda, Chi, Newton, Walling, & Catley, 1995; Nicholls, 1989).

Early studies in the education field have managed to identify some of the cognitive and behavioral outcomes associated with the different motivational climates. Ames and Archer (1988) found that students perceiving a TIC tended to adopt more effective learning strategies, apply more effort, and choose more challenging tasks than those in a perceived EIC. Additionally, Jagacinski and Nicholls (1984) when comparing students exposed to the respective climates, found that students exposed to an EIC would perceive themselves as less competent as they apply more effort. These results were in spite of the fact that students in both climates agreed that higher effort lead to better mastery of a skill.

As AGPT research began to cross into athletic settings, the overtly competitive nature of sport begged the question of whether or not results that were in line with the education literature would be possible. Duda and Nicholls (1992) found that the same dimensions of AGPT were indeed present in athletics and that associations with cognitive and behavioral outcomes were largely similar. Upon the discovery of these comparable relationships, sport-specific measures like the Perceived Motivational Climate in Sport Questionnaire (PMCSQ-1) were developed and further validated the 2-factor structure of the motivational climate in sport settings (Seifriz, Duda, & Chi, 1992; Walling, Duda, & Chi, 1993). Additionally, an exercise specific version (PMCEQ) was created and has recently been abbreviated (Moore, Fry, & Brown, 2015).

**Caring/task-involving climates.** In addition to the task- and ego-involving climates, Newton, Fry et al. (2007) found a climate dimension distinct from, though highly positively correlated with task-involving climates. This "Caring Climate" consisted less of the instructional aspects of leader interactions with the group (e.g., task demands and constraints, task-relevant feedback) and more of the supportive aspects of these interactions (e.g. warmth, guidance, secure attachment). Generally speaking, when a TIC is present a caring atmosphere will also be found, creating what is referred to as a caring/task-involving climate(C/TIC; Newton, Fry et al., 2007).

As stated earlier, though organized sports and physical activity in general are regarded as sure avenues for positive development, the growing body of AGPT and leadership research in these realms has clearly and overwhelmingly indicated that this is not necessarily the case. Research has shown that the positive outcomes many have come to expect from physical activity are largely dependent on the motivational climate as a function of leader behavior and interaction in these settings (Allen & Howe, 1998; Curran, Hill, Hall, & Jowett, 2015; Mageau & Vallerand, 2003; Nicolas, Gaudreau, & Franche, 2011; Smoll et al., 1993). In fact, during their study of

adolescent soccer players, Vella, Oades and Crowe (2013) found that factors similar to those contributing to a C/TIC were more highly associated with positive developmental experiences than overall team success.

As the body of AGPT research has grown in the physical activity literature, the numerous benefits of creating a C/TIC have become clear. In addition to the greater reported levels of intrinsic motivation found by Duda and Nicholls (1992), individuals exposed to C/TICs have reported greater satisfaction and enjoyment in their activity (Fry & Gano-Overway, 2010; Walling et al., 1993), more positive psychobiosocial states (Bortoli, Bertollo, Vitali, Filho, & Robazza, 2015), and reduced levels of anxiety (Smith, Smoll, & Cumming, 2007) when compared to those in an EIC. Furthermore—and still in line with educational research—meta-analyses of AGPT research done within physical activity settings showed that C/TICs were associated with reports of greater likelihood of persistence after failure, greater likelihood of choosing challenging tasks, and greater effort (see Harwood, Keegan, Smith, & Raine, 2015 for review). Perhaps the most basic, yet demonstrative effects of the benefits of C/TICs were described by Smith, Smoll, and colleagues who discovered that leader behaviors consistent with creating a C/TIC were the basis on which youth athletes differentiated “good” coaches from “bad” coaches, and that players exposed to coaches who were untrained in performing these behaviors were five times as likely to discontinue their participation with the team the next season (Barnett, Smoll, & Smith, 1992; Smith, Smoll, & Curtis, 1979.

**Ego-involving climates.** Unfortunately, as positive an experience as physical activity in a C/TIC can be for development, the same activities in an EIC can actually do more harm than good. Both phenomenological and quantitative research on poor leader behaviors have indicated—much like the Smith et al. (1979) study—that behaviors which qualify one as an

954 ineffective and even potentially damaging leader/teacher/coach fit Nicholls' (1989) description
955 of behaviors that foster an EIC (Bartholomew, Ntoumanis, & Thøgersen-Ntoumani, 2009;
956 Gearity, 2012). When individuals are exposed to these behaviors along with the inherent stress of
957 an achievement setting like sport, negative effects can be compounded and the activity may no
958 longer be beneficial to their development (Fraser-Thomas & Côté, 2009; Hansen, Larson, &
959 Dworkin, 2003; Todorovich, 2009). In some cases individuals can experience low self-esteem
960 and depression (Gervis & Dunn, 2004), develop maladaptive coping strategies (Kristiansen,
961 Roberts, & Abrahamsen, 2008), or become less engaged or completely burnt out with the activity
962 (Curran et al., 2015; Lemyre, Hall, & Roberts, 2008). In extreme cases, athletes can develop
963 potentially more serious conditions such as eating disorders (de Bruin, Bakker, & Oudejans,
964 2009).

965 The potential for negative outcomes that is characteristic of EICs is certainly a cause for
966 concern, especially when considering the impact of these outcomes on young people in critical
967 stages of development. Even more concerning is the pervasiveness of these climates at virtually
968 every level of physical activity (Gearity, 2012). Whether it be perpetrated unknowingly by
969 physical educators and untrained volunteers or maliciously instilled by coaches at elite levels,
970 encountering an EIC somewhere along their development is almost a certainty for individuals in
971 the physical activity realm.

972 Todorovich (2009) for example, found that extremely ego oriented physical educators
973 often allowed their beliefs regarding effort and ability to dictate their beliefs about teaching.
974 Specifically, despite a commonly held belief among the participants that students should be
975 graded according to effort, they also believe that only the best performers should be singled out
976 and praised during class. This communicates that despite grading on effort, these educators'

public praise and preferential treatment are reserved only for the best performers and not necessarily for those trying their hardest. Additionally, these physical educators felt that P.E. classes were isolated from other educational subject areas in that they felt they could not influence students' levels of performance on tasks. This indicates that P.E. teachers would attribute students' performance outcomes to an innate and unchangeable level of ability rather than students' effort. Overall, Todorovich's study showed that ego-oriented teachers may try to grade as fairly as possible for students of all abilities, but students perceived as having low ability will likely receive disproportionately little when it comes to attention, instruction, and praise. This dynamic is reflective of the teachers' high ego orientations and a hallmark of an EIC that is likely to stunt lower ability students' improvement on tasks and overall motivation.

The ubiquity of ego-involving climates extends far beyond the physical education classroom, too. Gearity (2012), using a sample of athletes who had competed at the collegiate level or higher, found that each participant had at least one experience with poor coaching at one or more levels of competition in their respective sports including, summer league, middle school, high school, junior college, collegiate, semi-professional, and professional teams

As it becomes clear that these environments are pervasive at every level of both the competitive and educational sides of physical activity, it is important to note that even those with high ability, those presumed to benefit the most from an EIC, are susceptible to the associated negative effects. In some extreme cases, ego-involving coaching behavior can approach emotional abuse. In their study of elite child athletes (having competed with national teams at world-class events) in multiple sports, Gervis and Dunn (2004) found that all 12 participants reported being subjected to "shouting" and "belittling" from their coach with most of them reporting such events as happening "frequently." Additionally, a majority of participants

reported frequently being “threatened” or “humiliated” with many stating they still suffered from residual emotional and psychological problems (Gervis & Dunn, 2004). Evidently even coaches at the highest level of youth sport, presumably those most qualified, may engage in behaviors that are counterproductive to positive development. Indeed, these studies suggest that an individual with high levels of physical ability may be at an even higher risk than less talented peers of experiencing an EIC and thus unwanted outcomes.

Though the motivational climate experienced by young athletes has a significant impact on their cognitive, affective, and behavioral outcomes, these outcomes are also greatly influenced by athletes’ achievement goal orientation. Recall that Nicholls (1989) explained that these outcomes were dependent on how an individual’s cognitive ability, the motivational climate to which they are exposed, and the individual’s personal goal orientation all interact with each other.

**Goal Orientation**

The final tenet of AGPT, goal orientation, is a personal variable indicated by individuals’ subjective conceptualizations of success. Along with personal conceptions of ability, individuals’ concepts of success are essential in understanding the motivation behind their achievement behavior. Goal orientations, when considered with personal beliefs about competency and the likelihood of accomplishing a task, can influence a multitude of behaviors in achievement settings such as task selection, task persistence, and reactions to failure at any given task (Nicholls, 1984, 1989).

Nicholls (1989) identified two orthogonal goal orientations. Every individual in a given setting will fall somewhere between high and low for ego orientation *and* high and low for task orientation. Individuals high in task orientation tend to define success as mastery of a task,

personal improvement on a task, or the application of high levels of effort in attempting a task. Conversely, individuals high in ego orientation tend to define success in more normative terms i.e., completing a task that few peers could or completing a task faster/with less effort than peers. Highly task-oriented individuals are self-referenced and seek to *develop* competence by skill acquisition and task mastery; highly ego oriented individuals seek to *demonstrate* competence by outperforming others. Despite their seemingly dichotomous nature, it is important to note that unlike motivational climate, Nicholls conceived of goal orientations as orthogonal; thus, an individual may exhibit high to low levels of either orientation. Also notable is that goal orientations are not mutually exclusive and are relatively stable (Nicholls, 1984, 1989).

Decades of research conducted in the educational and athletic fields have generally supported the predictions of Nicholls (1989) as they pertain specifically to younger (middle and high school) individuals' cognitive, affective, and behavioral responses. Higher task orientation has been shown to be a strong predictor of pleasant psychobiosocial states (Bortoli, Bertollo, Comani, & Robazza, 2011), greater enjoyment (Smith, Balaguer, & Duda, 2006; Stuntz & Weiss, 2009), positive coping strategies and greater persistence (Doron, Stephan, Maiano, & Le Scanff, 2011; Dweck & Leggett, 1988), transference of learned problem-solving strategies (Bereby-Meyer & Kaplan, 2005), and lower levels of performance anxiety (Grossbard, Cumming, Standage, Smith, & Smoll, 2007), while opposing outcomes were seen in individuals high in ego orientation.

Moreover, R. Ames (1983) found that students' with low self-perceptions of ability would differ in achievement behavior based on goal orientations. Students high in task orientation with low self-perceived ability were more likely to seek assistance with a skill and hold the belief that skill development would eventually lead to success. In contrast, students high

in ego orientation with low self-perceived ability were less likely to seek assistance, presumably because they believed that any request for help would demonstrate their lack of ability to peers (R. Ames, 1983). These findings support the conception of goal orientation, much like those of Morrison and Kuhn (1983), by showing that individuals high in ego orientation define and pursue success in constant reference to others, while students high in task orientation only tend to reference others for purposes such as social learning or even inspiration (Nicholls, 1989).

Though cognitive, affective, and behavioral outcomes for the highly ego-oriented have generally been found to be maladaptive (as seen in the earlier mentioned studies), not all will agree that a high ego orientation will always be necessarily maladaptive in and of itself. Nicholls (1989) explains this by highlighting the impact that task difficulty and perceived ability have on behavioral outcomes in individuals high in ego orientation. Specifically, perceived ability can have moderating effects on outcomes for these individuals, while this is generally not the case for those who are high in task orientation (Ames, 1992). For example, individuals high in ego orientation—presumably focused on avoiding a demonstration of low competence—may choose a task that very few of their peers can accomplish. The rationale being that failing to accomplish this task will have very few implications for the individual's competence relative to peers. In this case the individual high in ego orientation may choose excessively challenging tasks.

In another example, individuals high in ego orientation with high perceived-ability who fail to outperform others on a task can be highly motivated to persist at said task because their failure to outperform peers has—in their mind—demonstrated a level of ability that is incompatible with their self-perception. In this case, these individuals may exhibit high levels of persistence. In both cases, those high in ego orientation may exhibit positive behavioral

outcomes. However, these positive behaviors are adopted as means to an end (demonstrating ability and superiority) rather than ends in themselves.

These examples illustrate how a high ego orientation may not *always* lead to poor outcomes. However, there is little debate as to the best way to accomplish the goal Nicholls originally had in mind, that being optimal motivation for the greatest number of people. Nicholls (1989) believed that being highly task-involved, regardless of where individuals fell on the ego orientation spectrum, was key to optimal motivation.

With the goal of optimal motivation for the most people in mind, and having already discussed motivational climate, the prospect of changing individuals' goal orientation must be considered. Nicholls (1989) believed changes in orientation were possible and this stance has found some support in the research. Consistent with Nicholls (1989) and Ames' (1992) suggestion that climate will influence goal orientations, Anderman and Anderman (1999) found that goal orientations tend to change during the transition from elementary to middle school based on what types of goals are made salient in the classroom. Findings regarding goal orientations are in some ways inconsistent though, as some studies have shown them to be relatively stable traits across situations in the same domain (e.g., in educational settings but across the transition to secondary school; Tuominen-Soini, Salmela-Aro, & Niemivirta, 2012), and in the case of Duda and Nicholls (1992), across domains (e.g., academics to athletics) despite subjects' perceptions of differences in their own ability, from one domain to the other. Still other researchers have found evidence for both cases, that goal orientation is stable at the sample level and dynamic at the individual level over time in an educational setting (Fryer & Elliot, 2007).

An obvious factor in individuals' goal orientation as pointed to by Nicholls is their cognitive development. As discussed earlier, a more or less differentiated conception of ability plays a large role in achievement goal behavior and individuals' development in this area is fairly straightforward as described by Nicholls (1989). Additionally the self-regulative nature of achievement goals means that individuals are presumably going to evaluate their progress and experiences in achievement settings and consider adjusting the approaches they use in such settings as needed (Fryer & Elliot, 2007). However, goal orientations can also be largely affected by the development of a more or less sophisticated conception of learning itself and what skills it requires. For example, Vermetten, Lodewijks, and Vermunt (2001) found that the manner in which individuals differ in learning strategies (e.g. memorization vs. critical processing), their goal orientation, and personality factors were all related. The relationship between these variables are in line with Nicholls' original theory, specifically that the ways in which an individual understands the concept of learning and how best to pursue learning goals can be less influenced by cognitive development and more related to an individuals' philosophical understanding of the world (Nicholls, 1989). This relationship is evident when one considers the vast differences in learning approaches that can be seen in even the most advanced stage of cognitive development as described by Nicholls (1989).

Muddying the waters even further, the manner in which researchers frame goal orientations at the outset of a study can have implications as to whether they are seen as changeable states or stable traits. As pointed out by Kaplin and Maehr (2007), some goal orientation studies employ experimental manipulations (effectively controlling the motivational climate) or use questionnaires that focus on a specific task, while others look at goal orientation

in a specific domain (i.e. academics or athletics) across situations, with both research designs tending to find evidence in support of their original framework.

Due to these findings and to the generally complex nature of AGPT, there seems to be little consensus as to which factor—motivational climate or achievement goal orientation—has a larger impact on an individual's cognitive, affective, and behavioral outcomes in general. That being said, when looking at very specific outcomes, more is understood about the climate-goal orientation dynamic in achievement settings. What seems to be agreed upon is that goal orientations are generally more stable, closer to a trait, but are capable of changing as individuals develop and/or find themselves in different contexts. Additionally, it is more than plausible that motivational climates largely affect these changes in orientation (Anderman & Anderman, 1999). What remains less clear is which factor, climate or goal orientation, has a greater influence on an individual's state of being task- or ego-involved at any given moment.

## Stress

Inter-related with the effects of motivation on cognitive, affective, and behavioral outcomes are effects of individuals' experience with stress and their ability to cope. Physiological stressors like injury or illness, psychological stressors like insults or feelings of isolation, or even simply *anticipating* a stressor e.g., feelings of anxiety can activate the physiological stress response. During the stress response, the sympathetic portion of our autonomic nervous system activates the release of, among other things, the hormone cortisol. Cortisol release is the result of an activated Hypothalamic-Pituitary-Adrenocortical (HPA) axis. During the stress response, the hypothalamus secretes releasing hormones, the most notable of which is corticotropin releasing factor (CRF). CRF subsequently triggers the pituitary gland to release adrenocorticotropic hormone (ACTH) into the bloodstream. Upon reaching the adrenal

glands atop the kidneys, ACTH triggers the release of a class of hormones called glucocorticoids, the most well known of which is cortisol (Sapolsky, 2004). Finally, cortisol initiates a negative feedback loop by inhibiting the release of ACTH, thus returning cortisol to baseline levels when there is no longer the presence of a stressor (Hosseinichimeh, Rahmandad, & Wittenborn, 2015).

**Cortisol**

Although a high level of cortisol is not necessarily the direct cause of every negative effect of a chronically activated stress response, it is a significant factor and is also considered a reliable and easily quantifiable physiological indicator of the stress response (Kirschbaum & Hellhammer, 1994) and is thus commonly used in stress research. When conducting research with cortisol, it is important to consider a number of confounding variables.

Perhaps the largest of the possible confounds in cortisol research are the naturally occurring oscillation patterns in cortisol levels. The circadian rhythm of cortisol causes heightened levels during morning hours (8:00 am – 12:00pm) that gradually decrease as the day progresses, falling to the lowest levels during sleep (12:00am – 4:00am). The ultradian rhythm of cortisol refers to a pulse of production approximately every hour, which underlies the diurnal pattern of the circadian rhythm (Hosseinichimeh, Rahmandad, & Wittenborn, 2015). The diurnal pattern of cortisol oscillation must be accounted for when conducting research with salivary cortisol, as higher basal levels of cortisol can blunt the physiological response to stress. For this reason, cortisol measurements should be conducted during afternoon hours as suggested in previous studies (Hogue, M. Fry et al., 2013).

Other possible sources of measurement error in salivary cortisol studies are diet and medication. Mid-day meals and some steroid medications (e.g., asthma inhalers, some allergy medications) can cause variations in baseline cortisol measurements and dampen the effects of

physiological responses to stressors (Hansen, Garde, & Persson, 2008). Thus, to control for these potential confounds, participants should be screened based upon their eating habits on the day of collection and any medication they are taking.

Stress and coping research continues to gain significance because of the now well-established negative effects of chronic stress. Cortisol has been shown to be associated with impaired immunological and cardiovascular functioning, damage to neurons in the brain, and is also a contributing factor to the expression of disease (Burg & Pickering, 2011; McEwen & Stellar, 1993). More relevant to sport and exercise sciences, the catabolic nature of cortisol means that chronic exposure to high levels of the hormone can impact the body's ability to build muscle and repair itself.

A natural function of cortisol is to negatively affect protein synthesis and cause an increased use of protein in metabolic functions as opposed to glycogen (Dickerson & Kemeny, 2004). This allows the body to ignore functions like digestion or the rebuilding of muscle for short periods of time during acute stress, which evolutionarily speaking, was an important function for the survival of our primitive ancestors (Sapolsky, 2004). However, when chronically stressed this function will obviously have negative effects for athletes' recovery (Kraemer et al., 2004; Kraemer et al., 2009). Additionally, chronic stress can dampen the inhibiting effects of cortisol on ACTH, meaning that chronically stressed individuals will take longer to return to base levels of cortisol (Hosseinichimeh et al., 2015).

**Motivational Theories of Stress**

Beyond defining stress in physiological terms, Lazarus (1993) proposed a conceptualization of stress as a subset of emotion. In this concept of stress, the cognitive, motivational, and relational aspects of our experience of stress are central to our understanding.

Lazarus believed that stress as an emotion is borne from the interaction of a person with the environment (usually other people). Furthermore, inherent in our interactions with our environment are appraisals of the interaction in terms of our personal goals. Anytime we interact or anticipate an interaction with our environment we asses that interaction in terms of: (a) relevance or irrelevance to a goal, (b) congruence or incongruence with the goal, and (c) the specific goal to which it applies (Lazarus, 1993).

Building upon this motivational understanding, a similar concept of stress was used by Dickerson and Kemeny (2004) in the description of their social self-preservation theory. The theory posits that individuals are motivated to preserve their social value, self-esteem, and perceptions of their social status; individuals want to preserve their social selves much in the same way that early ancestors strived to preserve their physical selves. In line with this position, threats to the social self are believed to be capable of activating the stress response in the same way as threats to the physical self.

In using this theory, Dickerson and Kemeny's (2004) meta-analysis found that even when highly motivated, participants' attempting difficult tasks did not create a significant effect on cortisol when there was no perception of a social threat. In contrast, stress responses in motivated participants did spike when there was an element of a social evaluation present (e.g. recorded performance or presence of an audience). Motivated participant's performing tasks with a level of inherent uncontrollability (in the form of false feedback, harassment, etc.) also elicited significant stress responses. However, perhaps the most significant finding was that stress response effects in motivated participants were compounded and significantly higher in situations involving social evaluation *and* uncontrollability.

Being that the threat of social evaluation is characteristic of EICs and that such a threat is of particular concern to the ego-involved individual, the connections between motivational climate, ego orientation, stress, and outcomes become clear. The addition of the (relatively) uncontrollable nature of competitive performance makes the potential for high levels of chronic stress even greater. With the social self-preservation concept in mind, it follows that high levels of cortisol indicative of high stress have been associated with significant and generalized negative outcomes in sport such as increased tension and depression, and a decrease in overall athletic performance (Filaire, Bernain, Sagnol, & Lac, 2001).

Keeping with athletic performance in particular, Lazarus (2000) believed that the cognitive and motivational components of an individual's appraisals during adaptational encounters were intimately linked, via different emotional experiences, with any performance variations in that individual. This was a possible explanation for why individuals seem to be "on" certain days and "off" others. The dependence of these performance variations on individuals' appraisals of their coping resources (in addition to appraisals of the threat itself) allow for the possibility of buffering stress in athletic settings in ways essentially the same as any other domain.

**Stress and Coping**

Research on how one is able to cope with stress generally focuses on social support or personal coping strategies (many times including strategies that utilize social support networks). Social support research tends to look at differences in both the amount and the type of support that an individual has available (see Cohen & Wills, 1985 for review). Cassel and Cobb developed the stress-buffering hypothesis based on this notion, but through slightly differing approaches (Cassel, 1976; Cobb, 1976). Cassel believed that the negative effects of stressors

could be attenuated by a social support network that would provide task related expectations, assistance, evaluation, and rewards in a manner that is both consistent and specific (Cassel, 1976). Cobb, on the other hand, approached stress buffering with the belief that a social support network that made an individual feel related, cared for, and valued would alleviate stress (Cobb, 1976). Of course, both perspectives have garnered their fair share of support (Cohen & Wills, 1985).

Cassel and Cobb's respective approaches draw obvious similarities with Nicholls' (1989) description of a TIC and Newton, Fry et al.'s (2007) description of a Caring climate. However, as mentioned earlier, we know that these environments are far from guaranteed for the typical athlete or exerciser. This begs the question, how can an individual in an EIC—who is not provided with positive instructional feedback, and does not perceive much social support—cope with chronic or high levels of stress? Just as the state of being task- or ego-involved is dependent on environmental (climate) and personal (goal orientation) factors, so too are an individual's preferred method and efficacy in coping with stress.

The study of personality as it relates to stress and coping represents the other side of the coin in coping research. Beyond focusing only on coping strategies that rely on the use of social support networks, there is a long list of strategies that are more internally focused. To better understand and measure individual differences in using these strategies, Carver, Scheier, and Weintraub (1989), developed the COPE Inventory.

The COPE originally identifies 13 (15 at present) distinct coping strategies that fall into either the problem- or the emotion-focused categories with each strategy measured by its own subscale (Carver, Scheier, & Weintraub, 1989). For example, *Active coping* is a strategy in which an individual takes active and deliberate steps to relieve the effects of a stressor. An

example item is, “I concentrate my efforts on doing something about it.” This strategy is said to be at the core of the concept of problem-focused coping (Carver et al., 1989). On the other hand, strategies like *Behavioral or Mental disengagement* are emotion-focused and more representative of helplessness behaviors in that they aim only to distract an individual from negative emotions rather than deal with the stressor itself. An example item for mental disengagement is, “I go to movies or watch TV to think about it less.” (Carver et al., 1989). Carver is strongly opposed to directly referring to certain strategies as “adaptive” or “maladaptive,” but rather suggests using scale items to create constructs that can be construed as adaptive or maladaptive given the particular context being researched and the theoretical framework used (Carver, 2007). Research within AGPT for example, would assume that problem-focused coping is generally the more adaptive approach.

In the larger body of AGPT research, both goal orientation research and motivational climate research utilize, at the very least, a similar framework and both factors are considered to interact and play a significant role in the creation of an individual’s motivational state. The same is certainly true of individual differences in personality and social support in physical and mental/emotional responses to stress (Costa, Somerfield, & McCrae, 1996; Williams, Smith, & Gunn, 2011). Ntoumanis, Biddle, and Haddock (1999) made this comparison of stress and AGPT research in their study on coping as a mediator between motivation and affect in athletes. Using a version of the brief COPE that was adapted for sport, they found that problem-focused coping like *Suppression of competing activities* acted as a mediator between task orientation and positive affect. Conversely, emotion-focused coping strategies i.e., *focusing on and venting of emotions* mediated the relationship between ego orientation and negative affect. However, the model proposed in this study also included measures of the perceived motivational climate

(Ntoumanis et al., 1999). Inclusion of climate measures could have affected other relationships as the climate and orientation indicators were covaried.

Ntoumanis and colleagues' study was built upon earlier work by Pensgaard and Roberts (2003), who found that different goal orientations were related to different coping tendencies. Again, using the COPE inventory, the study found that participants who were high in task orientation tended to use more problem-focused strategies regardless of their level of ego orientation (although the high task/low ego group was scored highest in this regard). While these findings suggest that goal orientation will impact coping strategies and—subsequently—positive experiences, neither study included any control for the participants' perceived motivational climate due to their observational design. As stated by Pensgaard and Roberts (2003), it is possible that the athletes high in task orientation may have been so as a result of being in a TIC. Those athletes' motivational climate will likely have affected their perceived control during the situation being studied, which can influence their tendencies toward problem-focused coping (Pensgaard & Roberts, 2003).

Given these results, it is expected that goal orientation will affect coping strategies in physical activity. Additionally, it seems likely that these differences will influence individuals' efficacy in reducing both their physiological and psychological responses to stress. However, very little is known about the goal orientation-stress-coping relationship in settings in which the motivational climate is experimentally controlled.

Because of the impact that the motivational climate has on an individual's cognition, affect, and behavior, as well as the ease with which it can be manipulated, many studies in AGPT have been conducted utilizing interventions that affect the motivational climate (via leader behaviors, the nature of achievement tasks, etc.; Bortoli et al., 2015; Brown & Fry, 2014; Hogue,

M. Fry et al., 2013; Smith et al., 2007; Smoll et al., 1993). However, very few if any interventions aimed directly at athletes' goal involvement have been studied. What is especially problematic with this avenue of research is the difficulty in affecting goal involvement without *overtly* affecting the motivational climate. A possible solution to this problem lies in goal priming.

## Goal Priming

Priming task related goals is an effective means of manipulating individuals' achievement goals without overtly affecting the motivational climate. Though studies like that of Bereby-Meyer and Kaplan (2005) claim to have primed certain achievement goals, their procedure describes their making certain goals explicit to participants by explaining that, "the idea is to learn from mistakes in order to improve ability" in the mastery condition, or that, "the aim of the game is to compare the ability of different children in playing the game," and that "they had an opportunity to show that they were good in playing the game" in the performance condition (pg. 8). These are examples of researchers making certain goals and measures of achievement salient to the participants through explicit instruction rather than priming, effectively making the manipulation one of the motivational climate rather than goal involvement directly.

In contrast, other studies have used less direct forms of initiating different achievement goals in their participants. For example, Niiya, Crocker, and Bartmess (2004) used informational reading to prime their participants to adopt different learning orientations. On a practice GRE test, college students were randomly assigned to conditions in which they were exposed to a reading comprehension portion of the GRE containing information about how an individual's abilities develop. In one condition, participants were told that abilities (specifically intelligence)

are innate and unchanging (entity theory). In the other condition, participants were told that abilities are flexible and capable of being increased through effort (incremental theory). Participants were then also randomly assigned to a failure (45$^{th}$ percentile) or success (97$^{th}$ percentile) condition (Niiya et al., 2004). Results of the study showed that the effects of failure on participants' self-esteem could be buffered by priming them to adopt an incremental learning orientations, even in a context in which they perceived their self-worth as contingent on their performance (Niiya et al., 2004). Though learning orientations are conceptually distinct from Nicholls' (1989) goal orientations, they share many similar antecedents and behavioral outcomes (Dweck & Leggett, 1988).

Participants in Niiya et al.'s (2004) study were presented only with information suggesting different conceptions of intelligence and how it is developed. Because this was not an overt manipulation of the motivational environment, and participants were not provided with any specific cognitive strategies to protect their self-esteem in the face of failure, this study is an example of a direct albeit somewhat unconscious adjustment to the participants' personal orientations, while avoiding any manipulation to the motivational environment through explicit instruction. The finding that these differences in learning orientations buffered self-esteem from an experience of failure suggest that a similar intervention may have similar buffering effects on an individual's experience of stress as threats to self-esteem are considered an example of a situation that may lead to stress (Lazarus, 1993).

In a physical activity setting, Magaraggia, Dimmock, and Jackson (2014) showed that participants who were given scrambled sentence tasks that primed them to feel that their autonomy is supported, set higher exercise goals (in the form of longer intended duration) than those that received a controlling or neutral prime. This study provides an example in which a

priming intervention affected aspects of overt goal setting and intention to behave rather than the unconscious effects that are typically associated with priming studies (see Bargh, Chen, & Burrows, 1996). In addition to any stress buffering effects that could result from priming, studies like the one conducted by Magaraggia and colleagues suggest that priming can affect conscious psychological outcomes such as the intent to continue with an activity in the future.

## Conclusion

Research using AGPT has clearly supported that motivational climate interventions can enhance individuals' experiences in sport settings (Bortoli et al., 2015; Brown & Fry, 2014; Hogue, M. Fry et al., 2013; Smith et al., 1978; 1979; 2007). Additionally, the many parallels in AGPT and stress research suggest that a C/TIC can be conducive to stress buffering via social support. These findings offer a future direction in attempting to keep higher numbers of individuals engaged in physical activity for longer portions of their lives.

Despite decades of support for the benefits of creating more caring and task-involving environments, research shows that less supportive environments are common (Gearity, 2012; Gervis & Dunn, 2004; Todorovich, 2009) and it is likely that many athletes and/or exercisers will not always be able to avoid them. With this in mind, the importance of preparing individuals for these environments, both cognitively and emotionally, is evident. However, fewer studies have examined the complex relationship between personality, goal orientations, and coping styles and how they may affect individuals' susceptibility to stress in achievement settings. Furthermore, there have been no studies employing an intervention to affect participants' goal involvement without affecting the motivational climate, causing difficulty with interpretation regarding differences in goal orientations.

Therefore, there is a need for research aiming to affect goal orientations while controlling for the motivational climate that will allow for a better understanding of how goal orientations can possibly impact experiences of stress in a negative motivational climate.

References

Allen, J. B., & Howe, B. L. (1998). Player ability, coach feedback, and female adolescent athletes' perceived competence and satisfaction. *Journal of Sport & Exercise Psychology, 20*, 280-299.

Ames, C. (1992). Classrooms: Goals, structures, and student motivation. *Journal of Educational Psychology, 84*(3), 261-271.

Ames, C., & Archer, J. (1988). Achievement goals in the classroom: Students' learning strategies and motivation processes. *Journal of Educational Psychology, 80*(3), 260-267.

Ames, R. (1983). Help-seeking and achievement orientations: Perspectives from attribution theory. In B. DePaulo, A. Nadler, and J. Fisher (Eds.), *New directions in helping* (pp. 165-188). New York: Academic Press.

Anderman, L. H., & Anderman, E. M. (1999). Social predictors of changes in students' achievement goal orientations. *Contemporary Educational Psychology, 25*, 21-37.

Aspen Institute, Project Play. (2015). *Sport for all, play for life: A playbook to get every kid in the game.* Retrieved from http://www.aspeninstitute.org/publications/sport-all-play-life-playbook-get-every-kid-game

Bargh, J. A., Chen, M., & Burrows, L. (1996). Automacity of social behavior: Direct effects of trait construct and stereotype activation on action. *Journal of Personality and Social Psychology, 71*, 230-244.

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.

Bartholomew, K. J., Ntoumanis, N., & Thøgersen-Ntoumani, C. (2009). A review of controlling motivational strategies from a self-determination theory perspective: Implications for sports coaches. *International Review of Sport and Exercise Psychology, 2*(2), 215-233.

Bereby-Meyer, Y. & Kaplan, A. (2005). Motivational influences on transfer of problem-solving strategies. *Contemporary Educational Psychology, 30*, 1-22.

Bortoli, L., Bertollo, M., Comani, S., & Robazza, C. (2011). Competence, achievement goals, motivational climate, and pleasant psychobiosocial states in youth sport. *Journal of Sports Sciences, 29*(2), 171-180.

Bortoli, L., Bertollo, M., Vitali, F., Filho, E., & Robazza, C. (2015). The effects of motivational climate interventions on psychobiosocial states in high school physical education. *Research Quarterly for Exercise and Sport, 86*, 196-204.

Brown, T. C., & Fry, M. D. (2014). Evaluating the pilot of Strong Girls: A life skills/physical activity program for third and fourth grade girls. *Journal of Applied Sport Psychology, 26*, 52-65.

Burg, M. M., & Pickering, T. G. (2011). The cardiovascular system. In A. Baum & R. Contrada (Eds.), *Handbook of stress science: Biology, psychology, and health* (pp. 61-87). New York: Springer.

Carver, C. S. (2007). *COPE (complete version)*. Retrieved from http://www.psy.miami.edu/faculty/ccarver/sclCOPEF.html

Carver, C. S., Scheier, M. F., & Weintraub, J. K. (1989). Assessing coping strategies: A theoretically based approach. *Journal of Personality and Social Psychology, 56*(2), 267-283.

Cassell, J. (1976). The contribution of the social environment to host resistance: The Fourth Wade Hampton Frost Lecture. *American Journal of Epidemiology,104*(2), 107-123.

Cobb, S. (1976). Social support as a moderator of life stress. *Psychosomatic Medicine, 38*(5), 300-314.

Cohen, E. (2015, September 1). The coach is a bully: Now what? [Web log post]. Retrieved September 2, 2015, from http://www.huffingtonpost.com/emily-g-cohen/the-coach-is-a-bully-now-_b_8067838.html

Cohen, S. & Wills, T. A. (1985). Stress, social support, and the buffering hypothesis. *Psychological Bulletin, 98*(2), 310-357.

Costa, P. T., Somerfield, M. R., & McCrae, R. R. (1996). Personality and coping: A reconceptualization. In M. Zeidner & N. S. Endler (Eds.). *Handbook of coping: Theory, research, applications (pp. 44-61)*. New York: Wiley.

Cumming, S. P., Smith, R. E., Smoll, F. L., Standage, M., & Grossbard, J. R. (2008). Development and validation of the achievement goal scale for youth sports. *Psychology of Sport and Exercise, 9*, 686-703.

Curran, T., Hill, A. P., Hall, H. K., & Jowett, G. E. (2015). Relationships between the coach-created motivational climate and athlete engagement in youth sport. *Journal of Sport & Exercise Psychology, 37*, 193-198.

de Bruin, A. P., Bakker, F. C., & Oudejans, R. R. D. (2009). Achievement goal theory and disordered eating: Relationships of disordered eating with goal orientations and motivational climate in female gymnasts and dancers. *Psychology of Sport and Exercise, 10*(1), 72-79.

Dickerson, S. S., & Kemeny, M. E. (2004). Acute stressors and cortisol responses: A theoretical integration and synthesis of laboratory research. *Psychological Bulletin, 130*(3), 355-391. doi:10.1037/0033-2909.130.3.355

Doron, J., Stephan, Y., Maiano, C., & Le Scanff. (2011). Motivational predictors of coping with academic examination. *The Journal of Social Psychology, 15*(1), 87-104.

Duda, J. L., Chi, L., Newton, M. L., Walling, M. D., & Catley, D. (1995). Task and ego orientation and intrinsic motivation in sport. *International Journal of Sport Psychology, 26*, 40-63.

Duda, J. L., & Nicholls, J. G. (1992). Dimensions of achievement motivation in schoolwork and sport. *Journal of Educational Psychology, 84*(3), 290-299.

Dweck, C. S., & Leggett, E. L. (1988). A social-cognitive approach to motivation and personality. *Psychological Review, 95*(2), 256-273.

Filaire, E., Bernain, X., Sagnol, M., & Lac, G. (2001). Preliminary results on mood state, salivary testosterone:cortisol ratio and team performance in a professional soccer team. *European Journal of Applied Physiology, 86*, 179-184. doi:10.1007/s004210100512

Fraser-Thomas, J., & Côté, J. (2009). Understanding Adolescents' positive and negative developmental experiences in sport. *The Sport Psychologist, 23*, 3-23.

Fry, M. D. (2000a). A developmental analysis of children's and adolescents' understanding of luck and ability in the physical domain. *Journal of Sport & Exercise Psychology, 22*, 145-166.

Fry, M. D. (2000b). A developmental examination of children's understanding of task difficulty in the physical domain. *Journal of Applied Sport Psychology, 12*(2), 180-202.

Fry, M. D., & Gano-Overway, L. A. (2010). Exploring the contribution of the caring climate to the youth sport experience. *Journal of Applied Sport Psychology, 22*, 294-304. doi:10.1080/10413201003776352

Fry, M. D., & Duda, J. L. (1997). A developmental examination of children's understanding of effort and ability in the physical and academia domains. *Research Quarterly for Exercise and Sport, 68*, 331-344.

Fryer, J. W., & Elliot, A. J. (2007). Stability and change in achievement goals. *Journal of Educational Psychology, 99*(4), 700-714.

Gano-Overway, L. A. (2013). Exploring the connections between caring and social behaviors in physical education. *Research Quarterly for Exercise and Sport, 84*, 104-114. doi:10.1080/02701367.2013.762322

Gearity, B. T. (2012). Poor teaching by the coach: A phenomenological description from athletes' experience of poor coaching. *Physical Education and Sport Pedagogy, 17*(1), 79-96.

Gervis, M., & Dunn, N. (2004). The emotional abuse of elite child athletes by their coaches. *Child Abuse Review, 13*, 215-233.

Grossbard, J. R., Cumming, S. P., Standage, M., Smith, R. E., & Smoll, F. L. (2007). Social desirability and relations between goal orientations and competitive trait anxiety in young athletes. *Psychology of Sport and Exercise, 8*, 491-505.

Hansen, Å. M., Garde, A. H., & Persson, R. (2008). Sources of biological and methodological variation in cortisol and their impact on measurement among healthy adults: A review. *Scandinavian Journal of Clinical and Laboratory Investigation, 68*(6), 448-458.

Hansen, D. M., Larson, R. W., & Dworkin, J. B. (2003). What adolescents learn in organized youth activities: A survey of self-reported developmental experiences. *Journal of Research on Adolescence, 13*(1), 25-55.

Harwood, C. G., Keegan, R. J., Smith, J. M. J., & Raine, A. S. (2015). A systematic review of the intrapersonal correlates of motivational climate perceptions in sport and physical activity. *Psychology of Sport and Exercise, 18*, 9-25.

Hogue, C. M., Fry, M. D., Fry, A. C., & Pressman, S. D. (2013). The influence of a motivational climate intervention on participants' salivary cortisol and psychological responses. *Journal of Sport & Exercise Psychology, 35*, 85-97.

Hosseinichimeh, N., Rahmandad, H., & Wittenborn, A. K. (2015). Modeling the hypothalamus-pituitary-adrenal axis: A review and extension. *Mathematical Biosciences.* Advance online publication. doi:10.1016/j.mbs.2015.08.004

Jagacinski, C. M., & Nicholls, J. G. (1984). Conceptions of ability and related affects in task involvement and ego involvement. *Journal of Educational Psychology, 76*(5), 909-919.

Kaplan, A., & Maehr, M. L. (2007). The contributions and prospects of goal orientation theory. *Educational Psychology Review, 19*, 141-184. doi:10.007/s10648-006-9012-5

Kirschbaum, C. C. & Hellhammer, D. H. (1994). Salivary cortisol in psychoneuroendocrine research: Recent developments and applications. *Psychoneuroendocrinology, 19*(4), 313-333.

Koba, M. (2014, January 13). Spending big on kids' sports? You're not alone. *CNBC*. Retrieved from http://www.cnbc.com/2014/01/13youth-sports-is-a-7-billion-industryand-growing.html

Kraemer, W. J., French, D. N., Paxton, N. J., Häkkinen, K., Volek, J. S., Sebastianelli, W. J.,… Knuttgen, H. G. (2004). Changes in exercise performance and hormonal concentrations over a Big Ten soccer season in starters and nonstarters. *Journal of Strength and Conditioning Research, 18*(1), 121-128.

Kraemer, W. J., Spiering, B. A., Volek, J. S., Martin, G. J., Howard, R. L., Ratamess, N. A.,… Maresh, C. M. (2009). Recovery from a National Collegiate Athletic Association Division I football game: Muscle damage and hormonal status. *Journal of Strength and Conditioning Research, 23*(1), 2-10.

Kristiansen, E., Roberts, G. C., & Abrahamsen, F. E. (2008). Achievement involvement and stress coping in elite wrestling. *Scandinavian Journal of Medicine and Science in Sports, 18*, 526-538. doi:10.1111/j.1600-0838.2007.00646.x

Lazarus, R. S. (1993). Why we should think of stress as a subset of emotion. In L. Goldberger & S. Breznitz (Eds.), *Handbook of stress: Theoretical and clinical aspects* (pp. 21-39). New York: Free Press.

Lazarus, R. S. (2000). How emotions influence performance in competitive sports. *The Sport Psychologist, 14*, 229-252.

Lee, A. (2015, February 24). 7 Charts that show the state of youth sports in the US and why it matters. *The Aspen Institute.* Retrieved from http://www.aspeninstitute.org/about/blog/7-charts-that-show-the-state-of-youth-sports-in-the-us-and-why-it-matters.html

Lemyre, P. N., Hall, H. K., & Roberts, G. C. (2008). A social cognitive approach to burnout in elite athletes. *Scandinavian Journal of Medicine and Science in Sports, 18*, 221-234. doi:10.1111/j.1600-0838.2007.00671.x

Magaraggia, C., Dimmock, J., & Jackson, B. (2014). Motivational priming as a strategy for maximizing exercise outcomes: Effects on exercise goals and engagement. *Journal of Sport Sciences, 32*(9), 826-835.

Mageau, G. A., & Vallerand, R. J. (2003). The coach-athlete relationship: A motivational model. *Journal of Sport Sciences, 21*, 883-904.

Martens, R., Burton, D., Vealey, R., Bump, L., & Smith, D. (1990). Development and validation of the competitive state anxiety inventory-2. In R. Martens, R. S. Vealey, & D. Burton (Eds.), *Competitive Anxiety in Sport*, 117-190. Champaign, IL: Human Kinetics, Inc.

McAuley, D., Duncan, T., & Tammen, V. V. (1989). Psychometric properties of the Intrinsic Motivation Inventory in a competitive sport setting: A confirmatory factor analysis. *Research Quarterly for Exercise and Sport,* 60, 48-58.

McEwen, B. S., & Stellar, E. (1993). Stress and the individual: Mechanisms leading to disease. *Archives of Internal Medicine, 153*(18), 2093-2101.

Moore, E. W. G., Fry, M. D., & Brown, T. C. (2015). Psychometric properties of the Abbreviated Perceived Motivational Climate in Exercise Questionnaire. *Measurement in Physical Education and Exercise Science, 19*(4), 184-200. doi:10.1080/1091367X.2015.1072819

Morrison, H., & Kuhn, D. (1983). Cognitive aspects of preschoolers' peer imitation in a play situation. *Child Development, 54*, 1041-1053.

Newton, M., Fry, M. D., Watson, D., Gano-Overway, L., Kim, M. –S., Magyar, M., & Guivernau, M. (2007). Psychometric properties of the caring climate scale in a physical activity setting. *Revista de Psicologia del Deporte, 16*(1), 67-84.

Nicholls, J. G. (1984). Achievement motivation: Conceptions of ability, subjective experience, task choice, and performance. *Psychological Review, 91*(3), 328-346.

Nicholls, J. G. (1989). *The Competitive Ethos and Democratic Education.* Harvard University Press.

Nicolas, M., Gaudreau, P., & Franche, V. (2011). Perception of coaching behaviors, coping, and achievement in a sport competition. *Journal of Sport & Exercise Psychology, 33*, 460-468.

Niiya, Y., Crocker, J., & Bartmess, E. N. (2004). From vulnerability to resilience: Learning orientations buffer contingent self-esteem from failure. *Psychological Science, 15*(12), 801-805.

Ntoumanis, N., Biddle, S. J. H., & Haddock, G. (1999). The mediating role of coping strategies on the relationship between achievement motivation and affect in sport. *Anxiety, Stress, and Coping, 12*, 299-327.

Pensgaard, A. M. & Roberts, G. C. (2003). Achievement goal orientations and the use of coping strategies among Winter Olympians. *Psychology of Sport and Exercise, 4*, 101-116. doi:10.1016/SI469-0292(01)00031-0

Sapolsky, R. M. (2004). Glands, gooseflesh, and hormones. In *Why Zebras don't get ulcers* (pp. 19-36). New York: Henry Holt and Company.

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 & Exercise Psychology, 14*, 375-391.

Silva III, J. M. (1990). An analysis of the training stress syndrome in competitive athletics. *Journal of Applied Sport Psychology*, *2*(1), 5-20. doi:10.1080/10413209008406417

Smith, A. L., Balaguer, I., & Duda, J. L. (2006). Goal orientation profile differences on perceived motivational climate, perceived peer relationships, and motivation-related responses of youth athletes. *Journal of Sport Sciences, 24*(12), 1315-1327.

Smith, R. E., Smoll, F. L., & Cumming, S. P. (2007). Effects of motivational climate intervention for coaches on young athletes' sport performance anxiety. *Journal of Sport & Exercise Psychology, 29*, 39-59.

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.

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*(4), 602-610.

Stuntz, C. P., & Weiss, M. R. (2009). Achievement goal orientations and motivational outcomes in youth sport: The role of social orientations. *Psychology of Sport and Exercise, 10*, 255-262.

Todorovich, J. R. (2009). Extremely ego-oriented preservice teachers' perspectives on teaching physical education. *Journal of Teaching in Physical Education, 28*, 155-172.

Tuominen-Soini, H., Salmela-Aro, K., & Niemivirta, M. (2012). Achievement goal orientations and academic well being across the transition to upper secondary education. *Learning and Individual Differences, 22*, 290-305.

Vella, S. A., Oades, L. G., & Crowe, T. P. (2013). The relationship between coach leadership, the coach-athlete relationship, team success, and the positive developmental experiences of adolescent soccer players. *Physical Education and Sport Pedagogy, 18*(5), 549-561. doi:10.1080/17408989.2012.726976

Vermetten, Y. J., Lodewijks, H. G., & Vermunt, J. D. (2001). The role of personality traits and goal orientations in strategy use. *Contemporary Educational Psychology, 26*, 149-170. doi:10.1006/ceps.1999.1042

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.

Williams, P. G., Smith, T. W., Gunn, H., & Uchino, B. N. (2011). Personality and stress: Individual differences in exposure, reactivity, recovery, and restoration. In R. J. Contrada & A. Baum (Eds.). *The handbook of stress science: Biology, psychology, and health* (pp. 231-245). New York: Springer Publishing Company.

## Questionnaires

### Juggling Pre-Session Survey

**Please provide the following information:** (*Your answers will not affect whether you can participate in the study in any way. Honest answers will help us with the study results. Thank you!)*

1. Participant Number: _____ Date:_____

2. Age: _____

3. Race (circle one): African American/Black White/Caucasian Asian/Pacific Islander Hispanic/Latina Native American Other_____

4. Do you currently have any of the following?

| | | | |
|---|---|---|---|
| a. Flu* | YES | NO | |
| i. (*if YES: is your current fever above 100F? ) | YES | NO | DON'T KNOW |
| b. Cold | YES | NO | |
| c. Allergies | YES | NO | |

5. What time did you fall asleep last night (approximately)? _____

6. What time did you wake up this morning? _____

7. How many hours in total do you think you slept last night? _____

8. How much caffeine have you consumed today and what time did you consume it?

| Type/Size/# | Time |
|---|---|
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |

9. Have you exercised in the last 48 hours? YES* NO

*if yes, please indicate the length & type (for example, running/basketball/weights) of your work out and the date/time:

_____

_____

10. Please indicate the time of your last meal/caloric intake (including milk):

| Type/Size/# | Time |
|---|---|
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |

11. Have you consumed any alcohol in the last 24 hours? YES* NO

*If yes, please indicate when and how many drinks:

_____

12. Have you used any tobacco products in the last 24 hours? YES* NO

*If yes, please indicate when, how much, and which type:

_____

13. Have you taken any medication (prescription OR over-the-counter) in the last 24 hours?

YES* NO

*If yes, please indicate when and the name/amount of the medication:

_____

14. Have you used any illicit drugs (i.e. marijuana) in the last 24 hours? YES* NO

*If yes, please indicate when and what type:

_____

| **Directions:** Read each statement and then circle the appropriate number to the right of the statement to indicate *how you feel about the upcoming juggling session*. There are no right or wrong answers. | **Not At All** | **Somewhat** | **Moderately So** | **Very Much So** |
|---|---|---|---|---|
| 1. I am concerned. | 1 | 2 | 3 | 4 |
| 2. I feel nervous. | 1 | 2 | 3 | 4 |
| 3. I feel at ease. | 1 | 2 | 3 | 4 |
| 4. I have self-doubts. | 1 | 2 | 3 | 4 |
| 5. I feel jittery. | 1 | 2 | 3 | 4 |
| 6. I feel comfortable. | 1 | 2 | 3 | 4 |
| 7. I am concerned that I will not do as well as I can. | 1 | 2 | 3 | 4 |
| 8. My body feels tense. | 1 | 2 | 3 | 4 |
| 9. I feel self-confident. | 1 | 2 | 3 | 4 |
| 10. I am concerned about losing/failing. | 1 | 2 | 3 | 4 |
| 11. I feel tense in my stomach. | 1 | 2 | 3 | 4 |
| 12. I feel secure. | 1 | 2 | 3 | 4 |
| 13. I am concerned about choking under pressure. | 1 | 2 | 3 | 4 |

| | **Not At All** | **Somewhat** | **Moderately So** | **Very Much So** |
|---|---|---|---|---|
| 14. My body feels relaxed. | 1 | 2 | 3 | 4 |
| 15. I feel mentally relaxed. | 1 | 2 | 3 | 4 |
| 16. I am concerned about performing poorly. | 1 | 2 | 3 | 4 |
| 17. My heart is racing. | 1 | 2 | 3 | 4 |
| 18. I am confident I can meet the challenges. | 1 | 2 | 3 | 4 |
| 19. I am concerned about reaching my goal. | 1 | 2 | 3 | 4 |
| 20. I feel my stomach sinking. | 1 | 2 | 3 | 4 |
| 21. I am confident about performing well. | 1 | 2 | 3 | 4 |
| 22. I am concerned that others will be disappointed with my performance. | 1 | 2 | 3 | 4 |
| 23. My hands are clammy. | 1 | 2 | 3 | 4 |
| 24. I'm confident because I mentally picture myself reaching my goal. | 1 | 2 | 3 | 4 |
| 25. I'm concerned I won't be able to concentrate. | 1 | 2 | 3 | 4 |
| 26. My body feels tight. | 1 | 2 | 3 | 4 |
| 27. I am confident of coming through under pressure. | 1 | 2 | 3 | 4 |

**POST – QUESTIONNAIRE**

| Read each statement and think about how much you believe the statement describes the environment during the juggling session.<br><br>**During the juggling session…** | **Strongly Disagree** | **Disagree** | **Not Sure** | **Agree** | **Strongly Agree** |
|---|---|---|---|---|---|
| 1) . . . jugglers of all skill levels were made to feel valued. | 1 | 2 | 3 | 4 | 5 |
| 2) . . .jugglers were rewarded and noticed when they tried hard. | 1 | 2 | 3 | 4 | 5 |
| 3) . . .jugglers felt embarrassed if they didn't know how to perform the skill. | 1 | 2 | 3 | 4 | 5 |
| 4) . . .the instructors encouraged jugglers to try new skills. | 1 | 2 | 3 | 4 | 5 |
| 5) . . .jugglers were encouraged to do better than others. | 1 | 2 | 3 | 4 | 5 |
| 6) . . .jugglers were hesitant/embarrassed to ask the instructors or other jugglers for help. | 1 | 2 | 3 | 4 | 5 |
| 7) . . .the instructors encouraged jugglers to help each other. | 1 | 2 | 3 | 4 | 5 |
| 8) . . .the instructors made it clear who they thought were the most skilled jugglers. | 1 | 2 | 3 | 4 | 5 |
| 9) . . .jugglers were excited when they did better than others. | 1 | 2 | 3 | 4 | 5 |
| 10) . . .the instructors emphasized always trying your best. | 1 | 2 | 3 | 4 | 5 |
| 11) . . .the instructors gave most of their attention to only a few jugglers. | 1 | 2 | 3 | 4 | 5 |
| 12) . . .the focus was to keep improving at the skill. | 1 | 2 | 3 | 4 | 5 |

1707

| **Directions**: Read each statement and think about how much you believe that statement describes the Juggling Session. Then choose the answer that shows how much you agree or disagree with the statement.<br><br>***During the Juggling Session…*** | **Strongly Disagree** | **Disagree** | **Neither Agree or Disagree** | **Agree** | **Strongly Agree** |
|---|---|---|---|---|---|
| 1. Participants were treated with respect. | 1 | 2 | 3 | 4 | 5 |
| 2. The instructors respected the participants. | 1 | 2 | 3 | 4 | 5 |
| 3. The instructors were kind to participants. | 1 | 2 | 3 | 4 | 5 |
| 4. The instructors cared about the participants. | 1 | 2 | 3 | 4 | 5 |
| 5. The participants felt that they were treated fairly. | 1 | 2 | 3 | 4 | 5 |
| 6. The instructors tried to help the participants. | 1 | 2 | 3 | 4 | 5 |
| 7. The instructors wanted to get to know the participants. | 1 | 2 | 3 | 4 | 5 |
| 8. The instructors listened to the participants. | 1 | 2 | 3 | 4 | 5 |
| 9. Everyone liked the participants for who they are. | 1 | 2 | 3 | 4 | 5 |
| 10. The instructors accepted participants for who they are. | 1 | 2 | 3 | 4 | 5 |
| 11. The participants felt comfortable. | 1 | 2 | 3 | 4 | 5 |
| 12. The participants felt safe. | 1 | 2 | 3 | 4 | 5 |
| 13. The participants felt welcome. | 1 | 2 | 3 | 4 | 5 |

1708

| **Directions:** Read each statement and then circle the appropriate number to the right of the statement to indicate how you felt.<br><br>***<u>During the juggling session…</u>*** | **Not At All** | **Somewhat** | **Moderately So** | **Very Much So** |
|---|---|---|---|---|
| 2. I was concerned. | 1 | 2 | 3 | 4 |
| 2. I felt nervous. | 1 | 2 | 3 | 4 |
| 3. I felt at ease. | 1 | 2 | 3 | 4 |
| 4. I had self-doubts. | 1 | 2 | 3 | 4 |
| 5. I felt jittery. | 1 | 2 | 3 | 4 |
| 6. I felt comfortable. | 1 | 2 | 3 | 4 |
| 7. I was concerned that I was not doing as well as I could. | 1 | 2 | 3 | 4 |
| 8. My body felt tense. | 1 | 2 | 3 | 4 |
| 9. I felt self-confident. | 1 | 2 | 3 | 4 |
| 10. I was concerned about losing/failing. | 1 | 2 | 3 | 4 |
| 11. I felt tense in my stomach. | 1 | 2 | 3 | 4 |
| 12. I felt secure. | 1 | 2 | 3 | 4 |
| 13. I was concerned about choking under pressure. | 1 | 2 | 3 | 4 |

| | **Not At All** | **Somewhat** | **Moderately So** | **Very Much So** |
|---|---|---|---|---|
| 14. My body felt relaxed. | 1 | 2 | 3 | 4 |
| 15. I felt mentally relaxed. | 1 | 2 | 3 | 4 |
| 16. I was concerned about performing poorly. | 1 | 2 | 3 | 4 |
| 17. My heart was racing. | 1 | 2 | 3 | 4 |
| 18. I was confident I could meet the challenges. | 1 | 2 | 3 | 4 |
| 19. I was concerned about reaching my goal. | 1 | 2 | 3 | 4 |
| 20. I felt my stomach sinking. | 1 | 2 | 3 | 4 |
| 21. I was confident about performing well. | 1 | 2 | 3 | 4 |
| 22. I was concerned that others would be disappointed with my performance. | 1 | 2 | 3 | 4 |
| 23. My hands were clammy. | 1 | 2 | 3 | 4 |
| 24. I was confident because I mentally pictured myself reaching my goal. | 1 | 2 | 3 | 4 |
| 25. I was concerned I would not be able to concentrate. | 1 | 2 | 3 | 4 |
| 26. My body felt tight. | 1 | 2 | 3 | 4 |
| 27. I was confident of coming through under pressure. | 1 | 2 | 3 | 4 |