ACHIEVEMENT GOALS OF STUDENTS WITH ADHD

Kenneth E. Barron, Steven W. Evans, Lisa E. Baranik, Zewelanji N. Serpell, and Elizabeth Buvinger

Abstract. Although achievement goal theory is currently one of the dominant theoretical frameworks used to understand and improve student motivation (Brophy, 2004), little work has been done to evaluate the achievement goals of students with ADHD. After an initial review of achievement goal theory, the current study begins to address four research questions: What are the achievement goals of students with ADHD? How do achievement goals of students with ADHD differ from those of students without ADHD? How are achievement goals related to other academic outcome variables for students with ADHD? Can current instructional practices be altered to promote optimal goals and motivation of students with ADHD? Results revealed a number of interesting differences for students with ADHD, especially concerning performance-avoidance goals. Implications are discussed.

KENNETH E. BARRON, *Department of Psychology, James Madison University.*
STEVEN W. EVANS, *Department of Psychology, James Madison University.*
LISA E. BARANIK, *Department of Psychology, James Madison University.*
ZEWELANJI N. SERPELL, *Department of Psychology, James Madison University.*
ELIZABETH BUVINGER, *Department of Psychology, James Madison University.*

Over the past two decades, achievement goal theory has emerged as one of the predominant motivational frameworks for understanding students' achievement motivation (Brophy, 2004; Midgley et al., 1998; Pintrich & Schunk, 2002). Although achievement goal theory has been widely used to understand the motivation of students in a variety of educational settings, we know very little about the achievement goals of students with attention-deficit/hyperactivity disorder (ADHD). Students with ADHD have significantly higher dropout rates, increased frequency of failing grades, and poor academic outcomes compared to youth without ADHD (e.g., Fischer, Barkley, Fletcher, & Smallish, 1993). Furthermore, the school performance of individuals with ADHD is often significantly lower than would be predicted by their cognitive abilities (Hinshaw, 1992).

Achievement goal theory has been found to predict academic performance independent of cognitive ability (Elliot & Church, 1997; Harackiewicz, Barron, Tauer, & Elliot, 2002). Understanding the potential contribution of achievement goals in the typical path towards poor outcomes of children with ADHD could help us develop prevention and intervention programs to reduce the likelihood of poor outcomes for these youth.

Research is needed that can begin to address the following questions: What are the achievement goals of students with ADHD? How do the achievement goals

of students with ADHD differ from those of students without ADHD? How are achievement goals related to other academic outcome variables for students with ADHD? Finally, can current instructional practices be altered to promote optimal goals and motivation of students with ADHD?

Theoretical Background

Achievement goal theory provides a framework for understanding the reasons why we engage in achievement-related behavior and the standards used to evaluate success (Ames, 1992; Dweck & Leggett, 1988; Nicholls, 1984). Thus, rather than simply determining an overall amount or quantity of motivation, achievement goals help us determine the type or quality of someone's motivation.

Different labels have been used by different researchers; however, two general types of achievement goals have been proposed: mastery and performance (see Elliot, 2005, for a review).[1] When pursuing *mastery goals,* the purpose is to develop competence by acquiring new knowledge and skills. Success and failure are judged through self-referential standards or absolute standards of being able to complete a particular task. When pursuing *performance goals,* on the other hand, the purpose is to demonstrate competence relative to others (or to avoid demonstrating incompetence), and success and failure are judged through normative comparisons to others. According to Dweck (1986), the type of achievement goal adopted shapes how students approach, experience, and react to their school work, and has an influential impact on the affect, behaviors, and cognitions they experience.

For example, in one of the first comprehensive reviews of the achievement goal literature, Ames (1992) noted that students pursuing mastery goals used deeper, more elaborate study strategies, selected more challenging tasks, persisted in the face of difficulty, and held more positive attitudes toward learning. In contrast, students pursuing performance goals were more likely to adopt superficial learning strategies, select easier tasks, and engage in maladaptive behavior patterns following difficulty or failure. Therefore, several researchers quickly concluded that mastery goals were the optimal achievement goal for students to pursue.

The perspective that mastery goals are adaptive and performance goals are maladaptive has been labeled the *mastery goal perspective* (see Barron & Harackiewicz, 2001). One obvious implication of this perspective would be to question whether certain student populations who are struggling in school, like students with ADHD, are maximizing their endorsement of mastery goals while minimizing their endorsement of performance goals.

Other researchers disagree with a strict *mastery goal perspective,* suggesting that performance goals can also promote important achievement outcomes because they help orient individuals toward achievement and competence (Harackiewicz, Barron, Pintrich, Elliot, & Thrash, 2002). For example, Wentzel (1991) noted that high school students who adopted both mastery and performance goals had higher GPAs than students who only adopted mastery goals. In fact, several studies have found positive performance goal effects in some situations and for certain individuals (see Barron & Harackiewicz, 2000, for a review). Thus, a number of theorists endorse a *multiple-goal perspective* in which adopting both types of achievement goals may be more adaptive.

Furthermore, more recent work on achievement goal theory suggests that a mastery-performance goal distinction of motivation may be a simplistic dichotomization. For example, Elliot and colleagues (Elliot & Church, 1997; Elliot & Harackiewicz, 1996) partitioned the performance goal construct into *performance-approach goals,* where an individual's goal is to approach a learning opportunity in order to demonstrate competence (e.g., "My goal is to do better than other students") and *performance-avoidance goals,* where an individual's goal is to avoid demonstrating incompetence (e.g., "I just want to avoid doing poorly compared to others"). When these refined measurement scales have been used, maladaptive learning patterns have been found to be more closely associated with performance-avoidance goals and adaptive learning behaviors to be associated with performance-approach goals (Elliot, 2005).[2]

Thus, an alternative implication of the multiple goal perspective would be to question whether certain student populations, like students with ADHD, are endorsing the optimal combination of goals. Perhaps students with ADHD are adopting mastery goals but are not endorsing performance-approach goals. Ultimately, however, it is important to recognize that the optimal combination of goals for achieving academic success for students with ADHD may be different from those endorsed by successful children without such impairment.

Goal Orientations vs. Classroom Goal Structure

Another distinction that has emerged in the achievement goal literature centers on whether it is the goals of the student or the goals being promoted in a classroom environment that are being assessed. In other words, researchers have adopted person-centered approaches that measure the achievement goals that students personally endorse (typically referred to as *goal orientation*) and situation-centered approaches that

measure the goals perceived to be created by a particular classroom and teacher (often referred to as *perceived classroom goal structure* or *classroom goal climate*).

One important implication of this distinction is that the perceived classroom goal structure is argued to shape and influence students' goal orientation. Ames (1992) described classroom structures in terms of how they make certain achievement goals prominent to students through the type of assignments, evaluation practices, and distribution of authority used in the classroom. For example, evaluation practices that normatively compare or track students by level of ability reinforce performance goals. In particular, several researchers have studied how perceived classroom goal structures change as students transition from one educational environment to another, such as the transition from elementary school to middle school (Midgley, 2002). These authors have noted structural changes in middle school that are linked to a decline in personally pursued mastery goal orientations with subsequent negative effects on academic and psychological well-being. For example, rather than remaining with one primary teacher who teaches all subjects to the same group of students, students in middle school are taught by different teachers who have particular expertise in a given subject. Furthermore, students are typically tracked and grouped by ability into higher versus lower sections of particular subjects, making normative comparisons among students more salient for both students and teachers. To counteract this shift in orientations, researchers have attempted interventions that continue to reinforce and promote mastery goal structures in middle school environments (Midgley & Edelin, 1998), as well as studying the impact of promoting mastery and performance-approach goals in a classroom (Linnenbrink, 2005).

Applying Achievement Goal Theory to Students with ADHD

Although researchers have begun to apply achievement goal theory to investigations involving other types of educational disabilities (e.g., see work by Sideridis, 2005a), little research exists on the achievement goal orientations of students with ADHD or their perceptions of classroom goal structures. This is unfortunate because children with ADHD are described as having performance deficits, not skill deficits (Hinshaw, 1992). In other words, they have the necessary skills to function at a higher level, but fail to use them. Specifically, compared to peers without ADHD, these children tend to quit working on academic tasks more often (Hoza, Pelham, Waschbusch, Kipp, & Owens, 2001; Milich & Greenwell, 1991; Milich & Okazaki, 1991) and exhibit greater frustration with tasks (Milich & Greenwell, 1991; Milich & Okazaki, 1991).

Many of the academic behaviors that students with ADHD display seem to be associated with the maladaptive behaviors found in early research on having a performance goal orientation. Thus, students with ADHD may be pursuing performance goals at a higher rate while pursing mastery goals at a lesser rate. However, it is not yet known whether promoting a mastery approach is most conducive to the academic success of youth with ADHD. In order to understand the influence of classroom environments on the achievement goals of youth with ADHD, it is important to determine how students with ADHD perceive their classroom environments. Once the optimal goal orientations for this population are identified, their perception of classroom environments will help guide the development of classrooms conducive to their learning needs.

Interesting, although there is little research using contemporary measures of achievement goals to study students with ADHD (formally comparing and contrasting levels of mastery, performance approach, and performance-avoidance goals), a series of studies have been conducted on children with ADHD utilizing several of the core concepts and research paradigms from which achievement goal theory derived. Specifically, some ADHD researchers have been influenced by the early work of Dweck (e.g., Diener & Dweck, 1978; Dweck, 1975) and her laboratory paradigm of using solvable and unsolvable academic tasks. This work has been used to study learned helplessness and attribution patterns in achievement situations to determine the conditions under which children respond with an *adaptive, mastery* response vs. a *maladaptive, helpless* response. For example, Milich (1994) reviewed a series of studies in which he and his collaborators employed a research paradigm similar to Dweck's to evaluate the response patterns of students with ADHD when faced with success and failure experiences.

In her early work, Dweck found that some children responded adaptively to unsolvable tasks by attributing failure to lack of effort, increasing persistence, and maintaining a positive outlook that they had been presented a challenge to overcome. In contrast, other children responded maladaptively to unsolvable tasks by attributing failure to lack of ability, withdrawing, developing a negative outlook, and avoiding subsequent tasks. Using similar techniques, Milich and his colleagues demonstrated that when faced with unsolvable problems, boys with ADHD displayed several of the characteristics that are associated with a maladaptive, helpless pattern (e.g., students with ADHD were less likely to persist and were more frustrated than students without ADHD) (Milich & Greenwell, 1991; Milich &

Okazaki, 1991). However contrary to predictions, boys with ADHD who made effort attributions consistent with the adaptive, mastery response demonstrated less effort, greater helplessness, and more frequent quitting than boys with ADHD who attributed failure to external causes. Thus, the attributional response that yields adaptive behaviors among students without ADHD (that failure reflects lack of effort and thus can be controlled by giving more effort) did not provide the same benefit for boys with ADHD.

An additional component of this work evaluated the extent to which psychostimulant medication altered the achievement behavior of students with ADHD when faced with solvable and unsolvable problems. Results revealed that students were more likely to persist and experienced less frustration when on medication versus a placebo, especially when confronted with challenging and unsolvable problems (Carlson, Pelham, Milich, & Hoza, 1993; Milich, Carlson, Pelham, & Licht, 1991). In addition, students with ADHD on medication were more likely to make adaptive, mastery patterns of attributions than when taking a placebo. Thus, it was argued that medication helped promote (or normalize) a more adaptive motivational response. These studies involving motivational constructs that were precursors to contemporary achievement goal theory (as well as others replicating these findings for girls with ADHD, see Dunn & Shapiro, 1999) showcase the utility of incorporating motivational variables to further our understanding of achievement behavior among students with ADHD as well as assessing the efficacy of different interventions (like medication) for promoting better academic success for these students.

In addition to her early work on learned helplessness, which provided the groundwork for achievement goal theory, Dweck played a pivotal role in developing the achievement goal construct, which she argued was a better explanatory construct for capturing when students are likely to display adaptive or maladaptive learning patterns (Dweck, 1986; Dweck & Leggett, 1988). However, investigations that have attempted to evaluate more contemporary measures of achievement goals on student samples with ADHD are lacking.

One of the few studies that does provide an initial description was conducted by Carlson, Booth, Shin, and Canu (2002), who examined motivational variables in children with ADHD through self, parent, and teacher ratings. Although a range of different motivational instruments were utilized, one measure included an assessment of children's self-reported mastery goals and performance goals (Schunk, 1996). No differences were found for mastery goal adoption between children with ADHD and a non-ADHD control group; however, differences in performance goal adoption were found

between children with various subtypes of ADHD, with children meeting criteria for ADHD-combined type endorsing more performance goals than children with ADHD-inattentive type. In addition, ratings provided by teachers and parents provided two other measures that could be considered a proxy for students' level of mastery and performance goal pursuit (Stinnett & Oehler-Stinnett, 1992). Both teachers and parents perceived students with ADHD as having lower levels of mastery goals and lower levels of performance goals than students without ADHD.

Using a different approach to identify goal orientations, Dunn and Shapiro (1999) chose a forced-choice procedure developed by Dweck to evaluate the goal pursuit of students with ADHD. Specifically, participants were given two descriptions that either highlighted working on a task that was more mastery goal-oriented or a task that was more performance goal-oriented and were asked to choose which of the two tasks they would prefer. The results revealed that students with ADHD preferred working on the performance goal-oriented task more than a control group of students without ADHD.

A major limitation of each of these studies is that measures typically used to differentiate more contemporary distinctions of achievement goals (like goal orientation vs. classroom goal structure or mastery vs. performance-approach vs. performance-avoidance goals) have not been used with this population. A next step in the research process would be to identify the goal orientations and perceptions of goals that are promoted in classroom environments that may be unique to this population and then examine how achievement goals are related to academic achievement patterns. Understanding the goals for students with ADHD will provide important clues on how to improve academic success for this population of students who are at such a high risk for school failure and dropout.

Current Study

To investigate the role of achievement goals among students with ADHD, middle school students with a diagnosis of ADHD completed the goal subscales from the Patterns of Adaptive Learning Survey (PALS; Midgley et al., 2000) at two time points (in the beginning of the academic year and at the end). The PALS is one of the most widely used tools for assessing achievement goals in middle schools (see Midgley, 2002). It provides an assessment of students' goal orientations as well as their perceptions of classroom goal structures. In addition, it differentiates between mastery goals, performance-approach goals, and performance-avoidance goals. While other goal measures have been developed, we specifically used the PALS

to be able to connect to the already large body of findings based on this assessment tool.

The purpose of the current study was to address the following three research questions:

1. What are the goal orientations and perceptions of classroom goal structure for students with ADHD?
2. How do goal orientations and perceptions of classroom goal structure for students with ADHD differ from those of students without ADHD?
3. How do goal orientations and perceptions of classroom goal structure relate to other academic variables for students with ADHD?

Regarding the first research question, we would expect that students who are struggling academically in school are adopting less optimal goal orientations and perceive less optimal classroom goal structures. With regard to the second research question, we would further predict that students with ADHD are less mastery goal-oriented and/or more performance-avoidance goal-oriented than a non-ADHD comparison group. Children with performance-avoidance orientations have been described as having experienced a higher number of negative life events and a greater likelihood of producing negative life events than children with other goal orientations (Sideridis, 2005b). This propensity to experience and contribute to negative life events is very characteristic of youth with ADHD as they experience frustration and failure with academics and social interactions on a regular basis. Furthermore, the pattern of academic behavior noted in past studies of students with ADHD (e.g., demonstrating less persistence, experiencing greater frustration) are characteristic of children who would be less mastery-oriented and more performance-avoidant (Elliot, 2005).

Finally, regarding our third research question, we would expect that goal orientation and perceptions of the classroom goal structures would be related similarly for students with ADHD as for non-ADHD populations. Specifically, we expected that less optimal goal orientations and less optimal classroom goal structures would be linked to maladaptive outcomes. However, based on past motivational research with an ADHD population (e.g., Milich, 1994), the relationship between motivational variables like achievement goals and academic functioning may be different for children with ADHD than for peers without the disorder. To investigate relationships between achievement goal variables and other academic outcome variables, students' GPA and responses to additional subscales from the PALS were collected, including academic self-efficacy and other academically related outcomes associated with maladaptive learning (such as self-handicapping, avoiding novelty, and skepticism about school). The results of these additional subscales provide researchers with external criteria relevant for investigating adaptive and maladaptive outcomes associated with particular goal adoption (see Midgley, 2002). We were particularly interested in evaluating the maladaptive scales of the PALS due to the difficulty in school experienced by the current ADHD sample.

METHOD

Participants

Seventy students in sixth grade, ranging in age from 10 to 13 years old, from five middle schools in the Shenandoah Valley of Virginia, participated in the study. Data were collected during comprehensive evaluations for a longitudinal study of the effects of a school-based treatment program for children with ADHD. Parents referred their children to the study in response to recruitment mailings requesting children with problems related to impulsivity, hyperactivity, or inattention.

Eligibility criteria for the longitudinal study included (a) meeting diagnostic criteria for one subtype of ADHD, (b) having an IQ equal to or greater than 80, and (c) not meeting diagnostic criteria for bipolar disorder or schizophrenia. Participants for the current study included only students with complete data who were accepted into the program between the months of September and December (first semester of school) and who returned for a follow-up visit between the months of March and May (second semester of school), resulting in a final sample size of 50. Descriptive data regarding participants are presented in Table 1.

Measures Used to Determine Eligibility

Diagnostic Interview Schedule for Children (DISC-IV; Shaffer, Fisher, Lucas, Dulcan, & Schwab-Stone, 2000). Administered during the initial visit to establish participant eligibility, the DISC-IV is a structured diagnostic interview used to evaluate children for ADHD and other psychiatric disorders (e.g., major depression and oppositional defiant disorder) based on DSM-IV diagnostic criteria. Research assistants were trained to administer the DISC-IV to the parents, as well as a substance use section to the participants. The instrument has adequate reliability and validity evidence (McGrath, Handwerk, Armstrong, Lucas, & Friman, 2004; Shaffer et al., 2000), and has been widely used for diagnostic purposes in studies of children with ADHD (The MTA Cooperative Group, 1999).

Kaufman Brief Intelligence Test (K-BIT; Kaufman & Kaufman, 1990). The K-BIT is an individually administered measure of verbal and nonverbal intelligence for children, adolescents, and adults. This test, also used

Table 1
Descriptive Statistics of Sample Demographic Variables

N	**50**
Male	74.0%
Age	$M = 11.70$ ($SD = .47$)
Full Scale IQ	$M = 104.56$ ($SD = 12.23$)
WIAT - Word Reading	$M = 99.40$ ($SD = 12.67$)
WIAT - Numerical Operations	$M = 96.38$ ($SD = 14.09$)
WIAT - Spelling	$M = 97.70$ ($SD = 13.94$)
Race	
Caucasian	96%
Hispanic or Latino	2%
Other	2%
Type of ADHD	
Inattentive Type	36%
Hyperactive/Impulsive Type	0%
Combined Type	64%
Any Comorbid Disorder	74%
ODD	66%
CD	12%
Mania/Hypomania	4%
Major Depression	2%
Dysthymic Disorder	2%
GPA at end of 1st Semester	$M = 2.41$ ($SD = .95$)
GPA at end of 2nd Semester	$M = 2.27$ ($SD = .96$)

Note. WIAT=Wechsler Individual Achievement Test, ODD=Oppositional Defiant Disorder, and CD=Conduct Disorder.

for eligibility, was administered at the initial visit. The K-BIT has adequate reliability and validity evidence (Kaufman & Kaufman, 1990) and yields standard scores comparable to those provided by comprehensive intelligence batteries but requires only 15 to 30 minutes to administer.

Wechsler Individual Achievement Tests-II (WIAT-II; The Psychological Corporation, 2001). The WIAT-II is a measure of academic achievement that has been standardized with a sample of school-age children carefully selected to reflect the overall population of the United States. The revised version of this measure was administered during the initial visit. Studies demonstrate adequate test-retest reliability for students falling within the same age range as those targeted in the current study (The Psychological Corporation, 2001).

Disruptive Behavior Disorders Rating Scale (DBD; Pelham, Evans, Gnagy, & Greenslade, 1992). Administered at both the initial and the follow-up visits to track the severity of participants' ADHD symptoms, the DBD is a symptom rating scale completed by parents. The scale includes 18 symptoms of ADHD (e.g., "Is often easily distracted by extraneous stimuli"), and parents are asked to indicate whether a behavior is "not at all," "just a little," "pretty much," or "very much" characteristic of a child. An endorsement of "pretty much" or "very much" is considered to indicate the presence of a symptom.

Impairment Rating Scale (IRS; Evans, Allen, Moore, & Strauss, 2005). The IRS is a brief rating scale completed by parents that assesses their child's general functioning across a variety of life domains, including

relationships with peers, siblings, parents; academic functioning; self-esteem; family impact; and overall severity. Parents indicate the degree to which they believe functioning in these domains is or is not a problem for their child and requires or does not require additional treatment. A 6-point visual response scale is used, and scores of 4-6 indicate impaired behavior for the given domain. In the current study, parents completed the IRS at the initial visit.

Measures of Achievement Goals and Achievement-Related Outcomes

Pattern of Adaptive Learning Scales (PALS; Midgley et al., 2000). Administered at both the initial and follow-up visits, the PALS consists of a set of measures based on contemporary approaches to studying students' achievement motivation using achievement goal theory. The version of the PALS administered for the current study included 11 dimensions: Mastery Goal Orientation, Performance-Approach Goal Orientation, Performance-Avoidance Goal Orientation, Classroom Mastery Goal Structure, Classroom Performance-Approach Goal Structure, Classroom Performance-Avoidance Goal Structure, Academic Efficacy, Academic Self-Handicapping Strategies, Avoiding Novelty, Cheating Behavior, Disruptive Behavior, and Skepticism About the Relevance of School for Future Success. A Work Avoidance subscale was added to evaluate an alternative goal orientation that is currently debated as another important achievement goal to evaluate (Barron & Harackiewicz, 2003). Specifically, work avoidance refers to an orientation in an achievement setting to minimize the amount of effort or work that one must exert. See Table 2 for brief descriptions of each dimension.

Each item on the PALS was rated on a 5-point Likert-type scale with 1 being "Not at all True" and 5 being "Very True." Strong reliability and validity evidence for the PALS was reported by Midgley et al. (1998). Although typically administered as a paper-and-pencil measure, in the current study the scale was administered via computer. Participants were instructed to read the question on the screen while listening to the entire question being read to them though headphones, and then to enter the number on the keypad that corresponded to the response on the screen that they felt best applied to them. Once a response was registered, the computer automatically displayed and played the next question, so there was no opportunity to alter responses once entered. Participants were expected to provide a global rating for their classes, rather than rating one specific class, as has been the case in previous studies conducted with similar age groups (Midgley et al., 2000).

Grade point average (GPA). GPA was computed at the end of the first and at the end of the second semester by taking the average of students' grades reported for each of four core subjects: science, math, history, and reading. All schools used a 0 to 4.0 grading scale and the same percentage cutoffs to assign letter grades.

Procedures

Parents contacted the research center in response to recruitment mailings, and potential participants were pre-screened for eligibility using parent ratings on the DBD. If parent ratings indicated that the child met the pre-screening criteria (likely to meet diagnostic criteria for ADHD), an evaluation was scheduled for the parent and child at the Alvin V. Baird Attention and Learning Disabilities Center (ALDC). Parents were asked to distribute the teacher versions of the DBD and the IRS to each of their child's four core course teachers (science, math, history, and reading). The rating scales were accompanied by a self-addressed stamped envelope and a cover letter asking teachers to send the completed rating scales directly to the ALDC.

At the initial visit, an explanation of the research procedures was provided, and participants and their parents signed informed consent and assent forms. After the informed consent procedures, the evaluations were conducted. The initial evaluation lasted 6-8 hours and encompassed questionnaires, computer assessments, and clinical interviews with both the child and parent, administered by trained research assistants. To help guard against fatigue during the evaluation, participants were not engaged in the same activity for extended periods of time. In addition, several short breaks were included throughout the session as well as an hour-long lunch break.

As highlighted above, a number of criteria were used during the initial assessment to determine if the child was eligible to participate. The initial visit encompassed a full eligibility assessment, including diagnostic interviews conducted with both the child and parent to determine if participants met DSM-IV criteria for one subtype of ADHD. DSM diagnoses require the presence of impairment in functioning related to diagnoses and evidence of the presence of symptoms to an extent that is inconsistent with developmental levels. The DISC-IV assesses both impairment and symptoms, and all participants had to meet diagnostic criteria for a subtype of ADHD on this measure. In addition, participants also had to meet criteria based on parent and teacher ratings using the DBD and IRS. Impairment across setting was considered present if ratings on the IRS by parents and at least one teacher fell in the impaired range (4 or above). Symptoms were considered present if a parent and at least one teacher reported the symptoms on the

Table 2
Brief Description of PALS Dimensions

Dimensions	Brief Definition
PERSONAL ACHIEVEMENT GOAL ORIENTATIONS	
Mastery Goal Orientation	Students' purpose in learning is to develop competence in their coursework. (alpha=.85)
Performance-Approach Goal Orientation	Students' purpose in learning is to demonstrate their competence in their coursework. (alpha=.89)
Performance-Avoidance Goal Orientation	Students' purpose in learning is to avoid demonstrating incompetence in their coursework. (alpha=.74)
PERCEIVED CLASSROOM GOAL STRUCTURES	
Classroom Mastery Goal Structure	Students' perceptions that developing competence is emphasized in the classroom and by teachers. This climate focuses on self-improvement, understanding the material, and learning from mistakes. (alpha=.76)
Classroom Performance-Approach Goal Structure	Students' perceptions that demonstrating competence in the subject is emphasized in the classroom and by teachers. This climate focuses on getting good grades, high scores, and right answers. (alpha=.70)
Classroom Performance-Avoidance Goal Structure	Students' perceptions that avoiding demonstrating incompetence in the subject is emphasized in the classroom and by teachers. This climate focuses on not doing worse than others, not making mistakes, and not looking dumb. (alpha=.83)
ACADEMIC RELATED PERCEPTIONS, BELIEFS, AND STRATEGIES	
Academic Efficacy	Students' feelings of academic competence and ability to do their coursework. (alpha=.78)
Skepticism About the Relevance of School for Future Success	Students' belief that doing well in school will not help them achieve success in the future. (alpha=.83)
Disruptive Behavior	Students' use of behaviors that disrupt or disturb the class. (alpha=.89)
Cheating Behavior	Students' use of cheating in class. (alpha=.87)
Avoiding Novelty	Students' preference for avoiding new or unfamiliar work in class. (alpha=.78)
Academic Self-Handicapping Strategies	Students' use of strategies that prove that circumstances are at fault for low performance rather than lack of ability. (alpha=.84)

Note. Reported alphas are from the PALS manual (Midgley et al., 2000).

DBD as present "pretty much" or "very much" of the time. When teacher ratings were not available, as was the case for three participants, only the parent report was considered. These procedures are consistent with best practices in diagnosing children and adolescents with ADHD (Pelham, Fabiano, & Massetti, 2005). If the results of the evaluation indicated that the child met criteria for any subtype of ADHD, did not meet criteria for a diagnosis of bipolar disorder or schizophrenia, and had an IQ of 80 or greater, he was invited to participate in the larger treatment study as well as this study.

The follow-up visit was scheduled approximately six months after the initial visit, and lasted approximately four hours. This session was considerably shorter than the initial session because none of the diagnostic inter- views and assessments or IQ and achievement tests was administered.

RESULTS

Profiling the Achievement Goals of Students with ADHD

To address our initial research question of profiling the goal orientations and perceptions of classroom goal structure for our sample of students with ADHD, we first conducted a series of descriptive statistics on each of the goal variables assessed. Furthermore, because we conducted goal assessments both at the beginning and the end of the 6th-grade academic year (referred to as Time 1 and Time 2, respectively), we were able to profile students with ADHD twice and to look at potential changes in goals occurring during their first year in mid-

Table 3

Descriptive Statistics, Reliabilities, and Results from Paired-Samples t-Tests Comparing Time 1 and Time 2 Variables

Variable	Mean	*SD*	Alpha	Paired-Samples *t*-Test *p*-Value
Mastery Goal Orientation				
Time 1	4.32	.62	.75	.14
Time 2	4.50	.76		
Performance-Approach Orientation				
Time 1	2.85	1.05	.87	.84
Time 2	2.88	1.27		
Performance-Avoidance Orientation				
Time 1	3.47	1.06	.79	.05
Time 2	3.10	1.21		
Mastery-Approach Classroom Structure				
Time 1	4.32	.628	.64	.50
Time 2	4.39	.752		
Performance-Approach Classroom Structure				
Time 1	2.85	.73	.59	.93
Time 2	2.88	1.27		
Performance-Avoidance Classroom Structure				
Time 1	2.46	.98	.82	.82
Time 2	2.41	1.21		

Note. The possible range of scores for each variable was 1 to 5.

Table 4

Descriptive Statistics for ADHD Inattentive and Combined Subtypes and Results from t-Tests

Variable	Mean	SD	p-Value Time 1	Cohen's d Time 1	p-Value Time 2	Cohen's d Time 2
Mastery Orientation						
Inattentive	4.47	.49	.23	.36	.39	.26
Combined	4.24	.67				
Performance-Approach Orientation						
Inattentive	2.80	1.11	.78	.08	.92	.03
Combined	2.89	1.03				
Performance-Avoidance Orientation						
Inattentive	3.27	1.04	.31	.30	.19	.39
Combined	3.59	1.07				
Mastery-Approach Classroom Structure						
Inattentive	4.22	.72	.42	.24	.75	.09
Combined	4.38	.57				
Performance-Approach Classroom Structure						
Inattentive	2.77	.86	.56	.17	.92	.03
Combined	2.90	.65				
Performance-Avoidance Classroom Structure						
Inattentive	2.43	1.00	.87	.05	.98	.01
Combined	2.48	.98				

Note. Descriptive means and *SD* scores are presented for Time 1.

dle school. The means and standard deviations for both Time 1 and Time 2 goal variables are summarized in Table 3.

We then ran a series of one-way, repeated-measures ANOVAs to determine if students with ADHD adopted one type of goal orientation more than another and to determine if they perceived a particular type of classroom goal structure as being promoted more than another.

Regarding goal orientation, students with ADHD adopted significantly different levels of goal orientation across both Time 1, $F(2, 98) = 42.25$, $p<.001$ ($\eta^2=.46$), and Time 2, $F(2, 98) = 49.00$, $p<.001$ ($\eta^2=.50$). Mastery goal orientations ($M = 4.32$ and $M = 4.50$ for Time 1 and Time 2, respectively) were the goal most likely to be adopted across both time frames, and performance-approach goal orientations ($M = 2.85$ and $M = 2.88$,

for Time 1 and Time 2, respectively) were least likely to be adopted across both time frames. Performance-avoidance goal orientations fell between mastery and performance-approach goal adoption across both time frames ($M = 3.47$ and $M = 3.10$ for Time 1 and Time 2, respectively). Pairwise comparisons using a Bonferroni adjustment showed that all three goal orientations were significantly different from each other at the $p<.001$ level at both Time 1 and Time 2.

Regarding perceptions of classroom goal structures, students with ADHD perceived significantly different levels of classroom goal structures across Time 1, $F(2, 98)=91.59$, $p<.001$ ($\eta^2=.65$), and Time 2, $F(2, 98)=95.89$, $p<.001$ ($\eta^2=.66$). Students with ADHD were more likely to perceive their classrooms as being mastery-oriented ($M = 4.32$ and $M = 4.39$, for Time 1 and Time 2, respectively) and least likely to perceive their classrooms as

being performance-avoidance oriented (M = 2.46 and M = 2.42, for Time 1 and Time 2, respectively). Perceptions of performance-approach goal structures fell between mastery and performance-avoidance goal perceptions. Pairwise comparisons using a Bonferroni adjustment showed that all three perceptions of classroom goal structures were significantly different from each other at the $p<.001$ level at Time 1 and Time 2.

Next, we investigated whether there were any additional differences in goal orientation or perception of classroom goal structures according to type of ADHD (inattentive vs. combined hyperactive and inattentive) or severity of ADHD symptoms (as measured by the DBD; Pelham et al., 1992). Type of ADHD was a dichotomous variable, so we used a series of independent t-tests. Severity of ADHD symptoms was a continuous variable, so we used regression analyses. As shown in Table 4 and 5, no significant relationships emerged, suggesting that goal orientations and perceived goal structures did not differ as a function of subtype or severity.

Finally, to investigate any goal changes that might have occurred from the beginning of the academic year to the end, we conducted a series of paired sample t-tests for the goal variables across Time 1 and Time 2.

Regarding goal orientation variables, only performance-avoidance goals were significantly different across time, $t(49)$ = 2.0, p = .05, with performance-avoidance goal orientations being less endorsed at Time 2 than at Time 1. Regarding classroom goal structure variables, no significant changes emerged across time. Thus, achievement goal adoption and perceptions of the achievement goal environment remained relatively stable across students' first year in middle school.

Comparing the Achievement Goals of Students with ADHD to Those of Non-ADHD Samples

In addition to profiling the goal orientations and perceptions of classroom goal structure of our sample of students with ADHD, we also examined how the goals of students diagnosed with ADHD compared to the goals of students who had not been diagnosed with ADHD. Thus, we compared our ADHD sample of 6th-grade students to two normative samples. The first sample came from the PALS manual (Midgley et al., 2000), which reported means from a sample of 6th-grade students from Michigan. The second sample came from 6th-grade students living in the same geographic region as the students diagnosed with ADHD. The demographic characteristics for the PALS sample were more

Table 5
Regression Analyses for Severity of ADHD

Variable	Beta Time 1	p-Value Time 1	R^2 Time 1	Beta Time 2	p-Value Time 2	R^2 Time 2
Mastery Orientation	-.18	.20	.034	.06	.70	.06
Performance-Approach Orientation	-.08	.60	.006	.10	.51	.01
Performance-Avoidance Orientation	-.02	.92	.000	.15	.30	.02
Mastery-Approach Classroom Structure	-.25	.08	.063	.00	1.00	.00
Performance-Approach Classroom Structure	.027	.85	.001	.18	.22	.03
Performance-Avoidance Classroom Structure	-.157	.28	.025	.16	.26	.03

Note. Beta values represent the standardized coefficients.

Table 6
Descriptive Statistics for Two Separate Normative Non-ADHD Comparison Samples

Variable	Mean	SD
Mastery Goal Orientation		
PALS	4.15	.88
Local	4.13	.84
Performance-Approach Orientation		
PALS	2.46	1.15
Local	3.87	.90
Performance-Avoidance Orientation		
PALS	2.40	1.04
Local	3.45	1.03
Mastery-Approach Classroom Structure		
PALS	4.11	.72
Local	4.17	.80
Performance-Approach Classroom Structure		
PALS	3.34	.98
Local	3.30	.75
Performance-Avoidance Classroom Structure		
PALS	2.03	.90
Local	2.67	.99

Note. The possible range of scores for each variable was 1 to 5.

heterogeneous in terms of race and gender than the ADHD sample in the current study. Our local sample was more similar to our ADHD sample in terms of demographic characteristics and involved 42 students.

Descriptive statistics for the normative samples for each of achievement goal variables are reported in Table 6. Differences in achievement goals were compared between the ADHD sample and the PALS manual sample through a series of one-sample *t*-tests. A one-sample *t*-test allows a researcher to determine if the mean of a single sample is significantly different from some theoretical value.

In this case, we used the reported means for each of the goal variables in the PALS manual as the theoretical values that we tested our sample against. For example, to determine if there were significant differences between performance-avoidance goal orientation between our ADHD sample and the PALS sample, we compared the mean for our ADHD sample (*M's* = 3.40 and 3.10 for Time 1 and Time 2) against the published

mean in the PALS manual for performance-avoidance goal orientation ($M = 2.40$). Because we did not know what time of year the goal variables were collected for the PALS manual, we compared the PALS manual data to both our Time 1 and Time 2 data. The results from these analyses are reported in Table 7.

Results from one-sample *t*-tests showed that the ADHD sample had significantly higher performance-approach and performance-avoidance goal orientations than the PALS manual sample at both Time 1 and Time 2. In addition, the ADHD sample had marginally higher mastery goal orientations at Time 1 than the PALS manual sample. Furthermore, the ADHD sample perceived the classroom to be more mastery-oriented, less performance-approach oriented, but more performance-avoidance oriented at Time 1 and Time 2.

We adopted a different approach when we compared differences in achievement goals between the ADHD sample and our local normative sample. Because we collected our local sample and had access to the actual

data, we used more traditional comparisons of independent-sample *t*-tests. Furthermore, because the local normative sample was surveyed at the end of the school year, we limited our comparisons to the Time 2 data of our ADHD sample. The results from these analyses are also reported in Table 7.

Compared to the local sample, the ADHD sample had lower performance-approach goals, t (90) = 3.36, $p <$ .001. The ADHD sample also perceived the classroom to be less performance-approach oriented, t (90) = 2.68, p = .009. In sum, both normative samples and the ADHD sample endorsed mastery achievement goals the most. However, both normative samples endorsed per-

formance-approach and performance-avoidance goals at similar levels, whereas the ADHD students endorsed performance-avoidance goals more than performance-approach goals.

Relationship of Achievement Goals to Academic Outcome for Students with ADHD

To address the third research question regarding the relationships between achievement goals and academic behaviors for students with ADHD, we first calculated zero-order correlations. The correlation matrix in Table 8 summarizes the results for both Time 1 and Time 2 data collections (variables collected at Time 1 are

Table 7

Results of t-Tests Comparing Normative Samples to ADHD Sample

Variable	*p*-Value PALS vs. ADHD at Time 1	*p*-Value PALS vs. ADHD at Time 2	*p*-Value Local vs. ADHD at Time 2
Mastery Orientation			
PALS	.053	.346	–
Local	–	–	.136
Performance-Approach Orientation			
PALS	.011	.023	–
Local	–	–	.008
Performance-Avoidance Orientation			
PALS	<.001	<.001	–
Local	–	–	.223
Mastery-Approach Classroom Structure			
PALS	.022	.011	–
Local	–	–	.178
Performance-Approach Classroom Structure			
PALS	<.001	<.001	–
Local	–	–	.009
Performance-Avoidance Classroom Structure			
PALS	.003	.029	–
Local	–	–	.286

Note. Descriptive means and *SD* for the ADHD sample are reported in Table 3; descriptive means and *SD* for the PALS and LOCAL samples are reported in Table 6.

Table 8

Correlation Matrix of Goal Orientations, Perceptions of Classroom Goal Structure, and Achievement Outcome Variables

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	M	–	.20	-.01	.58	.16	-.20	.36	.08	-.36	-.26	-.24	-.11	-.46	.11
2	PAP	.23	–	.49	.24	.27	.21	.20	.11	.12	-.20	-.18	-.03	-.17	-.02
3	PAV	.20	.59	–	-.10	.45	.36	.09	-.16	.35	-.23	-.15	-.06	.11	.32
4	CM	.74	.36	.46	–	.17	-.08	.30	-.07	-.35	-.18	-.19	-.07	-.28	.32
5	CPAP	.18	.51	.47	.43	–	.39	.06	.18	.30	-.05	-.18	-.13	-.15	.13
6	CPAV	.05	.50	.67	.20	.57	–	-.04	.16	.33	-.08	.05	-.01	.17	.05
7	AE	.54	.02	.00	.47	-.04	-.15	–	-.05	-.36	-.17	-.32	-.14	-.36	.15
8	SH	-.28	.12	.17	-.06	.24	.32	-.22	–	.15	.24	.20	.19	.11	-.47
9	AN	-.21	.07	.31	-.07	.33	.40	-.45	.46	–	.12	.26	.20	.40	-.12
10	SRS	-.23	.02	.09	-.21	.34	.34	-.61	.32	.57	–	.16	-.18	.30	.03
11	DB	-.26	.10	.18	-.03	.34	.24	-.20	.44	.46	.29	–	.27	.38	-.25
12	CB	-.50	-.11	-.13	-.34	.02	-.06	-.33	.46	.29	.17	.58	–	.07	-.13
13	WAV	-.01	.14	-.17	-.06	.07	-.07	.04	-.04	-.09	-.28	.02	.08	–	-.03
14	GPA	.11	-.23	-.06	.15	-.06	-.19	.17	-.28	-.40	-.05	-.41	-.31	-.07	–

Note. M = mastery goal orientation, PAP = performance-approach goal orientation, PAV = performance-avoidance goal orientation, CM = mastery classroom goal structure, CPAP = performance-approach classroom goal structure, CPAV = performance-avoidance classroom goal structure, AE = academic efficacy, SH = academic self-handicapping strategies, AN = avoiding novelty, SRS = skepticism about the relevance of school for future success, DB = disruptive behavior, CB = cheating behavior, WAV = work avoidance, GPA = grade point average. Correlations from Time 1 are reported at the top right of the matrix and correlations from Time 2 are reported at the bottom left.

reported in the top right of the correlational matrix and variables collected at Time 2 are reported in the bottom left of the matrix).

Mastery goal orientations. At Time 1, mastery goal orientations were positively related to adaptive variables, such as academic efficacy ($r = .36$), and were negatively correlated with maladaptive variables, such as avoiding novelty ($r = -.36$), skepticism about the relevance of school ($r = -.26$), disruptive behavior ($r = -.24$), and work-avoidance ($r = -.46$). Performance-approach goal orientations were not strongly correlated with academic outcome variables, with its highest correlations being only -.20 with disruptive behavior and .20 with academic efficacy. As expected, performance-avoidance goal orientations were positively correlated with maladaptive academic variables like avoiding novelty ($r = .35$); however, surprisingly, they were also positively correlated with GPA ($r = .32$) and negatively correlated with skepticism about the relevance of school ($r = -.23$). This has not been found in past research using normative samples.

At Time 2, mastery goal orientations again were related positively to adaptive academic behaviors like academic efficacy ($r = .54$) and negatively to a wide variety of maladaptive academic behaviors, such as cheating behavior ($r = -.50$). Similar to Time 1, performance-approach goal orientations were not strongly related to the other academic variables at Time 2, except they now shared a negative correlation with GPA. Finally, performance-avoidance goal orientations were again positively related to avoiding novelty ($r = .31$), but were not as linked to other academic variables.

Perceived mastery classroom goal structure. At Time 1, perceived mastery classroom goal structures were associated with adaptive variables, such as academic efficacy ($r = .47$) and GPA ($r = .32$), and were negatively correlated with maladaptive variables, such as avoiding novelty ($r = -.35$) and work avoidance ($r = -.28$). Perceived performance-approach classroom goal structures were not strongly associated with other academic variables except for being positively associated with avoiding novelty ($r = .30$). Similarly, perceived performance-avoidance classroom goal structures were not strongly associated with other academic variables except for being positively associated with avoiding novelty ($r = .24$).

At Time 2, perceived mastery classroom goal structures again were associated with adaptive variables, such as academic efficacy ($r = .30$), and negatively correlated with maladaptive variables, such as cheating behavior ($r = -.34$) and skepticism about the relevance of school ($r = -.21$). In contrast to Time 1, both perceived performance-approach and performance-

avoidance classroom goal structures were more clearly associated to academic outcomes. Specifically, performance-approach classroom goal structures were positively associated with a range of maladaptive outcomes, such as self-handicapping ($r = .24$), avoiding novelty ($r = .33$), skepticism about relevance of school ($r = .34$), and disruptive behaviors ($r = .34$). Similarly, performance-avoidance classroom goal structures were positively associated with maladaptive outcomes like self-handicapping ($r = .32$), avoiding novelty ($r = .40$), skepticism about relevance of school ($r = .34$), disruptive behaviors ($r = .24$), and GPA ($r = -.19$).

Regression Analyses

Although correlations provide a first step in understanding the pattern of associations between variables, they are limited in their ability to evaluate and test the impact of pursuing multiple goals (see Barron & Harackiewicz, 2001, for a review on how to test for multiple achievement goal effects). Therefore, to more thoroughly investigate the potential additive and interactive effects of achievement goals, we conducted a series of multiple-regression analyses.

First, we tested a regression model that simultaneously included all three goal orientation variables to look at the independent and interactive effects of goal orientations on each of our academic outcomes. Second, we tested a regression model that included all three perceived classroom goal structure variables to look at the independent and interactive effects of classroom goal structures on each outcome. We thought testing separate regression models would best honor past research using normative samples that may have adopted a goal orientation approach vs. a classroom goal structure approach and would allow cleaner comparisons with our present sample of ADHD students to other studies using normative samples.

In addition, because we collected data at two separate points during the school year, we conducted a set of regressions with Time 1 variables and another set of regressions with Time 2 variables. We followed recommendations by Aiken and West (1991) and Frazier, Tix, and Barron (2004) to test for the main and interactive effects of our goal variables, such as standardizing all continuous variables and using standardized variables to calculate interaction terms. If interactions were significant, we calculated predicted values to determine the nature of the interaction. However, due to our limited pool and sample size of ADHD students, it is important to note that our power to detect interactive effects was low. We report only the significant effects that emerged from each model. We also report squared semi-partial coefficients (sr^2) to provide an index of effect size for each effect.

Goal Orientation Models

To investigate the effects of goal orientations on academic efficacy, self-handicapping, avoiding novelty, skepticism about the relevance of school, disruptive behavior, cheating behavior, work avoidance, and GPA, we tested a model that included the main effect terms for mastery, performance-approach, and performance-avoidance goal orientations as well as the two-way interactions between these terms. In addition, we included IQ score as a covariate in all goal orientation analyses to look at the role of participants' motivation above and beyond their cognitive ability.

Time 1. On avoiding novelty, the overall model was significant, $F(7, 42)=2.26$, $p=.048$ ($R^2=.27$). There were main effects for both mastery goal orientations, $F(1, 42)=4.23$, $p=.046$ ($B=-.34$, $sr^2=.07$), and performance-avoidance goal orientations, $F(1, 42)=5.54$, $p=.023$ ($B=.38$, $sr^2=.10$). Students who reported higher levels of mastery goals were less likely to avoid novelty, whereas students who reported higher levels of performance-avoidance goals were more likely to avoid novelty.

On work avoidance, the overall model was significant, $F(7,42)=2.38$, $p=.039$ ($R^2=.28$). A main effect was revealed for mastery goal orientation, $F(1,42)=9.47$, $p=.004$ ($B=-.51$, $sr^2=.16$). Students adopting higher levels of mastery goals reported less work avoidance.

On GPA, the overall model was nearly significant, $F(7,42)=2.15$, $p=.059$ ($R^2=.26$). A main effect was found for performance-avoidance goal orientations, $F(1, 42)=6.68$, $p=.013$ ($B=.42$, $sr^2=.12$). Students who reported higher levels of performance-avoidance goals had higher GPAs.

Time 2. On academic efficacy, the overall model was significant, $F(7,42)=3.08$, $p=.010$ ($R^2=.34$). A main effect was found for mastery goal orientations, $F(1, 42)=7.31$, $p=.010$ ($B=-.53$, $sr^2=.11$). Students reporting higher levels of mastery goal orientation indicated higher levels of academic efficacy.

On self-handicapping, the overall model was also significant, $F(7, 42)=2.57$, $p=.027$ ($R^2=.30$). A main effect was found for mastery goal orientations, $F(1, 42)=4.64$, $p=.037$ ($B=-.43$, $sr^2=.08$). Students reporting higher levels of mastery goal orientation indicated lower levels of self-handicapping.

On avoiding novelty, the overall model was significant, $F(7, 42)=2.97$, $p=.013$ ($R^2=.33$). A main effect was revealed for performance-avoidance goal orientations, $F(1, 42)=10.37$, $p=.002$ ($B=.53$, $sr^2=.17$). Students reporting higher levels of performance-avoidance goals were more likely to avoid new activities and challenges in school. In addition, the interaction of performance-approach and performance-avoidance goals was significant, $F(1, 42)=4.16$, $p=.048$ ($B=-.33$, $sr^2=.07$). The pattern of the interaction revealed that students who had higher performance-avoidance and lower performance-approach goals were the most likely to avoid novelty.

On cheating behavior, the overall model was significant, $F(7, 42)=2.48$, $p=.032$ ($R^2=.29$). Mastery goals, $F(1, 42)=5.18$, $p=.028$ ($B=-.46$, $sr^2=.09$), were a significant predictor. Student who were higher on mastery goals were less likely to cheat.

On work avoidance, the overall model was significant, $F(7, 42)=2.64$, $p=.024$ ($R^2=.31$). Mastery goals, $F(1, 42)=5.59$, $p=.023$ ($B=-.47$, $sr^2=.09$), performance-approach goals, $F(1, 42)=8.63$, $p=.005$ ($B=.544$, $sr^2=.14$), and performance-avoidance goals, $F(1, 42)=9.65$, $p=.003$ ($B=-.522$, $sr^2=.16$), were significant predictors. Students higher on mastery goals and performance-avoidance goals were less likely to be work avoidant, whereas students higher on performance-approach goals were more likely to be work avoidant.

Perceived Classroom Goal Structure Model

To investigate the effects of perceived classroom goal structures on academic efficacy, self-handicapping, avoiding novelty, skepticism about the relevance of school, disruptive behavior, cheating behavior, work avoidance, and GPA, we tested a model that included the main effect terms for perceptions of mastery, performance-approach, and performance-avoidance goals in the classroom as well as the two-way interactions between these terms.

Time 1. On avoiding novelty, the overall model was significant $F(6, 43)=3.577$, $p=.006$ ($R^2=.33$). Main effects were found for mastery classroom goal structure, $F(1, 43)=8.58$, $p=.005$ ($B=-.38$, $sr^2=.13$), and performance-approach classroom goal structure, $F(1, 43)=5.89$, $p=.019$ ($B=.349$, $sr^2=.09$). Students who perceived the classroom environment as being mastery-oriented were less likely to avoid novelty, whereas students who perceived the environment as being performance approach-oriented were more likely to avoid novelty.

Time 2. On academic efficacy, the overall model was significant, $F(7, 42)=2.88$, $p=.015$ ($R^2=.32$). A main effect was found for mastery classroom goal structure, $F(1, 42)=11.43$, $p=.002$ ($B=-.59$, $sr^2=.18$). Students reporting higher levels of mastery classroom goal structure indicated higher levels of academic efficacy.

On avoiding novelty, the overall model was significant, $F(6, 43)=2.781$, $p=.022$ ($R^2=.28$). However, no individual predictors reached significance.

On skepticism about the relevance of school, the overall model was significant, $F(6, 43)=3.55$, $p=.006$ ($R^2=.33$). Main effects were found for mastery classroom goal structure, $F(1, 43)=4.16$, $p=.048$ ($B=-.348$, $sr^2=.06$), and performance-approach classroom goal structure, $F(1, 43)=4.32$, $p=.044$ ($B=.355$, $sr^2=.07$). Students who perceived the environment as being mastery-oriented

were less likely to have skepticism about the relevance of school for the future. In contrast, students who perceived the environment as being performance approach-oriented were more likely to express skepticism about the relevance of school for the future.

On disruptive behavior, the overall model was significant, $F(6, 43)=3.314$, $p=.009$ ($R^2=.32$). A main effect was revealed for performance-approach classroom goal structure, $F(1, 43)=4.55$, $p=.039$ ($B=.368$, $sr^2=.07$). Students who perceived the classroom as being performance approach-oriented were more likely to be disruptive during class.

DISCUSSION

Achievement goal theory is one of the dominant theoretical frameworks used today to understand and improve student motivation (Brophy, 2004). So far, little work has been done to evaluate the achievement goals of students with ADHD. At the outset of this article, we recommended a series of questions that researchers should begin pursuing to evaluate the contribution that achievement goal theory could make in understanding and improving the motivation of students with ADHD. In the present investigation, we addressed three of the four questions.

Research Question 1

The first question was: "What are the achievement goals of students with ADHD?" Specifically, this question called for a more thorough assessment of the achievement goals of students with ADHD using more contemporary and multi-dimensional measures of achievement goals. Researchers have conducted studies on achievement goals from person-centered as well as situation-centered perspectives. A person-centered (goal orientation) approach asks students to report the goals that they personally adopt when learning, whereas a situation-centered (perceived classroom goal structure) approach asks students to report the goals that they perceive are being promoted by their teachers and their classrooms. We were particularly interested in determining whether students with ADHD endorsed goal orientations or perceived their classroom environments differently than did youth without ADHD.

Regarding goal orientations, we found that students with ADHD were most likely to endorse a mastery goal orientation for their schoolwork and least likely to adopt a performance-approach goal orientation for their coursework. Students' level of performance-avoidance goal orientation fell in between their mastery and performance-approach goal orientation. This pattern of goal orientation adoption was true at both Time 1 and Time 2 assessments during students' 6th-grade year.

Three things are striking based on the pattern that emerged. First, the higher level of mastery goal orientation and lower levels of performance goal orientations may be considered a positive result by many goal theorists, especially those who endorse the mastery goal perspective (where optimal motivation is believed to occur under this pattern). Second, the fact that the students were still struggling to do well in school, however, may be interpreted by other goal theorists as the result of failing to endorse performance-approach goals, especially by goal theorists who endorse a multiple-goal perspective (where optimal motivation is believed to occur by adoption of both mastery goals and performance-approach goals). When looking at the mean level of goal adoption on the 1-5 scale, a mastery goal orientation is endorsed well above the midpoint of the scale, whereas a performance-approach goal orientation is endorsed below the midpoint. Third, the level of performance-avoidance goal adoption is also above the midpoint of the scale; thus, failure to excel in school may be due to elevated levels of performance-avoidance goals in this student population. However, we would like to express caution in comparing the exact position that students report between different goal orientation measures. Since the various goal scales have not been standardized, we cannot assume they are directly comparable.

Regarding perceived classroom goal structures, we found that our sample of students with ADHD were most likely to perceive mastery classroom goal structures and least likely to perceive performance-avoidance classroom goal structures for their coursework, with perceptions of performance-approach classroom goal structures falling in between. This pattern of perceived classroom goal structures occurred at both Time 1 and Time 2. When looking at the mean level of classroom goal structure on the 1-5 scale, mastery classroom goal structures were perceived well above the midpoint of the scale, whereas performance-approach and performance-avoidance classroom goal structures were perceived below the midpoint.

Once again, three things are striking based on the pattern that emerged. First, proponents of the mastery goal perspective might argue that this pattern of findings is the preferred pattern to help promote and reinforce maximizing students' mastery goal pursuits while minimizing their performance goal pursuits. Second, proponents of the multiple-goal perspective may see the lack of perceived performance-approach classroom goal structures as a problem to encourage students to orient to both mastery and performance-approach goals (see also Linnenbrink, 2005). Third, even though both perceived performance goal structures were rated below the midpoint of the scale, perhaps the optimal goal pattern for perceived classroom goal structures requires a more radical shift of having performance goal structures

closer to 1 on the 1-5 scale. Again, some caution should be noted in comparing the exact position that students report between different perceived goal structure measures. Like the goal orientation scales, they have not been standardized.

We next evaluated whether there were any differences in goal orientations or perceptions of perceived classroom climate according to type of ADHD or severity of ADHD symptoms. Unlike previous research, which has documented motivational profile differences based on type of ADHD for other motivational variables (Carlson et al., 2002), no significant relationships emerged in the current sample for any of the achievement goal constructs. However, due to the limited sample size, more research is needed before any definitive conclusions can be made, and we refer the reader to Carlson et al. (2002) for potential implications of how to approach interventions for different subtypes of ADHD when different motivational patterns emerge.

Finally, we evaluated whether there were any changes in students' goal orientations or perceptions of perceived classroom climate over their 6th-grade year. We considered it essential to evaluate goals at more than one time point as students were transitioning into a new school environment that has been particularly associated with the development of greater performance goal focus (Midgley & Edelin, 1998). Surprisingly, only one difference emerged among the six goal variables, with students reporting less performance-avoidance goal orientation at the end of 6th grade than at the beginning.

These findings generate some potentially useful hypotheses about children with ADHD. It is interesting that the endorsement of a performance-avoidance orientation was unique to students with ADHD and that the orientation declined over the course of the year. This decline corresponds with the typical pattern of declining grades that occur for students with ADHD over the course of the academic year (Evans, Langberg, Raggi, Allen, & Buvinger, 2005). Although these findings are not conclusive, they suggest that a performance-avoidance orientation may play a unique role with these students and potentially facilitate classroom achievement.

Research Question 2

The second question was: "How do achievement goals of students with ADHD differ from those of students without ADHD?" After describing and profiling the goal orientations and perceptions of the classroom goal structure of our sample of students with ADHD, we were interested in normative comparisons with non-ADHD samples of a similar age. To accomplish this we first compared the levels of achievement goals reported by

our sample of ADHD students to the normative data reported in the PALS manual, which contains the most thorough and complete summary of past research using these scales.

Regarding goal orientation variables, we did not find any differences between the two samples on mastery goal orientation. However, as might be expected, our sample of students with ADHD were more performance-avoidance goal-oriented than the PALS sample. Our ADHD sample was also more performance-approach goal-oriented. Regarding classroom goal structure variables, our ADHD sample perceived their classrooms to reinforce more mastery goal structures, more performance-avoidance goal structures, and fewer performance-approach goal structures than did the PALS sample. Thus, based on this first normative comparison, it does not appear that mastery goals are being adversely affected, because there were no differences in mastery goal orientation between our ADHD sample and the PALS sample; our ADHD sample actually perceived their classroom environment as more mastery oriented than did the PALS sample. However, regarding performance goals, it would appear that our ADHD sample was adopting less optimal goals and perceiving less optimal goal structures (by reporting more performance-avoidance goal orientations and more perceived performance-avoidance goal structures).

We also compared our ADHD sample to a local sample of 6th-grade students. Two differences emerged here. Our ADHD sample was less performance-approach goal-oriented than our local sample of non-ADHD students, and our ADHD sample perceived their classrooms to reinforce less performance-approach goal structures than the PALS sample. Thus, once again, no major differences were found with mastery achievement goals between our ADHD sample and local normative sample. Instead, compared to our local normative sample, it could be argued that our ADHD sample was adopting less optimal goals and perceiving less optimal goal structures (by reporting less performance-approach goal orientations and less perceived performance-approach goal structures) if the multiple goal perspective is correct.

Interesting, although the two normative samples differed on their overall level of goal adoption based on the 1-5 scale, they shared a similar pattern on which goals were most and least endorsed. For both normative samples, mastery goal orientations were most endorsed whereas performance-approach and performance-avoidance goal orientations were endorsed at a lesser but somewhat similar level. This is in contrast to how our ADHD sample ranked their goals, with performance-avoidance goal orientations always being endorsed at a level that fell between mastery and performance-approach goals. Thus, while all three groups

shared similar levels of mastery goals, our ADHD sample consistently had higher levels of performance-avoidance goals than performance-approach goals.

This rank order may be a key pattern to track in future research to identify optimal goal patterns for this population. Achievement goal theorists would unanimously agree on the deleterious effects of endorsing performance-avoidance goals (whether they subscribe to the mastery goal perspective or the multiple-goal perspective of achievement goals theory).

Research Question 3

The third question was: "How are achievement goals related to other academic outcome variables for students with ADHD?" Past research has shown that associations between motivational variables for students with ADHD do not always operate in the same adaptive way as normative, non-ADHD populations (see Milich, 1994). Thus, we were interested in determining the relationship between achievement goals and a series of academic-related behaviors and outcomes. We selected a range of academic behaviors that would allow us to evaluate the relationships of our achievement goal constructs to both adaptive (e.g., GPA and academic efficacy) and maladaptive (e.g., avoiding novelty, self-handicapping) outcomes.

An investigation of correlations revealed a number of expected patterns of association based on achievement goal theory and past research involving normative samples. Regarding goal orientation variables, mastery goal orientation positively predicted adaptive behaviors (like academic efficacy) and negatively predicted a range of maladaptive behaviors (e.g., avoiding novelty, disruptive behavior, skepticism about school). Similarly, as in past research, performance-avoidance goal orientations were found to be linked to maladaptive behaviors (e.g., avoiding novelty). But in contrast to past research findings, performance-avoidance goal orientations were also associated with a number of adaptive outcomes (like obtaining a higher GPA and being less skeptical about school). So, performance-avoidance goals were not acting the way they typically do for a normative sample, at least in the beginning of 6th grade. This positive relationship between GPA and performance-avoidance goals was not replicated at the end of the year, but it is important to note that the only goal orientation that changed over the course of the year involved our ADHD sample becoming less performance-avoidance oriented. Similarly, GPA for our ADHD sample also decreased from the beginning of the year to the end. Consequently, performance-avoidance goals may be providing our sample of students with at least some motivation to remain focused on academics, and actually striving to not be the worst may be a helpful moti-

vator for this population. Thus, changing one type of motivational drive (like not wanting to be the worst) without changing others (like wanting to strive to be the best) may be detrimental. Goal theorists have often noted that having some motivation (even if it is based in performance goals) may be better than having no motivation at all (Pintrich & Schunk, 2002).

Regarding classroom goal variables, as theory would predict, mastery classroom goal structure positively predicted adaptive variables (like academic efficacy and GPA) and negatively predicted a range of maladaptive variables (such as avoiding novelty and work avoidance) at both the beginning and the end of the 6th-grade year. However, performance-approach classroom goal structure and performance-avoidance classroom goal structure were not strongly associated with academic outcomes at Time 1, but by Time 2 they were both positively associated with a wide range of maladaptive behaviors as theory would predict. Thus, collecting data at two time points was helpful in showing important patterns that only emerged at certain times of the year. If we had limited the data collection to the initial time point, we would not have uncovered the more common deleterious effects found for performance goals.

In addition to correlations, we conducted a series of regressions to evaluate multivariate effects that goals might have on academic behaviors. Specifically, we evaluated the potential for goals to predict outcomes in an additive or interactive fashion. While little support emerged for unique interactive goal effects, the trends established in the discussion of correlations were supported in the regressions. However, the regression models revealed fewer significant relationships, especially for the classroom goal structure measures.

Various factors may be at play with regard to the lack of significant relationships between goal variables and the various academic variables, especially when evaluated with regression. The small sample size and lack of power were already noted. Another measurement issue should be noted for future research.

An important issue being debated by achievement goal theorists involves the level of specificity that is most appropriate for assessing an achievement goal and the level of specificity in the outcomes collected (see Baranik, Barron, Finney, & Sundre, 2005; Elliot, 2005). For example, we can assess students' achievement goals for a specific situation (e.g., for a math class or for an English class), or more globally for all of their classes in a particular semester. The ability of goals to best predict outcomes may depend on the level of specificity selected. In the current study, we followed past recommendations with this age group from the PALS manual to assess goals globally, but future research would bene-

fit by evaluating students' specific goals for different classes. In addition to the specificity of the goal, the level of specificity of the outcome has also been shown to be an important component in other areas of research, with matching the level of specificity of the predictor and outcome yielding the best results (see Pajares & Miller, 1995). Students with ADHD frequently report variations in their desire to achieve in some classes and not others, and these differences are frequently attributed to the student's relationship with the teacher. The relationship between a child and each of his/her teachers is quite variable in middle school (Evans et al., 2005); as a result, examining goal orientation within each classroom is likely to increase our understanding of this process.

Finally, future research would benefit from looking at additional criteria. In the current study, we focused primarily on self-report variables from the Pattern of Adaptive Learning Survey, and as for all self-report data we must recognize the limitations and potential biases inherent in this method. Future work will benefit by moving beyond self-report measures to include other behavioral outcomes of adaptive and maladaptive learning (e.g., actual number of behavior problems, actual number of schoolwork assignments completed correctly and on time), and by evaluating ratings from other sources (e.g., teachers and parents).

Research Question 4

The final research question posed at the outset of this article was: "Can current instructional practices be altered to further promote optimal goals and motivation of students with ADHD?" This question was not addressed in the current study, but is a topic for our future research. Before we can make specific recommendations for teachers, we must better understand the unique role of performance avoidance with this population. Although this may be considered a counterproductive goal by some, for youth with ADHD it can contribute to academic success. That is not to claim that it is the optimal strategy for these students as it may contribute to some of the poor learning strategies exhibited by these children. Further research is needed to help us understand how to transition students with ADHD to an optimal orientation without sacrificing the benefits of a less-than-optimal approach. Moreover, the effect of behavioral contingencies, self-appraisal, and impulsivity may further interact with goal orientation and contribute to the prediction of achievement. In fact, one of the concerns about such a strong reliance on behavioral techniques with youth with ADHD is that these techniques may diminish their intrinsic motivation to achieve. Similar concerns exist regarding relying on stimulant medication instead of

attributing success and failure to one's own ability and effort; however, studies suggest that children with ADHD attribute success to internal factors and failure to external factors regardless of whether they are taking stimulant medi-cation or not (Pelham, Hoza & Pillow, 2002). An examination of the interactions between treatment effects (medication and psychosocial), environmental influences (teacher and parent expectations and contingencies), treatment outcomes, and motivational character- istics is needed to advance our understanding of youth with ADHD and develop effective methods to help them.

Future research will also benefit by considering additional achievement goals. The current study focused on the three types of achievement goals that have received the most empirical attention in the literature (mastery, performance-approach, and performance-avoidance goals), but researchers are currently looking at models that partition mastery goals into mastery-approach vs. mastery-avoidance goals grounded in the same logic that resulted in partitioning performance goals into two separate constructs. A focus on avoidance tendencies again may be particularly relevant for an ADHD population, and this may be a particularly interesting population for evaluating the utility of measuring mastery-avoidance goals. In addition, these data suggest that improving our understanding of the role of goal orientation in children with ADHD may provide valuable clues for understanding techniques that may be used to improve their academic functioning.

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NOTES

[1] Researchers have used a variety of labels to differentiate between mastery and performance goals. For example, mastery goals also have been called task goals (Nicholls, 1984), learning goals (Dweck & Leggett, 1988), and intrinsic goals (Pintrich & Garcia, 1991). Performance goals also have been called ego goals (Nicholls, 1984), ability goals (Ames & Ames, 1984), relative ability goals (Midgley, et al., 1998), and extrinsic goals (Pintrich & Garcia, 1991).

[2] Readers new to this area should also note work by Grant and Dweck (2003) and Brophy (2005) for alternative conceptions of what a performance goal can represent.

AUTHOR NOTE

Please address correspondence concerning this article to: Kenneth E. Barron, MSC 7401, James Madison University, Harrisonburg, VA 22807; barronke@jmu.edu