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Academic Work Ethic in Middle School Students: Extending Scale Research and Investigating Construct Validity

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I am submitting herewith a dissertation written by Emily Pendergrast Taylor entitled "Academic Work Ethic in Middle School Students: Extending Scale Research and Investigating Construct Validity." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in School Psychology.

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Academic Work Ethic in Middle School Students:

Extending Scale Research and Investigating Construct Validity

A Dissertation Presented for the
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Dedication

This dissertation is dedicated to all those who held my precious children, Charles and Mary Ingrid, as I worked to complete this project. It truly would not have been possible without your selflessness, love, and encouragement.

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Abstract

This three-study dissertation was designed to: 1) extend the research on Parkhurst's (2013) Academic Work Ethic-Student (AWE-S) scale, 2) develop and analyze reliability of the Academic Work Ethic-Teacher (AWE-T) scale, and 3) expound on the construct validity of academic work ethic by comparing AWE-S and AWE-T scores to external factors (i.e., grades, perceived support, and parental work ethic) and Grit (Duckworth, 2007), a similar construct. Research was conducted in both rural and urban middle schools in Tennessee and included student, teacher, and parent participants.

Both scales were found to have high reliability coefficients and stable factor structures. Student scale (AWE-S) means were moderately, significantly correlated with a variety of variables, including persistence in a math task, classroom grades in math and an elective course, teacher scale (AWE-T) means, and students' perceived support in pursuing postsecondary education. The AWE-S was also found to be significantly related to the Grit Scale for Children. The AWE-T, completed by teachers regarding students' academic work ethic, was found to be highly, significantly correlated between teachers and predictive of classroom grades. In fact, up to 87% of variance in classroom grades was accounted for by the scales combined.

The ability to accurately and consistently measure academic work ethic, as well as the construct's predictive relationship to student behavior and grades, gives rise to a variety of practical applications for these scales. Future researchers and administrators should consider using the AWE-S and AWE-T to measure academic work ethic in middle school students, screen for students at academic risk or with a lack of support in academic achievement, and inform programs designed to teach positive work ethic skills and

behaviors, in order to promote success in school and beyond.

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Chapter I

Literature Review

The question of what determines academic achievement and success has interested psychologists, teachers, parents, and researchers in education for decades. Many believe and recognize that achievement is not predicted by aptitude alone. In fact, while it is well established that general intelligence is strongly correlated with school achievement (an average correlation of $r = .50$, with coefficients ranging from .11 to .90), it only accounts for about 25% of variance in overall achievement (Deary, Strand, Smith, & Fernandez, 2007; Kuncel, Hezlett, & Ones, 2004; Rindermann, 2006). Part of the discrepancy in correlation values can be attributed to diverse measures of achievement, particularly when examining standardized, end-of-year achievement testing versus grades given by teachers. In contrast to standardized tests, which correlate more highly with intelligence, classroom grades are not only an indication of knowledge of the subject material, but also encompass other aspects such as classroom behavior, participation, and "motivation" (Steinmayr & Spinath, 2008).

Because outside of genetic predisposition to intelligence, there is 75% unexplained variance in achievement, it is worthwhile to investigate concepts that may influence or predict academic success. Other factors, external to the individual (e.g., socioeconomic status, access to resources, familial attitudes, peer influence, traits of teachers, and classroom/school environment) have been demonstrated to have influence on academic achievement (Barton & Coley, 2007). However, it is heavily assumed (and confirmed anecdotally) that individuals are able to overcome their circumstances and achieve more than others thought possible; or conversely, students given every opportunity to succeed may drop out of school or fail to put forth sufficient effort in the classroom. Thus, this literature review seeks to investigate various

noncognitive, or motivational, theories and constructs as they apply to learners and academic achievement. The chapter will end with a discussion of the new construct of academic work ethic (Parkhurst, 2011) and an outline of the Chapters 2-5, ahead.

Predicting Academic Achievement

Self-Determination Theory

Self-determination theory (SDT), emphasizes the role of environmental conditions in fostering or suppressing motivation (Deci & Ryan, 2000). The theory asserts that every person, regardless of culture, requires the fulfillment of autonomy, competence, and relatedness, although the means of fulfilling such needs may vary. Appleton, Christenson, and Furlong (2008) described the two aspects of SDT that are particularly relevant for educators: The first is that SDT provides a conceptualization regarding the way that students internalize external demands. Rather than focusing on intrinsic motivation as the only desired end, SDT acknowledges that the catalyst for behavior in many situations (e.g., education) is external to the student (Ryan & Deci, 2000). SDT specifies qualitative differences in the level of self-determination across five types of extrinsic motivation (Ryan, 1995). Amotivation, or the relative absence of motivation for a task, is characterized by a lack of intentionality, lack of control, and feelings of incompetence. External regulation refers to behaviors that are regulated exclusively by rewards and constraints, where relative autonomy is low. Introjected regulation is described as when behaviors are partially internalized, but the internalization is not consistent with other aspects of the self (e.g., acting in order to assuage guilt, lessen anxiety, or maintain a positive image). Regulation is considered *identified* when behaviors are performed by choice and because the individual considers them important, though not necessarily enjoyable (e.g., pursuing an advanced degree as a step toward entering a desired field). Finally, integrated

regulation is characterized by high levels of autonomy and occurs when behavior is congruent with the individual's values and needs.

The second aspect of SDT that is relevant to education is its careful analysis of context and students' experience of that context. This delineation clarifies the role an educator can serve in increasing students' sense of autonomy and self-regulated behavior. Environments that provide both support and autonomy have been shown to be particularly important during the adolescent years (Eccles & Midgley, 1989; Newell & Van Ryzin, 2007; Ryan, Miller, & Lynch, 1994) and predict autonomous motivational processes and subsequent achievement (Grolnick, Ryan, & Deci, 1991; Guay & Vallerand, 1997). Furthermore, students taught using directed, but "noncontrolling" methods exhibited greater rote learning, greater interest, and increased conceptual learning, perhaps due to increased levels of perceived autonomy (Deci, Kostner, & Ryan, 1999; Grolnick & Ryan, 1987).

Achievement Goal Theory

Dweck (1986) describes two types of achievement goals and proposes that students' goals interact with their self-efficacy beliefs to influence the amount of effort they expend on school tasks. Performance goals emphasize positive evaluations from others, while learning goals focus on gaining new skills and knowledge, even if failures occur during the process. Students with performance goals are most likely to interpret failure as a sign of low ability and to withdraw effort. Students with learning goals see failure as a cue to change their strategy for completing the task or increase their efforts. This increased effort often enables students with learning goals to improve their performance (Elliot & Dweck, 1988).

These two goal orientations predict different outcomes in the context of academic achievement. In general, task orientation (i.e., a focus on learning goals) is regarded as more

adaptive than ego orientation (i.e. a focus on performance goals). Task orientation is related to selection of challenging tasks, effective study strategies, positive attitudes toward learning, and positive emotions; ego orientation is associated with selection of easier tasks, trivial learning strategies, concern for social status, and thoughts of escape and behavioral withdrawal when difficulties are encountered (Kaplan & Maehr 2007; Bortoli, Bertollo, Comani, & Robazza, 2011; Dweck & Leggett 1988). Even so, ego orientation has sometimes been related to positive learning strategies and a high degree of self-efficacy (Midgley, Kaplan, & Middleton, 2001; Stipek, 2002). To account for these findings, Elliot and Church (1997) hypothesized that there exists two types of performance goals, performance-approach (i.e., striving to demonstrate competence) and performance-avoidance (i.e., striving not to demonstrate incompetence). Performance-approach goals are positively related to student achievement (e.g., Elliot & McGregor, 1999; Lopez, 1999; Urdan, 2004), whereas performance-avoidance goals have been demonstrated to negatively correlated with performance (Elliot & Church, 1997; Zusho, Pintrich, & Cortina, 2005).

Need for Achievement

Murray (1938) considered the need for achievement a basic human need and in his conception of needs, a consistent trait of personality. Need for achievement refers to a consistent and enduring concern with setting and meeting high standards of achievement, motivated by internal (i.e., intrinsic) or external (i.e., extrinsic) factors, such as pressure to meet others' expectations. It is considered "domain-general" and can be applied to a variety of situations (Steinmayr, 2008). Students with high need for achievement may have increased determination to achieve high grades or test scores, may study intensely or for a prolonged period of time, or work with purpose toward a high or distant goal. Jackson (1967) used need for achievement

theory as the basis for the Personality Research Form (PRF), one of the most widely used questionnaires in personality research. McClelland (1961) extended Murray's theory by categorizing need for achievement as the result of an emotional conflict between the hope to approach success and the desire to avoid failure, linked to positive and negative emotions, respectively. The balance between these negative and positive emotions is thought to determine the intensity of achievement-related behavior.

Because school is essentially a series of achievement situations, it is hypothesized that need for achievement, in both Murray and McClelland's conceptualizations, would be elicited regularly in the classroom environment. Correlations of achievement motives (assessed via self-report) and academic success have been found to be significant with weak to moderate magnitudes in both high school and college populations (Paunonen & Ashton, 2001; Spangler, 1992). School accomplishments necessitate fulfilling specific demands that require a certain degree of drive, which Murray and McClellend would describe as need for achievement, and hard work.

Expectancy-Value Theory

According to expectancy-value theory (Wigfield & Eccles, 2000), achievement beliefs and behaviors are determined by both the expectation students have for success and the subjective value students place on succeeding. In other words, students must ask two questions: 1) "If I try hard, can I succeed?" and 2) "If I succeed, will the outcome be valuable or rewarding to me?" (Woolfolk, p. 376). Unlike need for achievement, both expectancies and values are conceptualized in a domain-specific manner (i.e., focusing on specific tasks or subjects). According to Wigfield and Eccles (2000), students differentiate between three components of subjective task value: their interest in the task, its perceived importance, and its perceived utility.

Finally, there is the question of cost (i.e., "What are the risks if I fail?", "Will I look stupid?", "What could I be doing instead?") (Woolfolk, 2013).

Tollefson (2000) presented the following example, particularly relevant to the present studies: A theoretical group of students have been assigned a set of complicated problems in mathematics. Assuming the students like mathematics and have a history of success in math courses, these students expect to complete the assignment successfully and to reap the rewards of success on the assignment. The rewards may be external (e.g., a high grade) or internal (e.g., a sense accomplishment associated with completing a difficult task, pride that others are not able to complete as quickly or as easily). According to expectancy-value theory, these students expend the maximum effort on the assignment. A second group of students do not have a history of success in mathematics and find completing math assignments to be time-consuming and difficult. These students plan to complete the assignment but do not expect to earn a high grade. For these students, completing the assignment will eliminate external and internal consequences of receiving a failing grade. If the value placed on the removal of the negative consequence of failure is high, these students will attempt and complete the assignment even if they do not expect to perform well; however, they are unlikely to expend maximum effort on the assignment. Finally, consider a group of students who have a history of difficulty in school and for whom passing grades in mathematics seem to them to be out of their reach. These students may not even attempt any of the problems, even those for which they might be able to earn partial credit. These students may value the external rewards of school such as good grades and approval from teachers; however, they do not expend effort because they have no expectation of success. This phenomenon has been supported by several studies in academic settings (Gottfried, 1985, 1990; Pintrich & DeGroot, 1990; Steinmayr & Spinath, 2007).

Self-Efficacy

Closely related is the concept of self-efficacy, or belief in one's capabilities to organize and execute the course of action required to achieve goals within a certain domain (Bandura, 1997). Self-efficacy beliefs, according to Bandura, are important in determining whether individuals will expend effort on a task or persist in the face of difficulty. According to theories on self-efficacy, students with high self-efficacy attempt tasks and persist even if tasks are difficult; students with low self-efficacy expend minimal effort and, in many cases, give up easily. Bandura distinguished between outcome expectations and efficacy expectations: Outcome expectations are beliefs that particular courses of action lead to particular outcomes, and efficacy expectations are beliefs that the person is capable of successfully completing the course of action that will lead to success. Students may believe that particular courses of action will lead to success in school, but not believe that they are capable of successfully completing the actions required for success. Thus for any task, a person could have a high or low outcome expectation and a high or low efficacy expectation. Students who have high outcome expectations and high efficacy expectations approach academic tasks with confidence and persist even when the tasks are difficult.

According to Bandura, individuals develop their personal sense of efficacy from four sources: 1) performance accomplishment, 2) observation of the performance of others, 3) verbal persuasion and related types of social influence, and 4) states of physiological arousal from which they judge personal capabilities and vulnerability (Bandura, 1982). While teacher modeling, positive feedback, and instruction enhance students' self-efficacy beliefs, the primary route to changes in self-efficacy is through direct mastery experiences (Bandura, 1997). When students master a task, their expectation that they will master similar tasks in the future increases.

However, while success generally contributes to enhanced efficacy expectations, attributions of success to ease of the task or help from others may not lead to increased efficacy expectations. For efficacy expectations to be enhanced by mastery or success on a task, success on the task needs to be attributed to ability or effort (Tollefson, 2000).

Schunk (1989) hypothesized that self-efficacy would be relevant in the academic setting. For example, at the beginning of an activity, students differ in the beliefs about their capabilities regarding learning the material, performing certain tasks, and initial self-efficacy varies based on aptitude and prior experiences. In the process of leaning or work being completed, internal (e.g., goal-setting) and external (e.g., rewards, feedback) factors signal to the student how well they are learning, and from this, students assess efficacy for future learning. In other words, as students work on tasks and perform better, they must maintain a sense of self-efficacy (Shunk, 1991). Bandura (1997) cited evidence suggesting that self-efficacy heavily influences choice of activities, effort, and persistence. Self-efficacy has also been related to use of positive learning strategies (Zimmerman & Martinez-Pons, 1990) goal-setting (Shunck, 1991), and engagement (Bandura, 1997).

Conscientiousness

Conscientiousness is defined as purposeful, strong-willed, determined, and organized behavior (Costa & McCrae, 1998) and is perhaps the most widely measured and validated noncognitive construct (Abuhassan & Bates, 2015). Conscientiousness is associated with better health, greater longevity, better effort and performance at both school and work, and enduring social relationships (Deary, Batty, Pattie, & Gale, 2008; Roberts, Kuncel, Shiner, Caspi, & Goldberg, 2007; Tautwein, 2009). Noftle and Robbins (2007) summarized the results of 20 studies examining the relationship between conscientiousness and GPA and found a significant,

positive relationship in 15 of the studies. This relationship remained even when controlling for other variables such as gender, SAT scores, and prior GPA. Interestingly, Bidjerano and Dai (2007) found that effort regulation fully mediated the predictive validity of conscientiousness on GPA in undergraduate samples. Noftle and Robbins (2007) confirmed using 4 additional data sets that the association between conscientiousness and academic effort is closer than that between cognitive ability and academic effort.

Conscientiousness plays a major role in the newly developed construct of grit, which is defined as the tendency to sustain interest in and effort toward very long-term goals (Duckworth, Peterson, Matthews, & Kelly, 2007). A two-factor model of grit as perseverance and consistency of interest has been argued to predict accomplishment over and above personality and IQ. Perseverance entails working to overcome challenges, as indicated by items on the Grit Scale such as, "I finish whatever I begin." Consistency is assessed by items such as, "I have difficulty maintaining my focus on projects that take more than a few months to complete (reversed)" and indicates a personality characteristic of pursuing goals over a long period of time. Grit scores have been associated with small but significant differences in achievement, including spelling-bee attainment in children, and lower drop-out rates among West Point cadets (Duckworth et al., 2007). Abuhassan and Bates (2015) found that while conscientiousness and IQ adequately accounted for school grades, higher perseverance was associated with higher life-course accomplishment.

Engagement

Engagement refers to the behavioral intensity and emotional quality of a student's involvement during a learning activity (Skinner, Furrer, Marchland, & Kindermann, 2008). It is a multidimensional construct which has been hypothesized to consist of three or four separate,

though intercorrelated, aspects: behavioral engagement, emotional engagement, cognitive engagement, and agentic engagement (a new construct which refers to the student's constructive contribution to instruction, such as asking questions and clarifying expectations) (Fredericks, Blumfield, & Paris; Skinner, 2004; Kindermann, Connell, & Wellborn, 2009; Reeve, 2013).

Students' engagement in the classroom is particularly important as it refers to the behavioral pathway by which motivational processes contribute to learning and development (Connell & Wellborn, 1991). Engagement has been shown to have a significant effect on skill development and grades earned (Finn & Rock, 1997; Skinner & Belmont, 1993). In contrast, a disengaged student is distracted, passive, and gives up easily when faced with difficulties. Disengaged student also express negative emotions and withdrawal, and they use fewer learning strategies (e.g., planning, monitoring). Furthermore, engagement has been found to mediate the effects between positive classroom environment and grades (Reyes, Brackett, Rivers, White, & Salovey, 2012).

Engagement reflects an individual's active involvement in a task or activity (Reeve, Jang, Carrell, Jeon, & Barch, 2004). Appleton, et al. (2008) illustrated its distinction from motivation as it pertains to reading tasks, stating that motivational aspects include (a) perceived reading competency; (b) perceived value of reading in order to obtain larger goals (better grades, parent/teacher praise); and (c) perceived ability to succeed at the reading task, among others. Motivation and engagement are thought to be separate but not orthogonal. For example, one could be motivated but not actively engaged in a task (Connell & Wellborn, 1991; Furrer & Skinner, 2003). Motivation is thus necessary, but not sufficient for engagement (Appleton, et al., 2008). While changes in motivation are typically thought to precede changes in engagement, recent longitudinal research suggests that that changes in motivation produced by changes in

engagement may be just as strong. Thus, the effect is reciprocal (Jang, Kim, and Reeve, 2012).

The Academic Work Ethic

Foundations

While noncognitive contructs are important to understand, there is a need to investigate not only cognitive attributions, goals, and expectations, but actual performance-related behaviors and outcomes, as well as beliefs specifically regarding the value of related traits (e.g., hard work, persistence). According to Miller and Coady (1984), work ethic refers to "the beliefs, values, and principles that guide the way individuals interpret and act upon their rights and responsibilities within the work context at any given time" (Miller & Coady, 5). McCortney and Engels (2003) described work ethic as a construct composed of two distinct parts: internal attitudes or values held by individuals and the (observable) work-related behaviors that outwardly reflect these attitudes or values. In other words, work ethic describes not only the internal state of an individual but also resulting behaviors, outcomes, and achievement. It should be noted that the definition of work ethic has changed over time, away from an emphasis on religiosity or protestant ethic, and with increasing emphasis on individual motivation, productivity, and collaboration (Naylor, 1988; McClelland, 1961; Parkhurst, 2011; Weber, 1958).

Lounsbury et al., (2003) proposed a similar construct, called work drive, which represents an enduring motivation to expend time and effort to finish projects, meet deadlines, be productive, and achieve success (Lounsbury, Sundstrom, Loveland, & Gibson, 2003). Using an original scale, work drive was found to predict unique variance in college course grades beyond that predicted by intelligence and the "Big Five" personality traits, including openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism. Lounsbury et. al

(2003) consequently emphasized the importance of studying similar variables in order to predict academic performance and achievement.

Rau and Durand (2000) found evidence for an "academic ethic" construct, which was found to predict college grades. As described by researchers, students with a well-developed academic ethic place their studies above leisure activities, study on a daily or near-daily basis, and study in a disciplined, intense, and sober fashion. They posited that the academic ethic is not a natural predisposition but is a learned behavior likely found in children from families with a strong work ethic and possibly strong religious or ethical values (Rau & Durrand, 2000). Notably, while the study found grades significantly and positively correlated with an academic ethic and academic locus of control (Trice 1985, 1987), ACT scores shared no such relationship. Finally, Fox and Grams (2007) created a Work Ethic Behavior Indicators Inventory for the purpose of formulating classroom lesson plans on work ethic.

A New Scale

Up until 2011, no measure of work ethic behaviors, specifically intended for the academic setting, had been developed and rigorously tested for reliability and validity. Even so, the term work ethic is often used by teachers and administrators in reference to student populations. As Duckworth and Yeager (2014) explained, only measurement makes it possible to observe, experiment, and change something. Thus, if one is interested in changing the work ethic of students, it is essential to be able to accurately define and quantify it with precision. Parkhurst's (2013) dissertation studies described the development and initial evaluation of an Academic Work Ethic-Student (AWE-S) measure. Initial factor analysis and convergent validity of data from 380 undergraduate students were used to develop a 25-item five factor AWE-S measure. In a subsequent study, fifth- through eighth- grade students completed the AWE-S and

then the Partial Assignment Completion procedures, which required students to choose to complete either a partially completed math assignment or a new matched assignment that would require 10% less effort to complete. Logistic regression results revealed that specific AWE-S factors (hard work and self-reliance) were significantly related to student choice.

Expounding on the AWE Construct

The following chapters outline three research studies surrounding academic work ethic and related traits and achievement outcomes (e.g., grades). The first study (Chapter 2) investigates the relationship between item interspersal, a measure of persistence, academic work ethic and grades. The second study (Chapter 3) provides initial validation for an Academic Work Ethic Scale for teachers (AWE-T) and compares teacher-report to student self-report, classroom grades in both math and elective classes, and persistence. Chapter 4 describes the third study, which further validates the AWE-T and examines external predictors of AWE-S scores. Finally, Chapter 5 will provide a brief summary, synthesis, and discussion of all three studies.

Chapter II

Persistence, Academic Work Ethic, and Achievement in Middle-School Students

Persistence is a commonly recognized trait or behavior that parents and educators seek to foster in children and adolescents. Persistence has been related to numerous positive outcomes (Duckworth & Quinn, 2009; Peterson & Seligman, 2004) but can be difficult to operationally define. Binder (1996) defined persistence simply as the ability to maintain high rates of work completion over longer intervals. Padilla-Walker, Day, Dyer, and Black (2012) provide a more nuanced definition that encompasses two elements: First, they describe persistence as the ability to persevere and continue toward a goal when the motivational source originates in the individual rather than primarily on external elements. This concept is informed by self-determination theory (Niemiec, Ryan, & Deci, 2010), which explores how one autonomously chooses to continue toward a goal, even when there are difficulties present (Ryan, Patrick, Deci, & Williams, 2008). On the other hand, individuals who continue on a task out of fear of punishment would not be considered self-determined or persistent in the truest sense of the term. The importance of an internal "motivational source" is emphasized in studies of persistence or task endurance which provide students with choices regarding type or amount of participation.

A second element of persistence considers competing tendencies and discomfort. Padilla-Walker et al. (2012) summarized that behavior designed to obtain a target goal can only qualify as persistence when one continues working despite delays and obstacles. In other words, just because someone repeatedly participates in something enjoyable for an extended period does not necessarily qualify that person as persistent. This ability to continue on despite barriers has been alternately labeled "perseverance" and "grit" (Duckworth & Quinn, 2009; Peterson & Seligman, 2004). Persistence likely overlaps with constructs like conscientiousness, work ethic,

and achievement but is considered unique due to these elements of self-direction and stamina. Peterson and Seligman (2004) echo these ideas, stating that persistence is the "voluntary continuation of a goal-directed action in spite of obstacles, difficulties, or discouragement" (p. 220).

Several studies show strong correlations between academic achievement and persistence (Martin, 2006; Rayle, Kurpius, & Arredondo, 2006; Tracy & Robbins, 2006). For example, preschool and school-age children who were rated high in task persistence were also found to have higher standardized test scores and cognitive abilities (Deater-Deckard, Petrill, Thompson, & DeThorne, 2005). Oliver, Guerin, and Gottfried (2007) found that adolescents with higher grade-point averages reported greater internal locus of control and persistence, and similar findings exist in college populations (Blecher, 2006). Because it has been determined to be an important predictor of success, it follows that educators, administrators, and parents would seek to increase persistence in students.

One highly researched method of influencing students' preference for work without compromising academic demands is to intersperse briefer, more preferred math problems into tasks composed of difficult, less preferred problems (Cates & Skinner, 2000; Skinner, Robinson, Johns, Logan, & Belfiore, 1996). Skinner (2002) explained this effect with the discreet task completion hypothesis. According to this hypothesis, when assignment completion is reinforced (e.g., by teacher praise, tokens, or escape from additional work), the discrete tasks leading up to assignment completion take on conditioned reinforcing properties via the principle of classical conditioning. For students working on a mathematics worksheet, completion of each problem is believed to serve as a conditioned reinforcer by signaling completion of the entire assignment; thus, interspersing brief problems increases conditioned reinforcement rates and lessens the

perceived barriers that students must overcome to complete the assignment.

Logan and Skinner (1998) found that sixth-grade students were more likely to choose a math assignment with brief problems interspersed, even when the additive intersperal assignment included more problems and required more effort to complete. These results were supported with subsequent studies conducted across tasks and participants (McCurdy, Skinner, Grantham, Wastson, & Hindman, 2001; Skinner, et al., 1996; Teeple & Skinner, 2004; Wildmon, Skinner, McCurdy, and Sims, 1999; Wildmon, Skinner, Watson, & Garrett, 2004). Furthermore, researchers found that interspersing additional, brief tasks prompted students to choose assignments with up to 40% more work (e.g., 40% more long target problems) (Billington, Skinner, & Cruchon, 2004; Cates & Skinner, 2000; Cates, Skinner, Watson, Rhymer, MCNeill, and McCurdy, 1999; Meadows & Skinner, 2005).

Kirk's (2010) dissertation studies included two experiments that sought to assess the impact of interspersing additional math problems (i.e., briefer problems and/or longer problems) among target math problems on students' persistence. Improving upon Montarello and Martens (2005) study involving additive interspersal and task endurance, Kirk administered computer-delivered multiplication problems to high school and college students over a period of 1 hour. Persistence was measured by seconds worked as opposed to correct digits. These studies did not yield significant results in terms of influencing persistence, perhaps due to a notable difference between Kirk's procedures and previous research on additive interspersal. Previous studies exposed each participant to both control and interspersal assignments (i.e., on printed handouts) so that students were aware that the assignments contained a limited number problems. Therefore, each additional solved problem was able to serve as a reinforcer because students were aware of their progress toward completion. In Kirk's (2010) experiments, the computer

program delivered math problems continuously, with one problem displayed on the screen at a time, and with no terminal problem.

The current study seeks to extend the research on additive interspersal procedures and persistence, specifically by building on Kirk's procedure of administering short and long math problems via a computer program. However, this study's computer program will include an indication of students' progress toward assignment termination with the completion of each additional problem. Additionally, aspects related to persistence (i.e., academic work ethic and achievement) will be investigated. In doing so, this study will also evaluate/analyze the Academic Work Ethic-Student (AWE-S) (Parkhurst, 2013), a self-report measure of work ethic designed for fifth- through twelfth-grade students, and classroom grades to examine predictive validity of the AWE-S regarding persistence and classroom performance.

Method

Participants and Setting

Participants included 72 middle-school students from a rural middle school in the Southeastern United States. The sample included 39 males and 33 females; 66 were Caucasian, 2 were African-American, 1 was Hispanic, 1 was Native American, 1 was Asian, and 1 was Indian. These numbers reflect the total makeup of the school, which was about 95% Caucasian, 2% African American, 1% Hispanic, and 1% Asian. The percentage of students within the school considered economically disadvantaged, or qualifying for free or reduced lunch, is equal to 46%. Participants included sixth-, seventh-, and eighth-grade students, the youngest participant being 11 years, 2 months, and the oldest being 14 years, 0 months. The average student age was 12 years, 11 months. Participants completed assigned tasks within one elective class period, entitled "Diversified Technology", late in the fall semester. The Diversified

Technology teacher administered all instructions.

Materials and Measures

Persistence program. A computer-based persistence task was designed for this experiment, modeled after Kirk's (2010) multiplication computer program. The program was downloaded onto flash drives, which could be individually connected to each laptop. The control program presented only target, two-digit by two-digit, problems. To ensure students had to carry a numeral following each multiplication operation, all digits were greater than or equal to four (e.g., 76 x 58). On the experimental program, every third two-digit by two-digit problem was followed by a one-digit by one-digit multiplication problem (e.g., 2 x 3). These single-digit factor were always less than 4; thus, no carrying was required. For each problem type, the computer randomly generated digits for each problem according to these rules, which were designed to maximize the time difference required to complete the two types of problems (see Billington, Skinner, Hutchins, & Malone, 2004). A "Stop" button at the bottom of the screen allowed students to end the program at any time. A ticking bar at the top of the screen was designed to indicate progression in the math assignment with each completed problem, but was actually a function of time spent working. Each time the program was run on the laptops, data on student demographics, time started, time finished, and average rate of problem completion were saved.

AWE-S. Drawing on the seven dimensions of the MWEP (Miller et al., 2002), Parkhurst, Skinner, Taylor, Rowlette, Saudargas, Springer, & Woehr (in submission) developed a self-report measure of academic work ethic for students in grades 5-12, in order to evaluate the multidimensional construct of work ethic at an appropriate age-level for students and within the educational context (rather than in reference to the workplace). The AWE-S, a student self-

report measure, was used to assess attitudes and behaviors concerning academic work ethic using a 5-point Likert scale (1=strongly disagree, 5 =strongly agree). In the current study, the 25-item questionnaire was revised to further improve internal consistency. Specifically, several items with low reliability (i.e., coefficient alphas, inter-item correlations, and item-total correlations) were either omitted or rewritten for clarity based on Parkhurst et al.'s (in submission) suggestions. All factors were retained, leaving the 6-dimension model intact. Table 1.1 presents the six dimensions, the operational definitions used, and sample items.

Grades. Numerical, semester grades (of consenting/assenting parents and students) were collected from the Diversified Technology teacher 1 month after the in-class experiment took place.

Table 1.1 *AWE-S Dimensions, Dimension Definitions, and Sample Items*

Dimension:	Definition:	Sample Item:
Hard Work	Belief in the virtue of working hard in the school setting	- I can solve difficult problems if I work hard.
Leisure	The importance of non-school related activities above school-related activities	- School takes too much time.
Self-Reliance	The desire for autonomy in one's school work	- I solve my own problems.
Morality/Ethics	Understanding concepts of right and wrong; the belief in justice	- Cheating is OK if the test is too hard.
Delay of Gratification	The ability to postpone immediate rewards for the sake of later outcomes	- I wait my turn.
Perseverance	Steady persistence in a course of action in spite of obstacles to achievement	- It is important to finish school assignments all the way.

Procedures

All procedures were run in the students' Diversified Technology classroom. The students' desks were not rearranged for the experiment, and students sat in their usual seating arrangements, about 3 feet apart, spread around the room. Laptop computers (24) were set up on the desks, each with a flash drive that contained one of two experimenter-constructed math persistence programs. Half of the computers contained a flash drive with a control computer program and half with the experimental program. The computers were arranged in alternating formation (control-experimental-control-experimental) on desks. Both programs presented multiplication computation problems one at a time. After using the keyboard to type in their answer and press "Enter", another problem would appear on the screen. Students entered the classroom for their regularly scheduled Diversified Technology class. Those without parental consent were instructed to close their computers and work on a class assignment. Assent was solicited and obtained from each of the students with signed parental consent forms.

After students were seated and assent forms were collected, their Diversified Technology teacher administered procedures using a script given by researchers. Students were told to remain quiet throughout the entire class period. Students were told that after they clicked the "Start" button on their computer screens, their computer would deliver math problems one at a time. Students were provided blank paper and told they could use it and a pencil or pen to work the problems and then use the keyboard to provide the answer. After providing their answer, they were instructed to press "Enter" and a new problem would appear on their screens. The students were told that they must begin working on the math problems, but they were also informed that they could quit at any time and work quietly on a simple journaling assignment (given by the teacher) for the rest of the period. Students were told that they could quit at any time by clicking

the "Stop" button on the bottom right corner of the screen. At the end of the class period, students were asked to stop working on both the math problems and their journals, materials were collected, and computers were re-set for the next class. Five class periods of equal length (i.e., 45 minutes) were used, with participants ranging from sixth to eighth grade.

The co-researcher independently recorded the primary experimenter's behavior using a procedural integrity checklist. The researcher recorded 100% integrity across all experimental sessions.

Results

Means

Complete data were available for 65 students. Data obtained from 9 students was omitted due to blatantly inaccurate and immediate responses to math problems, including those that required long multiplication. Out of a control group of 22, 12 students quit before the end of the class period and 10 continued to work until being told to stop. In the experimental group of 34, which included brief math problems interspersed with two-digit by two-digit problems, 11 quit early and 23 worked until the class period ended. Table 1.2 displays the means and standard deviations across dependent variables for the control and experimental groups. A one-way ANOVA with groups (i.e., control and experimental) serving as the independent variable and number of problems completed serving as the dependent variable revealed a significant difference $F(56,1) = 6.28$, $p = .02$ between control ($M = 23.00$min, $SD = 8.38$) and experimental ($M = 32.76$min, $SD = 16.95$) groups. Students working on the experimental (interspersal) assignment worked approximately 8% longer ($M = 28.90$min, $SD = 5.30$) than those working on the control assignment ($M = 26.80$min, $SD = 6.57$), but this difference was not significant.

Table 1.2 *Experimental and Control Group Summary Statistics for each Dependent Variable*

	Control Group			Experimental Group		
	N	*M*	*SD*	*N*	*M*	*SD*
Minutes worked before quitting or end of class period	22	26.79	6.57	34	28.90	5.30
Number of students still working at the end of the class period	10 45%			23 68%		
Problems completed*	22	23.00	8.38	34	32.76**	16.95
Seconds per problem*	22	70.91	21.92	34	63.73	35.12

* Significant difference at $p < .05$ level

** Target problems completed = 24.57

A one-way ANOVA with rate (seconds per problem) serving as a dependent variable and groups (i.e., control and experimental) serving as the independent variable revealed no significant difference between groups. These findings suggest that while interspersing the briefer problems enhance problem completion rates, they did not have a significant effect on quitting nor time worked.

Chi Square

The relationship between group and time worked (i.e., minutes worked before quitting) may have been confounded due to the short class periods in which students participated in the persistence task. There were a large number of students (n=33) who never quit; thus, all of these students worked the same number of minutes (~32 minutes). Because of this, a new categorical variable was added to indicate whether the participant was working or had quit early at the end of the class period. Chi square analysis was utilized to test for a relationship between group (control vs. experimental) and persistence (quit vs. no quit). While the relationship was in the hypothesized direction, with more students in the control group quitting early, it was not significant, $\chi^2(1, 56) = 2.72, p = .099$. This analysis indicates that interspersal may potentially affect rates of quitting, as the interaction approached significance in the predicted direction.

AWE-S Scale Analysis

Response means and standard deviations can be found in Table 1.3. Responses from 56 students were evaluated, and a complete reliability analysis using SPSS 21.0 for Macintosh was computed for the scale. Results yielded a high coefficient alpha of .84 for the total AWE-S. Item-Total Statistics can be found in Table 1.4. While several items did not correlate well with the overall scale (e.g., items 1, 3, 5), they correlated closely with other items in the scale, observed through inter-item correlations and factor analysis. Item 5, however, was not strongly correlated with the overall scale or other items, nor did it fit well into the factor structure. This item could have caused confusion due to the wording ("I don't wait for other people to help me."), which may have been positively or negatively interpreted by the students. Factor analysis (Principle Components Analysis with Varimax rotation) yielded 8 components, together accounting for 70% of variance in AWE-S score. See Table 1.5 for the complete component matrix and Figure 1.1 for Scree Plot analysis. Visual analysis confirmed 6 factors, as Leisure and Self-Reliance items made up two factors each in the component matrix. It should be noted that while these factors were retained, they did not necessarily match the dimensions proposed by Parkhurst et al (in submission). Factors including items written to support the dimensions of Leisure, Self-Reliance, and Perseverance appear to have held up in isolation, perhaps due to their distinctiveness from other dimensions in the scale. Items measuring Hard Work, Delay of Gratification, Perseverance, and Morality/Ethics were intercorrelated and combined to create multiple factors.

Correlation Analysis

As expected, the experimental (interspersal) group completed more problems than the control group [$F(1, 56) = 6.28, p = .02$]. Students that were still working on the math task at the

Table 1.3 *Item Means and Standard Deviations*

Item	Mean	Std. Deviation
1*	2.21	1.098
2	2.85	1.262
3*	2.26	1.361
4	4.00	1.109
5	3.04	1.208
6*	4.21	1.246
7	3.60	1.115
8*	2.47	1.367
9*	3.92	1.089
10	3.91	1.131
11	4.43	.797
12	4.28	.794
13*	2.21	1.230
14	3.70	.932
15	3.77	.891
16	3.66	.999
17	4.00	1.019
18*	1.60	.968
19*	3.60	1.321
20	2.85	1.150
21	4.06	.864
22	4.08	.851
23	3.11	1.235
24	2.26	1.258
25	3.96	1.240

* indicates prior reversed-scored items

Table 1.4 *Item-Total Statistics*

Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
1	81.85	154.977	.192	.595	.842
2	81.21	142.937	.560	.561	.828
3	81.79	155.206	.129	.626	.847
4	80.06	149.478	.396	.739	.835
5	81.02	155.596	.145	.413	.845
6	79.85	149.900	.327	.464	.838
7	80.45	147.791	.457	.732	.833
8	81.58	144.940	.444	.588	.833
9	80.13	147.155	.496	.616	.832
10	80.15	150.054	.365	.579	.836
11	79.62	154.509	.318	.613	.838
12	79.77	150.025	.555	.667	.832
13	81.85	146.784	.441	.769	.833
14	80.36	145.388	.675	.743	.827
15	80.28	152.938	.350	.597	.837
16	80.40	150.590	.402	.454	.835
17	80.06	155.901	.177	.507	.842
18	82.45	150.560	.419	.693	.835
19	80.45	146.676	.407	.637	.835
20	81.21	153.245	.241	.636	.841
21	80.00	150.192	.496	.766	.833
22	79.98	148.788	.574	.616	.831
23	80.94	151.131	.289	.525	.839
24	81.79	146.514	.438	.626	.833
25	80.09	142.895	.574	.723	.828

Table 1.5 *Factor Analysis Component Matrix*

Item	Component							
	1	2	3	4	5	6	7	8
1	.239	.404	-.278	-.555	.196	.231	.107	-.086
2	.596	.120	.043	.431	.123	-.003	.018	.102
3	.119	.641	.080	.257	.072	-.425	.156	.282
4	.512	-.197	-.213	.194	-.557	-.265	.001	-.027
5	.169	.028	.218	.320	.319	.656	-.014	.049
6	.397	.019	.017	.452	-.400	.362	-.013	-.127
7	.529	.127	.175	.155	-.541	-.042	.183	-.290
8	.477	.602	.035	-.185	.049	.084	-.026	-.284
9	.576	.206	-.360	-.046	-.066	.066	-.442	.084
10	.451	-.186	.492	-.198	.237	.293	.313	.038
11	.417	-.297	.047	-.205	-.389	.219	.502	.255
12	.654	-.224	-.017	-.069	-.156	.217	-.054	-.028
13	.457	.689	.209	-.083	-.080	-.073	.216	-.049
14	.753	-.098	.061	-.087	.166	-.038	-.114	.055
15	.415	-.232	-.458	.133	.168	-.091	.402	.346
16	.486	.038	.375	-.099	.049	.040	-.325	.354
17	.308	-.462	.408	-.152	.007	-.391	-.105	.139
18	.388	.711	.139	.073	.103	-.138	.164	.093
19	.463	.092	-.600	.043	.122	.058	-.138	.362
20	.324	-.326	-.464	-.051	.333	-.074	.382	-.250
21	.615	-.256	.408	-.291	.184	-.260	-.063	-.137
22	.703	-.236	.027	-.224	-.101	-.012	-.113	.170
23	.343	-.203	.173	.593	.322	.009	-.125	-.065
24	.492	-.205	-.070	.262	.392	-.274	.108	-.389
25	.684	-.020	-.314	-.174	-.020	.012	-.289	-.298

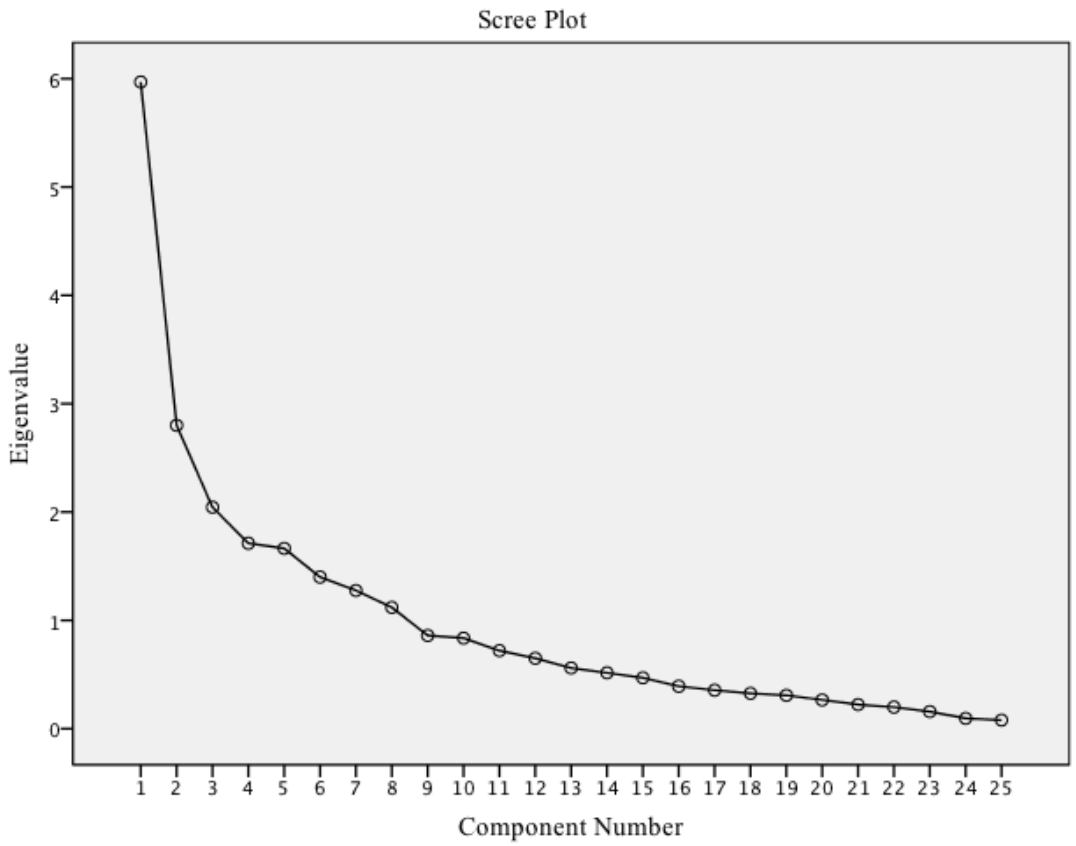

Figure 1.1 *Eigenvalues on the Scree Plot*

end of the class period (i.e., did not quit) spent a longer time working and completed more problems, on average, than those who quit (see Table 1.2). As shown in Table 1.6, persistence as measured by minutes spent working or by working the entire class period (i.e., not quitting) was not related to AWE-S scores. Control and experimental groups were independently correlated with the AWE-S measure and also yielded insignificant results. Furthermore, neither time worked nor quit status was predictive of students' grades in their diversified technology class. See Chapter 3 for a discussion of how minutes spent working was predictive of students' grades in their mathematics class. AWE-S was moderately, significantly correlated with grade in the Diversified Technology class, $r(53)=.491$ $p<.001$.

Table 1.6 *Correlations Among Persistence Variables and Academic Work Ethic*

Variable	*M*	*SD*	1	2
1. AWE-Student	3.42	.50		
2. Persistence (Did not quit)	.059	.496	.021	
3. Persistence (Minutes spent working)	28.07	5.97	.117	.810**

Note: ** $p<.01$

Discussion

The current study continued Kirk's (2010) research on additive interspersal procedures, taking into account Fantino's (1969) delay reduction hypothesis, which states that discrete tasks may serve as discriminative stimuli indicating that time to reinforcement, typically delivered contingent upon assignment completion, has decreased. Thus, the computer program by which math problems were delivered indicated progress (via a ticking bar) as the participant answered each additional math problem. Two persistence variables were examined in the current study: 1)

Total time spent working on math problems before quitting or being asked to stop working, and 2) Quit status (i.e. whether or not the student was still working on math problems when asked to stop by the primary researcher). Analysis of the latter variable was employed due to the short length of time available for students to work (or decide to quit). This was less time than provided in Kirk's studies, in which students were provided with around 1 hour to work, increasing the range of minutes worked substantially. ANOVA, chi square, and correlation analyses showed that neither measure of persistence was influenced by group (control vs. experimental/intersperal) membership. While there is some evidence that the experimental group, which received shorter math problems interspersed, worked longer and at a faster rate, these results were not significant. The interspersal group completed significantly more problems than the control group, and a greater percentage of students in the control group quit early, but chi square analysis revealed that the interaction was not significant. These results provide support for using additive interspersal in the classroom, as the procedure may increase opportunities for students to practice basic skills. The persistence variable of *time worked* was later found to be predictive of grades in the students' math courses (See Chapter 3).

Several limitations existed in the present study. As previously discussed, the class periods at the school in which the study took place were shorter than an hour. Students came into class, materials, including assent forms, were passed out, and instructions were given. Though all computers were set up between class periods, students were only left with 30-35 minutes to work (or choose to quit working) on the math task. Thus, the full range of participation vs. quitting and total time worked may not have been realized. If more class time had been provided, persistence of students who worked until the end of the class period may have been more pronounced, and additive intersperal may have had a greater influence over

students' decisions to quit or continue working on the task.

Additionally, the researchers set up a contrived situation in order to measure persistence. The math tasks did not apply to and had no effect on the students' grades in their Diversified Technology class. Additionally, the math task involved solving short and long multiplication problems, which students may not have been required to solve by hand (i.e., without a calculator) in some time. Students may not have considered these tasks to be educationally valid or related to their success in school.

Furthermore, students were told that if they chose to quit working on the math task that they could resume work in their Diversified Technology class journals. While these journals were intended to be an enjoyable activity, they were a participation requirement for the class. Thus, some students may have actually displayed positive work ethic behavior by quitting what they considered an irrelevant math task to work on a true assignment. In the future, a study of this type would benefit from employing tasks related to information being presently learned by the student participants. It would also be helpful to ensure that the alternate activity is not related to their academic coursework in any way.

It is important to note that although computers were set up prior to students entering the classroom in an alternating arrangement (i.e., control-experimental-control-experimental), there were more students in the experimental group. This problem was exacerbated by having to omit several participants due to inaccurate responding (e.g., randomly typing answers quickly rather than solving the multiplication problems). Thus, experimental and control group numbers were skewed.

The Academic Work Ethic-Student measure was found to have high internal reliability, with a high coefficient alpha ($\alpha = .84$) and a 6-component factor structure. Data were available

for 65 middle school students across various grades. While the students' self-reported AWE-S scores did not predict persistence on the in-class math assignment, it was significantly, moderately correlated with overall grades in their Diversified Technology course. AWE-S scores were similarly correlated to overall grades in students' math courses (See Chapter 3). In the future, the scale would benefit from either omitting Item 5 or rewriting it for clarity. Also, further exploratory and confirmatory factor analysis should be done on the scale's component structure. While several items related to Leisure, Self-Reliance, and Perseverance appear to load heavily into individual dimensions, items designed around the dimensions of Hard Work, Delay of Gratification, and Persistence are intercorrelated even in the restricted, 6-dimension factor model.

Finally, the AWE-S is a self-report measure. Several limitations exist when using self-reported data in psychological research, including participants' tendency toward social desirability and consistent/moderate responding, researchers asking for numeric or finite answers regarding abstract concepts, and the inability to verify responses (See Chapter 3 for further discussion). New research further suggests that adolescent responders may be especially prone to "mischievous responding", causing researchers to make incorrect conclusions regarding adolescent populations (Robinson-Cimpian, 2014). One study found that simply asking adolescents whether or not they had responded truthfully at the end of a self-administered questionnaire, that 12% of students reported that they had not answered honestly (Cornell, Klein, Konold, & Huang, 2012). Because of these threats to validity, an additional, external source would be helpful in investigating academic work ethic and evaluating the AWE-S. Teachers have a broad knowledge of their students' work habits. Teachers also have a larger comparison group than parents, for example, and may be able to respond more accurately and consistently

than student or parent respondents. Thus, an alternate Teacher Version of the AWE-S may be helpful as an alternate validity source when examining student academic work ethic.

Chapter III

Teacher Evaluation of Academic Work Ethic: An Initial Analysis of the AWE-T

Originating in the work of Max Weber (1958), the construct of "work ethic" has been conceptualized in several different ways over the past century (Furnham, 1984, 1990). Miller, Woehr, and Hudspeth (2002) defined work ethic as a multidimensional construct that pertains to work-related activity and generalizes to other domains, including education. In addition, they developed the Multidimensional Work Ethic Profile (MWEP), which has become one of the most widely used measures of work ethic in recent years (Meriac, 2012). Specifically, it is comprised of seven components or dimensions: (a) Centrality of Work, a belief that work is important in its own right, (b) Self-Reliance, representing a drive toward independence in task accomplishment, (c) Hard Work, a belief that increased effort is the key to achievement, (d) Leisure, a value on down-time/non-work activities, (e) Morality/Ethics, a proclivity to engage in just/moral behavior, (f) Delay of Gratification, the capacity to postpone rewards until a later time, and (g) Wasted Time, the importance of the efficient use of time. This scale is a valid and reliable measure and has been used in a variety of settings (Parkhurst, 2013).

Though referred to on a regular basis in schools, the construct of work ethic has rarely been formally applied in educational settings. Munson and Rubenstein (1992) contend that "schoolwork is the student's job" and that the "school is a workplace, the student is learner, and the learner is a worker". Teachers and administrators consistently deem work ethic and its surrounding constructs as highly important to success in school (Skinner & Belmont, 1993). Work ethic is similar to, yet distinct from terms such as engagement, motivation, self-efficacy, and study habits (See Chapter 1 for a full explanation of differences). In general, research in educational psychology has focused on individual, cognitive influences on work ethic behaviors,

such as attributions (Weiner, 1986), self-efficacy (Schunk, 1991), perceived ability (McIver, Stipek, & Daniels, 1991), perceived control and competence (Chapman, Skinner, & Baltes, 1990), self-concept (Wigfield & Karpathian, 1991), intrinsic motivation (Deci & Ryan, 1985), interest (Schiefele, 1991), learning strategies (Pintrich & De Groot, 1990), and goal orientations. A large component of work ethic, however, is defined not by cognitive attributions, but by actual performance-related behaviors and outcomes, as well as beliefs specifically regarding the value of work as it relates to academics.

In order to reflect the MWEP's multidimensional approach, Parkhurst, et al., (in submission) developed a reliable and valid measure of academic work ethic, written for students at a fifth-grade reading level. In developing this measure, the authors built upon MWEP by creating a 25-item, multidimensional scale, entitled the Academic Work Ethic-Student measure (AWE-S). This measure was designed to assess work ethic as it pertains to education (rather than the workplace) and be completed by middle and high school students (i.e., grades 5-12), as opposed to adults.

The AWE-S has been shown to predict student choice behaviors in terms of assignment completion (Parkhurst, 2013) and to be a valid predictor of classroom grades above and beyond other factors. These results are similar to those found regarding work drive and work ethic in older, college-age populations in relation to grade point average (GPA) and adding significant, unique variance beyond general intelligence, personality, and high school GPA and standardized test scores (Lounsbury, Sundstrom, Loveland, & Gibson, 2003; Meriac, 2012) .

Even with the demonstrated reliability of the AWE-S, there are limitations associated with relying on self-report measures in psychological research, especially in terms of validity (Cornell, Klein, Konold, & Huang, 2012). Podsakoff and Organ (1986) expounded on several of

these pitfalls in their article on using self-report data in organizational research. First, self-report measures cannot be cross-validated. In other words, respondents' answers are not verifiable unless asked information which can be gathered from alternate sources. For example, researchers could ask, "How many days have you been absent?" and verify this data with school records. Also, the idea of the consistency motif, in which participants retain a consistent, moderate line in a series of questions, can skew the validity of self-report data. Additionally, higher-order processes and abstraction are often needed to report information other that finite events or concrete facts. Often, in measuring complex constructs, such as work ethic, respondents are asked not only asked to recall, but also must participate in weighing, inference, prediction, interpretation, comparison, and estimation. Finally, the phenomenon of social desirability prompts responders to portray themselves in the most favorable light. This may subtly change response distributions on an item-by-item basis.

Given these issues with self-report, it would be ideal for the validity of Academic Work Ethic measures to have alternate methods of evaluating students' AWE. Teachers and parents, for example, may be able to respond more honestly and more consistently to a more complex construct such as AWE, which can be difficult to measure. Researchers measuring unitary constructs, such as motivation or engagement, have found low to moderate agreement between student and teacher ratings (Fox & Grams, 2007; Goodenow, 1993; Skinner, Kindermann, & Furrer, 2009; Wentzel, 1998), but rarely have teacher—teacher correlations been investigated in the literature. The purpose of the current study is the further validate, especially in terms of convergent validity, the construct of academic work ethic, as well as to strengthen the overall understanding of AWE by comparing it to teacher reports and other validity items (i.e., grades, persistence). In Study 1, student report of AWE (AWE-S) was found to be a significant

predictor of classroom grades as well as persistence on a multiplication assignment. In this study, that data will be expounded upon by asking the same students' teachers (one diversified technology teacher and one math teacher) to evaluate their academic work ethic with the Academic Work Ethic-Teacher measure.

Method

Participants and Setting

Participants included 72 middle-school students from a rural middle school in the Southeastern United States. The sample included 39 males and 33 females; 66 were Caucasian, 2 were African-American, 1 was Hispanic, 1 was Native American, 1 was Asian, and 1 was Indian. These numbers reflect the total makeup of the school, which is 95% Caucasian, 2% African American, 1% Hispanic, and 1% Asian. The percentage of students within the school considered economically disadvantaged, or qualifying for free or reduced lunch, was about 46%. Student participants included sixth-, seventh-, and eighth-grade students, the youngest participant being 11 years, 2 months, and the oldest being 14 years, 0 months. The average student age was 12 years, 11 months. Student participants completed assigned tasks on a voluntary basis within one elective class period, entitled "Diversified Technology", late in the fall semester.

Participants also included each student's Diversified Technology teacher and core mathematics teacher from the fall semester, including 11 teachers in all. Teachers were able to complete assigned tasks at their leisure within a 2-week period.

Materials and Measures

AWE-S. Drawing on the seven dimensions of the MWEP (Miller et al., 2002), Parkhurst et al. (in submission) developed a self-report measure of academic work ethic for students in grades 5-12, in order to evaluate the multidimensional construct of work ethic at an appropriate

age-level for students and within the educational context (rather than in reference to the workplace). The AWE-S, a student self-report measure, was used to assess attitudes and behaviors concerning academic work ethic using a 5-point Likert scale (1 strongly disagree, 5 strongly agree). In the current study, the 25-item questionnaire was revised to further improve internal consistency. Specifically, several items with low reliability (i.e., coefficient alphas, inter-item correlations, and item-total correlations) were either omitted or rewritten for clarity based on Parkhurst et. al.'s (in submission) suggestions. All factors were retained, leaving the 6-dimension model intact. Table 2.1 presents the six dimensions, the operational definitions used, and sample items.

Table 2.1 *AWE-S Dimensions, Dimension Definitions, and Sample Items*

Dimension:	Definition:	Sample Item:
Hard Work	Belief in the virtue of working hard in the school setting	- I can solve difficult problems if I work hard.
Leisure	The importance of non-school related activities above school-related activities	- School takes too much time.
Self-Reliance	The desire for autonomy in one's school work	- I solve my own problems.
Morality/Ethics	Understanding concepts of right and wrong; the belief in justice	- Cheating is OK if the test is too hard.
Delay of Gratification	The ability to postpone immediate rewards for the sake of later outcomes	- I wait my turn.
Perseverance	Steady persistence in a course of action in spite of obstacles to achievement	- It is important to finish school assignments all the way.

AWE-T. The process of developing the AWE-T measure began with creating roughly 40 academically focused and general items based on the seven dimensions on the MWEP (Miller et al., 2002). Additionally, items were created for a new dimension of Perseverance, which was proposed as an eighth factor related to work ethic (Parkhurst et al., 2011). Previous researchers added this eighth factor because perseverance in academic assignments appeared to be an especially salient factor in the completion of schoolwork. Also, Merrens and Garrett (1975) suggested that perseverance (e.g., working on a long assignment until finished) may be an important value relating to work ethic. A team of three (i.e. one professor, two upper-level graduate students) reviewed and omitted items based on repetitiveness, content, and construct validity. All items were assessed using Flesch-Kincaid readability standards and re-written, if necessary, to be at or below a fifth-grade reading level. From the draft items, 16 items were selected (2 per factor). Negatively worded items were included. Items were arranged under factor headings, which included the definition of each factor (e.g., Self-Reliance: The desire for autonomy in one's school work). Table 2.2 presents the eight dimensions, the operational definitions used, and sample items.

Items were worded so that teachers could select the frequency of the individual student's behaviors and/or attitudes for each item (e.g., "When faced with a challenging assignment, this student can _____ be counted on to work hard,"). Response choices were labeled 1-6: 1. Never, 2. Almost Never, 3. Sometimes, 4. Generally, 5. Almost Always, and 6. Always. In the directions at the top of the survey page, teachers were given percentage-based frequencies to match each response: Never (0% of the time), Almost Never (20% of the time), Sometimes (40% of the time), Generally (60% of the time), Almost Always (80% of the time), and Always (100% of the time).

Table 2.2 *AWE-T Dimensions, Dimension Definitions, and Sample Items*

Dimension:	Definition:	Sample Item:
Hard Work	Belief in the virtue of working hard in the school setting	When faced with a challenging assignment, this student can _____ be counted on to work hard.
Leisure	The importance of non-school related activities above school-related activities	This student _____ seeks out opportunities for free-time activities.
Self-Reliance	The desire for autonomy in one's school work	When faced with a challenge, this student _____ attempts to solve it independently.
Ethics	Understanding concepts of right and wrong; the belief in justice	This student _____ care about grades being fair.
Delay of Gratification	The ability to postpone immediate rewards for the sake of later outcomes	This student is _____ able to work for a long time without praise.
Perseverance	Steady persistence in a course of action in spite of obstacles to achievement	This student _____ finished long assignments.
Centrality of Work	The importance of school in the student's life	This student _____ views schoolwork as important.
Wasted Time	Attitudes reflecting the active and productive use of work time	This student _____ uses school time efficiently.

In addition to AWE-T items, teachers were asked to provide each student's numerical semester grade (i.e., 1-100) in his or her class.

Procedures

Consent was gained before students participated in the computer-based, item-intersperal and persistence activity described in Study 1. On the day that these procedures took place, teachers were given AWE-T forms and instructed on survey directions as well as procedures to return the surveys. Two weeks after the persistence activity took place, researchers delivered the AWE-S forms for all students with consent forms to complete during a small portion of their elective class. Researchers collected this data, as well as the AWE-T, from both the Diversified

Technology and mathematics teachers one week later. Surveys were locked in a filing cabinet, available only to the primary researcher.

Results

Scale Analysis

Response means and standard deviations can be found in Table 2.3. Of the 144 total responses, 72 were evaluated by the Diversified Technology teacher, and 72 were evaluated by 10 core mathematics teachers). A complete reliability analysis using SPSS 21.0 for Macintosh was computed for the original scale. Results yielded a coefficient alpha of .96 for the total AWE-T. Item-Total Statistics can be found below (Table 2.4). Inter-item correlations were also examined. When separately analyzing the measures completed only by the mathematics teachers (to allow for a more diverse sample of raters) the coefficient alpha obtained was also .96.

It can be observed that omitting Leisure dimension items and one Delay of Gratification item from the scale would yield slightly higher coefficient alphas and higher item-total correlations. However, because Leisure items were negatively skewed (i.e., most middle-school students prefer free-time activities to school) and these two dimensions were perhaps the most distinctive dimensions in the scale, they were not excluded. This also allowed researchers to retain the integrity of the original scale in subsequent analyses as well as retain the 8-dimension model.

Factor analysis (Principle Components Analysis with Varimax rotation) yielded 3 components, with 6 dimensions of AWE making up the first factor, accounting for 65% of variance in AWE-T score. Leisure represented its own factor, adding 12% variance, and Delay of Gratification was the final factor, accounting for 6% of variance. A high percentage (83%) of variance was explained by these 3 components. This narrower factor structure was expected for

Table 2.3 *Item Means and Standard Deviations*

	Mean	Std. Deviation
Self-Reliance 1	4.34	1.123
Self-Reliance 2	4.25	1.195
Leisure 1*	3.13	.948
Leisure 2*	2.83	.749
Hard Work 1	4.25	1.189
Hard Work 2*	4.47	1.080
Centrality of Work 1	4.25	1.084
Centrality of Work 2	4.34	1.047
Wasted Time 1*	4.53	.970
Wasted Time 2	4.37	1.084
Delay of Gratification 1	4.18	1.036
Delay of Gratification 2*	4.22	.911
Ethics 1*	4.20	1.170
Ethics 2	4.52	1.088
Perseverance 1	4.43	1.223
Perseverance 2*	4.48	1.058

* indicates prior reversed-scored items

Table 2.4 *Item-Total Statistics*

	Scale Mean if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Self-Reliance 1	61.99	.869	.889	.954
Self-Reliance 2	62.01	.871	.876	.954
Leisure 1	63.38	.101	.709	.965
Leisure 2	63.52	.189	.730	.964
Hard Work 1	62.09	.928	.904	.953
Hard Work 2	61.92	.915	.874	.953
Centrality of Work1	62.09	.903	.914	.954
Centrality of Work 2	62.02	.903	.922	.954
Wasted Time 1	61.90	.858	.781	.955
Wasted Time 2	61.99	.909	.857	.954
Delay of Gratification 1	62.24	.798	.720	.956
Delay of Gratification 2	62.19	.406	.413	.962
Ethics 1	62.24	.779	.657	.956
Ethics 2	61.87	.624	.532	.959
Perseverance 1	61.90	.878	.868	.954
Perseverance 2	61.88	.889	.909	.954

Table 2.5 *Factor Analysis Component Matrix*

	Component		
	1	2	3
Self-Reliance 1	.896	-.018	.035
Self-Reliance 2	.894	.021	.083
Leisure 1	.064	.914	.252
Leisure 2	.154	.923	.167
Hard Work 1	.950	-.045	.020
Hard Work 2	.931	.037	.005
Centrality of Work 1	.929	-.061	-.018
Centrality of Work 2	.932	-.092	-.057
Wasted Time 1	.886	-.029	-.033
Wasted Time 2	.933	-.052	.055
Delay of Gratification 1	.822	.098	-.270
Delay of Gratification 2	.422	.438	-.750
Ethics 1	.801	.150	.137
Ethics 2	.678	-.132	.303
Perseverance 1	.916	-.139	.057
Perseverance 2	.927	-.158	.051

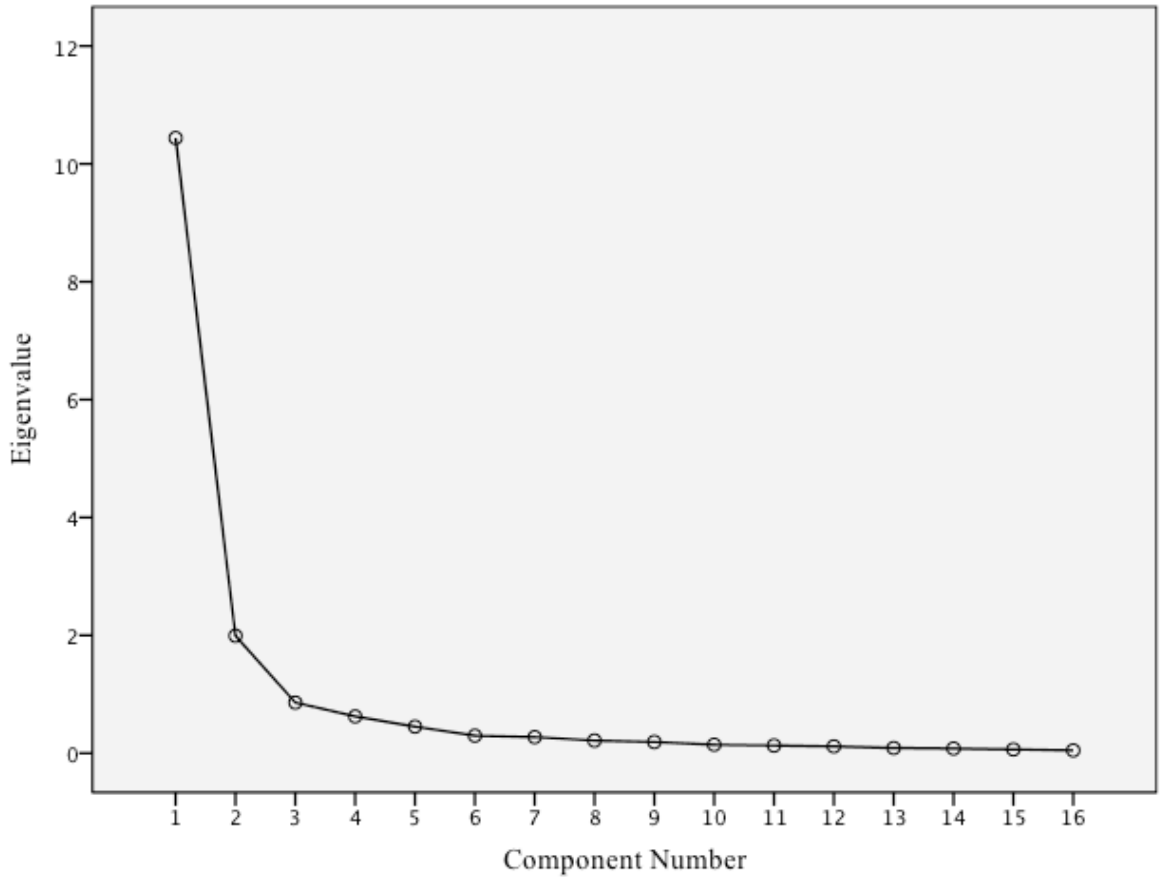

Figure 2.1 *Eigenvalues on the Scree Plot*

for the AWE-T, as the scale was comprised of only 16 items. See Table 2.5 (below) for the complete component matrix and Figure 2.1 for Scree Plot analysis.

Correlation Analysis

Complete data were available for 65 out of 72 students. Descriptive statistics and correlations among variables are presented in Table 2.6. Positive, moderately strong correlations were found between the measure of AWE-S and both AWE-T measures for the Diversified Technology (elective) teacher ($r = .41, p < .01$) and the math teacher ($r = .50, p < .01$). When comparing average individual AWE scores (to account for missing data), students rated their own academic work ethic lower than both teachers, on average. There also exists a small, but significant, increase is AWE-S scores as students progress through middle school (i.e., students aged 13 rated their AWE as higher than students aged 11). Moderate, highly significant agreement was demonstrated between the Diversified Technology and math teachers ($r = .51, p < .01$).

Table 2.6 *Correlations Among Study Variables*

Variable	*M*	*SD*	1	2	3	4	5
1. AWE-Student	3.42	.50					
2. AWE-T (DTech)	4.20	.67	.41**				
3. AWE-T (Math)	4.17	.98	.50**	.51**			
4. Grade (DTech)	91.13	6.65	.49**	.90**	.59**		
5. Grade (Math)	84.20	10.16	.51**	.64**	.55**	.66*	
6. Age	13		.31**	.20	.31*	.18	.66*

Note: * $p < .05$; ** $p < .01$

The validity item for this study, semester grades, yielded moderate to high correlations with student and teacher evaluations of AWE. Student evaluations of their own academic work

ethic (AWE-S) were similarly correlated with both math ($r = .51, p < .01$) and Diversified Technology ($r = .49, p < .01$) grades. Grades given by the elective teacher were very highly correlated with his evaluation of student work ethic ($r = .90, p < .01$) and moderately to highly correlated with students' grades in math ($r = .64, p < .01$). AWE-T evaluations by math teachers were moderately correlated with both math grades ($r = .55, p < .01$) and grades in the Diversified Technology class ($r = .59, p < .01$). It is clear from the *AWE-T—grade* correlations in both classes that the elective class grade depended more on teacher evaluation of AWE than do grades in mathematics. Interestingly, AWE-S evaluation predicted grades in both classes nearly equally.

Regression Analysis

To examine incremental validity, a hierarchical multiple regression analysis was conducted of grades with the following order of entry: (1) AWE-T from designated teacher; (2) AWE-S; and (3) AWE-T from alternate teacher. The results are shown in Table 2.8 and Table 2.9. The amount of unique variance contributed at each step is represented by the incremental variance or the squared semi-partial correlation coefficient (R^2 Change). In mathematics grades, a total of .49% of the variability in course grade was accounted for, with the math teacher's evaluation of student academic work ethic (AWE-T [Math]) accounting for 31% of the variance in course grade ($p < 0.01$), with the student self-evaluation (AWE-S) adding an additional 8% ($p < 0.01$), and AWE-T (Diversified Technology), the elective teacher's evaluation of student work ethic, accounting for an additional 10% ($p < 0.05$) of the unique variance in course grade.

In the Diversified Technology elective grades, a total of 87% of the variability in course grade was accounted for, with general the elective teacher's evaluation of student academic work ethic (AWE-T [Diversified Technology]) accounting for 85% of the variance in course grade

Table 2.7 *Multiple Regression; Dependent Variable = Grade in mathematics course*

Step	Variable	R	R^2	R^2 Change
1	AWE-T (Math)	.557**	.311**	.311**
2	AWE-S	.624*	.389*	.078*
3	AWE-T (DTech)	.699*	.489*	.100*

Table 2.8 *Multiple Regression; Dependent Variable = Grade in Diversified Technology course*

Step	Variable	R	R^2	R^2 Change
1	AWE-T (DTech)	.921**	.847**	.847**
2	AWE-S	.927*	.860*	.013*
3	AWE (Math)	.930	.865	.005

Table 2.9 *Multiple Regression; Dependent Variable = Grade in mathematics course (adding Persistence Measure)*

Step	Variable	R	R^2	R^2 Change
1	AWE-T (Math)	.491*	.203*	.241*
2	AWE-S	.568*	.251*	.081*
3	AWE-T (DTech)	.624*	.445*	.201*
4	Time Worked	.854**	.666**	.206**

($p < 0.01$), with the student self-evaluation (AWE-S) adding an additional 1% ($p < 0.01$), and AWE-T (Diversified Technology), and the math teacher's evaluation adding no unique variance (See Table 2.8).

A measure of persistence in the experimental group (N=30) of Study 1 was also found to account for 20% of the variance in student's grades in their mathematics course. This could be due to a combination of math skill (because the task involved multiplication) and general persistence with rote assignments. This allowed for 67% of math grade variance to be accounted for by 3 AWE variables and persistence (See Table 2.9)

Discussion

The Academic Work Ethic-T (AWE-T) measure was found to have high internal reliability, with coefficient alphas of .96 for all AWE-T surveys combined (from 11 teachers) as well as with elective and math teacher evaluations separated. No items were determined necessary to be thrown out of the overall measure, although the components Leisure and Delay of Gratification appear to measure unique variance and do not correlate with the total scale as well as the 6 remaining dimensions as evidenced by factor analysis yielding 3 factors.

AWE-T correlated moderately to highly to classroom grades in both an elective and math course. Additionally, AWE-T was moderately correlated with other teacher evaluators and students' self-report of AWE (in the AWE-S collected in Study 1). AWE-T was found to be more highly correlated with elective grades than math grades, which may be an indication of higher ability required to receive a high grade in a math class as opposed to an elective class. This finding was confirmed through hierarchical multiple regression, showing that the classroom teacher's evaluation of AWE accounted for 85% of variance in the Diversified Technology class but only 31% in the math class. Furthermore, persistence (as measured by total minutes spent working on the task administered in Study 1) accounted for 20% of variance in student math grades. This finding should be interpreted cautiously, however, due to the restricted sample size of the experimental group.

Several limitations existed in the present study. First, the relationship between grades and AWE may have been confounded in the teacher evaluations as numerical grades were reported on the same paper used to complete AWE-T items. In the future, researchers should attempt to obtain information on students' grades separately, so as not to influence teacher's AWE evaluations based on the student's grade they have just denoted.

In future studies, a greater number of teachers should be recruited from a greater diversity of subjects. Also, the student population of this study was quite homogenous in terms of race, which may have limited the validity of results. The sample size of the students was also somewhat small. In the future, more students should be recruited from a great diversity of backgrounds.

Additionally, concurrent validity should be obtained in the creation and validation of a scale such as the AWE-T. Other measures should be distributed and compared to the AWE-T in subsequent research. This investigation into teacher report of AWE would also benefit from additional validity items such as achievement outcomes, student tardiness or disciplinary status, or even measures of familial work ethic traits and attitudes.

Chapter IV

Examination of External Influences on Academic Work Ethic and Validation of the AWE-T

As discussed in Chapter 1, motivational theories related to academic achievement are copious in number; however, it is also important to examine external factors that may influence academic work ethic in school-age children and adolescents. Indeed, researchers posit that the "academic ethic" is not a natural predisposition but is a learned behavior, likely found in children from families with a strong work ethic (Rau & Durrand, 2000). In a statistically rigorous study by Song, Bong, Lee, and Kim (2015), though influence of adults on children was found to decline during adolescence, parents still appeared to maintain the greatest influence on adolescent academic motivation and achievement as compared to teachers and peers. The study also suggested that emotional support from parents predicts stronger mastery goals, weaker performance-avoidance goals, lower test anxiety, and higher academic achievement.

Even so, relatively little is known about the transmission of work ethic and related traits from parents to their children (ter Bogt, Raaijmakers, & van Wel, 2003). Furnham (1987) found a significant but low correlation (r=.24) between the work ethic of mothers and their children, though the correlation between fathers and children was not significant. De Witte (1995) reported a similar correlation of (r=.30) between the ethic of mothers and children but also failed to find a correlation between the work ethic of fathers and their children. In a longitudinal study over 4 years, Cotton, Bynum, and Madhere (1997) reported a positive link between the aspirations of parents and their children's intrinsic and extrinsic motivation to work.

Several goals exist for the present (and final) study, making up this three-part dissertation on academic work ethic in middle school students. These goals center around increasing the validity of both the Student and Teacher versions of the Academic Work Ethic Scale:

The current study seeks to compare parent and child work ethic behaviors by administering the MWEP-Short Form to one parent per student participant. Because of the grade range of participants in the study, the additional question of whether familial values related to work ethic converge, diverge, or remain stable during adolescence will be investigated. Social support for academic success and student/familial expectations for the future will also be measured using a short survey developed by an educational nonprofit organization, Education Opens Doors, Inc. Finally, additional concurrent validity for the AWE-S is anticipated to be found in comparing the AWE-S results to Duckworth and Quinn's Grit Scale for Children (2009).

Regarding the Academic Work Ethic-Teacher Scale, this measure was previously determined to have high internal reliability, with coefficient alphas of .96 for all AWE-T surveys combined (from 11 teachers) as well as with elective and math teacher evaluations separated. No items were determined necessary to be unsound, although the components of Leisure and Delay of Gratification appeared to measure unique variance and did not correlate with the total scale as well as the 6 remaining dimensions, as evidenced by factor analysis yielding 3 factors. AWE-T was found to correlate moderately to highly with classroom grades in both elective and math courses. Additionally, AWE-T was moderately correlated with other teacher evaluators and students' self-report of AWE. AWE-T was found to be more highly correlated with elective grades than math grades, which may be an indication of higher ability required to receive a high grade in a math class as opposed to an elective class. This finding was confirmed through hierarchical multiple regression, showing that the classroom teacher's evaluation of AWE accounted for 85% of variance in students' Diversified Technology elective class but only 31% in math classes.

The AWE-T will benefit from further validation in another school setting with a more diverse student population. Similar questions as presented in Chapter 3 surrounding correlations between teacher and student evaluation of work ethic and comparison to achievement data will be investigated in the present study.

Method

Participants and Setting

Participants included 48 middle-school students from an urban, Catholic elementary and middle school in the Southeastern United States. The sample included 20 males and 28 females; 3 were Caucasian, 6 were African-American, 28 were Hispanic, 5 were Asian-American, and 6 students identified as "Other". These numbers reflect the total makeup of the school. Student participants included fifth-, sixth-, seventh-, and eighth-grade students. Student participants completed assigned tasks on a voluntary basis.

Participants also included two teachers and a parent for nearly every student participant, numbering 40 parents and 4 teachers total. Parents and teachers were able to complete assigned tasks at their leisure within a 3-week period.

Materials and Measures

AWE-S. Drawing on the seven dimensions of the MWEP (Miller et al., 2002), Parkhurst et al. (in submission) developed a self-report measure of academic work ethic for students in grades 5-12, in order to evaluate the multidimensional construct of work ethic at an appropriate age-level for students, within the educational context (rather than in reference to the workplace). The AWE-S, a student self-report measure comprised of 25 items, was used to assess attitudes and behaviors concerning academic work ethic using a 5-point Likert scale (1 strongly disagree, 5 strongly agree). In the current study, the revised questionnaire (See Chapter 3) was distributed

to all student participants in grades 5 through 8. The wording of item 5 was revised for clarity for this study. It now reads, "I try to solve problems before asking others to help me." (See Appendix A).

Grit Scale. The Grit Scale for Children was developed by Duckworth and Quinn (2009). This 8-item scale evaluates children's trait-level persistence and passion for long-term goals and retains the 2-factor structure of the original Grit Scale (Duckworth, Peterson, Matthews, & Kelly, 2007). Among adolescents, the scale has been shown to longitudinally predict both GPA and, inversely, time spent watching TV. It was found to have moderate test-retest reliability (r = .68 after 1 year) and high internal consistency (coefficient alphas = .82 and .84) in a sample of 279 middle and high school students. Items include statements such as: "I am a hard worker," and "I often set a goal but later choose to pursue (follow) a different one" (See Apendix __ for complete survey). Items are answered on a 5-point Likert scale (1 not like me at all, 5 very much like me).

Student Post Survey. The Student Post Survey was developed by researchers at Education Opens Doors, Inc. and is used in their middle and high school Roadmap to Success curriculum, which focuses on fostering enrollment in post-secondary education. Examples of survey items include: "I expect to go to college after graduating high school," and "I feel my family will support me if I want to attend college." Besides demographic information, the form includes 10 items answered on a 5-point Likert scale regarding perceived support regarding pursuing postsecondary education. Survey results have been found to correlate positively with high school retention, college application rates, and college attendance. In the current study, the survey was used to assess personal expectations and familial support regarding future academic endeavors.

MWEP-SF. The Short Form of the Multidimensional Work Ethic Profile (MWEP)

reduced the length of the original 65-item MWEP to 28 items (Merriac, Woehr, Gorman, & Thomas, 2013). The scale was designed to be completed by employed adults and has been demonstrated to have excellent internal consistency across several studies. While shorter in length, the Short Form retains the same factor structure, comparable reliability and construct validity evidence based on the nomological network, and similar relationships with work outcomes as the full MWEP.

AWE-T. The process of developing the AWE-T measure began with creating roughly 40 academically focused and general items based on the seven dimensions on the MWEP (Miller et al., 2002). Additionally, items were created for a new dimension of Perseverance, which was proposed as an eighth factor related to work ethic (Parkhurst et al., 2011). Previous researchers added this eighth factor because perseverance in academic assignments appeared to be an especially salient factor in the completion of schoolwork. Also, Merrens and Garrett (1975) suggested that perseverance (e.g., working on a long assignment until finished) may be an important value relating to work ethic. A team of three (i.e. one professor, two upper-level graduate students) reviewed all the draft items for repetitiveness, content, and construct validity. All items were assessed using Flesch-Kincaid readability standards and re-written, if necessary, to be at or below a fifth-grade reading level. From the draft items, 16 items were selected (2 per factor). Negatively worded items were included. Items were arranged under factor headings, which included the definition of each factor (e.g., Self-Reliance: The desire for autonomy in one's school work). Based on the results of Study 2 (described in Chapter 3) all 16 items were retained across 8 dimensions. Table 3.1 presents the dimensions, the operational definitions used, and sample items.

Items were worded so that teachers could select the frequency of the individual student's

behaviors and/or attitudes for each item (e.g., "When faced with a challenging assignment, this student can _____ be counted on to work hard,"). Response choices were labeled 1-6: 1. Never, 2. Almost Never, 3. Sometimes, 4. Generally, 5. Almost Always, and 6. Always. In the directions at the top of the survey page, teachers were given percentage-based frequencies to match each response: Never (0% of the time), Almost Never (20% of the time), Sometimes (40% of the time), Generally (60% of the time), Almost Always (80% of the time), and Always (100% of the time). In addition to AWE-T items, Math and English teachers were asked to provide each student's numerical quarter grade (i.e., 1-100) in his or her class at a later date.

Procedures

Parent Consent forms were sent home with the MWEP-SF (for a parent/guardian to complete) attached. Both of these forms (i.e., Parent Consent, MWEP-SF) were provided in both English and Spanish due to the high percentage of Hispanic/Latino families that attend the school. After 3 weeks, students with completed consent forms were given Student Assent forms and three measures (1. AWE-S, 2. Grit Scale [these 2 scales were counterbalanced], and 3. Student Post-Survey) during their homeroom class. All measures were completed by the students within 15 to 30 min. during their homeroom period and were returned to the primary researcher. The homeroom teacher independently recorded the researcher's behavior using a procedural integrity checklist. Four teachers recorded 100% integrity across the 4 sessions. On the same day that survey packets were given to students, teachers were given AWE-T forms (roughly 20 per teacher) and a full explanation of survey directions. Researchers collected AWE-T forms 2 weeks later and information on students' grades 2 weeks after that. See Table 3.2 for a complete list of measures. Surveys were locked in a filing cabinet, available only to the primary researcher.

Table 3.1 *AWE-T Dimensions, Dimension Definitions, and Sample Items*

Dimension:	Definition:	Sample Item:
Hard Work	Belief in the virtue of working hard in the school setting	When faced with a challenging assignment, this student can _____ be counted on to work hard.
Leisure	The importance of non-school related activities above school-related activities	This student _____ seeks out opportunities for free-time activities.
Self-Reliance	The desire for autonomy in one's school work	When faced with a challenge, this student _____ attempts to solve it independently.
Ethics	Understanding concepts of right and wrong; the belief in justice	This student _____ care about grades being fair.
Delay of Gratification	The ability to postpone immediate rewards for the sake of later outcomes	This student is _____ able to work for a long time without praise.
Perseverance	Steady persistence in a course of action in spite of obstacles to achievement	This student _____ finished long assignments.
Centrality of Work	The importance of school in the student's life	This student _____ views schoolwork as important.
Wasted Time	Attitudes reflecting the active and productive use of work time	This student _____ uses school time efficiently.

Table 3.2 *Measures administered to parents, teachers, and students*

Parent	MWEP-SF		
Teacher	AWE-T	Report student end-of-quarter grade (percentile) in Mathematics	
Student	AWE-S	Grit Scale	Student Post Survey

Results

Teacher Scale Analysis

Response means and standard deviations can be found in Table 3.3. Of the 84 total responses, 48 were evaluated by students' homeroom teachers (i.e., primary teacher), and 36 were evaluated by a secondary, academic teacher. While the primary teacher spent the most time with students daily, the teachers shared all academic subjects. Thus, "secondary" does not imply

that courses taught by these teachers are less academically rigorous. The exception to this was the fifth-grade classroom, which only has one academic teacher. Thus, a secondary teacher did not evaluate students' academic work ethic in grade 5. A complete reliability analysis using SPSS 23.0 for Macintosh was computed for the original scale. Results yielded a high coefficient alpha of .91 for the total AWE-T. Item-Total Statistics can be found below (Table 3.4). Inter-item correlations were also examined.

As similarly observed in Chapter 3, omitting Leisure dimension items from the scale would yield slightly higher coefficient alphas and higher item-total correlations. However, because Leisure items were negatively skewed and this dimension was perhaps the most distinctive in the scale, it was not excluded. This also allowed researchers to retain the integrity of the original scale in subsequent analyses as well as the 8-dimension model.

Factor analysis (Principle Components Analysis with Varimax rotation) yielded 4 components, with 5 dimensions of AWE making up the first factor, accounting for 53% of variance in AWE-T scores. Leisure represented its own factor, adding 13% variance, as well as Self-Reliance which added 8%. Delay of Gratification was the final factor, accounting for 6% of variance. A high percentage (80%) of variance was explained by these 4 components. This narrow factor structure was expected for the AWE-T, as the scale was comprised of only 16 items. See Table 3.5 (below) for the complete component matrix and Figure 3.1 for Scree Plot analysis.

Correlation and Analysis of Variance

Complete student and teacher data were available for 47 out of 48 students. Additional parent self-report data were obtained for 40 participants. Descriptive statistics and correlations among variables are presented in Table 3.6. A positive, low to moderately strong correlation was

Table 3.3 *Item Means and Standard Deviations*

	Mean	Std. Deviation
Self-Reliance 1	3.94	1.344
Self-Reliance 2	3.33	1.329
Leisure 1*	3.19	1.406
Leisure 2*	2.86	1.240
Hard Work 1	4.19	1.294
Hard Work 2*	4.29	1.182
Centrality of Work 1	4.54	1.190
Centrality of Work 2	4.61	1.142
Wasted Time 1*	4.80	.960
Wasted Time 2	3.96	1.227
Delay of Gratification 1	4.10	1.402
Delay of Gratification 2*	3.79	1.198
Ethics 1*	4.60	1.143
Ethics 2	4.54	.993
Perseverance 1	4.53	1.253
Perseverance 2*	4.39	1.206

* indicates prior reversed-scored items

Table 3.4 *Item-Total Statistics*

	Scale Mean if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Self-Reliance 1	61.70	.773	.701	.899
Self-Reliance 2	62.31	.513	.570	.908
Leisure 1	62.45	.009	.855	.926
Leisure 2	62.78	-.080	.860	.926
Hard Work 1	61.45	.857	.845	.897
Hard Work 2	61.35	.701	.688	.902
Centrality of Work1	61.10	.812	.937	.899
Centrality of Work 2	61.03	.827	.948	.899
Wasted Time 1	60.84	.759	.802	.902
Wasted Time 2	61.68	.748	.637	.901
Delay of Gratification 1	61.54	.806	.836	.898
Delay of Gratification 2	61.85	.362	.560	.913
Ethics 1	61.04	.694	.654	.903
Ethics 2	61.10	.368	.460	.912
Perseverance 1	61.11	.806	.761	.899
Perseverance 2	61.25	.798	.802	.899

Table 3.5 *Factor Analysis Component Matrix*

	Component			
	1	2	3	4
Self-Reliance 1	.605	-.075	.517	.325
Self-Reliance 2	.219	-.003	.912	.089
Leisure 1	-.017	.961	-.058	.128
Leisure 2	-.129	.960	-.011	.035
Hard Work 1	.835	-.005	.329	.122
Hard Work 2	.862	.184	.014	-.052
Centrality of Work 1	.927	-.176	.145	.040
Centrality of Work 2	.922	-.165	.145	.099
Wasted Time 1	.839	-.061	.182	.015
Wasted Time 2	.665	-.054	.406	.215
Delay of Gratification 1	.619	-.100	.388	.583
Delay of Gratification 2	.146	.171	.123	.842
Ethics 1	.589	-.095	.398	.312
Ethics 2	.467	-.237	.397	-.446
Perseverance 1	.812	-.073	.318	.066
Perseverance 2	.810	-.125	.151	.328

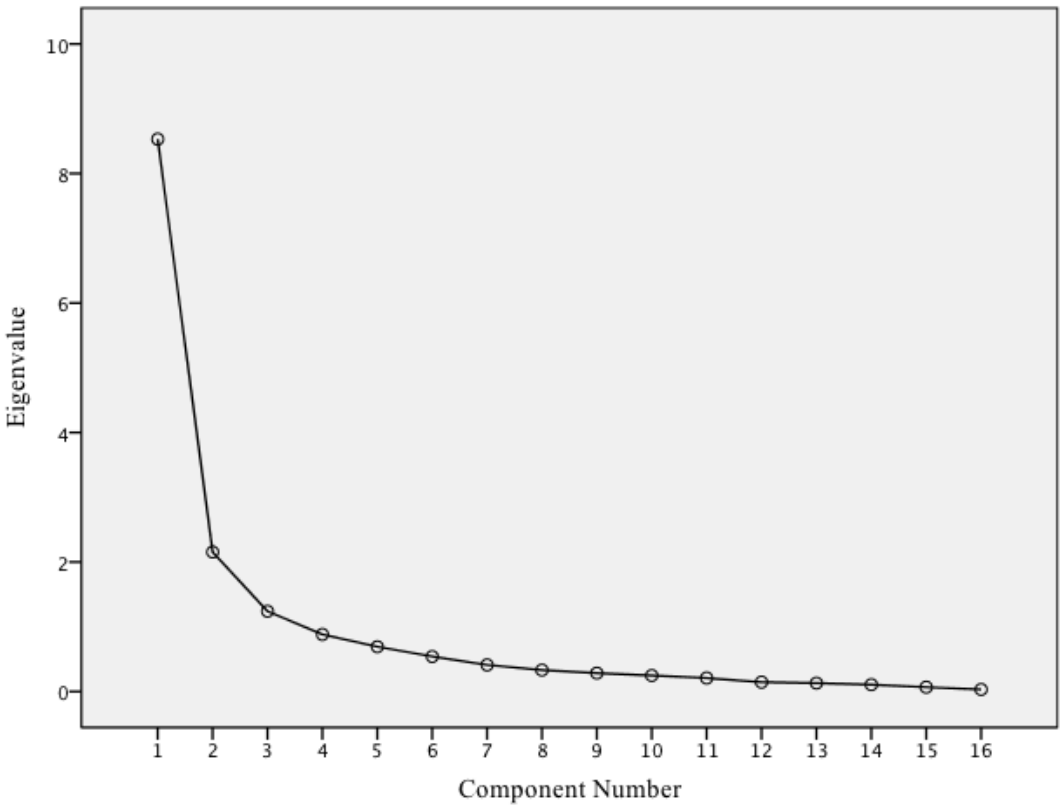

Figure 3.1 *Eigenvalues on the Scree Plot*

found between the measure of AWE-S and the AWE-T completed by students' primary, homeroom teacher ($r = .33, p < .05$). For students rated by two academic teachers, AWE-T measures between primary and secondary teachers were very highly and significantly correlated ($r = .85, p < .01$).

Table 3.6 *Correlations Among Study Variables*

Variable	*M*	*SD*	1	2	3	4	5	6
1. AWE-Student	3.72	.44						
2. Grit	3.43	.58	.50**					
3. AWE-T (Primary)	4.22	.78	.33*	.24				
4. AWE-T (Secondary)	3.95	.81	.26	.22	.85**			
5. MWEP-SF (Parent)	3.77	.36	.19	.16	-.02	-.06		
6. Post Survey (Perceived Support)	4.33	.50	.64**	.44**	.25	.43*	.63	
7. Math Grade	78.14	11.49	.17	.15	.58**	.69**	.16	.29*

Note: * $p < .05$; ** $p < .01$

The Grit scale items were correlated with AWE-S items in order to establish concurrent validity. While the constructs are not operationally defined in the exact same way, a moderately strong correlation was established between the two scales ($r = .50, p < .01$). A one-way ANOVA with grade level serving as the independent variable and AWE-S and Grit scores as the dependent variables was completed. Though not significant, the data show a decrease in both AWE-S and Grit as reported by students as they progress through middle school [$F(3,44) = 2.38$, $p=.08$; $F(3,44) = 2.54$, $p=.07$] (See Figures 3.2 – 3.3). This effect is significant when comparing AWE-T (teacher report) across grade [$F(3,43) = 6.70$, $p<.01$] but is not observed in MWEP-SF (parent self-report) [$F(3,43) = .91$, $p<.45$]. When comparing individual AWE-T scores, the average student rated their own academic work ethic as lower than both average teacher ratings

(See Table 3.6). Demographics including race and gender did not account for significant differences in any study variables with the exceptions of AWE-T related to gender, with females being rated significantly higher than males [$F(1,46)$=7.72 , p<.01].

Due to availability, students' quarterly grades in mathematics were analyzed, rather than in both mathematics and English. Correlations between math grades and other study variables yielded significant results, especially when compared to AWE-Teacher ratings, including primary (r = .58**, p < .01) and secondary (r = .69**, p < .01) teachers. Student evaluations (AWE-S) of their own academic work ethic (r = .17, p = .29) and grit (r = .17, p = .32) were not correlated with quarterly grades in mathematics. Finally, grades and perceived support (as measured by the Post Survey) were moderately and significantly correlated (r = .29*, p < .05).

The external validity scales for this study, including MWEP-SF (i.e., parent self-reported work ethic) and the Post Survey (i.e., perceived support in regard to postsecondary education) were correlated with study variables (see Table 3.6). While the MWEP-SF was not significantly correlated with any of the other dependent variables and was unchanged based on demographic variables of ethnicity, gender, and grade, the Post Survey (a measure of perceived post-secondary support) was moderately and significantly correlated with the other student-report measures, AWE-S (r = .64, p < .01) and Grit (r = .44, p < .01). This relationship was also observed between Post Survey and AWE-T (secondary) (r = .43, p < .01). Correlations between AWE-T (primary) and Post Survey did not yield significant results. Finally, it is notable that student ratings on the final item of the AWE-S (i.e., '25. School is important.') are significantly correlated at a moderate to high level with the Post Survey (a student-report measure of support for post-secondary education) means (r = .64, p < .05).

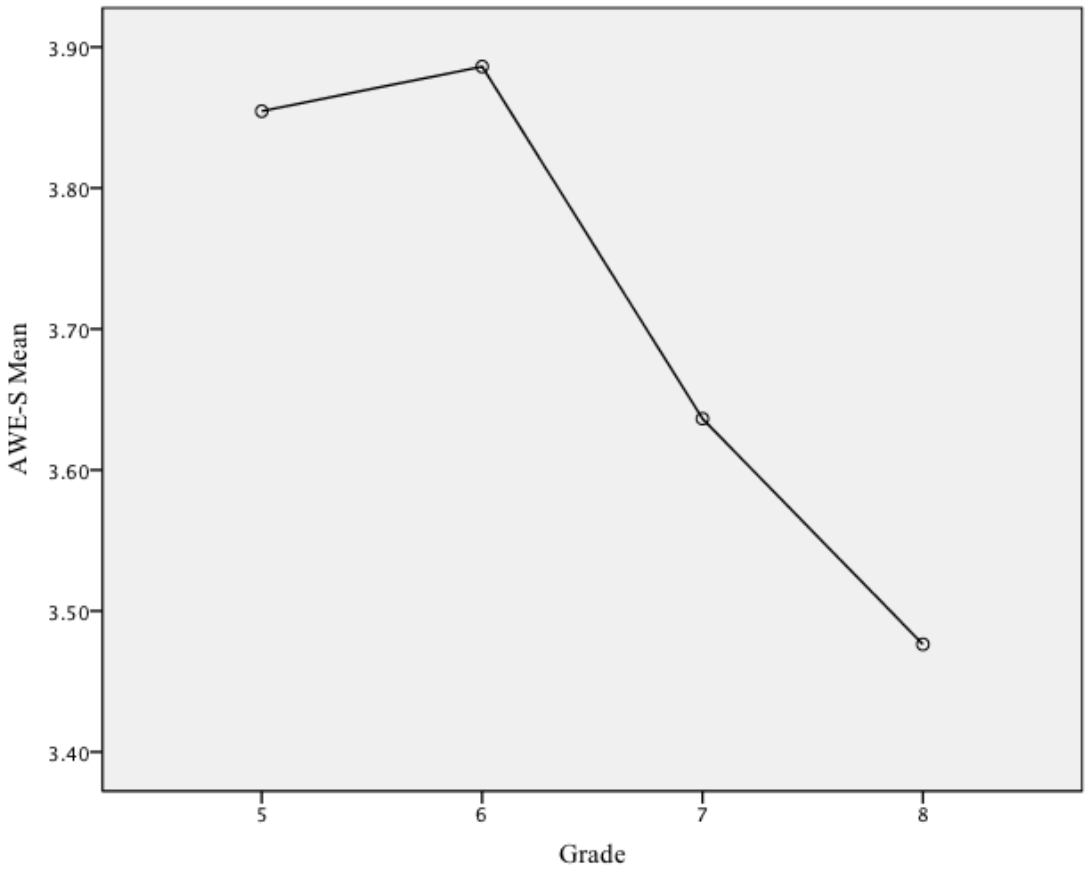

Figure 3.2 *Means plot of AWE-S across Grade level*

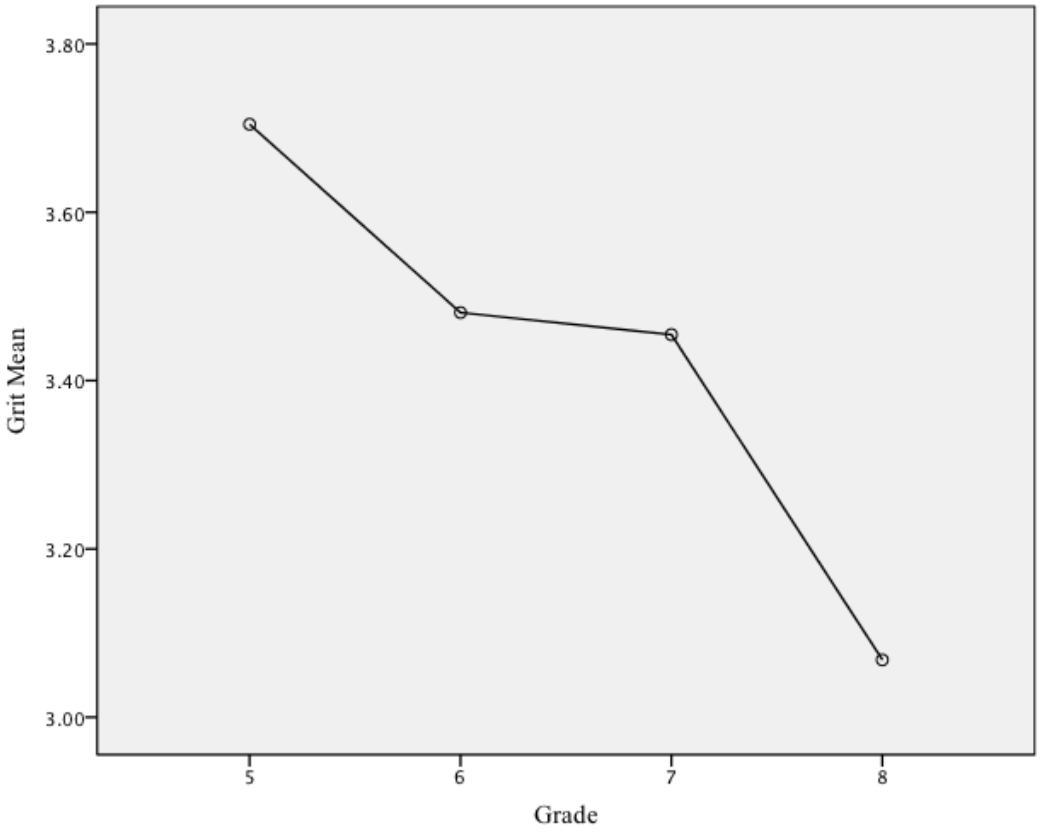

Figure 3.3 *Means plot of Grit across Grade level*

Regression Analysis

To examine incremental validity, a hierarchical multiple regression analysis was conducted of grades with the following order of entry: (1) AWE-T from the primary teacher; (2) AWE-T from the secondary teacher; and (3) Post Survey results, a measure of perceived support for postsecondary education which is completed by the student. The results are shown in Table 3.7. The amount of unique variance contributed at each step is represented by the incremental variance or the squared semi-partial correlation coefficient (R^2 Change). In mathematics grades, a total of 60% of the variability in course grade was accounted for, with the primary teacher's evaluation of student academic work ethic (AWE-T [Primary]) accounting for 17% of the variance in course grade ($p < 0.05$), with the secondary teacher's evaluation (AWE-T [Secondary] adding an additional 42% ($p < 0.01$), and the Post Survey accounting for no unique variance in course grade.

A simple logistic regression was performed adding student variables (AWE-S and Grit) as well as parent work ethic (MWEP-SF). All 6 variables combined accounted for 62% of variance in student math grades ($p < 0.01$).

Table 3.7 *Multiple Regression; Dependent Variable = Grade in mathematics course*

Step	Variable	R	R^2	R^2 Change
1	AWE-T (Primary)	.410	.168	.168*
2	AWE-T (Secondary)	.771	.594	.427**
3	Post Survey (Perceived Support)	.773	.597	.003

Discussion

The Academic Work Ethic-T (AWE-T) measure was found to have high internal reliability, with a coefficient alpha of .91 for all AWE-T surveys combined (from 4 teachers).

No items were determined necessary to be thrown out of the overall measure, although the components of Leisure, Self-Reliance, and Delay of Gratification appear to measure unique variance and do not correlate with the total scale as well as the 5 remaining dimensions (as evidenced by factor analysis yielding 4 factors). AWE-T was highly correlated with other teacher evaluators and student math grades, and AWE-T was moderately correlated with students' self-report of AWE.

In contrast to Study 1 (See Chapter 2), in this population, AWE-Student means decreased as they progressed from grade 5 to 8 at a magnitude approaching significance. Similarly, AWE-T (teachers' rating of their students' AWE) decreased significantly across grade level. This supports previous research demonstrating that motivation and willingness to work declines as students' progress through middle school (Eccles & Midgley, 1989). This age group's overall attitude toward school has been shown to become more negative; their self-esteem and academic self-concept decline (Stipek & MacIver, 1989; Wigfield, Eccles, MacIver, Reuman, & Midgley, 1991) and they attribute less value to academic endeavors (Fox & Grams, 2007). Additionally, comparison to results from a predominately Caucasian middle school in Study 1 suggests that there may be an interaction effect between race and grade level in relation to self- and teacher-report of AWE. A similarity between Study 3 and 2 exists in the finding that students, on average, rated their AWE lower than both primary and secondary teachers. Furthermore, secondary (i.e., not homeroom) teachers' rating of AWE related more to external factors (i.e., perceived post-secondary support) in the current study than ratings by homeroom teachers. Secondary teachers' AWE-T ratings were also more predictive of classroom grades in mathematics. Because of the middle school teachers' shared responsibility of academic instruction, regardless of homeroom grade, secondary teachers had often been their students'

homeroom teacher in previous years (e.g., the grade 6 homeroom teacher is also a seventh-grader's secondary teacher in English). This may account for the fact that while primary teachers' AWE-T ratings were closer to students' AWE-S ratings, secondary teachers' AWE-T ratings were more closely related to grades and perceived support.

The construct of perceived support (as measured by the 8-item Post survey) yielded an interesting relationship to AWE in that it was significantly correlated to both student self-report measures (AWE-T and Grit) and to quarterly grades in mathematics. This evidence supports the idea that students who feel externally supported and encouraged to continue their education work harder and value learning more than those students with less external support. Further evidence is observed in the moderate to high correlation between Post Survey means and ratings of the AWE-S Item 25 ("School is important.") Clearly, there is a relationship between academic work ethic in this age group and the values surrounding education that they perceive their family to possess. This finding supports research that shows parent involvement in their children's education to be associated with higher achievement outcomes (Goodenow, 1993; Ryan, et al., 1994; Wentzel, 1997). These findings emerge consistently in the literature whether the outcome measures are grades, standardized test scores, or teacher ratings (Song et al., 2015). This pattern holds not only for the overall student population, but for minority students as well. (Barton & Coley, 2007, Jeynes, 2005).

Several limitations existed in the present study. First, while the diversity of the sample of participants in this study is a strength, a larger number of student, parent, and teacher participants should be recruited for future research. Several relationships that were approaching significance may have been clarified by obtaining a greater sample size. Furthermore, the external variable of parent work ethic (as determined by the MWEP-SF) was not found to be significantly related to

other study variables. In the future, it may be helpful to specify whether female or male parents/guardians complete the survey and check for differences between the two groups (as would be consistent with previous research). Investigating group differences based on another external factor, family income, may also provide insight into how students conceptualize the value of education and hard work. Finally, perceived familial support for postsecondary education significantly predicted student AWE, while the parent measure of work ethic, the MWEP-SF, did not. Future researchers should investigate parent attitudes toward education, school work, and higher education more directly, rather than simply focusing on broad work ethic traits of parents and if such traits are transmitted to children.

Chapter V

Conclusions

A recurring theme in popular culture is concern over American's declining work ethic and decreasing positive work attitudes, which have been posited to correspond to lower levels of job performance, higher levels of absenteeism and turnover, and increases in counterproductive behavior (Sheehy, 1990). Others have argued that work ethic is actually not in decline; instead, the work ethic among those classified as "Generation X" is different than that of previous generations because of shifting job settings and corporate goals (Spiegler, 1997).

Regardless of the point of view, the importance of work ethic to employers is apparent. In a survey, Flynn (1994) found that more than 50% of hiring manager reported they were more concerned about an applicant's attitude than aptitude. In another survey of 150 American managers, Flynn found that nearly 60% of the respondents ranked work ethic as the most important factor when hiring an administrative employee, over characteristics such as intelligence (23%), enthusiasm (12%), and education (4%).

These ideals are increasingly reflected in academic standards, as Fox and Grams (2007) described in their summary of related national guidelines. For example, the *National Standards for Family and Consumer Sciences Education* specify that students should demonstrate transferable and employable skills, including work ethic and professionalism, in community and workplace settings. Other examples include the *National Career Development Guidelines*, which indicate that students should be able to assess the impact of their positive personal characteristics (e.g., honesty, dependability, responsibility, integrity, and loyalty) on their career development and the *National Standards for Business Education*, which identify performance expectations related to punctuality, dependability, and ability to work with others.

Academic Work Ethic

Munson and Rubenstein (1992) asserted that "schoolwork is the student's job" and that the "school is a workplace, the student is learner, and the learner is a worker" (p. 289). Teachers and administrators have been reported to consistently cite work ethic and its surrounding constructs as highly important to success in school (Skinner & Belmont, 1993). Though often referred to in schools, the construct of work ethic has rarely been formally researched or applied in educational settings.

In general, research in educational psychology has focused on individual, cognitive influences on work ethic behaviors, such as attributions, self-efficacy, and intrinsic motivation. Work ethic, however, is defined not only by cognitive attributions, but also by performance-related behaviors and outcomes, as well as specific beliefs regarding the value of work (Miller & Coady, 1984). Thus, there is a need to investigate not only cognitive attributions, goals, and expectations, but actual performance-related behaviors and outcomes, as well as beliefs regarding the value of related traits (e.g., hard work, persistence) (McCortney & Engels, 2003).

Lounsbury et al. (2003) proposed a construct similar to work ethic, called work drive, which is defined as an enduring motivation to expend time and effort to finish projects, meet deadlines, be productive, and achieve success. Work drive was found to predict unique variance in college course grades beyond that predicted by intelligence and the "Big Five" personality traits. Rau and Durand (2000) found evidence for an academic ethic construct, which was found to predict college grades. While the study found grades significantly and positively correlated with an academic ethic and academic locus of control (Trice 1985, 1987), ACT scores shared no such relationship. Finally, Fox and Grams (2007) created a Work Ethic Behavior Indicators Inventory for the purpose of formulating classroom lesson plans on work ethic. This measure

was not tested for reliability nor was it empirically validated.

As Duckworth and Yeager (2014) explained, measurement makes it possible to observe, experiment, and change something. Thus, if one is interested in changing the work ethic of students, it is essential to be able to accurately define and quantify it with precision. Up until 2011, no measure of work ethic behaviors, specifically intended for the academic setting, had been developed and rigorously tested for reliability and validity.

Parkhurst's (2013) dissertation studies described the development and initial evaluation of an Academic Work Ethic-Student (AWE-S) measure directly based on Miller, Woehr, and Hudspethth (2002) Multidimensional Work Ethic Profile (MWEP), which has become one of the most widely used measures of work ethic in recent years (Meriac, 2012). It is comprised of seven components or dimensions: (a) Centrality of Work, a belief that work is important in its own right, (b) Self-Reliance, representing a drive toward independence in task accomplishment, (c) Hard Work, a belief that increased effort is the key to achievement, (d) Leisure, a value on down-time/non-work activities, (e) Morality/Ethics, a proclivity to engage in just/moral behavior, (f) Delay of Gratification, the capacity to postpone rewards until a later time, and (g) Wasted Time, the importance of the efficient use of time. In order to reflect the MWEP's multidimensional approach, Parkhurst developed a reliable and valid measure of academic work ethic, written for students at a fifth-grade reading level. In developing this measure, the authors built upon MWEP by creating a 25-item, multidimensional scale, entitled the Academic Work Ethic-Student measure (AWE-S). This measure was designed to assess work ethic as it pertains to education (rather than the workplace) and be completed by middle and high school students (i.e., grades 5-12), as opposed to adults.

Prior to the current dissertation research, the AWE-S had been shown to predict student

choice behaviors regarding assignment completion (Parkhurst, et al., in submission) and to be a valid predictor of classroom grades above and beyond other factors. These results are similar to those found regarding work drive and work ethic in older, college-age populations in relation to grade point average (GPA) and adding significant, unique variance beyond general intelligence, personality, and high school GPA and standardized test scores (Lounsbury, et al., 2003; Meriac, 2012). The broad goals of this dissertation included strengthening the construct of academic work ethic by obtaining further reliability data, as well as testing for scale validity by comparing student scores to external factors, including teacher report and family values.

Study I

The first study sought to extend the research on additive interspersal procedures and persistence, specifically by building on Kirk's (2010) procedure of administering short and long math problems via a computer program. Aspects related to persistence (i.e., academic work ethic and achievement) were also investigated. While there was some evidence that the experimental group, which received shorter math problems interspersed, worked longer and at a faster rate, these results were not significant. The interspersal group completed significantly more problems than the control group, and a greater percentage of students in the control group quit early, but chi square analysis revealed that the interaction was not significant. These results provided support for using additive interspersal in the classroom, as the procedure may increase opportunities for students to practice basic skills. The AWE-S measure was found to have high internal reliability, with a high coefficient alpha and 6-component factor structure. AWE-S was found to be a significant predictor of classroom grades as well as persistence on the multiplication assignment.

Study II

The purpose of second study was to further validate, especially in terms of convergent validity, the construct of academic work ethic, as well as to strengthen the overall understanding of AWE by comparing it to teacher reports and other validity items (i.e., grades, persistence). Teachers (one elective teacher and one math teacher) were asked to evaluate their students' academic work ethic with the Academic Work Ethic-Teacher (AWE-T) measure. The scale was found to have high internal reliability, with coefficient alphas of .96. AWE-T correlated moderately to highly with classroom grades in both an elective and math course. Additionally, AWE-T was moderately correlated with other teacher evaluators and students' self-report of AWE. Hierarchical multiple regression showed that the classroom teacher's evaluation of AWE accounted for a greater percentage of variance in students' elective class than in the math class.

Study III

The final study sought to compare parent and child work ethic attitudes and behaviors by administering the MWEP-Short Form to one parent per student participant. Social support for academic success and student/familial expectations for the future were also measured. Finally, additional concurrent validity for the AWE-S was investigated by comparing the AWE-S results to Duckworth and Quinn's Grit Scale for Children (2009). Results showed that the AWE-T was highly correlated with other teacher evaluators and quarterly mathematics grades and was moderately correlated with students' self-report of AWE. AWE-T means decreased significantly as grade level increased. The construct of perceived support was significantly correlated to both student self-report measures (AWE-S and Grit), math grades, and ratings of the AWE-S Item 25, which states, "School is important."

Limitations

Several limitations existed for the three studies associated with the current dissertation research. First, AWE-S is a self-report measure, which can lead to reliability issues such as participants' tendency toward social desirability and consistent/moderate responding, as well as the inability to verify responses. This limitation was addressed through the creation of the AWE-T, by obtaining concurrent validity with the Grit Scale for Children, and by comparing the students' AWE-S score to a persistence task and various classroom grades. Additionally, studies such as these have greater power when more participants are recruited. While the overall diversity of participants in the three studies combined was good, future research on the AWE-S and AWE-T should obtain larger sample sizes in order to provide more confidence in the generalizability of the findings.

Future Applications

Learning and demonstrating work ethic begins in the classroom with engaging in the material, positive work and study behaviors, and accepting academic challenges. Unfortunately, motivation and willingness to work has been shown to rapidly decline as students enter middle school, and the middle school years have increasingly become identified as a time of general academic risk (Eccles & Midgley, 1989). This age group's overall attitudes toward school have been shown to become more negative; their self-esteem and academic self-concept decline (Stipek & MacIver, 1989; Wigfield, Eccles, MacIver, Reuman, & Midgley, 1991), and they attribute less value to academic endeavors (Fox & Grams, 2007). This research presents major concerns, not only because of its implications for students' immediate experience but also because the behaviors associated with these beliefs (e.g., low effort and less effective learning strategies) are salient predictors of school dropout (Fox & Grams, 2007; Payne, 2001).

A particular challenge exists in making the abstract concept of work ethic meaningful to adolescents, especially middle school and early high school students who typically are not yet employed. As a cultural norm, work ethic reflects a set of intrinsic attitudes and behaviors valued by predominant groups in society, and the rules of work ethic can be seen as "hidden" or "out-of-reach" for at-risk students. Payne (2001) postulated that students who are from a poverty background, defined as having limitations in various types of resources and relationships, may not perceive or value dependability, initiative, and interpersonal skills related to work ethic. While these values are silently and indirectly reinforced in schools though teacher modeling, rewards, and consequences, practical advice on increasing such behaviors is rarely given (Miller & Coady, 1984). Students are seldom directly engaged and instructed regarding the value of education or the ultimate goals of education and learning (Fox & Grams, 2007; Payne, 2001). Furthermore, these students are also disadvantaged in the most basic resources, such as literacy materials in the home, a desk or place to study, and a quiet area without distractions (Barton & Coley, 2007). As a result, traits related to work ethic might seem enigmatic and unattainable.

It follows that more specific instruction into this hidden culture, including positive work ethic traits, could benefit students in their immediate role in school and in their current and future roles in families, communities, and careers (Taylor, 2005). Some intervention programs have shown promise (Fox & Grams, 2007) but present significant limitations, especially in terms of evaluating effectiveness. It is the eventual hope that by securing a valid representation of, and an understanding of what contributes to academic work ethic, that effective intervention programs may be implemented in schools, especially at grade- and age-levels in which engagement in school-relative activities and positive values surrounding AWE begin to diminish. Due to the strong reliability and validity of the AWE-S and AWE-T scales, they should be considered for

use as screening tools to evaluate whether students may be at academic risk. Because these scales are comprised of only 25 and 16 items, respectively, and are written at a fifth-grade reading level, they are ideal for broad use in the educational setting.

Summary

This 3-study dissertation was designed to 1) extend the research on Parkhurst et al.'s (in submission) Academic Work Ethic-Student scale, 2) develop and analyze reliability of the Academic Work Ethic-Teacher scale, and 3) expound on the construct validity of academic work ethic by comparing AWE-S and AWE-T scores to external factors (i.e., grades, perceived support, and parental work ethic) and the Grit Scale for Children, a similar measure. The ability to accurately and consistently measure academic work ethic, as evidenced by strong reliability statistics and significant relationships across student variables, as well as the construct's predictive relationship to student behavior and grades, gives rise to a variety of practical applications for these scales. Future researchers and administrators should consider the AWE-S and AWE-T to measure academic work ethic in middle school students, screen for students at academic risk or with a lack of support in academic achievement, and guide instruction in positive work ethic skills and behaviors which will promote success in school and beyond.

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Appendices

Appendix A

Academic Work Ethic-Student Scale

Name: _____

Instructions: Rate how much you agree with each of the following statements. For example, if the statement was, "I like pizza," and you really like pizza, you would circle 5 (Strongly Agree). If you really don't like pizza, you would circle 1 (Strongly Disagree). Please take your time and be honest with your answers.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. I wish I had more time to do what I want.	1	2	3	4	5
2. I like to finish my school work without asking for help.	1	2	3	4	5
3. I can't play as much as I want because of school.	1	2	3	4	5
4. It is important to finish school assignments all the way.	1	2	3	4	5
5. I try to solve problems before asking others to help me.	1	2	3	4	5
6. Cheating is OK if the test is too hard.	1	2	3	4	5
7. I think hard work makes anything possible.	1	2	3	4	5
8. School takes too much time.	1	2	3	4	5
9. I will give up on assignments if they are too long.	1	2	3	4	5
10. I don't ask for help unless I really need it.	1	2	3	4	5
11. If I work hard enough, I can reach my goals.	1	2	3	4	5
12. I work hard now for a good grade later.	1	2	3	4	5
13. I would rather play than be at school.	1	2	3	4	5
14. I won't quit on assignments until they are finished.	1	2	3	4	5
15. I solve my own problems.	1	2	3	4	5
16. I wait my turn.	1	2	3	4	5
17. I can solve difficult problems if I work hard.	1	2	3	4	5
18. I need time to have fun.	1	2	3	4	5

19. I don’t finish long assignments.	1	2	3	4	5
20. I don’t like to ask for help on my homework.	1	2	3	4	5
21. I finish what I start.	1	2	3	4	5
22. I always try my best with school work	1	2	3	4	5
23. I learn more when I do assignments on my own.	1	2	3	4	5
24. I like homework that is challenging.	1	2	3	4	5
25. School is important.	1	2	3	4	5

Appendix B

Academic Work Ethic-Teacher Scale

Your Name: _____

Student: _____

Directions: The following sentences have been designed to gain your perspective on specific student attitudes and behaviors observed in your classroom. Read each sentence carefully. Pairs of questions have been built around definitions of constructs that are commonly seen in the educational setting. Please circle the best choice for each sentence, even if it is difficult to make up your mind. There are no right or wrong answers. All responses 1-6 represent the frequency with which you observe the behavior or attitude.

1. Never	0% of the time
2. Almost Never	20% of the time
3. Sometimes	40% of the time
4. Generally	60% of the time
5. Almost Always	80% of the time
6. Always	100% of the time

Self-Reliance: The desire for autonomy in one's school work

When faced with a challenge, this student _____ attempts to solve it independently.					
1. Never	2. Almost Never	3. Sometimes	4. Generally	5. Almost Always	6. Always

This student _____ prefers to do his schoolwork on his/her own.					
1. Never	2. Almost Never	3. Sometimes	4. Generally	5. Almost Always	6. Always

Leisure: The importance of non-school related activities above school-related activities

This student _____ seeks out opportunities for free-time activities.					
1. Never	2. Almost Never	3. Sometimes	4. Generally	5. Almost Always	6. Always

The opportunity to engage in free-time activities is _____ valued by this student.					
1. Never	2. Almost Never	3. Sometimes	4. Generally	5. Almost Always	6. Always

Hard Work: The belief in the virtue of working hard in the school setting

When faced with a challenging assignment, this student can _____ be counted on to work hard.					
1. Never	2. Almost Never	3. Sometimes	4. Generally	5. Almost Always	6. Always

This student _____ extends insufficient effort on assignments.					
1. Never	2. Almost Never	3. Sometimes	4. Generally	5. Almost Always	6. Always

Centrality of Work: The importance of school in the student's life

This student _____views school work as important.					
1. Never	2. Almost Never	3. Sometimes	4. Generally	5. Almost Always	6. Always

Learning is _____ valued by this student.					
1. Never	2. Almost Never	3. Sometimes	4. Generally	5. Almost Always	6. Always

Wasted Time: Attitudes reflecting the active and productive use of work time

This student _____ thinks school work is a waste of time.					
1. Never	2. Almost Never	3. Sometimes	4. Generally	5. Almost Always	6. Always

This student _____ uses school time efficiently.					
1. Never	2. Almost Never	3. Sometimes	4. Generally	5. Almost Always	6. Always

Delay of Gratification: The ability to postpone immediate rewards for the sake of later outcomes

This student is _____ able to work a long time without praise.					
1. Never	2. Almost Never	3. Sometimes	4. Generally	5. Almost Always	6. Always

Constant, small rewards are _____ important to the student.					
1. Never	2. Almost Never	3. Sometimes	4. Generally	5. Almost Always	6. Always

Ethics: Understanding concepts of right and wrong; The belief in justice

If this student was sure they wouldn't be caught, they would _____ cheat.					
1. Never	2. Almost Never	3. Sometimes	4. Generally	5. Almost Always	6. Always

This student _____ cares about grades being fair.					
1. Never	2. Almost Never	3. Sometimes	4. Generally	5. Almost Always	6. Always

Perseverance: Steady persistence in a course of action in spite of obstacles to achievement

This student _____ finishes long assignments.					
1. Never	2. Almost Never	3. Sometimes	4. Generally	5. Almost Always	6. Always

When given a challenging assignment, this student _____ gives up easily.					
1. Never	2. Almost Never	3. Sometimes	4. Generally	5. Almost Always	6. Always

Appendix C

Multidimensional Work Ethic Profile-Short Form (English)

Name: _____

Instructions: This section lists a series of statements. Please choose the alternative that best represents your agreement with how well each statement describes *you* (the parent or guardian).

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. It is important to stay busy at work and not waste time.	1	2	3	4	5
2. I feel content when I have spent the day working.	1	2	3	4	5
3. One should always take responsibility for one's actions.	1	2	3	4	5
4. I would prefer a job that allowed me to have more leisure time.	1	2	3	4	5
5. Time should not be wasted, it should be used efficiently.	1	2	3	4	5
6. I get more fulfillment from items I had to wait for.	1	2	3	4	5
7. A hard day's work is very fulfilling.	1	2	3	4	5
8. Things that you have to wait for are the most worthwhile.	1	2	3	4	5
9. Working hard is the key to being successful.	1	2	3	4	5
10. Self-reliance is the key to being successful.	1	2	3	4	5
11. If one works hard enough, one is likely to make a good life for oneself.	1	2	3	4	5
12. I constantly look for ways to productively use my time.	1	2	3	4	5
13. One should not pass judgment until one has heard all of the facts.	1	2	3	4	5
14. People would be better off if they depended on themselves.	1	2	3	4	5
15. A distant reward is usually more satisfying than an immediate one.	1	2	3	4	5
16. More leisure time is good for people.	1	2	3	4	5
17. I try to plan out my workday so as not to waste time.	1	2	3	4	5
18. The world would be a better place if people spent more time relaxing.	1	2	3	4	5
19. I strive to be self-reliant.	1	2	3	4	5

20. If you work hard you will succeed.	1	2	3	4	5
21. The best things in life are those you have to wait for.	1	2	3	4	5
22. Anyone who is able and willing to work hard has a good chance of succeeding.	1	2	3	4	5
23. It is important to treat others as you would like to be treated.	1	2	3	4	5
24. I experience a sense of fulfillment from working.	1	2	3	4	5
25. People should have more leisure time to spend in relaxation.	1	2	3	4	5
26. It is important to control one's destiny by not being dependent on others.	1	2	3	4	5
27. People should be fair in their dealings with others.	1	2	3	4	5
28. A hard day's work provides a sense of accomplishment.	1	2	3	4	5

Multidimensional Work Ethic Profile-Short Form (Spanish)

Nombre: _____

Instrucciones: Esta sección contiene unas series de oraciones. Por favor, elija la alternativa y frase que mejor lo describa a usted (padre/madre/tutor).

	Muy desecuerdo	**Desecuerdo**	**Neutral**	**Estoy de acuerdo**	**Estoy muy desecuerdo**
1. Es importante mantenerse ocupado en el trabajo y no perder el tiempo.	1	2	3	4	5
2. Estoy satisfecho cuando paso el día trabajando.	1	2	3	4	5
3. Uno debería asumir siempre responsabilidad por sus actos.	1	2	3	4	5
4. Prefiero un empleo que me permite tener más tiempo libre.	1	2	3	4	5
5. El tiempo no debe ser desperdiciado sino usarse de manera eficiente.	1	2	3	4	5
6. Siento más satisfacción por aquellas cosas que me hacen esperar.	1	2	3	4	5
7. Un día de trabajo duro me hace sentir realizada.	1	2	3	4	5
8. Las cosas más valiosas son las que me hacen esperar.	1	2	3	4	5
9. Ser trabajador es la clave para ser exitoso.	1	2	3	4	5
10. La autosuficiencia es la clave para ser exitoso.	1	2	3	4	5
11. Si uno trabaja duro puede lograr una buena vida.	1	2	3	4	5
12. Constantemente busco maneras de usar el tiempo de forma productiva.	1	2	3	4	5
13. No se debe juzgar sin haber considerado toda la información .	1	2	3	4	5
14. Las personas estarían en mejor posición si dependieran de sí mismas.	1	2	3	4	5
15. Generalmente, una recompensa a futuro es más gratificante que una recompensa inmediata.	1	2	3	4	5
16. Pasar más tiempo de ocio es bueno para las personas.	1	2	3	4	5
17. Trato de planear de antemano el día de trabajo para no desperdiciar tiempo.	1	2	3	4	5
18. El mundo sería mejor si las personas pasaran más tiempo relajándose.	1	2	3	4	5

19. Me esfuerzo para ser autosuficiente.	1	2	3	4	5
20. Si uno trabaja duro, tendrá éxito.	1	2	3	4	5
21. Las cosas que más apreciamos en la vida aquellas nos hace esperar.	1	2	3	4	5
22. Cualquiera que se proponga y pueda trabajar duro tiene una buena posibilidad de tener éxito.	1	2	3	4	5
23. Es importante tratar a las personas como a uno le gustaría que lo traten.	1	2	3	4	5
24. Me siento realizado cuando trabajo.	1	2	3	4	5
25. Las personas deberían tener más tiempo libre para disfrutar del ocio.	1	2	3	4	5
26. Es importe ser independiente para poder controlar nuestro destino.	1	2	3	4	5
27. Las personas deben ser justas en sus interacciones con otros.	1	2	3	4	5
28. Un día de trabajo duro crea un sentimiento de logro.	1	2	3	4	5

Appendix D

Grit Scale for Children

8- Item Grit Scale

Directions for taking the Grit Scale: Please respond to the following 8 items. Be honest – there are no right or wrong answers!

1. New ideas and projects sometimes distract me from previous ones.
Very much like me / Mostly like me / Somewhat like me / Not much like me / Not like me at all

2. Setbacks (delays and obstacles) don't discourage me. I bounce back from disappointments faster than most people.
Very much like me / Mostly like me / Somewhat like me / Not much like me / Not like me at all

3. I have been obsessed with a certain idea or project for a short time but later lost interest.
Very much like me / Mostly like me / Somewhat like me / Not much like me / Not like me at all

4. I am a hard worker.
Very much like me / Mostly like me / Somewhat like me / Not much like me / Not like me at all

5. I often set a goal but later choose to pursue (follow) a different one.
Very much like me / Mostly like me / Somewhat like me / Not much like me / Not like me at all

6. I have difficulty maintaining (keeping) my focus on projects that take more than a few months to complete.
Very much like me / Mostly like me / Somewhat like me / Not much like me / Not like me at all

7. I finish whatever I begin.
Very much like me / Mostly like me / Somewhat like me / Not much like me / Not like me at all

8. I am diligent (hard working and careful).
Very much like me / Mostly like me / Somewhat like me / Not much like me / Not like me at all

Appendix E

Post Survey

Education opens doors

Student Post-Survey

Roadmap to Success

First Name: _____

Last Name: _____

School Name: _____

Teacher Name: _____

Directions: Write your student ID in the boxes provided and fill in the bubbles to match.

0	0	0	0	0	0	0
1	1	1	1	1	1	1
2	2	2	2	2	2	2
3	3	3	3	3	3	3
4	4	4	4	4	4	4
5	5	5	5	5	5	5
6	6	6	6	6	6	6
7	7	7	7	7	7	7
8	8	8	8	8	8	8
9	9	9	9	9	9	9

PART 1: Completely fill in one bubble for the description that best describes you:

1A. Grade Level: ○ 6th ○ 7th ○ 8th ○ 9th ○ 10th ○ 11th ○ 12th

1B. Gender: ○ Male ○ Female

1C. Ethnicity:

○ African-American ○ Asian-American
○ Caucasian/White ○ Hispanic/Latino
○ Multi-ethnic ○ Other

1D. Have your parents or guardians (excluding older siblings) completed a college degree at a four-year university?

○ Yes ○ No

PART 2: Completely fill in one bubble to answer each of the questions below:

2A. At this time, do you plan to graduate high school?

○ Yes ○ No

2B. How often do your parents/guardians speak with you and encourage you to go to college?

○ Never ○ Often
○ Sometimes ○ Very Often

2C. At this time, which plan are you most likely to pursue after high school?

○ Enter the workforce
○ Attend a community college (two year program)
○ Attend a four year university
○ Attend a trade school (such as training to be a car mechanic, electrician, or cosmetologist)
○ Join the military

PART 3: Please read each of the 10 statements below and completely bubble **one choice** that best describes **your opinion**. There are no right or wrong answers.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
3A. My family expects me to go to college.	○	○	○	○	○
3B. I expect to go to college after graduating high school.	○	○	○	○	○
3C. My teachers and counselors expect me to go to college.	○	○	○	○	○
3D. My parents believe I have good enough grades to go to college.	○	○	○	○	○
3E. I believe I have good enough grades to go to college.	○	○	○	○	○
3F. My school strongly promotes all students going to college.	○	○	○	○	○
3G. I feel my family will support me if I want to attend college.	○	○	○	○	○
3H. I feel my friends will support me if I want to attend college.	○	○	○	○	○
3I. I feel my teachers & counselors will support me if I attend college.	○	○	○	○	○
3J. There are options available to help me pay for college.	○	○	○	○	○

***Note:** *The word "college" is referred to here as a 2-year or 4-year institution through which you attain an associate's or bachelor's degree.*

V.1

Vita

Emily Pendergrast Taylor was born and grew up in Wilmington, North Carolina. She obtained a B.A. in Psychology with honors and a minor in English from Wake Forest University in Winston-Salem, North Carolina in 2010. After graduating, Emily attended The University of Tennessee's School Psychology Ph.D. program. In December, 2012, she received a M.S. in Applied Educational Psychology. Emily completed her year-long predoctoral internship through University of Tennessee Health Science Center's Professional Psychology Internship Consortium in Memphis, Tennessee and will receive her Ph.D. in December 2016.