THE RELATION OF PERCEIVED MOTIVATIONAL CLIMATE, MINDSET, AND ACHIEVEMENT GOAL ORIENTATION TO GRIT IN MALE HIGH SCHOOL SOCCER PLAYERS

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Grit is defined as “perseverance and passion for long-term goals.” Although studied in relation to various outcomes, such as retention and academic performance, few studies have examined variables that may contribute to grit’s development. Further, few studies have examined this construct in relation to sport performance or within athletic environments, despite its clear connection to sport-related constructs like mental toughness and resilience. Thus, based in achievement motivation theory, this study examined the relations of the perceived motivational climate as defined by athletes’ perceptions of the coaches’ behaviors (task vs. ego), athletes’ perceptions of their achievement goal orientation (task vs. ego), athletes’ perceptions of their implicit theory (i.e., fundamental beliefs regarding whether or not ability can change; growth vs. fixed), and athletes’ perception of their level of grit. Male varsity soccer players ($N = 81$; $M_{age} = 15.80 \pm .81$) from a large metropolitan area in the south central U.S. completed questionnaires measuring these achievement motivation constructs. The full regression model was significant, accounting for 18% of the grit variance, $F(6, 74) = 2.77, p = .017$. Within the full model, having a growth mindset ($\beta = .25, p = .035$) and endorsing a task goal orientation ($\beta = .36, p = .004$) predicted higher levels of grit for the athletes. Neither the coach-created motivational climate, nor the athletes’ ego orientation or fixed mindset, were significantly predicted their grit scores. Consistent with Dweck and Duckworth, components of achievement motivation theory, particularly related to a task or growth perspective, may play an important role in athletes’ developing a perspective that allows them to work effectively and diligently toward long-term goals.
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THE RELATION OF ACHIEVEMENT MOTIVATION AND GRIT

Introduction

Duckworth and Gross (2014) have defined grit as “passion and effort sustained over years” (p. 320) and “the tenacious pursuit of a dominant superordinate goal despite setbacks” (p. 319). Individuals high in grit are willing to work diligently, and maintain effort and interest over years even when they have experienced failures and/or adversity. Given this definition and its theoretical connection to subsequent achievement, grit has almost exclusively been studied as a predictor of performance outcomes, explaining unique and significant variance in educational attainment (i.e., academic degree earned), achievement (e.g., GPA, income, professional success) and retention (both with military cadets and new teachers), as well as teacher effectiveness (Duckworth, Kirby, Tsukayama, Berstein, & Ericsson, 2011; Duckworth et al., 2007; Duckworth & Quinn, 2009; Robertson-Kraft & Duckworth, 2014). Thus, little is known about how grit occurs, including the psychosocial factors (or environments) that may contribute to its development. Duckworth and her colleagues (Duckworth & Gross, 2014; Duckworth, Peterson, Matthews, & Kelly, 2007) have suggested that grit may in part be determined by individuals’ beliefs about ability (i.e., malleable vs. fixed), attributions for outcomes (e.g., effort vs. ability), and beliefs about external influences (e.g., level of task difficulty), and recently have recommended that researchers examine individuals’ goals and their process of pursuing goals in relation to grit.

Achievement motivation theory (Dweck & Leggett, 1988; Dweck & Reppucci, 1973; Elliot & Dweck, 1988; Nicholls, 1984) suggests that athletes’ perceptions of achievement situations (e.g., success based on effort vs. ability; success as self-referenced vs. other-referenced), as well as their goals, influence their persistence, willingness to pursue difficult
tasks and, ultimately, their performance (Cury, Da Fonsesca, & Sarrazin, 2002; Seifriz, Duda, & Chi, 1992; Lochbaum & Roberts, 1993). These perceptions are shaped by the motivational climates to which they are exposed. Research suggests that motivational climates – task-involving and ego-involving – are created through messages from significant others, such as teachers and coaches, about effort, task difficulty, participation, making mistakes, and performance success (Ames, 1992; Nicholls, 1989). Such climates, then, orient athletes to think about, and behave in, achievement situations in certain ways. In a task-involving climate, for example, athletes receive positive feedback when they work hard, put forth effort, demonstrate improvement, and persist in the process. Environments that value the process of learning, support the use of self-monitoring skills, and teach athletes that effort is important for success foster the development of task oriented goals (e.g., improvement through hard work/effort, self-referenced comparisons). In ego-involving climates, on the other hand, athletes learn that poor performances and mistakes will be punished, athletes with the most ability will “earn” the coach’s attention, and winning (or performing better than others) is more important than personal improvement (Cury et al., 2002; Seifriz et al., 1992). When sport environments emphasize athletes’ innate ability, the need to correctly execute skills every time (i.e., mistakes are unacceptable outcomes), and comparisons among teammates regarding performance, ego oriented goals are fostered (e.g., maintaining positive judgments of ability by demonstrating superior performances relative to others; Harwood & Swain, 1998; Waldron & Krane, 2005). Experimental research has demonstrated causal relationships between perceived motivational climate and beliefs about the causes of success (Treasure & Roberts, 2001) and intrinsic interest in physical activity (Cury et al., 1996), even after controlling for athletes’ achievement goal orientations.
These climates also inform athletes’ beliefs about whether ability is fixed, and thus difficult to change, or is malleable, and thus can develop through effort (Mueller & Dweck, 1998). These internal theories of ability are referred to as mindsets, and are believed to influence whether individuals approach tasks with the focus of improving ability or demonstrating it (Dweck, 2006). From a fixed mindset perspective, ability is believed to be stable and difficult to develop or change regardless of effort, which corresponds with the adoption of an ego goal orientation. From a growth mindset perspective, ability is viewed as something that can be improved with hard work. This mindset, then, is associated with adopting a task goal orientation (Dweck 2006). Growth mindsets have been related to challenge-seeking behavior (Hong, Chiu, Dweck, Lin, & Wan, 1999), effective emotional coping in response to failure (Potgieter & Steyn, 2010), and persistence on difficult physical tasks, such as a novel but difficult step aerobic exercise (Kasimatis, Miller, & Marcussen, 1996) and an intelligence test (Hong et al., 1999).

Achievement motivation constructs, including motivational climates and goal orientations, have been related to a variety of sport-relevant outcomes, such as performance success (e.g., persisting), psychological well-being (e.g., self-esteem, perceived sport competence, sport enjoyment), self-determined styles of motivation (Standage, Duda, & Ntoumanis, 2003) and intrinsic motivation (Atkins, Johnson, Force, & Petrie, 2013; Duda, Fox, Biddle, & Armstrong, 1992; Harwood, Keegan, Smith, & Raine, 2015; White, Duda, & Keller, 1998); yet to date, they have not been related to athletes’ levels of grit. In sport, grit has been studied primarily as a predictor of subsequent behaviors, such as sport-specific engagement (e.g., time spent in competition, training, and play; Larkin, O’Connor, & Williams, 2016; Martin, Byrd, Watts, & Dent, 2015) and perceptual-cognitive performances (e.g., decision making and situational probability; Larkin et al., 2016). Outside of the sport context, scholars have
emphasized the importance of understanding how grit might be fostered in classroom settings (Hochanadel & Finamore, 2015; Shechtman, DeBarger, Dornsife, Rosier, & Yarnall, 2013). Duckworth (2013) has proposed that grit’s development is theoretically based in a long-term approach to goals via persistence and resiliency, and that understanding how athletes perceive and utilize their ability is crucial to effectively foster grit in them. Consistent with this perspective, grit may result from messages about success and failure from significant others (i.e., motivational climates), as well as the mindsets and goal orientations athletes adopt (Adie & Arslan, 2014; Duckworth et al., 2007). Therefore, achievement motivation theory (Ames & Archer, 1988; Cury et al., 2002; Elliot & Dweck, 1988; Nicholls, 1984) provides a framework for examining grit’s development.

Thus, the purpose of my study was to examine the relations of perceived motivational climates, mindset, and goal orientations to athletes’ levels of grit. Although I expected that perceived motivational climate (particularly perceptions of a task-involving climate), mindset (particularly a growth oriented one), and goal orientation (particularly a task-oriented approach) would be significantly related to male athletes’ grit scores at the bivariate level, when considered simultaneously, I hypothesized that mindset would incrementally account for grit above perceived motivational climate, and achievement goal orientation would incrementally account for grit above mindset.

Method

Participants

Eighty-one male soccer players were recruited from high schools and soccer clubs from a large suburban area located in the south central U.S. In terms of race/ethnicity, the players were Hispanic/Latino/Mexican American, (n = 31, 43.7%), Caucasian/White (n = 31, 43.7%), Other
(n = 4, 5.6%), African-American/Black, (n = 3, 4.2%), and Asian American/Pacific Islander players (n = 2, 2.8%). Mean age was 15.81 years (SD = .82); mean years playing organized soccer was 9.38 (SD = 3.57).

Instruments

Demographics. Participants reported their age, race/ethnicity, and total number of years participating in organized soccer.

Perceived motivational climate. The 33-item Perceived Motivational Climate in Sport Questionnaire-2 (PMCSQ-2; Newton, Duda, & Yin, 2000) measures athletes’ perceptions of the motivational climate created by their coach across the following subscales: Cooperative Learning (perceived importance that teammates work with one another to improve execution), Effort/Improvement (perceived interconnection of working hard to improve in an athletic setting), Important Role (belief that each member of the team has an important role to play), Intra-Team Member Rivalry (perception that intra-team member rivalry is present on the team), Unequal Recognition (perception that the coach recognizes skilled players more than non-skilled players), and Punishment for Mistakes (belief that the coach will punish undesirable performances). These subscales are combined to form two second-order factors -- Task-Involving (i.e., Cooperative Learning, Effort/Improvement, Important Role) and Ego-Involving (i.e., Intra-Team Member Rivalry, Unequal Recognition, Punishment for Mistakes). For the current study, the athletes assessed their current soccer team’s environment as created by the team’s coach, and responded to each item from 1 (strongly disagree) to 5 (strongly agree). Consistent with Waldron and Kane (2005), the total score for the task- and ego-involving climates were used, which were represented by the mean of each factor’s respective items; higher scores indicate stronger perceptions of that climate. Cronbach’s alphas have ranged from
.87 to .88 in a sample of female adolescent volleyball players (Newton, Duda, & Yin, 2000); alphas from the current study were .91 (task) and .90 (ego). Regarding concurrent validity, athletes who perceived a task-involving climate were more likely to be intrinsically motivated, whereas athletes who perceived an ego-involving climate were more likely to perceive pressure and tension. Moreover, higher scores on the task-involving Cooperative Learning, Effort/Improvement, and Important Role subscales were positively, and Unequal Recognition subscale negatively, associated with team satisfaction (Newton, Duda, & Yin, 2000).

Mindset. Consistent with the fixed (entity) and growth (malleable) mindset perspectives that represent implicit theory, two items were adapted from Dweck, Chiu, and Hong’s (1995a) 3-item implicit theory scale. Thus, one item depicted soccer ability as a fixed entity (“You have a certain amount of soccer ability and you can’t really do much to change it.”), and the other as malleable (“No matter how much soccer ability you have, you can always change it quite a bit.”). Athletes responded to each item on a scale that ranged from 1 (Strongly Disagree) to 6 (Strongly Agree). For the original 3-item scale, Cronbach’s alphas have ranged from .94 to .98 (Dweck et al., 1995a). Dweck et al. (1995a) also reported that the implicit theory items represent two unique dimensions, neither of which was related significantly to measures of cognitive ability, confidence in intellectual ability, and self-esteem.

Achievement goal orientation. The 12-item Achievement Goal Scale for Youth Sports (AGSYS; Cumming, Smith, Smoll, Standage, & Grossbard, 2008) measures children’s goal orientations along two dimension: ego (success based on outperforming others) and task (success based on mastering a skill and being the best one can be). On each item, athletes responded from 1 (Not true at all) to 5 (Very true). Total score is the mean of each scale’s respective items; higher scores indicate greater perceptions of that goal orientation. In a sample of male and
female youth athletes, Cumming et al. (2008) found Cronbach’s alphas of .78 (task) and .88 (ego); alphas from the current study were .64 (task) and .87 (ego). The task and ego orientation scales provided a good fit within a two-factor model of goal orientation and demonstrated substantial convergent validities (i.e., .39 to .58, p < .001) with corresponding academic orientation scales.

Grit. The 8-item Short Grit Scale (Grit-S; Duckworth & Quinn, 2009) measures individuals’ ability and willingness to pursue a long-term goal through sustained focus, interest, and effort. On each item, athletes responded from 1 (Very much like me) to 5 (Not like me at all). For the current study, item 3 was dropped because of its negative effect on the scale’s internal consistency. The item was worded indirectly (i.e., included “not”) and measured the broad concept of goal consistency, which athletes may have not interpreted as sport-specific. Thus, the athletes’ total score is the mean of the seven items; higher scores indicate greater grit. Cronbach’s alphas were .83 for male and female undergraduates (Duckworth, Peterson, Matthews, & Kelly, 2007) and .63 for male youth soccer players (Larkin, O’Connor, & Williams, 2016); alpha for the current study was .62. Grit has demonstrated incremental validity in predicting educational attainment among undergraduate students, after holding constant the influence of all Big Five Inventory dimensions (Duckworth et al., 2007).

Procedure

After obtaining approval from the researcher’s university IRB, the high school and select soccer coaches were contacted via email to solicit permission to have their players participate in this study. Through email and follow-up phone calls, the researchers explained the purpose of the study and answered coaches’ questions. After obtaining permission from each head coach, the researchers attended a regularly scheduled practice to distribute consent forms for the players to
take home to their parents. At a subsequent in-person meeting that occurred within a week, all consented (and assented) players then anonymously completed the demographics questionnaire, the Perceived Motivational Climate in Sport Questionnaire (PMCSQ-2), the implicit theory measure, the Achievement Goal Scale for Youth Sports (AGSYS), and the Short Grit Scale (Grit-S). The packets took approximately 10 minutes to complete; players were entered in a random drawing to win gift cards valued at $5 to $10.

Data Analysis

SPSS Version 20.0 (2011) was utilized to conduct the data analyses. Initially, missing data were examined and found to be missing completely at random, Little’s MCAR $\chi^2(629) = 623.94, p = .549$. Only 0.48% of data were missing across all of the questionnaires, thus values were imputed using mean substitution (Schlomer, Bauman, & Card, 2010). Next, the variables distributional properties were examined (e.g., skewness, kurtosis, outliers); there were no significant violations of normality. Hierarchical multiple regression (HMR) was used to examine the relation of perceived motivational climate, implicit theory, and goal orientation to athletes’ grit. At Step 1, the athletes’ task- and ego-involving climate scores from the PMCSQ-2 were entered. At Step 2, the growth and fixed mindset items from the implicit theory measure were entered. At Step 3, the task and ego goal orientation scale scores from the AGSYS were entered. Alpha was set at .05.

Results

At the bivariate level, the psychosocial predictors correlated with grit as follows: .09 ($p = .423$; task-involving climate), -.05 ($p = .668$; ego-involving climate), .25 ($p = .026$; growth mindset), -.18 ($p = .109$; fixed mindset), .31 ($p = .005$; task goal orientation), .03 ($p = .776$; ego
goal orientation). Among the predictors, no correlation exceeded .34, which indicates that multicollinearity would not be a problem in the regression analyses. See Table 1.

The inclusion of the motivational climates at Step 1 was not significant, \( F(2, 78) = .34, p = .714, \text{Adj. } R^2 = .01 \). The inclusion of the two mindset items at Step 2, was significant, \( F(2, 76) = 3.15, p = .048 \), explaining an additional 7.6% of the grit variance. The inclusion of goal orientation at Step 3 also was significant and accounted for an additional 9.9% of the variance, \( F(2, 74) = 4.49, p = .014 \). The full regression model was significant, \( F(6, 74) = 2.77, p = .017, \text{Adj. } R^2 = .12 \). Within the full model, as hypothesized, having a growth mindset (\( \beta = .25, p = .035 \)) and endorsing a task goal orientation (\( \beta = .36, p = .004 \)) predicted higher levels of grit for the athletes. Neither of the coach-created motivational climates, nor the athletes’ ego orientation or fixed mindset, were related significantly to their grit scores. See Table 2.

Table 1

<table>
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<th>Variable</th>
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<th>5</th>
<th>6</th>
<th>7</th>
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<tbody>
<tr>
<td>1. PMCSQ-2 – Task</td>
<td>.91</td>
<td></td>
<td></td>
<td></td>
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<td>2. PMCSQ-2 – Ego</td>
<td>-.32</td>
<td>.90</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td>3. ITM – Growth</td>
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<td>.18</td>
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<td></td>
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<td>4. ITM – Fixed</td>
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<td>5. AGSYS – Task</td>
<td>.08</td>
<td>.01</td>
<td>.06</td>
<td>-.20</td>
<td>.64</td>
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<td>6. AGSYS – Ego</td>
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<td>.16</td>
<td>.14</td>
<td>-.05</td>
<td>.45</td>
<td>.87</td>
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<td>7. Grit-S</td>
<td>.09</td>
<td>-.05</td>
<td>.25</td>
<td>-.18</td>
<td>.31</td>
<td>.03</td>
<td>.62</td>
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Means: 4.05, 3.05, 4.91, 2.06, 4.57, 3.66, 3.65
(SD): (.57), (.67), (1.06), (1.13), (.43), (.94), (.48)

Note. PMCSQ-2 – Perceived Motivational Climate in Sport Questionnaire-2 (total scores can range from 1, low, to 5, high); ITM – Implicit Theory Scale (total scores can range from 1, low, to 6, high); AGSYS – Achievement Goal Scale for Youth Sports (total scores can range from 1, low, to 5, high); Grit-S – Short Grit Scale (total scores can range from 1, low, to 5, high). Values on the diagonal reflect the scale’s Cronbach’s alpha, with the exception of the ITM which is a two-item measure. Correlations greater then .30 and less than -.30 are significant at the \( p < .01 \) level.
### Table 2

*Hierarchical multiple regression analyses predicting grit (N = 81)*

<table>
<thead>
<tr>
<th>Predictor</th>
<th>$R^2$</th>
<th>$\Delta R^2$</th>
<th>$\Delta F$</th>
<th>$B$</th>
<th>$SE(B)$</th>
<th>$\beta$</th>
<th>$t$</th>
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<tr>
<td><strong>Step 1</strong></td>
<td>.01</td>
<td>.01</td>
<td>.34</td>
<td></td>
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<tr>
<td>Perceived task-involved climate</td>
<td>.07</td>
<td>.10</td>
<td>.08</td>
<td>.70</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived ego-involved climate</td>
<td>-.02</td>
<td>.09</td>
<td>-.02</td>
<td>-.19</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td>.09</td>
<td>.08</td>
<td>3.15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived task-involved climate</td>
<td>.07</td>
<td>.10</td>
<td>.08</td>
<td>.68</td>
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<td></td>
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<tr>
<td>Perceived ego-involved climate</td>
<td>-.04</td>
<td>.09</td>
<td>-.06</td>
<td>-.52</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Growth Mindset</td>
<td>.10</td>
<td>.05</td>
<td>.22</td>
<td>1.88</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed Mindset</td>
<td>-.05</td>
<td>.05</td>
<td>-.11</td>
<td>-.90</td>
<td></td>
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<tr>
<td><strong>Step 3</strong></td>
<td>.18</td>
<td>.10</td>
<td>4.49</td>
<td></td>
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<tr>
<td>Perceived task-involved climate</td>
<td>.07</td>
<td>.10</td>
<td>.08</td>
<td>.71</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Perceived ego-involved climate</td>
<td>-.03</td>
<td>.08</td>
<td>-.04</td>
<td>-.37</td>
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<tr>
<td>Growth mindset</td>
<td>.11</td>
<td>.05</td>
<td>.25</td>
<td>2.15*</td>
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<td></td>
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<tr>
<td>Fixed mindset</td>
<td>-.02</td>
<td>.05</td>
<td>-.04</td>
<td>-.31</td>
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<td></td>
<td></td>
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<tr>
<td>Task goal orientation</td>
<td>.41</td>
<td>.13</td>
<td>.36</td>
<td>3.00**</td>
<td></td>
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<tr>
<td>Ego goal orientation</td>
<td>-.09</td>
<td>.06</td>
<td>-.17</td>
<td>-1.41</td>
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<td></td>
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*Note.* The $\Delta F$-test is for each step of the model. Degrees of freedom corresponding to $\Delta F$ are 2, 78 for Step 1; 2, 76 for Step 2; 2, 74 for Step 3. Full Model $R^2 = .18$, $F(6, 74)= 2.77$*

*p < .05

**p < .01
Discussion

Although the perceived motivational climates were not significantly related to grit in Step 1 of the regression model, both mindset and goal orientation accounted for significant amounts of variance in the male soccer players’ scores at Steps 2 and 3. As hypothesized, athletes who believed that ability was malleable and thought success was defined by personal growth achieved through hard work and effort reported higher levels of grit; however, neither a fixed mindset nor an ego goal orientation contributed significantly.

Previous research in sport on the relation of achievement motivation constructs to grit characteristics (e.g., toughness, resilience, persistence) has reported similar results. For example, Lochbaum and Roberts (1993) found that among 296 athletes, a task goal orientation was positively related to effort, practice mastery, learning benefits, and personal ability satisfaction. Similarly, in a sample of 3478 athletes, positive relations between task goal orientation and adaptive achievement strategies, including persistence in practice, working hard in practice to enhance mastery, and effort in competition were found (Biddle, Wang, Kavussanu, & Spray, 2003). Further, in a sample of male and female undergraduates, Kasimatis, Miller, and Marcussen (1996) examined mindsets and motivation to persist on a physically challenging task. Participants completed a novel exercise that was presented via a video and then were asked about their motivation to keep up with the video and continue the exercise, as well as their eagerness to participate in a full-length program of this type of exercise. Growth-minded individuals reported being more motivated to persist in this novel exercise (where they experienced difficulty keeping up) than did the participants who had fixed mindsets. Finally, in a non-athlete sample of male and female undergraduates, Akin and Arslan (2014) found that a task-approach goal orientation was the strongest predictor of grit; neither task-avoidance nor ego-approach or avoidance goal
orientations were significant. They suggested that task-approach goals foster achievement, task persistence, and an understanding of the importance of persevering, all characteristics that underlie grit.

Based on unpublished collaborative research between Dweck and Duckworth, when students are taught to persist – and internalize that motivation – they develop a growth mindset, which improves their grit (Perkins-Gough, 2013). Thus, in sport, athletes who come to believe that hard work and effort is essential for success and who value personal growth would be expected to learn how to sustain their motivation over time and be resilient to setbacks (Mueller & Dweck, 1998; Potgeiter & Steyn, 2010; Wang, Haertel, & Walberg, 1997). In a recent study examining the relation between grit, deliberate practice, and performance among male and female spelling bee participants, Duckworth et al. (2011) found that individuals higher in grit were more willing to engage in the tasks that required effort and were less intrinsically rewarding than individuals lower in grit. The authors concluded that participants higher in grit were more willing to do so because they understood that these effortful tasks would lead to more effective preparation and eventual task mastery and improved performance. Believing that deliberate practice could improve their performance facilitated their willingness to engage in it. Moreover, Hill, Borrow, and Bronk (2014) found that a sense of purpose and positive affect were positively related to grit, consistent with research in the physical activity context demonstrating that a task-orientation is associated with positive affect, enjoyment, and intrinsic motivation (Ntoumanis & Biddle, 1999; Standage & Treasure, 2002). These results suggest that enjoyment for engaging in a task facilitates perseverance, even in the face of challenge, and a sense of purpose fosters the commitment to pursue long-term goals.
Essentially, over years of sustained effort, grit emerges from the beliefs and behaviors that underlie a growth mindset and task goal orientation. Older people tend to have higher levels of grit than younger people, suggesting that grit may increase with experience over the lifespan (Duckworth et al., 2007), as they form and internalize their beliefs about ability and success (Dweck, 2006; Nicholls, 1984). Specifically, over time, athletes in task-involving climates begin to internalize messages associated with the environment (e.g., focus on personal growth, effort, and maximum participation; Seifriz et al., 1992). This internalization results in schemas that reflect a growth mindset toward athletic ability and a task goal orientation. With these belief systems in place, athletes approach training and practice with an intrinsic motivation and commitment to mastery, and they perceive competition as an opportunity to challenge themselves and grow personally (Adie, Duda, & Ntmoumanis, 2008; Lochbaum & Roberts, 1993). As they work hard and exert effort, defining their success through their personal development and progress, they come to see that sustained effort and perseverance often pays off in terms of reaching long-term goals. Thus, over time, they develop higher levels of grit.

Limitations existed that warrant discussion. First, the sample included only male high school soccer players, which limits generalizability. Previous research on achievement motivation has demonstrated gender differences between males and females (Duda, Olson, & Templin, 1991; Dweck & Reppucci, 1973), thus future research should examine female athletes to determine if these achievement motivation constructs are differentially related to their grit scores. Second, the small sample size limited the statistical analyses that could be conducted with the data. Previous achievement motivation research in sport has demonstrated that motivational climates strongly influence dispositional goal orientation and that motivational climates lead to other outcomes (e.g., intrinsic motivation) via goal orientation (Cury et al., 1996). In future
studies, with larger samples, researchers could test more complex models and examine potential mediational pathways leading from motivational climates to grit through goal orientation and mindset. Last, although appropriate given the nascent state of grit research in sport, the cross-sectional methodology limits statements about directionality or causality. If future cross-sectional studies continue to support the relations between grit, task goal orientation, growth mindset, and possibly different task-involving climates, researchers could establish longitudinal methodologies to see exactly how and when in an athlete’s development that grit emerges.

Grit is differentiated from other determinants of success (e.g., self-control) by its inclusion of a superordinate goal tenaciously worked towards over long periods of time and in the face of setbacks (Duckworth & Gross, 2014) – sport inherently provides this kind of goal for athletes to pursue. Based on the results of this study, fostering task-oriented goals and growth mindsets in athletes may help increase their grit as well. Thus, the potential benefits of fostering task-oriented goals, as well as growth mindsets, may extend to the development of athletes’ grit, which may serve them well as they pursue longer-term goals in sport.

References


APPENDIX A

EXTENDED LITERATURE REVIEW
Introduction

Grit is defined as “perseverance and passion for long-term goals” (Duckworth, Peterson, Matthews, & Kelly, 2007, p. 1087). Individuals high in grit are willing to work diligently, and maintain effort and interest over years despite experiencing failures and adversity. Although intelligence was long believed to be the best predictor of achievement (e.g., in school-related, job-related, and everyday tasks), recent research has shown that grit contributes uniquely and significantly to successful performances, such as educational attainment, achievement, and retention, as well as teacher effectiveness (Duckworth, Kirby, Tsukayama, Berstein, & Ericsson, 2011; Duckworth et al., 2007; Duckworth & Quinn, 2009; Robertson-Kraft & Duckworth, 2014). As a newer construct, grit has almost exclusively been examined as a predictor of performance success, so little is known about the psychosocial factors that may contribute to its development. Duckworth et al. (2007) suggested grit may in part be determined by individuals’ beliefs about ability, attributions of outcomes, and beliefs about external influences (e.g., effort task difficulty). More recently, Duckworth and Gross (2014) recommended that future research examine individual characteristics, including achievement goal orientation, as they relate to levels of grit.

Research on achievement motivation often focuses on why ability does not consistently predict performance. Achievement motivation theory suggests that individuals’ approaches to performance situations (e.g., academic or athletic) as well as their goals influence their persistence, willingness to pursue difficult tasks and, ultimately, their performance (Elliot & Dweck, 1988). The theory proposes that motivational climates orient individuals to approach performance situations in certain ways through messages from significant others, including teachers and coaches. Specifically, feedback from significant others regarding the importance of
effort vs. natural ability for success informs individuals’ beliefs about whether ability can change or is fixed (Smith, Smoll, & Cumming, 2009). These internal theories of ability are referred to as mindsets, and are believed to influence whether individuals approach tasks with the focus of improving ability or demonstrating it (Dweck, 2006). Initial achievement motivation studies focused on academic outcomes (Diener & Dweck, 1978; Dweck & Reppucci, 1973; Schunk, 1982), but in time researchers began to see its relevance in other performance areas and started to apply it in sport (e.g., Cury, Da Fonesca, & Sarrazin, 2002; Seifriz, Duda, & Chi, 1992).

Achievement motivation correlates have been examined in sport in relation to outcomes such as performance success (e.g. persisting), psychological well-being (e.g., self-esteem, perceived sport competence, sport enjoyment), and intrinsic motivation (Atkins, Johnson, Force, & Petrie, 2013; Duda, Fox, Biddle, & Armstrong, 1992; White, Duda, & Keller, 1998). This research has demonstrated the parallels between students and athletes, identifying how personal beliefs of ability, as well as feedback from coaches and instructors, influence performance both in classrooms and in sport environments. Recent literature has suggested that grit, as another important performance-related outcome, also may be associated with messages about success and failure from significant others, mindsets, and goal orientation (Adie & Arslan, 2014; Duckworth et al., 2007). Thus far, grit has primarily been examined in academic and military contexts, leaving sport as a new environment in which researchers can study this construct. Duckworth (2013) has proposed that grit’s development is based in a long-term approach to goals via persistence and resiliency, and that understanding how athletes perceive and utilize their ability is crucial to effectively foster grit in them.

Existing literature on grit has yet to adequately address potential antecedents in its development, despite Duckworth and colleagues’ (Duckworth & Gross, 2014; Duckworth et al.,...
2007) suggestions to do so. Thus, research is needed to determine the extent to which achievement motivational constructs might contribute to grit’s development, whether in sport or academic domains. In this paper, I will review achievement motivation theory, describe previous research regarding achievement in academics and athletics (including perceived motivational climates, mindsets, and achievement goal orientations), and discuss grit and its theoretical development, culminating in the purpose for my study.

Achievement Motivation Theory

Achievement motivation theory is used to explain or predict behavior in performance contexts, including academics and athletics. According to achievement motivation theory (Dweck & Leggett, 1988; Dweck & Reppucci, 1973), individuals’ goal orientations and mindsets guide their definition of success (e.g., personal growth vs. winning) and determine their achievement behavior. Achievement goal orientation refers to differences in goal pursuit based on how individuals interpret their competence and how they define success in specific settings (Duda, Olsen, & Templin, 1991). Mindsets refer to beliefs about the extent to which ability can change as a result of effort (Dweck, 2006). Depending on individuals’ goal orientation and mindset, their behavior is either directed toward developing ability or demonstrating ability (Nicholls, 1984). Models of achievement motivation theory suggest that mindsets, achievement goals, and achievement behaviors are influenced by the motivational climates created by significant others in achievement contexts (Ames, 1992). Individuals learn how to define success and how to value effort based on the messages they receive from significant others in their environment. Therefore, motivational climates, mindsets, and achievement goal orientations are three important, and related, constructs in understanding achievement behavior and performance.
Motivational Climates

Many scholars have suggested that exposure to certain motivational climates in achievement contexts shapes individuals’ adopted mindsets, achievement goals, and ultimately their performance behaviors (Ames, 1992; Nicholls, 1989; Seifriz et al., 1992). Significant others (e.g., coaches, parents, teachers, and peers) act as socializing agents, creating motivational climates through their messages and feedback about ability, effort, difficulty of tasks, and markers of success. Over time, individuals internalize these consistent messages regarding determinants of success and integrate the information into their own belief systems. Thus, the motivational climate that individuals perceive influences how they approach and respond to achievement tasks (Roberts, Treasure, & Conroy, 2007; White, 1996).

The two types of motivational climates – task and ego – parallel the types of goal orientations individuals may develop. Initial research on achievement motivation has suggested that goal orientations could develop over time as a result of the focus of the learning environments to which children are exposed (Ames, 1992). Specifically, the design of learning activities, evaluation and reward practices, and distribution of responsibility can make different goals salient. In a task-involving learning climate, for example, students receive positive feedback when they work hard, put forth effort, demonstrate improvement, and persist in the process. Environments that value the process of learning, recognize students’ effort, and support the development and use of self-monitoring skills teach students that effort is important to success and foster task-oriented goals. In ego-involving learning climates, on the other hand, students perceive that poor performances and mistakes will be punished, students with the most ability will receive the most attention, and winning (or performing better than others) is more important than personal improvement. When classroom environments emphasize providing
correct answers to academic problems (e.g., math), students’ innate ability, and comparisons among peers regarding performance, ego-oriented goals are fostered.

Perceptions of a task-involved climate are associated with intrinsic motivation (i.e., motivation to engage in a behavior for its inherent satisfaction) and the belief that success is the result of effort. An ego-involved climate, however, is associated with decreased intrinsic motivation and the belief that success results from ability (Xiang & Lee, 2002). Elliott and Dweck (1988) found that the goals children adopted to complete a problem-solving task were significantly affected by the manner in which the experimenter presented the task to the children. When the children were told there was an opportunity to learn by doing the task, thus highlighting the value of a task-oriented approach, their beliefs about their current skill levels did not affect their achievement behavior. In this task-involved condition, children consistently sought to increase their competence, even with public errors, regardless of whether they believed their skills were high or low. However, when ego goals were emphasized, children with perceived high ability persisted longer in response to obstacles compared to children with perceived low ability, but they also avoided a challenging task in which they might be judged as incompetent. Moreover, despite being told they had the ability to learn, children with perceived low ability responded with negative ability attributions and gave up more quickly than low ability children within the task-involved condition.

Dweck and colleagues further demonstrated the influential power of motivational climates by examining the effect that instructors’ feedback had on students (Kamins & Dweck, 1999; Mueller & Dweck, 1998). Male and female fifth graders were tasked with solving a set of Standard Progressive Matrices. After four minutes of working on the problem set, all children were told, “Wow, you did very well on these problems. You got [number of problems] right.
That’s a really high score.” Regardless of their actual score, all children were told they had solved at least 80% of the problems they had answered. Subsequently, some of the children were praised for their ability (“You must be smart at these problems”), some of the children were praised for their effort (“You must have worked hard at these problems”), and the remaining children were in the control condition and received no additional feedback. Ultimately, 67% of the children who were praised for their intelligence chose ego-oriented goals, and 92% of the children who were praised for their effort chose task-oriented goals. Children in the control condition were split equally between adopting task- and ego-oriented goals. Essentially, praise regarding effort encouraged children to learn new things, whereas ability-focused praise encouraged children to protect their perceived intelligence. Moreover, children who received effort praise were more likely to persist in working on the problems, and more likely to enjoy completing the task than their intelligence praised counterparts (Mueller & Dweck, 1998).

Research suggests children who are praised for their intelligence choose an easier task in which they can avoid mistakes, whereas students who are praised for their effort prefer challenging tasks from which they can learn. Moreover, students who are praised for their intelligence tend to lose their confidence and enjoyment when the task becomes more difficult, leading to a decrease in performance (Dweck, 2006).

Early research on motivational climates in academic settings revealed several distinctions between the two climates, including evaluative practices in the classroom and the presence and strength of social comparison (Ames & Archer, 1988). One hundred and seventy-six male and female middle school students completed questionnaires regarding goal orientation, learning strategies, task challenge, attitude towards class, casual attribution, and perceived ability. When students perceived their class as a task-involved environment, they were more likely to report
using effective learning strategies, preferring challenging tasks, enjoying their class, and believing that effort was important for success. They also noted that when social comparison was emphasized, students focused on their ability. In contrast, when absolute standards, self-improvement, or participation were emphasized, students focused on their effort and task strategies. These findings suggest that task-involved motivational climates are likely to foster a way of thinking that is necessary for sustained student involvement and perseverance in learning.

Mindset

Dweck (2006) proposed that children integrate their understandings of task difficulty, effort, and standards of success – including the information they receive from socializing agents – into meaning systems referred to as mindsets. She theorized that mindsets orient individuals towards consistent achievement goal orientations, and subsequently determine the kind of achievement behavior in which children engage. The two mindsets – growth and fixed – reflect fundamental beliefs regarding whether or not ability can change. More specifically, from a fixed mindset perspective, ability is believed to be stable and cannot be changed regardless of effort. This mindset also is thought to be associated with adopting an ego goal orientation (which will be discussed in the following section). From a growth mindset perspective, ability is viewed as a malleable quality that can be improved with hard work. This mindset, then, is associated with adopting a task goal orientation (Dweck 2006). Overall, Dweck and her colleagues’ research has consistently demonstrated that children who hold a growth mindset tend to pursue task goals and seek to increase their competence through hard work and effort; children who hold a fixed mindset tend to pursue ego goals in hopes of receiving positive judgments, or at least preventing negative ones, regarding their abilities in relation to others (Dweck, 2006; Dweck & Leggett, 1988).
Dweck, Chiu, and Hong (1995a) argued that there were evident cognitive and behavioral consequences that stemmed from mindsets about the malleability of personal attributes. Individuals who hold fixed mindsets, for example, tend to understand behavior in terms of a person’s fixed traits, such as intelligence, talent, or even moral character. However, individuals who hold growth mindsets tend to focus more on other factors (e.g., needs, goals, intentions). The authors contend that individuals who hold a fixed mindset in relation to their intelligence are more likely to blame it for negative outcomes, such as believing they are “dumb,” or will be seen as dumb, in the face of academic challenges, than individuals who hold a growth mindset. Individuals who hold a growth mindset about intelligence, however, are likely to view the same negative outcome as being a function of their effort or strategic approach. Furthermore, Dweck at al. (1995a) suggested that the individuals who held a growth mindset (“growth theorists”) were more likely to focus on behavioral factors (e.g., effort, problem-solving strategies) and more likely to continue working toward mastering the task than their fixed theorist counterparts.

Children as young as preschoolers and kindergartners demonstrate response patterns that are in line with the two mindsets (Dweck et al., 1995a). Children who hold growth mindsets demonstrate mastery-oriented responses (e.g., focus on effort and strategy, increased persistence, and generation of new problem-solving strategies) when they encounter failure or criticism on meaningful tasks. In contrast, children with fixed mindsets demonstrate helpless responses (e.g., negative self-attributions, lowered expectancies, negative affect, decreased persistence, and a lack of constructive strategies) in response to achievement setbacks. Younger children, however, conceptualize their failure as “I am bad,” rather than thinking “I am dumb.” This goodness-badness dichotomy seems to mirror the fixed mindset adopted by older children and adults (Dweck et al., 1995a). Moreover, students’ beliefs about the malleability of their intelligence
have “profound effects on their motivation, learning, and school achievement” (Dweck, 2008, p. 110). Socializing agents, such as parents, teachers, and coaches, can foster a growth mindset by encouraging children to persist and to work hard. How parents, teachers, and coaches define success also influences children’s mindsets. In task-involved environments, in which socializing agents define success in terms of skill development, self-improvement, and the exertion of maximum effort, children tend to develop growth mindsets. In ego-involved environments, in which success if defined in terms of social comparison, children tend to develop fixed mindsets (Cury, Da Fonseca, Rufo, & Sarrazin, 2002; Ommundsen, 2001).

**Achievement Goal Orientation**

Achievement motivation theory suggests that ability can be judged compared to one’s own past capacity (wherein improvements indicate competence) or relative to others (wherein competence is indicated through either equal achievement stemming from less effort or greater achievement resulting from equal effort as another). How individuals conceptualize ability and success determines their goal orientation. These achievement goal orientations – task and ego – define how individuals approach performance situations. Task goals, also referred to as learning or mastery goals, emphasize improving ability or mastering new tasks, so that the focus is on improving ability over time through hard work and effort, not on proving current ability in comparison to others. From this perspective, competence develops from personal improvement and task mastery from exerted effort. Individuals who adopt task-oriented goals aim to improve their skills, prefer effortful tasks, do not give up when faced with challenges, and behave adaptively in response to failure (i.e., do not internalize the failure and attribute it to their sense of worth), and they employ effective problem-solving techniques. Moreover, with a task goal
orientation, difficulty and ability judgments are self-referenced. These individuals use personal accomplishments and their own past achievements as a point of reference (Nicholls, 1984).

Ego-oriented goals, also known as performance or outcome, emphasize maintaining positive, and avoiding negative, judgments of ability, by demonstrating superior performances relative to others. With an ego goal orientation, competence develops from performing favorably compared to others. Whereas task-oriented individuals are willing to put forth effort for the sake of learning and growth, ego-oriented individuals will only put forth high effort if they believe they will receive positive evaluations in return; that is, they are likely to outperform others. With ego orientation, task difficulty is determined based upon the performance of others. The more effort or time needed to learn a skill or task compared to others, the less ability is demonstrated or perceived. From this perspective, individuals could learn or master a personally challenging task through their efforts, but still believe they are not capable if their performance does not meet or surpass those of others. In this case, these individuals could still believe they failed to establish high ability if others required less effort or time to master the same task (Nicholls, 1984).

Dweck and colleagues sought to understand why certain individuals adopted task-oriented behavior, seeking challenging tasks and successfully persisting in response to failure, whereas others adopted ego-oriented behavior, avoiding challenges and experiencing impaired performance in the face of obstacles (Diener & Dweck, 1978, 1980; Dweck, 1975; Dweck & Reppucci, 1973). Challenging tasks offer opportunities to learn, but also pose a risk of failure. Those who adopt task goals are more likely to view the challenge as emphasizing the process of learning and effortful engagement, while deemphasizing the negative consequences of making mistakes (Ames & Archer, 1988). In response, task-oriented goals foster challenge-seeking
behaviors, persistence in response to obstacles, and self-referenced evaluations (Nicholls, 1984). Those who adopt ego goals, however, are more likely to view the challenge as a threat to their sense of worth because failure is defined comparatively (Ames & Archer, 1988). Subsequently, ego-oriented goals contribute to challenge-avoiding behavior, low persistence in the face of adversity, and other-referenced or normative evaluations (Nicholls, 1984).

In regard to patterns of behavior in response to failure, research on achievement goals has consistently demonstrated significant differences between the two goal orientations (Dweck & Reppucci, 1973; Elliott & Dweck, 1988; Mueller & Dweck, 1998). In particular, task-oriented individuals tend to respond to failure by exerting greater effort, persisting longer in their pursuit of achievement, and believing that their failure is due to a deficit in problem-solving strategy or effort, rather than in ability. Ego-oriented individuals, on the other hand, tend to respond to failure by displaying signs of learned helplessness, avoiding challenging tasks, and believing that their performance is exclusively linked to their innate ability.

Overall, task-oriented individuals have been found to report greater perceived effort, greater improvement and ability, greater academic success, and reduced performance impairment than ego-oriented individuals (Nicholls, 1984). Moreover, compared to task-oriented individuals, ego-oriented individuals tend to perceive effort as an indicator of low ability, and thus tend to avoid challenging and difficult tasks that might require extended effort (Nicholls, 1984). In a meta-analysis of 24 studies that manipulated achievement goals in individuals, Utman (1997) determined that task goals, which focus on the opportunity for learning and personal growth, led to better performance across a range of experimental tasks (e.g., anagrams, making collages, computer simulations, reading comprehension) than ego goals, which focus on demonstrating high ability. Utman also noted that task-oriented individuals tended to be more flexible and
creative when responding to adversity. Furthermore, task oriented individuals tend to have higher levels of intrinsic motivation, allowing them to enjoy persisting and completing the task. In contrast, ego-oriented individuals seem to respond inflexibly to difficulty, are primarily motivated by external sources, and experience less enjoyment compared to a need to achieve.

Dweck and Legget (1988) proposed a model whereby an individuals’ self-concept about ability (growth vs. fixed) would be expected to foster a given goal orientation, which in turn would establish the pattern of responding. For instance, a growth mindset should foster a task goal orientation, which should result in challenge seeking behavior (regardless of confidence in ability), effort and strategy focus, positive affect, and high persistence in the face of difficulty. In contrast, the model suggests that a fixed mindset should foster an ego goal orientation, which results in challenge avoidance behaviors, negative ability attributions, negative affect, and low persistence in the face of difficulty (Dweck & Legget, 1988). The authors identified achievement goal orientation as a central construct of motivation, explained the behavioral consequences of each goal orientation, and linked the goals to underlying psychological antecedents (i.e., mindsets). Building off that work, Dweck et al. (1995a) shifted the emphasis from goals to mindsets and maintained that goals set up behavioral responses within the context of mindsets. Specifically, Dweck et al. (1995a) proposed a model that clarified the role mindsets played in self-evaluations and responses to setbacks. Their model reiterated the processes outlined by the earlier model, and suggested that mindsets foster different goals, understandings of outcomes, and responses to outcomes. The two models focus on different aspects of the achievement motivation model, and highlight the important roles both mindsets and goal orientation play in predicting achievement behavior.
Summary

Two different motivational climates have been described, as have corresponding, mindsets, achievement goals, and achievement behaviors. Motivational climates inform individuals how to pursue tasks based on how success is defined within the climate. Socialization, especially from parental figures, seems to heavily influence the origin and development of mindsets in children. As they learn, through feedback or information provided by socializing agents, individuals integrate this new information into their existing knowledge regarding success to develop their mindset. Their mindset then directs their pursuit of achievement goals and engagement in appropriate achievement behavior that is consistent with how success should be pursued within the motivational climate. The mindsets, achievement goals, and achievement behavior promoted by the two motivational climates can either promote or inhibit future growth. Specifically, task-involved climates in which success is defined based on personal development foster growth mindsets, which encourage goals focused on improving skill over time. The emphasis on effort in this goal orientation results in greater persistence and willingness to try more challenging tasks. Ego-involved motivational climates in which success is defined based on performing better than others foster fixed mindsets, which encourage goals focused on appearing more competent than others. This emphasis on innate ability often leads to giving up and withdrawing in the face of failure or adversity (Dweck et al., 1995a; Dweck & Leggett, 1988).

The behavior individuals ultimately use to pursue their goals seems to be influenced by their understanding of ability and how it can be applied (Duckworth et al., 2007; Dweck, 2006). Specifically, although individuals who hold both types of mindsets may agree that ability and effort are possible causes of performance, the mindset individuals hold may persuade them to
assign unequal weights to such causes (Hong, Chiu, Dweck, Lin, & Wan, 1999). Mindsets may also influence how individuals choose between tasks. For instance, Stone and Dweck (1998) found that not only did students with growth and fixed mindsets differ in their respective preferences for task-oriented activities (tasks that would allow them to practice and improve skills) or ego-oriented activities (tasks designed to assess ability, but not teach them anything new), but they also differed in their perceptions of the activities. Fixed mindset students perceived the task as measuring their underlying and future intelligence; growth mindset students perceived the task as measuring their present skills. Furthermore, fixed mindset students reported worrying about not feeling or looking smart on the task-oriented activity. This relation is congruent with Dweck and Leggett’s (1988) earlier model, which proposed that mindsets direct the chosen goal orientation, which ultimately leads to the behavioral response pattern.

Achievement Motivation in Academia

Early research regarding achievement motivation theory primarily focused on academic domains to examine how particular goal orientations influenced students’ performances and responses to success and/or failure. Achievement motivation theory predicts that task-oriented students interpret academic performance outcomes (success or failure) as indications of whether they should change their current strategy or effort level, regardless of their perceived ability. Ego-oriented students, in contrast, tend to see performance outcomes as indications of their ability in comparison to peers in order to demonstrate their superior competence (Dweck & Legget, 1988; Dweck & Reppucci, 1973; Mueller & Dweck, 1998).

In addition to differing in how they interpret and employ performance outcomes, the two groups also differ in how they attribute success and failure. Diener and Dweck (1978) studied the responses of 120 male and female fifth grade students in a series of studies examining
differences in problem-solving strategy, attributions of ability, and verbalizations during performance between task- and ego-oriented students. Children were split at the median into task or ego groups based on their scores on the Intellectual Achievement Responsibility (IAR), a scale used to measure students’ locus of control and assumption of responsibility following success or failure. Children were presented with eight training problems and four test problems. During the first two training problems, children were initially given feedback (“right” or “wrong”). On the third training problems children were ultimately introduced to the no-feedback procedure, in which the experimenter might say nothing after certain cards. The no-feedback procedure was maintained throughout the four test problems as well. In both studies, the children were asked for an attribution for their performance. In the second study, the researchers asked the children to think out loud prior to the seventh training problem. The authors found that task-oriented students rarely attributed their failure to lack of ability, engaged in self-monitoring and self-instruction (e.g., choosing to focus on solutions for failure instead of the cause of it), and employed useful strategies (e.g., hypothesis checking) to solve the problems. Ego-oriented children, on the other hand, consistently attributed failure to lack of ability, employed ineffective strategies (e.g., perseverating) to solve problems, and sometimes completely withdrew from the task by quitting.

Achievement goals have demonstrated longitudinal influence in academics as well. Harackiewicz, Barron, Tauer, and Elliot (2002) examined achievement correlates in 471 male and female first-semester college freshman taking an introductory psychology course. Researchers followed the students until they graduated to assess their continued interest in psychology and performance in subsequent classes. Harackiewicz et al. measured students’ achievement motivation, a two-dimensional motive to strive for performance excellence that is
believed to be predictive of the type of achievement goals students adopt in various classroom settings. The work-mastery orientation encompasses the desire to work hard, the preference for challenging tasks, and self-referenced evaluations, whereas the competitive orientation involves the enjoyment of competition and the desire to be better than others. Compared to their ability, prior performance, and achievement motivation, achievement goals were the strongest and most robust predictor of interest outcomes ($\beta = .35$ for task goals and $\beta = -.11$ for ego goals) and enjoyment outcomes ($\beta = .16$ for task goals and $\beta = -.17$ for ego goals). Students who adopted task goals at the beginning of their introductory psychology course were more likely to enjoy lectures, express interest in psychology, take additional psychology classes, and declare a major in psychology. The authors suggested that achievement goals might play an integral role in promoting optimal motivation and setting student’s academic trajectory (Harackiewicz et al., 2002).

The classroom motivational climate (i.e., classroom and school practices that make task or ego goals salient to students, as well as goal-related messages communicated by teachers) has also been found to affect students’ motivation and learning patterns, whereby students’ personal achievement goal orientations tend to correspond to their perceptions of the classroom environment (Kaplan, Middleton, Urdan, & Midgley, 2002). For instance, when teachers group students by ability or employ competitive grading practices, they create the perception that performing better than others and getting the right answers is important, and thus produce an ego-involved climate in their classes. In comparison, when teachers focus on skill development and improvement by encouraging students to explore topics they find interesting or by communicating that the main goal is to understand the material, students tend to adopt a task goal orientation (Kaplan et al., 2002).
When the importance of effort, in relation to success, is emphasized in classrooms, children learn that persisting and continuing to put forth effort will ultimately lead to personal growth and increased performance. Schunk (1982) studied the effects of effort attributional feedback in the context of developing mathematical competency on children’s perceptions of their self-efficacy and achievement. Forty male and female elementary school students were given a set of subtraction problems of varying difficulty and then asked to evaluate their self-efficacy. Students who solved fewer than 20% of the problems were monitored periodically by an adult proctor and received didactic training in one of three feedback conditions: effort attributional feedback concerning past achievement (“You’ve been working hard”), effort attributional feedback concerning future achievement (“You need to work hard”), or no feedback. The students in the no-feedback condition were monitored by adult proctors similar to the students in the feedback conditions to control for the effects of monitoring. A fourth group who received no training and no monitoring was included to act as a control in relation to the three other training groups, since Schunk expected that training alone and adult attention might promote achievement. After three consecutive days of the feedback groups receiving training, the students completed another set of subtraction problems, and evaluated their self-efficacy before and after the test. Schunk found that effort attributional feedback concerning past achievement led to greater skill development and greater perceptions of self-efficacy than each of the other conditions, and to faster progress in task mastery than feedback regarding future achievement or no feedback in the training control condition. Not only do these results suggest that encouraging children to try harder may undermine their self-efficacy, but also that one piece of feedback regarding the importance of hard work can promote academic achievement.
Research has also demonstrated how mindsets can be influenced to foster more adaptive achievement behavior (Blackwell, Trzesniewski, & Dweck, 2007; Hong et al., 1999). Blackwell et al. (2007), for instance, examined whether a motivational climate intervention could teach seventh grade students to adopt a growth mindset. Ninety-one male and female students completed questionnaires regarding their task and ego goals, beliefs about effort, mindset, and attributions and strategies in response to failure. Half of the students participated in an eight-week workshop where they were taught that learning changes the brain and they were in charge of this process. As expected, a growth mindset was positively associated with positive effort beliefs ($r = .54$), task-oriented goals ($r = .34$), low helpless attributions (e.g., “The test was unfair;” $r = .44$), and task-oriented strategies (i.e., effort escalation or strategy change; $r = .45$). Moreover, compared to students in the control group, students in the experimental group were significantly higher in growth mindset (Cohen’s $d = .47$) and were rated by their teachers as having positively changed their motivation after the intervention, indicating that the intervention was effective. These results support the idea that motivational climates, and feedback from socializing agents within these climates can influence mindsets in academic domains.

Research also has sought to clarify and understand how mindsets affect achievement behavior and academic performance (Hong et al, 1999; Stipek & Gralinski, 1996; Stone & Dweck, 1988). Stipek and Gralinski (1996) explored students’ beliefs about intelligence and effort, and how these beliefs related to academic achievement. Three hundred and nineteen male and female third, fourth, fifth, and sixth grade students filled out a battery of questionnaires regarding their beliefs on intelligence and effort; their scores on a standardized achievement test represented their academic performance. Students who held a fixed mindset were primarily ego-oriented. They believed that intelligence and performance remain stable over time, and that
intelligence either promotes or limits success in all academic subjects. Students who held a
growth mindset were primarily task-orientated, and they believed that effort has positive effects
on intelligence and performance. Moreover, the students’ goal orientation partially mediated the
effects their mindsets had on their performance. These findings suggest that mindsets and
achievement goal orientations are both important factors in determining achievement behaviors.
Furthermore, they are consistent with models that posit that mindsets guide the development of
goal orientations, which in turn direct particular patterns of achievement behavior.

Additionally, beliefs about ability and goal adoption seem to be linked to coping
behaviors. Rhodewalt (1994) demonstrated that individual differences in the tendency to engage
in self-handicapping behaviors were related to mindset and achievement goals in a sample 88
male and female undergraduates. Students who endorsed a fixed mindset and believed that good
performances are due to innate ability tended to report pursuing ego goals in achievement
contexts. Thus, students with a fixed mindset stated that their goal was to demonstrate high
ability in comparison to others. In contrast, students who endorsed a growth mindset and
believed that effort can improve ability, reported pursuing task goals. Furthermore, students high
in self-handicapping behavior (e.g., lack of effort, procrastination) were more inclined to hold a
fixed mindset, be guided by ego goals, and be motivated to receive positive feedback than
students low in self-handicapping behavior. These results provide support that mindsets and
achievement goal orientation direct achievement behavior.

In research aimed at examining the role of mindsets in academic domains, Hong et al.
(1999) sought to integrate Dweck and Legget’s (1988) model with attribution theory in a series
of three studies. In the first study, 97 male and female undergraduates completed a test of
conceptual reasoning, after which the participants were shown a bar chart that supposedly
reported their score and the score of another participant. After receiving negative feedback (i.e. the chart indicated that they underperformed compared to the other participant), students with a growth mindset attributed their performance to lack of effort, and students with a fixed mindset attributed their performance to lack of ability.

In the second study, incoming college freshman at a Hong Kong university completed a questionnaire that emphasized English language proficiency as a critical determinant in academic success. They were then asked how likely they would be to enroll in a remedial course shown to be effective in improving English proficiency in university students. The students were also asked to provide their performance on a recent proficiency exam that measured English, and to complete an implicit theory measure to assess whether they held a growth or fixed mindset. Those students who had performed poorly on the proficiency exam and who had a growth mindset were more likely to take the remedial course than their fixed mindset peers who had performed poorly. Students with a fixed mindset did not believe that remedial action could increase their English proficiency, even though they were told it was vital for their future academic success (Hong et al., 1999).

Finally, in their third study, 60 undergraduates at a Hong Kong university read passages designed to induce either a fixed mindset or a growth mindset. Afterwards, students in both conditions completed a set of problems sampled from an intelligence test, and they received feedback that they had either performed at a satisfactory level (i.e., at the 66th percentile of the university undergraduates who had taken the test) or at an unsatisfactory level (i.e., at the 20th percentile of the university undergraduates). Students were then provided with the opportunity to choose to work on a related tutorial exercise that would effectively improve their performance on the intelligence tests or an unrelated ability task. After choosing, the students were asked to
indicate whether they would prefer the items in the problem-solving task to be easy or relatively difficult, and how they attributed their performance on the problem set. Students in the fixed mindset condition who received negative feedback were unlikely to choose the tutorial. Students in the growth mindset condition who received negative feedback, however, chose to work on the tutorial over the unrelated task. Consistent with their first study, students in the growth mindset condition more strongly attributed unsatisfactory performance to a lack of effort than did students in the fixed mindset group. Moreover, students in the growth mindset condition also preferred the relatively difficult task (even after receiving negative feedback), whereas students in the fixed mindset condition preferred the easy task (Hong et al., 1999).

These studies (e.g., Blackwell et al., 2007; Kaplan et al., 2002; Rhodewalt, 1994; Stipek & Gralinski, 1996) provide comprehensive and consistent support for the relationships between motivational climates, mindsets, goal orientations, and achievement behaviors in academic contexts. Students who perceive that effort is important and come to believe that hard work will lead to success tend to develop growth mindsets regarding intelligence. They are subsequently disposed to adopt task goal orientations, and then engage in adaptive achievement behavior, including task persistence, increased effort, interest and enjoyment, and effective problem-solving strategies. Students who perceive that performing better than others will be rewarded and are told that natural ability is necessary for success tend to develop fixed mindsets of intelligence. They often adopt ego goal orientations, and then exhibit ineffective behavior, including decreased effort and withdrawal.

Achievement Motivation within Sport

Consistent with findings from previous research on motivational correlates in academic domains (e.g., Blackwell et al., 2007; Dweck & Leggett, 1988; Mueller & Dweck, 1998),
research in sport settings suggest that motivational climates lead to the development of parallel goal orientations (Cury et al., 2002; Seifriz et al., 1992). In research aimed at extending work on motivational climates from academic to sport settings, for instance, Seifriz et al. (1992) found that perceived motivational climates significantly influence athletes’ achievement motivation development. One hundred and five adolescent male basketball players completed questionnaires regarding their intrinsic motivation, beliefs about the causes of success, goal orientation, and perception of their team’s motivational climate. They found that perceptions of a task-involving climate – teams characterized by a focus on personal growth, effort, and maximal participation – were significantly more associated with reported enjoyment of basketball ($M = 25.6$) and overall intrinsic motivation ($M = 73.1$) than perceptions of an ego-involving climate ($M = 21.2$ and $M = 68.2$, respectively). Furthermore, when the athletes perceived that coaches were reinforcing task-oriented behaviors (e.g., trying hard, personal growth), they believed that applying effort was more likely to help them achieve success in their sport. Perceptions of reinforced ego-involving behavior (e.g., competing with teammates, being a starting player, facing negative consequences for making mistakes), however, led the athletes to believe that high ability would lead to success.

In addition to the significantly positive relations between perceived task-involving climate and enjoyment and intrinsic motivation, athletes’ dispositional goal orientation also emerged as a significant predictor of indices of intrinsic motivation. Specifically, and as expected, task goal-orientation was related to higher levels of exerted effort, perceived competence, and believing that effort leads to success. Seifriz et al. (1992) noted that an athlete’s perception of their team’s motivational climate influences the athlete’s attribution style and level of intrinsic motivation. They concluded that athletes’ definition of sport success (e.g., based on effort or ability) is the best predictor of beliefs and perceptions about the importance putting forth effort.
Harwood and Swain (1998) examined how dispositional and situational factors interact in predicting achievement goal orientation. One hundred and nineteen male and female elite junior tennis players completed questionnaires regarding their goal orientation and situational factors of competition. This Match Context Questionnaire has three distinct factors: match value (i.e., the personal achievement value expected to be gained by competing in the match), perceived state goal preference of significant others (i.e., players’ perceptions of what their parents and coaches would want them to achieve in their match and their perception of the goal orientation that would best garner recognition from the Lawn Tennis Association), and social/personal perceptions of ability (e.g., self-perceptions of ability, perceptions of the opponent’s ability, perceptions of coach’s and parents’ belief in their ability). Perceptions of task goal preferences from significant others ($\beta = .41$), match value ($\beta = .28$), and social/personal perceptions of ability ($\beta = -.24$) significantly predicted players’ pre-competition task goal orientation ($R^2 = .29$). The tendency to value winning over personal performance ($\beta = .23$), match value ($\beta = .42$), and perceptions of task goal preferences from significant others ($\beta = -.33$) significantly predicted players’ pre-competition ego goal orientation ($R^2 = .41$). Both situational and dispositional factors appeared to influence the players’ pre-match goal orientations, and the authors emphasized the importance of considering both when predicting goal involvement in achievement contexts.

In a repeated measures study of adolescent female softball players, Waldron and Krane (2005) examined the extent to which coach-initiated and parent-initiated motivational climate could influence athletes’ goal orientations during a competitive season. Sixty-two high school athletes reported their goal orientation at the beginning of the season and then provided their perceptions of coach and parent motivational climates, and their own goal orientation, at the end of the season six to eight weeks later. Early season task goal orientation ($\beta = .54$), coach-initiated
task climate ($\beta = .28$), and a parent climate of learning and enjoyment ($\beta = .19$) significantly predicted late season task goal orientation ($R^2 = .51$). Only early season ego goal orientation ($\beta = .54$) was a significant predictor of late season ego goal orientation ($R^2 = .42$). The results from these studies (Harwood & Swain, 1998; Waldron & Krane, 2005) support the importance of both situational and dispositional factors in the development of athletes’ goal orientations.

Additional research has demonstrated that motivational climates are associated with outcomes beyond mindsets and goal orientations, including well-being and sport enjoyment (Atkins, Johnson, Force, & Petrie, 2013; 2015; Le Bars, Gernigon, & Ninot, 2009). For example, Le Bars et al. (2009) examined personal and contextual differences in elite youth judokas who persisted in national training compared to those who dropped out. Fifty-two male and female persisting judokas and 52 male and female judokas who dropped out from a national training center in France completed a series of questionnaires measuring the perceived motivational climate of their training environment, achievement goal orientation, physical self-perceptions about their ability and self-esteem, perceived competence in judo, and intentions of dropping out of judo.Judokas who dropped out perceived the climates created by coaches ($partial \eta^2 = .07$), parents ($partial \eta^2 = .09$), and peers ($partial \eta^2 = .16$) as less task-involving than did judokas who persisted. Moreover, dropouts reported being less task goal-oriented ($partial \eta^2 = .06$), and reported greater intentions to give up ($partial \eta^2 = .10$) than persisting judokas.

In a study on parental and peer-created motivational climates, Atkins et al. (2013) examined 227 female youth athletes’ self-reported persistence in sport. Their findings suggest that when parents encourage their children to have fun and do their best, and emphasize effort over winning, their children feel more positively about themselves ($\beta = .41, R^2 = .40$), have more fun in their sport ($\beta = .36, R^2 = .18$), and believe they are good at their sport ($\beta = .45, R^2 = .22$).
Further, they found that enjoyment ($\beta = .40$) was the only significant predictor of the children’s self-reported intention to stay involved in their sport ($R^2 = .16$). In a related study, Atkins et al. (2015) expanded their focus to perceived motivational climates created by parents, peers, and coaches across two adolescent male samples. Using independent samples of 205 and 200 eight grade male athletes, their model demonstrated that task-involving climates created by parents ($\beta = .47$) and peers ($\beta = .32$), but not coaches, directly explained task goal orientation ($R^2 = .51$). A task goal orientation subsequently predicted sport competence ($\beta = .59$, $R^2 = .34$), self-esteem ($\beta = .29$, $R^2 = .63$), and sport enjoyment ($\beta = .64$, $R^2 = .41$). Similar to Atkins et al. (2013), they found that enjoyment ($\beta = .35$) was the only consistent significant predictor of intention to continue in their sport ($R^2 = .43$). Thus, these results suggest that a task-involving motivational climate, along with the associated goal orientation, is indirectly related to continuing in sport, depending on the extent to which athletes enjoy their participation.

Harwood, Keegan, Smith, and Raine (2015) conducted a systematic review of 104 studies regarding correlates of perceived motivational climate in sport and physical activity settings. In regard to the relation between motivational climate and goal orientation, they found moderate positive effect sizes between perceptions of a task-involved climate and dispositional task goal orientation ($\rho_c = .46$) and between perceptions of an ego-involved climate and dispositional ego goal orientation ($\rho_c = .36$). Further, they found that a task-involved motivational climate was positively associated with perceived competence, self-esteem, performance, intrinsic motivation, and positive affect. In contrast, an ego-involving motivational climate was positively related to extrinsic motivation, amotivation (lack of motivation), use of maladaptive strategies, and perfectionism.
To test models of achievement motivation in sport and understand what leads individuals to adopt different achievement goals in an athletic setting, Cury et al. (2002) examined perceived motivational climate, mindset, and goal orientation in a sample of 682 male students from French high schools. Cury et al. found that task goal orientation was positively associated with perceptions of a task-involving motivational climate and a growth mindset about sport ability, and negatively related to perceptions of an ego-involved climate. Ego goal adoption was associated with perceptions of an ego-involving climate and holding a fixed mindset regarding sport ability; ego goal orientation was also negatively related to a growth mindset. Additionally, when the boys held a growth mindset they were more likely to adopt task, and less likely adopt ego, goals; their fixed mindset however, was associated with adopting ego goals.

Other research on mindsets in sports has examined its relation to goal orientation and coping in response to failure. For instance, Potgieter and Steyn (2010) examined these psychological and motivational correlates in 80 male and female university students who were actively competing in sport at the school, provincial, national, or international level. Overall, athletes’ reactions to success and failure were more positive than negative. However, growth mindset and task orientation strongly related to more positive reactions to both success and failure, meaning athletes with this goal orientation viewed performance outcomes as constructive (e.g., “When the going gets tough, the tough get going”) rather than destructive (e.g., “I feel depressed if I experience failure and disappointment in my sport”). Ego orientation, but not fixed mindset, was associated with negative reactions for success, such as fearing success or experiencing pressure to maintain performance levels after performing well.

Similarly, mindsets may influence the motivation to persist in the face of physical challenges (Kasimatis, Miller, & Marcussen, 1996). Fifty male and female undergraduates were
either told that athletic coordination was mostly learned (growth mindset condition) or that it was genetically determined (fixed mindset condition). Participants were shown two exercise videos teaching a novel type of exercise. The first video was easy and included basic movements. The second video was difficult and included complex movement with few repetitions to learn. Participants in the growth mindset condition were more motivated to persist at the new exercise after experiencing difficulty, expressed higher self-efficacy, and reported significantly less negative affect in response to task difficulty than participants in the fixed mindset condition. Because participants’ theories regarding athletic coordination were manipulated, they argued that their results provided support for a causal link between mindsets and motivation, which is consistent with Dweck and Leggett’s (1988) social-cognitive model of motivation.

Biddle, Wang, Chatzisarantis, and Spray (2003) demonstrated support for a hierarchical relationship between mindset and achievement goal orientation. Across three studies aimed at developing and validating an instrument capable of assessing athletic ability beliefs, 3,478 male and female children between the ages of 11 and 19 years completed different versions of the measure. Their results indicated that mindsets predicted the adopted goal orientation, and that mindsets and goal orientation each acted as important predictor variables in their model. Specifically, fixed mindset and ego goal orientation each directly and positively predicted self-reported amotivation towards sport and physical activity; growth mindset indirectly, through task goal orientation, negatively predicted amotivation. The students’ growth mindset and task goal orientation directly and positively predicted enjoyment. Biddle et al.’s (2003) findings demonstrate the important role that mindsets and achievement goals play in understanding determinants of motivation in youth athletes.
Research on achievement motivation in sport has also demonstrated the relations between goal orientation and psychological outcomes, apart from the influence of motivational climate or mindsets. For instance, Duda et al. (1992) examined the relation between achievement goal orientation, beliefs about success in sport, interest in, and enjoyment of sport in 142 male and female middle school children. Task-oriented children believed that success in sport was founded in a desire to work hard and try their best, and they were more likely to endorse cooperation. Ego-oriented children believed that success was due to ability level and task difficulty, and they were more likely to avoid hard work in sport. Duda et al. argued that avoiding expending effort and practicing self-handicapping are strategies that may mask a fragile sense of ability in sport.

In a similar study, Adie, Duda, and Ntoumanis (2008) examined the relations among goal orientation, challenge and threat appraisals, and indices of well-being among 424 male and female athletes across six sports at the club or elite level. Their results demonstrated that achievement goal orientation served as a framework for interpreting competition as a threat or a challenge. This appraisal, in turn, predicted athletes’ self-esteem and positive affect. Specifically, athletes who adopted task-oriented goals, in which the focus was on effort and improvement, were more likely to perceive competition as a challenge (i.e., as an opportunity for accomplishment and personal growth), which then predicted positive affect and increased self-esteem. Ego-oriented goals were positively related to both challenge and threat appraisals, whereby the athletes perceived the challenge as an opportunity for achievement, but also felt threatened by the consequences of failing (i.e., lowered validation of self). These appraisals subsequently predicted decreased self-esteem, decreased positive affect, and increased negative affect. Adie et al.’s (2008) findings suggest that achievement goals provide a context for cognitive appraisals, and that athletes who adopt ego-oriented goals may experience more fear of
failure if they perceive a demanding and potentially stressful sport-related event (i.e. competition) to be a threat.

Athletes’ goal orientation has been linked to a sense of purpose. For example, White et al. (1998) had 192 male and female youth athletes complete a two-part questionnaire designed to measure their goal orientation and views about what sport should do (e.g., “A very important thing sport should do is give us the chance to feel like a champion”). The youth sport participants who were high in task orientation believed that sport should improve self-esteem and sportsmanship, and should promote the values of good citizenship, personal growth, exerted effort, and a healthy lifestyle. Task-oriented athletes also viewed sport as intrinsically rewarding and as a process in itself, rather than as a means to obtain an extrinsic or self-serving reward, such as popularity or a high-paying job. Ego-oriented athletes believed that sport should lead to a high status career, teach them how to bend the rules when necessary, and weed out children who do not have what it takes to succeed in the sport.

In an attempt to better understand the relation between goal orientation and achievement behavior, Lochbaum and Roberts (1993) recruited 296 male and female high school athletes to complete questionnaires designed to measure their goal orientation, perceived causes of success, competition strategies, practice strategies, practice benefits, and competition satisfaction. As expected, task orientation was strongly and positively related to effort, practice mastery, learning benefits, and personal ability satisfaction. The athletes’ ego orientation, however, was moderately and positively related to practice avoidance, normative ability satisfaction, and the belief that chance contributes to success. Task-orientated athletes also endorsed adaptive achievement strategies, including persisting, exerting effort considering their own performance importance, and working hard in practice to enhance their skills. Ego-oriented athletes focused
on external criteria for determining success, and tended to avoid exerting effort or persisting. If ego-oriented athletes perceive their ability as high, they may persist and demonstrate high levels of motivation, but they may ultimately engage in maladaptive strategies in the face of continued failure or difficulty. Generally, task-oriented athletes are more likely to persist and engage in desirable and adaptive achievement strategies, especially in the face of difficulty or failure.

Existing research on achievement motivation in sport has consistently demonstrated relations between achievement correlates and psychosocial outcomes and successes (e.g., Adie et al., 2008; Atkins et al., 2013; 2015; Duda et al., 1992). Recent literature, however, has suggested that another psychological outcome may result from the presence of certain motivational climates and related mindsets and goal orientations (e.g., Duckworth, Kirby, Tsukayama, Berstein, & Ericsson, 2011; Duckworth, Peterson, Matthews, & Kelly, 2007). This variable, grit, is a stable, noncognitive trait and it has been associated with adaptive achievement behaviors similar to those displayed by task-oriented individuals, including task persistence, willingness to engage in difficult tasks, effort, and success (Duckworth et al., 2007). Research in this area indicates that grit may be an important factor to account for in achievement motivational models aiming to distinguishing behavior between individuals with similar ability.

Grit as a Determinant of Achievement Behavior

Grit, or passion and perseverance for long-term goals, has yet to be sufficiently examined in athletic domains. Similar to early work on achievement motivation theory, initial research on grit has primarily focused on academic and other achievement domains (Duckworth et al., 2011; Duckworth et al., 2007; Robertson-Kraft & Duckworth, 2014) and only several published studies have examined the effects of grit in athletes (Ali & Rahman, 2012; Larkin, O’Connor, & Williams, 2015; Martin, Byrd, Watts, & Dent, 2015). However, grit is a possible contributing
factor to athletes’ success, given that athletes higher in grit may be more likely to strive for personal growth and to persist longer in the face of challenge and failure. Duckworth et al. (2007) suggested that, theoretically, the development of grit might be determined by how individuals pursue their goals. Specifically, they argued that beliefs about ability, attribution of outcomes, and beliefs about external influences (i.e., effort) might influence individuals’ inclination to pursue long-term goals via passion and perseverance.

Duckworth et al. (2007) initially began studying grit to understand what individual differences, above ability, could predict success in achievement contexts. Across six studies conducted to develop and validate the Grit Scale, the authors found that grit was related to traits from the Big Five model of personality: Conscientiousness, the tendency to exert self-discipline and strive for achievement ($r = .77, p < .001$); Neuroticism, the level of emotional stability and impulse control ($r = -.38, p < .001$); Agreeableness, the tendency to be compassionate and cooperative with others ($r = .24, p < .001$); Extraversion, the tendency to seek stimulation from the company of others ($r = .22, p < .001$); and Openness to Experience, the degree of intellectual curiosity and creativity ($r = .14, p < .001$). Moreover, grit scores were associated with higher GPAs ($r = .25, p < .01$), but with lower IQ, in a sample of 139 male and female undergraduates. Grit’s negative relation to intelligence supports the idea that supposed innate ability is not necessary, nor sufficient, for achievement and success. Finally, grit was related to self-control, or the ability to resist temptation and control impulses ($r = .63, p < .001$), in a sample of 1,218 freshman West Point cadets. However, grit is distinguished from conscientiousness, and other dependability aspects like self-control, in that it specifies the pursuit of consistent goals and interests through effort over time (Duckworth et al., 2007).
Grit has demonstrated incremental predictive validity of success measures (e.g., retention, educational achievement) above intelligence, conscientiousness, and self-control (Duckworth et al., 2007). Across the same six development and validation studies, Duckworth et al. found that individuals high in grit attained higher levels of education (partial $\eta^2 = .05$), made fewer career changes ($\beta = -.44$), advanced to higher rounds in a spelling competition ($\beta = .34$), and earned higher GPAs than those low in grit ($r = .34, p < .001$). Both Duckworth et al. (2007) and Robertson-Kraft and Duckworth (2014) found that grit was a strong predictor of retention. Among the West Point cadets, grittier cadets ($\beta = .44$) were more likely to complete their first summer of training and persist to the fall semester (Duckworth et al., 2007). Similarly, among 154 novice teachers in low-income districts, grittier teachers were more likely to remain teaching throughout the school year ($Cohen’s d = .79$; Robertson-Kraft & Duckworth, 2014). Robertson-Kraft and Duckworth also found that grit positively predicted teacher effectiveness (i.e., greater achievement in their students; $Cohen’s d = .45$). These results highlight the importance of grit in long-term success.

In a follow-up study of a group of male and female spelling bee participants, Duckworth, Kirby, Tsukayama, Berstein, and Ericsson (2011) examined the relation between grit, deliberate practice, and performance. Deliberate practice involved effortful engagement in a focused training activity designed to improve performance; in the Kirby et al. (2011) study it was operationalized as solitary studying and memorizing words. Although spelling bee participants rated deliberate practice as less enjoyable and more effortful than other practice techniques like being quizzed by someone else or reading leisurely, deliberate practice was the strongest predictor of spelling bee performance. Grit predicted performance, and grit predicted deliberate practice. Moreover, deliberate practice mediated the relation between grit and spelling bee
performance. These results suggest that individuals higher in grit are more willing to engage in tasks that require effort and are less intrinsically rewarding that lead to more effective preparation in the hopes of eventual task mastery and improved performance.

As a newer construct, grit has primarily been examined as a predictor of success and achievement outcomes (Duckworth et al., 2011; Duckworth et al., 2007; Robertson-Kraft & Duckworth, 2014), and few studies have attempted to understand grit’s development. Given that initial studies suggest that grit is a strong predictor of success, teachers, parents, and coaches would all benefit from learning how to foster it in their children. In one of the first studies to explore motivational correlates of grit, Von Culin, Tsukayama, and Duckworth (2014) examined how individuals’ approaches to pursuing happiness related to two facets of grit: perseverance of effort and consistency of interests over time. Across two online samples consisting of both male and female adults ($N_1 = 15,874; N_2 = 317$), Von Culin et al. found that individuals higher in grit tended to pursue happiness through engagement (i.e., attention-absorbing activities) and meaning (i.e., activities that serve an altruistic purpose) rather than through pleasure (i.e. hedonically positive activities). These findings may be more related to how individuals perceive the activity than the nature of the activity itself. For example, sport may be categorized within each of these approaches, but athletes’ demonstrated levels of grit may be determined by their goals in the sport. For instance, athletes who are task-oriented and high in grit may perceive sport as worth mastering, and thus categorize sport as attention-absorbing. On the other hand, athletes who are ego-oriented and low in grit may perceive the same sport as an opportunity to prove their talent, and thus categorize the sport as an immediate positive, pleasure-filled activity.

In another recent study designed to examine potential correlates and theoretical causes of the development of grit, Hill, Borrow, and Bronk (2014) found that positive affect ($r = .15$) and a
sense of purpose \((r = .21)\) were both positively related to levels of grit. This relation between sense of purpose and grit is consistent with literature on perceived motivational climate that has demonstrated that believing that every player has a sense of purpose on the team (i.e., every player has an important role on the team) is a key marker of a task-involved climate (Newton, Duda, & Yin, 2000; Seifriz et al., 1992). Moreover, the relation between positive affect and grit that Hill et al. found is consistent with research on both perceived motivational climate and achievement goal orientation that has explored the relation between task-orientation and psychosocial correlates. Specifically, within physical activity contexts, a task-orientation is associated with positive affect, enjoyment, and intrinsic motivation (Ntoumanis & Biddle, 1999; Standage & Treasure, 2002). Task-orientation may then also be positively related to levels of grit, whereby enjoyment for engaging in a task facilitates perseverance, even in the face of challenge, and a sense of purpose fosters the commitment to pursue long-term goals.

Akin and Arslan (2014) tested the relation between achievement goal orientations and grit in a sample of 509 male and female university undergraduates. For their study, Arkin and Aslan further dichotomized task and ego goals into approach and avoidance goals. With task-approach goals, individuals strive to achieve skill mastery, and with task-avoidance goals, individuals may be more interested in avoiding misunderstanding, losing skill, or leaving a task incomplete or unmastered. Similarly, ego-approach goals involve a focus on demonstrating competence in comparison to peers, whereas ego-avoidance goals are more concerned with avoiding demonstrating incompetence. Arkin and Aslan found that a task-approach \((\beta = .41)\) and a task-avoidance \((\beta = -.23)\) goal orientation, as well as an ego-approach \((\beta = -.10)\) and ego-avoidance \((\beta = -.26)\) goal orientations explained 46% of the variance in grit. The task-approach goal orientation was the strongest predictor of grit. These results are consistent with previous
literature demonstrating that task-oriented goals promote preferences for effortful tasks, attempts to enhance ability, persistence in the face of adversity, and adaptive problem-solving strategies in response to failure, and that ego-oriented goals focus on avoiding challenge because difficult tasks are seen as threatening to perceived ability, and premature resignation in response to failure (Adie et al., 2008; Nicholls, 1984; Utman, 1997). These data demonstrating achievement goal orientation’s relation to grit, in conjunction with prior evidence of achievement goal orientation’s relation to perceived motivational climate and mindset, support the potential for a model accounting for the relation between perceived motivational climate, mindset, goal orientation, and grit.

Grit can be broken down into two components: consistency of interest (including remaining loyal to commitments over time) and perseverance of effort (including having resilience in the face of adversity). In grit literature, resilience refers to behavioral, attributional, or emotional responses to challenges that are positive and beneficial for development (Yeager & Dweck, 2012). Typically, individuals with more of a growth mindset have demonstrated more resilience when confronted with a challenge than individuals with more of a fixed mindset (Dweck, 2006; Yeager & Dweck, 2012). In a summary article on implicit theories and resilience, Yeager and Dweck contended that even among high achieving students, fixed mindsets of intelligence can compromise resilience in academic settings. Such students interpret academic challenge as indications that they lack intelligence and either are dumb, or may be perceived as dumb. Therefore, such students may not use learned skills to be resilient if their mindset does not allow for the possibility of improvement. However, research indicates that mindsets can be changed, and that doing so can foster resilience. Specifically, mindsets are often domain specific (e.g., individuals can hold a growth mindset in regards to intelligence and a fixed mindset in
regards to personality), and can change over time due to both experiential and environmental factors. In prior work by Mueller and Dweck (1998), for instance, when students were praised for being smart (rather than for working hard), those students actually ended up endorsing more of a fixed mindset and less resilience following setbacks. Believing that hard work is important and productive is a key component of both a task goal orientation and grit. A growth mindset appears to serve as a protective factor against potential negative effects of adversity and failure by promoting resilience and sustaining motivation (Wang, Haertel, & Walberg, 1997). Thus, there seems to be evidence that grit should be included in models of achievement motivation.

Although recent research has attempted to understand how teachers and coaches can foster grit in the classroom and on the field (Hochanadel & Finamore, 2015; Major, 2013; Shechtman, DeBarger, Dornsife, Rosier, & Yarnall, 2013), no published study to date has examined the relation between perceived motivational climate and grit. However, based on unpublished collaborative research between Dweck and Duckworth, it appears that when students are taught to persist – and internalize the motivation – they develop a growth mindset, which improves their grit (Perkins-Gough, 2013). Research has begun to piece together motivational correlates and grit, but no study to date has empirically linked achievement motivation constructs to grit in a sample of athletes. Behaviors associated with grit, including persistence in the face of adversity and effortful engagement are associated with task-involved motivational climates, growth mindsets, and task-goal orientations. As recent as 2014, Angela Duckworth, the pioneer of grit research, noted that, “much remains to be discovered about [grit’s] underlying psychological mechanisms” (Duckworth & Gross, 2014, p. 320). The current study aims to begin filling in this gap in the literature by determining the extent to which perceived motivational climate, achievement goal orientation, and mindset are related to grit.
among high school athletes. If, as proposed, grit is a determinant of success that can be taught and facilitated, it is first necessary to understand what factors may promote or inhibit it.

Figure 1. Visual depiction of the relationship between the variables.

Purpose

For this study, I will adapt and expand earlier models (Dweck et al., 1995a; Dweck & Leggett, 1988) of achievement motivation that have indicated that perceived motivational climates influences mindset, which in turn, induce goal orientation. Since grit appears to be related to goal pursuit and beliefs about effort, grit will be applied to existing models describing processes of achievement motivation to examine the extent to which the models account for the newer construct of grit. Thus, the purpose of the current study will be to examine the relation between achievement motivation constructs (i.e., perceived motivational climate, mindset, and achievement goal orientation) and male athletes’ grit.

My hypotheses are:
1. At the bivariate level, perceived motivational climate (particularly perceptions of a task-involved climate), mindset (particularly a growth oriented one), and goal orientation (particularly a task-oriented approach) will be related positively and significantly to male athletes’ grit scores.

2. When all the achievement motivation variables are considered simultaneously, I expect mindset will incrementally account for grit above perceived motivational climate, and achievement goal orientation will incrementally account for grit above and mindset.
APPENDIX B

EXTENDED METHODOLOGY
Method

Participants

Eighty-one male varsity soccer players were recruited from high schools across the Dallas-Ft. Worth area. This sample represents the general racial/ethnic and socioeconomic status of the soccer players from the participating schools.

Instruments

Demographics. Participants reported their gender, age, race/ethnicity, total number of years participating in organized soccer, number of years playing on their current varsity team (including the present year), current year in school, GPA, types of soccer teams on which they have played (or are playing; club, high school, or both), primary position on each team (offense/forward/striker, midfield, defense, or goalie), and playing frequency on each team (starter, reserve/but play more than half a game, reserve/but play less than half a game, or does not play).

Perceived motivational climate. The 33-item Perceived Motivational Climate in Sport Questionnaire-2 (PMCSQ-2; Newton, Duda, & Yin, 2000) measures athletes’ perceptions of the motivational climate created by their coach across the following subscales: Cooperative Learning (4 items; perceived importance that teammates work with one another to improve execution), Effort/Improvement (8 items; perceived interconnection of working hard to improve in an athletic setting), Important Role (5 items; belief that each member of the team has an important role to play), Intra-Team Member Rivalry (3 items; perception that intra-team member rivalry is present on the team), Unequal Recognition (7 items; perception that the coach recognizes skilled players more than non-skilled players), and Punishment for Mistakes (6 items; belief that the coach will punish undesirable performances). These subscales are combined to form two second-
order factors: Task-Involving (comprised of Cooperative Learning, Effort/Improvement, and Important Role) and Ego-Involving (comprised of Intra-Team Member Rivalry, Unequal Recognition, and Punishment for Mistakes). For the current study, the athletes assessed their current soccer team’s environment as created by the team’s coach, and responded to each item, such as “Players help each other learn,” on a scale ranging from 1 (strongly disagree) to 5 (strongly agree).

Consistent with Waldron and Kane (2005), I used the total score for the Task- and Ego-Involving climates, which were represented by the mean of each factor’s respective items; higher scores indicate stronger perceptions of that climate. Internal consistencies (Cronbach’s alphas) have ranged from .87 to .88 in a sample of female adolescent volleyball players (Newton, Duda, & Yin, 2000). Regarding concurrent validity, athletes who perceived a Task-Involving climate were more likely to be intrinsically motivated, whereas athletes who perceived an Ego-Involving climate were more likely to perceive pressure and tension. Moreover, higher scores on the Cooperative Learning, Effort/Improvement, and Important Role subscales were positively, and Unequal Recognition subscale negatively, associated with team satisfaction (Newton, Duda, & Yin, 2000).

Mindset. The athletes responded to two items that were adapted from a 3-item implicit theories scale (Dweck, Chiu, & Hong, 1995a). Consistent with the fixed (fixed entity) and growth (malleable) mindset perspectives that represent implicit theory, the two items were modified to fit the context and sample of the study. Thus, one item depicted soccer ability as a fixed entity (“You have a certain amount of soccer ability and you can’t really do much to change it.”) and the other item depicted it as malleable (“No matter how much soccer ability you have, you can always change it quite a bit.”). Athletes responded to each item on a scale that
ranged from 1 (Strongly Disagree) to 6 (Strongly Agree). For the original 3-item scale, Cronbach’s alphas have ranged from .94 to .98; test-retest reliability was .80 over a two-week interval (Dweck, Chiu, & Hong, 1995a). Dweck et al. (1995) reported that the implicit theory measure represents two separate factors, and it was not significantly related to measures of cognitive ability (r = -.12), confidence in intellectual ability (r = .02), and self-esteem (r = -.01).

Achievement goal orientation. The 12-item Achievement Goal Scale for Youth Sports (AGSYS; Cumming, Smith, Smoll, Standage, & Grossbard, 2008) measures children’s goal orientations along two dimension: Ego (6 items; success based on outperforming others) and Task (6 items; success based on mastering a skill and being the best one can be). On items such as “I feel successful when I do my best,” the athletes respond from 1 (Not true at all) to 5 (Very true). Total scores for the separate task and ego goal orientations are based on the means of the respective items; higher scores indicate greater perceptions of that goal orientation. In a sample of over 1600 male and female athletes who ranged in age from 9 to 14 years, Cumming et al. (2008) found Cronbach’s alphas of .78 (Task) and .88 (Ego). The task and ego orientation scales provided a good fit within a two-factor model of goal orientation and demonstrated substantial convergent validities (i.e., .39 to .58, p < .001) with corresponding academic orientation scales.

Grit. The 8-item Short Grit Scale (Grit-S; Duckworth & Quinn, 2009) measures individuals’ ability and willingness to pursue a long-term goal through sustained focus, interest, and effort. On items such as “Setbacks don’t discourage me,” the athletes respond on a scale from 1 (Very much like me) to 5 (Not like me at all). Total score is the mean; higher scores indicate greater grit. Cronbach’s alpha was .83 in a sample of 139 male and female undergraduates (Duckworth, Peterson, Matthews, & Kelly, 2007). Although the scale’s total score is associated with Big Five Conscientiousness (r = .77, p < .001) and self-control (r = .63, p
<.001), grit is distinguished by its emphasis on enduring effort and focus rather than a propensity for order or self-discipline. Furthermore, grit demonstrated incremental validity in predicting educational attainment among undergraduate students, after holding constant the influence of all Big Five Inventory dimensions (Duckworth et al., 2007).

Procedure

After obtaining approval from the researcher’s university IRB, high school and select soccer coaches were contacted via email to solicit permission to have their male players participate in a larger study on the influence of different types of verbal feedback on subsequent soccer. Through email and follow-up phone calls, the researchers explained the purpose of the study and answered any coaches’ questions. After obtaining permission from each head coach, the researchers arranged a time to visit the team during a scheduled practice and distribute consent forms for the players to take home to their parents. At a subsequent in-person meeting, all consented (and assented) players then completed the demographics questionnaire, the Perceived Motivational Climate in Sport Questionnaire (PMCSQ-2), the implicit theory measure, the Achievement Goal Scale for Youth Sports (AGSYS), the Short Grit Scale (Grit-S), and other measures that were part of the larger study. The consent forms and packets were coded by number, and no names (or other explicitly identifying information) were recorded on the questionnaire packets. The packets took approximately 10 minutes to complete. At each school, once all players had completed the full study, they were entered into a drawing to win a locally donated soccer gift or a cash prize ranging from $5 to $10.

Data Analysis

SPSS Version 22.0 will be utilized to conduct the data analyses for this study. Missing data will be examined first and imputations made using best practices (Schlomer, Bauman, &
Card, 2010). Subsequently, I will examine the distributions of each measure to determine if any violations of normality exist. If any do exist, I will make adjustments following best practices (Tabachnick & Fidell, 2001). To address the primary research question, which is the relation of perceived motivational climate, achievement motivation, and implicit theory to athletes’ grit, I will use hierarchical multiple regression (HMR). At Step 1 of the model, I will enter the athletes’ Task- and Ego-Involving scale scores on the PMCSQ-2. At Step 2, I will enter the growth and fixed mindset scores from the implicit theory scale. At Step 3, I will enter the Task and Ego goal orientation scale scores on the AGSYS. Based on a sample size of 81, an alpha level of .05, and 6 predictors in the model, the power level for the analysis will be 0.86.
APPENDIX C

DEMOGRAPHIC QUESTIONNAIRE
Please answer the following questions honestly. It is important that you answer every question. There are no “wrong” or “right” answers, so just do the best you can.

1. Gender:
   _____ Male
   _____ Female

2. Age: _____

3. Race/ethnicity:
   _____ Caucasian/White
   _____ Hispanic/Latino/Mexican American
   _____ African-American/Black
   _____ American Indian
   _____ Asian American/Pacific Islander
   _____ Other (specify: ______________________________________) 

4. Number of Years you have Participated in Organized Soccer (including this year)
   a. in high school: _____
   b. in your life: _____

5. Current Academic Status:
   _____ Freshman
   _____ Sophomore
   _____ Junior
   _____ Senior

6. Current GPA: _____

7. What is your level of participation on your high school soccer team in the past year?
   This is my first year on the varsity team _____
   This is my second year on the varsity team _____
   This is my third year on the varsity team _____
   This is my fourth year on the varsity team _____
   I don’t play on a varsity team _____

7a. If you participated on a high school soccer team in the past year, on average, how many hours did you spend in practice and competition per week? _____

8. What position do you primarily play on your high school team? (only choose one)
   _____ Offense/Forward/Striker
   _____ Midfield
   _____ Defense
   _____ Goalie
9. What is/was your primary playing status on your high school team? (only choose one)
   ______ Starter
   ______ Reserve, but play more than half a game
   ______ Reserve, but play less than half a game
   ______ Do not play

10. Have you played for a club soccer team in the past year?
    Yes _______
    No _______

10a. If yes, on average, how many hours did you spend in practice and competition per week during the season? _______

11. What position do/did you primarily play on your club team? (only choose one)
    ______ Offense/Forward/Striker
    ______ Midfield
    ______ Defense
    ______ Goalie
    ______ I don’t play club soccer

12. What is/was your primary playing status on your club team? (only choose one)
    ______ Starter
    ______ Reserve, but play more than half a game
    ______ Reserve, but play less than half a game
    ______ Do not play
    ______ I do not play club soccer
COMPREHENSIVE REFERENCE LIST


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