

RECOGNIZING, DIFFERENTIATING, AND REFERRING STUDENTS WITH ABSENCE
SEIZURES: WHAT FACTORS AFFECT PRESERVICE TEACHERS' DECISION MAKING?

By

NICOLE NASEWICZ

A DISSERTATION PRESENTED TO THE GRADUATE SCHOOL
OF THE UNIVERSITY OF FLORIDA IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

UNIVERSITY OF FLORIDA

2009

© 2009 Nicole Nasewicz

To my patient husband, loving family, and the graduate faculty who provided me with endless support and counsel—I could not have achieved this milestone without you.

ACKNOWLEDGMENTS

I thank the members of my supervisory committee for their ongoing support and counsel, with particular gratitude for my committee chair who encouraged me to investigate a topic I feel passionately about. I thank the Assistant Director/Elementary Coordinator of the Unified Elementary Proteach Program (UEP) at the University of Florida for helping to coordinate my research efforts, the preservice teachers who graciously participated in my research study, and the UEP course instructors who surrendered valuable class time so that I could pursue my scholarly interests. I thank my loving family for providing me with endless encouragement, and for helping me maintain a positive perspective throughout the entirety of this process. Finally, I thank my husband for sacrificing countless nights and weekends, being a reassuring presence, and demonstrating a genuine interest in my study, which provided me with the validation and motivation I needed to proceed.

TABLE OF CONTENTS

	<u>page</u>
ACKNOWLEDGMENTS	4
LIST OF TABLES	8
ABSTRACT	10
CHAPTER	
1 REVIEW OF THE LITERATURE	12
Attention-Deficit/Hyperactivity Disorder.....	12
Clinical Definition of ADHD	13
Attention-Deficit/Hyperactivity Disorder-Primarily Inattentive Subtype.....	14
Diagnosis	15
Educational Problems	17
Health Outcomes	17
Treatment.....	18
Clinical Utility	18
Over-Diagnosis and Differential Diagnosis	19
Summary.....	20
Epilepsy	21
Absence Seizures.....	22
Diagnosis	23
Educational Problems	24
Health Outcomes	25
Treatment.....	26
Summary.....	27
Overlapping and Distinguishing Symptoms.....	27
Overlapping Symptoms	27
Distinguishing Symptoms	30
Summary.....	33
ADHD, Epilepsy, and School.....	33
School-Based Assessment.....	36
The School Psychologist	36
The Integration of Medical and Educational Information.....	38
Pharmacotherapy	38
School-Based interventions.....	39
Summary.....	44
The Instrumentality of Teachers.....	44
Direct Influence	45
Indirect Influence.....	46
Knowledge and Beliefs.....	49
Teacher Efficacy.....	51

Preservice Teacher Preparation Programs	54
Summary	56
Assessing Professional Judgment	57
The Factorial Survey	58
Independent variables	59
Dependent variables	60
Subgroup Variation	61
Level of Analysis	62
Criticisms	63
Rebuttal	64
Summary	64
Conclusion	65
Purpose of the Study	66
2 METHODS AND PROCEDURES	71
Participants and Settings	71
Measures	76
Vignette Instrument	76
Independent variables	77
Dependent variables	78
Proteach Demographic Information Survey (PDIS)	78
Instrument Development	79
Knowledge of Attention Deficit Disorders	82
Knowledge and Attitudes Toward Epilepsy and Persons with Epilepsy	83
Procedure	84
Child Vignettes	84
Demographic Information	88
Knowledge and Beliefs About ADHD	88
Knowledge and Beliefs About Epilepsy	90
3 RESULTS	99
Question 1	99
Question 2	100
Question 3	103
Question 4	105
Question 5	107
Question 6	108
Question 7	110
4 DISCUSSION	117
Introduction	117
Question 1	119
Question 2	123
Respondent characteristics	123

Child characteristics	127
Question 3.....	128
Question 4.....	130
Respondent characteristics	130
Child characteristics	132
Question 5.....	133
Question 6.....	134
Question 7.....	135
Practical Implications	136
Limitations.....	141
Implications for Future Research.....	143

APPENDIX

A INSTRUCTOR INVITATION LETTER	148
B INFORMED CONSENT.....	149
C SAMPLE VIGNETTE INSTRUMENT	151
Research Vignettes	151
Jennifer	152
Katie.....	153
Anne.....	154
Julie.....	155
Kelly	156
Tracy.....	157
D PROTEACH DEMOGRAPHIC INFORMATION SURVEY	158
E UNIFIED ELEMENTARY PROTEACH PROGRAM CORE REQUIREMENTS.....	160
F INSTRUCTION ON ADHD AND ABSENCE SEIZURES.....	161
G COGNITIVE INTERVIEWS INFORMED CONSENT.....	162
H PILOT STUDY CONSENT FORM.....	164
I KADDS INSTRUMENT.....	166
J ATPE INSTRUMENT.....	169
LIST OF REFERENCES	171
BIOGRAPHICAL SKETCH	181

LIST OF TABLES

<u>Table</u>	<u>page</u>
1-1	Criteria for Attention-Deficit/Hyperactivity Disorder as outlined in the Diagnostic and Statistical Manual of Mental Disorders – Fourth Edition – Text Revision.....68
1-2	Seizure classification69
1-3	Overlapping symptoms of ADHD-PI and absence seizures.....69
1-4	Distinguishing symptoms of ADHD-PI and absence seizures70
1-5	Subgroup variation assumptions*70
2-1	Preservice Teacher-Related Demographic Information as Reported on the Proteach Demographic Information Survey (PDIS)92
2-2	Preservice teachers’ knowledge, attitudes, and experiential information as reported on the Proteach Demographic Information Survey (PDIS)93
2-3	Correlation matrix for selected preservice teacher characteristics as reported on the Proteach Demographic Information Survey (PDIS).....94
2-4	Independent variables and levels assigned within the vignettes95
2-5	Mann-Whitney test statistics to assess for nonresponse error on the open-ended item across the vignettes96
2-6	Preservice teachers’ explanations for the hypothetical children’s presenting episodes of inattention97
2-7	Correlations between preservice teachers’ objective and subjective knowledge98
3-1	Summary of hierarchical linear modeling analysis for variables predicting preservice teachers’ ability to recognize absence seizures.....112
3-2	Crosstabulation results for preservice teachers’ seizure disorder ratings across the ADHD and absence seizure vignettes.....113
3-3	Crosstabulation results for preservice teacher’ explanations for the hypothetical children’s presenting episodes of inattention.....113
3-4	Summary of hierarchical linear modeling analysis for variables predicting preservice teachers’ ability to differentiate absence seizures from ADHD114
3-5	Summary of hierarchical linear modeling analysis for variables predicting preservice teachers’ referral decision115

3-6	Crosstabulation results for preservice teachers' referral decisions on the vignettes	116
E-1	Unified Elementary Program (UEP) core curriculum and field experiences	160
F-1	Instruction on ADHD and seizure disorders provided in Unified Elementary Program .	161

Abstract of Dissertation Presented to the Graduate School
of the University of Florida in Partial Fulfillment of the
Requirements for the Degree of Doctor of Philosophy

RECOGNIZING, DIFFERENTIATING, AND REFERRING STUDENTS WITH ABSENCE
SEIZURES: WHAT FACTORS AFFECT PRESERVICE TEACHERS' DECISION MAKING?

By

Nicole Nasewicz

May 2009

Chair: Tina Smith-Bonahue
Major: School Psychology

Attention-Deficit/Hyperactivity Disorder (ADHD) and epilepsy are common pediatric disorders that often occur co-morbidly. Both disorders predispose children to a wide range of school-related problems, some of which are the same and others vastly different. Fortunately, with early diagnosis and comprehensive disease management, the long-term sequelae of these disorders can be largely redirected. Diagnosing and differentiating between the disorders, however, can be remarkably complex. Diagnostic difficulties are particularly characteristic to the differentiation of absence seizures and ADHD - Primarily Inattentive Subtype (ADHD-PI), given that they present with subtle, overlapping symptomology.

Teachers are among the most influential adults in the identification and management of ADHD and epilepsy in children. Unfortunately, teachers regularly fail to participate effectively in the diagnostic and evaluation process. Using a factorial survey design, 100 preservice teachers participated in this study to investigate (1) whether preservice teachers recognized absence seizures, (2) what characteristics predicted recognition ratings, (3) whether preservice teachers differentiated absence seizures from ADHD, (4) what characteristics predicted differentiation ratings, (5) whether preservice teachers anticipated initiating referrals for hypothetical children presenting with absence seizures, (6) what characteristics predicted referral ratings, and (7)

whether preservice teachers anticipated making different referral decisions for hypothetical children presenting with absence seizures and hypothetical children presenting with ADHD?

Overall, preservice teachers recognized absence seizures. Knowledge of ADHD, a respondent-level characteristic, and having received a previous diagnosis of ADHD-PI, a child-level characteristic, had negative effects on recognition ratings. Two child-level characteristics, having no recollection for what happened during the elapsed time and fluttering eyelids, had positive effects on recognition ratings. Preservice teachers differentiated reliably between unambiguous cases of absence seizures and ADHD. However, their proficiency declined when the disorders occurred co-morbidly. Only one respondent-level characteristic, referral efficacy, had a significant effect on differentiation ratings. Overall, preservice teachers anticipated initiating referrals for students presenting with absence seizures. Variance in referral ratings depended exclusively on respondent-level characteristics. Specifically, beliefs about the teacher's role and mean recognition rating had positive effects on referral ratings. In general, preservice teachers anticipated being more likely to initiate referrals for students presenting with absence seizures than students presenting with ADHD.

CHAPTER 1 REVIEW OF THE LITERATURE

Attention-Deficit/Hyperactivity Disorder

Attention-Deficit/Hyperactivity Disorder (ADHD) is the most common neurobehavioral disorder of childhood (American Academy of Pediatrics, 2000). ADHD is characterized by a persistent pattern of inattention, hyperactivity-impulsivity, or both (American Psychiatric Association [APA], 2000). Some degree of energy, exuberance, and impetuosity is normal, and even expected of school-aged children. However, in excess, these behaviors may be maladaptive. For example, children with ADHD often experience significant functional problems, such as school difficulties, academic underachievement, troublesome interpersonal relationships (e.g., with family and friend), and low self-esteem (American Academy of Pediatrics, 2000). The core symptoms of ADHD—inattention and hyperactivity-impulsivity—are thought to arise in early childhood and persist across the developmental span (Mash & Barkley, 2003). Therefore, while a diagnosis of ADHD can be made at any age, diagnostic criteria includes that some of the behaviors are present before age seven years (APA, 2000). Repeatedly, research and clinical practice demonstrates that with early recognition, accurate assessment, and comprehensive disease management, many of the undesirable educational and psychosocial outcomes associated with ADHD can be redirected (American Academy of Pediatrics, 2000).

To be diagnosed with ADHD, a child's inattentive and hyperactive-impulsive behaviors must be of greater intensity, or occur with greater frequency, than can be expected given the child's developmental level (APA, 2000). The symptoms must cause clinical impairment in at least two settings (e.g., social, academic, or occupational functioning) (Ball, Wooten, & Crowell, 1999). However, the degree of dysfunction that the behaviors cause can vary significantly across settings, depending on the nature of the environment. ADHD generally causes more impairment

in environments that place greater demands on children's attention and concentration abilities, such as school (APA, 2000). In fact, ADHD is so apparent and problematic in educational settings that researchers and practitioners previously referred to it as a school-based disorder (Atkins & Pelham, 1991; Wright, 2002). The prevalence rate of ADHD is estimated to range from 3–7% in school-age children, occurring significantly more in males than in females (i.e., 3:1 ratio, respectively) (APA, 2000; Mash & Barkley, 2003). Notably, the prevalence of ADHD has varied substantially across studies and overtime. Many researchers attribute this variability to changes in diagnostic criteria for the disorder (American Academy of Pediatrics, 2000).

Clinical Definition of ADHD

While syndromal constructs similar to ADHD have existed for decades, the current definition differs markedly from its predecessors (Mash & Barkley, 2003; Wright, 2002). For example, Hyperkinetic Behavior Syndrome, Hyper-excitability Syndrome, Attention Disorders, Minimal Brain Dysfunction, and Hyperkinetic Reaction of Childhood are all childhood disorders relating to inattention and hyperactivity (Wright, 2002). However, the diagnostic criteria for Attention Deficit Disorder (ADD), adopted by the *Diagnostic and Statistical Manual of Mental Disorders - Third Edition* (DSM-III), was the first to recognize inattention as a unifying element (Wright, 2002). The DSM-III provided practitioners with lists of core symptoms and decision rules for differential diagnosis. On the basis of this criteria, practitioners had to determine whether the individual was experiencing ADD with hyperactivity or without hyperactivity (Mash & Barkley, 2003). Researchers and practitioners favored the new, explicit criteria, believing that it improved both objectivity and reliability of diagnosis (Wright, 2002).

A prominent, and somewhat controversial, modification to the definition of the disorder was the transition to a categorical diagnostic classification system in the *Diagnostic and Statistical Manual of Mental Disorders – Fourth Edition* (DSM-IV) (APA, 1994, 2000; Nigg,

2006). Repeatedly, factor analytic studies identified two distinct dimensions underlying the cardinal symptoms of ADHD: (1) Inattention and (2) Hyperactivity-Impulsivity (APA, 2000; Mash & Barkley, 2003). In keeping with these findings, the DSM-IV augmented diagnostic criteria for ADHD to reflect two distinct dimensions, and provided practitioners with two separate lists of items—one for inattention and one for hyperactivity-impulsivity. Both lists contained independent criteria with thresholds, resulting in three subtypes of the disorder: Attention-Deficit/Hyperactivity Disorder - Primarily Hyperactive-Impulsive Type (ADHD-PHI), Attention-Deficit/Hyperactivity Disorder - Primarily Inattentive Type (ADHD-PI), and Attention-Deficit/Hyperactivity Disorder - Combined Type (ADHD-C) (APA, 2000; Mash & Barkley, 2003).

Attention-Deficit/Hyperactivity Disorder-Primarily Inattentive Subtype

Attention-Deficit/Hyperactivity Disorder - Primarily Inattentive Subtype (ADHD-PI), often erroneously referred to as ADD, is estimated to occur in 3–9% of school-age children, suggesting that it is as prevalent as ADHD-C (Mash & Barkley, 2003; Nigg, 2006). The disparity across gender is less pronounced for this subtype (APA, 2000); some epidemiological studies observed comparable rates across males and females (e.g., 1.4% vs. 1.3%, respectively) (Mash & Barkley, 2003). Cardinal symptoms of ADHD-PI include failure to give close attention to details and difficulty sustaining attention (APA, 2000). Children with the disorder tend to move from one uncompleted activity to the next, whether it be chores, schoolwork, or play activities (APA, 2000). Their schoolwork tends to be messy, and is often riddled with careless errors. Typically, children with ADHD-PI avoid tasks or activities that require sustained mental effort and demonstrate a marked aversion to homework (APA, 2000).

Parents and teachers of children with ADHD-PI often describe them as daydreamers. More specifically, they report that children with ADHD-PI appear as though their mind is elsewhere and attend only intermittently during conversations (APA, 2000). As a result, they may miss details in conversations, or fail to comprehend the rules of a game. In general, individuals with ADHD-PI are described as disorganized; they frequently lose or damage materials necessary to complete a task (APA, 2000). Children with the disorder are easily distracted by irrelevant stimuli in the environment, which can interfere substantially with their ability to complete assignments and tasks. Imagine, for example, a typical classroom overflowing with noises, such as the ticking of a clock, the tapping of a pencil, or the whispering of students. For most children these noises are readily ignored. For a child with ADHD-PI, these noises may be conspicuous and may seem inescapable.

Diagnosis

Practitioners of varying types (e.g., primary care physicians, subspecialties, and non-physician mental health providers) may diagnose a child with ADHD, and the diagnostic practices they utilize may vary considerably (American Academy of Pediatrics, 2000). Despite advances in science, researchers have yet to discover a laboratory test can accurately and reliably identify ADHD (Williams et al., 2002). Currently, the DSM-IV stands as the universally accepted criteria for the identification of ADHD and is used by practitioners in most clinical settings (Wright, 2002). The DSM-IV, based on the medical model of human behavior, conceptualizes disorders as being syndromal and inherent to the person (Wright, 2002). Benefits of this type of classification system are that it facilitates a uniform code of communication, promotes a consensual understanding of disorders, and improves reliability in measuring behaviorally derived constructs, such as ADHD (Wright, 2002). However, many practitioners remain unconvinced of the usefulness of the DSM-IV definitional standard, especially those who

routinely link diagnostic information to interventions. These practitioners prefer to rely on dimensional classification schemes, which conceptualize behavior as occurring on a continuum (i.e., they are concerned with the *degree*, or severity, of the behavior) (Mash & Barkley, 2003). Dimensional classification schemes, which rely on multivariate statistical techniques, are thought to enhance diagnostic power (Mash & Barkley, 2003). As a result, the diagnosis of ADHD routinely involves clinical observations, interviews, and behavioral rating scales (Williams et al., 2002).

To receive a diagnosis of ADHD-PI, children must exhibit at least six symptoms consistent with the inattention threshold outlined in the DSM-IV for a minimum of six months (Table 1-1) (APA, 2000). Like ADHD-C, the behavior must cause impairment in at least two settings. However, the level of dysfunction may vary with respect to the demands of the environment (APA, 2000). Additionally, the child must display fewer than six symptoms consistent with the Hyperactivity-Impulsivity threshold (i.e., the child would meet criteria for ADHD-C) (APA, 2000). To best understand a child's behavior, the DSM-IV advises practitioners to gather information from multiple informants who observe and interact with the child across disparate settings (APA, 2000). In addition to parents, guidelines identify teachers as *natural raters* (Tripp, Schaughency, & Clarke, 2006). Their input is preferred particularly for their ability to have close and continuing contact with students (i.e., children spend 40% of their developing life in school), to observe students under demanding learning conditions, and to compare the students behavior to his or her peers (i.e., whom are of the same developmental level and placed under similar conditions) (Bishop & Slevin, 2004; Tripp et al., 2006; Wright, 2002). With parental consent, practitioners may elect to review school records, including comprehensive evaluations and

conference reports, and may consult with *key* school-based personnel, such as the school psychologist (American Academy of Pediatrics, 2000).

Educational Problems

Unfortunately, the literature clearly documents that ADHD places children at-risk for a wide range of educational problems (American Academy of Pediatrics, 2000). For example, numerous studies have demonstrated that children with ADHD score lower on intelligence tests than normal controls. Notably, however, this difference becomes non-significant when hyperactive-impulsive behavior is partialled out (Barkley, Karlsson, & Pollard, 1985; Hinshaw et al., 1987; Lynham, Moffitt, & Stouthamer-Lober, 1993; Mash & Barkley, 2003). Children with ADHD-PI tend to have the most difficulty on executive functioning tasks, particularly those that require selective or focused attention, rapid retrieval of verbal information from memory, and visual-spatial processing (Barkley, DuPaul, & McMurray, 1990; Garcia-Sanchez, Estevez-Gonzalez, Suarez-Romero, & Junque, 1997). ADHD-PI also places children at-risk for academic underachievement and learning disability (Mash & Barkley, 2003). Hynd et al. (Hynd et al., 1991; Morgan, Hynd, Riccio, & Hall, 1996) reported that, within a sample of children with ADHD-PI, 60% met criteria for learning disability, most commonly in math. Unsurprisingly, then, children with ADHD-PI are significantly more likely to be retained and to receive special education services than children in the general population (Mash & Barkley, 2003).

Health Outcomes

Researchers have conducted few studies exploring the relationship between ADHD-PI and adverse health outcomes (Mash & Barkley, 2003). They have, however, conducted considerable research with respect to ADHD-C. Since children with ADHD-C meet criteria for the inattention threshold, it may be reasonable to generalize many of the findings to individuals with ADHD-PI. Accident proneness, injury, and motor vehicle accidents are among the most notable adverse

health outcomes associated with ADHD-C. According to parents, as compared to normal controls, children with ADHD-C are up to four times more accident prone; and are significantly more likely to sustain injuries in various sports, fracture bones, and ingest poisonous substances (Mash & Barkley, 2003). They are also more likely to experience sleep disturbances—a negative and unfortunately common side-effect of stimulant medication (Becker, Fennell, & Carney, 2004; Mash & Barkley, 2003). Adolescents with ADHD-C are more likely to be involved in motor vehicle accidents, and they are significantly more likely to be found at fault. Moreover, as compared to same-age peers, they receive significantly more speeding citations, and they are significantly more likely to have their drivers licenses suspended (Mash & Barkley, 2003).

Treatment

The most common form of treatment for all ADHD subtypes is stimulant medication. Consistent with the prevalence of the disorder, the use of stimulant medication has risen steadily among pediatric populations. In their study, Safer and Zito (as cited in Nigg, 2006) estimated that between 2 and 2.5 million children in the United States (U.S.) were taking stimulant medication for ADHD in 1999, which was equivalent to 3% of all U.S. children. Another survey-based study found that rates among insured patients are even higher, estimating that approximately 4.3% of U.S. children were taking stimulant medication (Nigg, 2006). Psychotherapy, and more specifically, behavioral management, is another effective treatment option (Nigg, 2006; Swanson et al., 1998). Extant research suggests that psychotherapy and medication in combination are associated with the best outcomes (Nigg, 2006; Swanson et al., 1998).

Clinical Utility

Researchers have established the clinical utility of ADHD-PI by demonstrating that the subtype can be differentiated from ADHD-C with respect to its presentation and long-term outcomes (Nigg, 2006). In general, ADHD-PI tends to emerge later than ADHD-C (e.g., 8–12

years vs. 5–8 years, respectively) (Applegate et al., 1997; Mash & Barkley, 2003). Additionally, as compared to children with ADHD-C, children with ADHD-PI display fewer oppositional or aggressive symptoms, are less likely to be diagnosed with co-morbid externalizing disorders (e.g., ODD and CD), and are more shy and withdrawn (Mash & Barkley, 2003). They are less likely to have speech and language problems as well (Cantwell & Baker, 1992; Mash & Barkley, 2003). While both groups of children are at-risk for special education placement, children with ADHD-PI are more likely to receive special education services for learning disabilities, whereas children with ADHD-C are more likely to be placed in classes intended for behaviorally disturbed children (Mash & Barkley, 2003). Studies suggest that children with ADHD-PI require more remedial assistance; researchers attribute this need to their deficits in focused attention, verbal retrieval skills, and visual-spatial processing (Barkley et al., 1990; Garcia-Sanchez et al., 1997; Mash & Barkley, 2003).

Over-Diagnosis and Differential Diagnosis

In general, ADHD-PI has good clinical utility. The associated symptoms hang together statistically like a syndrome, the disorder responds positively to treatment, and it can be differentiated from ADHD-C and ADHD-PHI (Nigg, 2006). However, despite being an empirically based construct, ADHD-PI may still be misdiagnosed or over-diagnosed.

Researchers allege that the shift to a categorical diagnostic system (i.e., in the DSM-IV) caused the prevalence of the disorder to rise drastically. More specifically, by dividing inattention and hyperactivity-impulsivity into distinct dimensions with individual thresholds, more children meet diagnostic criteria than in the past (APA, 2000; Mash & Barkley, 2003). Practitioners relying on previous editions of the DSM would have diagnosed these children with Attention Deficit Hyperactivity Disorder - Not Otherwise Specified (ADHD-NOS) (APA, 2000). Additionally, while inter-evaluator reliability for ADHD-C— a broad diagnostic category— is fairly high,

some researchers caution that reliability tends to decline upon diagnosing narrower subtypes of the disorder, such as ADHD-PI (Mash & Barkley, 2003).

In light of these criticisms, some researchers and practitioners charge current diagnostic ADHD criteria with being unable to differentiate between qualitatively different forms of inattention (i.e., inattention originating from heterogeneous etiologies). Children who initially present with ADHD are regularly found to have a range of pediatric disorders, including but not limited to: learning disabilities, movement disorders, fragile X syndrome, genetic disorders, pervasive developmental/autistic disorders, or epilepsy (Pearl, Weiss, & Stein, 2001). To guard against misdiagnosis and over-diagnosis, the DSM-IV-TR requires practitioners to perform differential diagnosis, which functions to rule out other psychiatric, medical, or neurological disorders that may account for the child's presenting behavior (Pearl et al., 2001). Unfortunately, differential diagnosis is an imperfect practice, especially when disorders' share subtle, overlapping symptomology.

Summary

ADHD, a common neurobehavioral disorder, is comprised of three subtypes: (1) ADHD-PI, (2) ADHD-PI, and (3) ADHD-C (APA, 2000; Barkley et al., 1990; Mash & Barkley, 2003). Characterized by inattention, ADHD-PI can interfere substantially with a child's daily functioning, especially at school (Mash & Barkley, 2003; Nigg, 2006). If diagnosed early and accurately, children with ADHD-PI typically respond positively to treatment, which may involve stimulant medication, psychotherapy, or both (Nigg, 2006; Swanson et al., 1998). However, researchers and practitioners are growing increasingly concerned that children with ADHD-PI are being misdiagnosed and, more specifically, over-diagnosed (Nigg, 2006). Critics of the current ADHD definitional standard caution that, due to the broad and unspecific nature of *DSM-IV-TR* diagnostic criteria, children with inattention stemming from heterogeneous etiologies are

routinely diagnosed with ADHD-PI (APA, 2000; Mash & Barkley, 2003). To ensure that children's inattention is not stemming from another source, practitioners rely on differential diagnosis (Pearl et al., 2001). Unfortunately, however, differential diagnosis is an imperfect precaution and regularly fails to detect alternative explanations for children's inattention (Pearl et al., 2001).

Epilepsy

Epilepsy, a chronic and often serious health condition, is characterized by recurrent seizures (Cull & Goldstein, 1997; Gastaut, 1973). A seizure is a sudden, involuntary, time-limited alteration in behavior that is accompanied by an abnormal electrical discharge in the brain. Seizures are caused by a variety of factors, including but not limited to (1) diseases affecting the central nervous system, (2) genetic syndromes, and (3) birth trauma. However, the cause of seizures is unknown in approximately two-thirds of cases (Cull & Goldstein, 1997). Thus, regarding its relationship with epilepsy, a seizure may be conceptualized as a nonspecific symptom of a disorder that must be further diagnosed (Lishman, 1987). Epilepsy is one of the most common neurological diseases in the general population (Dantas, Carirr, Carirr, & Filho, 2001). Depending on the populations studied and the definitions used, the prevalence rate for epilepsy ranges from .4-1% (Center for Disease Control [CDC], 1994). While the disease transcends all demographic boundaries, epilepsy is especially prevalent during the school years, affecting approximately 0.5% of school-age children (Bishop & Slevin, 2004; Dantas et al., 2001; Kaleyias, Tzoufi, Kotsalis, Papavasiliou, & Diamantopoulos, 2005; Ojinnaka, 2002).

When evaluating a child for epilepsy, neurologists classify the child's seizures as either generalized or partial, depending on the origin of the abnormal activity in the brain (Table 1-2) (Cull & Goldstein, 1997; Leppik, 2000). Generalized seizures involve abnormal activity throughout the brain, whereas partial seizures involve abnormal activity that is isolated to a

discrete, or focused, part of the brain (Agnew, Nystul, & Conner, 1998; Leppik, 2000).

Generalized seizures are more common. The Tonic-clonic seizure, previously referred to as the grand mal seizure, is the most notable type of generalized seizure. However, absence seizures, which are characterized by subtle behavior changes, are the most common type of childhood epilepsy (Agnew et al., 1998). Frequently, absence seizures are considered benign, since they are not believed to (1) be caused by injuries to the brain, (2) cause injury to the brain, and (3) have a significant impact on psychological and social well-being (Wirrell, 2003). The finding that many individuals outgrow absence seizures was used as further evidence that they are not a threat to life or long-term health. However, today, many researchers and practitioners dispute these assumptions, pointing to evidence that absence seizures do have negative effects on well-being, and to the fact that a significant number of individuals never outgrow them (Wirrell, 2003).

Absence Seizures

Absence seizures, previously referred to as petit mal epilepsy, are characterized by impaired consciousness that is unaccompanied by large convulsive movements. The most common type of childhood epilepsy, absence seizures occur in approximately 2-10% of children with epilepsy (Agnew et al., 1998). Typically, absence seizures emerge between ages 5 and 15 years, with a higher prevalence among females (Agnew et al., 1998; Leppik, 2000). The typical course of absence seizures is that they become less frequent in adolescence and often remit entirely in adulthood (Agnew et al., 1998). Absence seizures are characteristic for their brevity (Agnew et al., 1998; Leppik, 2000). They typically last for 5 to 10 seconds; however, deviations of up to 60 seconds are not uncommon. The term *pyknolespy* (pyknos refers to overcrowding) is associated with absence seizures as it describes their tendency to occur in rapid succession (Leppik, 2000). Children may experience several hundred-absence seizures per day with little to no normal mental activity between them (Adams & Victor, 1993; Agnew et al., 1998).

Neurologists distinguish between typical and atypical absence seizures. Commonly, typical absence seizures are idiopathic, or the etiology of the seizures is unknown. Fortunately, studies suggest that they remit entirely in approximately 40% of patients, most commonly during adolescence (Leppik, 2000). Atypical absence seizures, in contrast, are more complex. During atypical absence seizures, children can retain some ability for purposive movement and speech, which complicates their presentation and makes them difficult to identify (Leppik, 2000). Like typical absence seizures, atypical absence seizures occur more in females and emerge prior to adolescence. Unlike typical absence seizures, atypical absence seizures tend to occur with greater frequency, to be more prolonged, and to co-occur with other seizure types (Leppik, 2000). For example, absence seizures associated with Juvenile Absence Epilepsy can last for several hours (Pearl et al., 2001). Children with atypical absence seizures demonstrate significantly higher rates of mental retardation, and tend to have a higher incidence of global cognitive deficits. This seizure type tends to be expressed as a nonspecific symptom of brain injury during development (Leppik, 2000).

Diagnosis

Diagnosis of absence seizures depends heavily on behavioral descriptions during clinical events (Williams et al., 1996). Current clinical practice dictates that electroencephalogram (EEG) recordings only assist in the diagnosis of absence seizures, and that abnormal epileptiform activity (i.e., on an EEG) only be treated if it is accompanied by clinical seizures (Schubert, 2005; Williams et al., 2002). This recommendation is based on the assumption that subclinical epileptiform activity does not affect attention or cognitive functioning (Schubert, 2005). The finding that many children with ADHD (i.e., 6-30%) demonstrate abnormal epileptiform activity bolsters the recommendation that EEG recordings be supplemented by behavioral descriptions (Tan & Appleton, 2005). Notably, many researchers and practitioners challenge the assumption

that subclinical epileptiform activity does not impair cognitive functioning, insisting that it does impair attention to a degree (Schubert, 2005).

Persons with absence seizures describe them as “brief flashes of blackouts,” “like in a daze,” or “getting into a trance” (Panayiotopoulos et al., 1992). They report a lack of aura prior to the onset of an absence seizure (i.e., a sensation that it is about to occur), as well as an absence of a postictal period following the seizure’s termination (i.e., post seizure confusion) (Leppik, 2000). For pediatric populations, diagnosis relies almost exclusively on parental descriptions and reports (Williams et al., 1996). Parents of children with typical absence seizures describe the episodes as being discrete, in that the onset and offset of the episode are obvious (Pearl et al., 2001). While absence seizures are considered non-convulsive, some minor movements may be present during the event. Parents commonly report body limpness and the arrest of activity (e.g., the child may suddenly drop whatever item he or she was holding). Williams et al. documented a very clear pattern of behaviors associated with absence seizures. Every parent in the study endorsed staring behavior, cessation of speech, failure to respond, and the need for information to be repeated (Williams et al., 1996). Identifying atypical absence seizures may be more difficult, given that the episodes tend to be more sporadic, more unpredictable, less discrete, last for protracted periods of time, and are associated with mental retardation, all of which may complicate the presentation of the behavior (Pearl et al., 2001).

Educational Problems

Cognitive ability varies significantly across individuals with epilepsy, and given the transitory nature of seizures (i.e., they are time-limited events and can be outgrown), can vary markedly over time (Svoboda, 2004). Much of the time, epilepsy is associated with deficits in narrower cognitive domains, such as visual-spatial processing, attention, and memory. However, again, given the transitory nature of seizures, deficits may only be temporary (Binnie, Channon,

& Marston, 1990). The results of studies suggest that age of onset, seizure frequency, and seizure type all affect cognitive functioning. More specifically, earlier onset, increased frequency of seizures, longer duration of seizures, and partial seizures are associated with a worse prognosis (Cull & Goldstein, 1997). Regarding absence seizures, atypical absence seizures are associated with impaired cognitive functioning, and, more specifically, functioning in the mentally retarded range. Typical absence seizures, in contrast, have only been linked to transitory deficits due to impaired consciousness (Cull & Goldstein, 1997).

Prolonged periods of impaired consciousness due to consecutive absence seizures can lead to considerable dysfunction at school. For example, if they occur during instruction, or during exposure to novel material, a child may have gaps in his or her learning and fail to master important skills (e.g., during math instruction) (Leppik, 2000). Unsurprisingly, academic deficits are common among children who experience absence seizures. As a group, children with epilepsy are at-risk for academic underachievement and learning disability (LD). Fastenau, Shen, Dunn, and Austin (2008) found that approximately half (48.2%) of children with epilepsy met discrepancy criteria for learning disability; discrepancies were most common in writing (38%), followed by math (20%) and reading (13%) (Fastenau et al., 2008). Additionally, as compared to children in the general population, children with epilepsy are significantly more likely to be retained and to receive special education services (Svoboda, 2004). Earlier onset and increased frequency of seizures are associated with more cognitive difficulties and greater academic dysfunction (Cull & Goldstein, 1997).

Health Outcomes

Unfortunately, the literature suggests that absence seizures place children at-risk for experiencing a number of adverse health outcomes. Specifically, absence seizures are associated with accident proneness and injury. In one study 27% of children with absence seizures reported

having sustained an injury as a result of losing consciousness during an absence seizure (Wirrel, 2003; Camfield, Camfield, Dooley, & Gordon, 1996). School-age children are at increased risk for being involved in bicycling accidents, being struck by a car, and for acquiring mild head injury. Adolescents with absence seizures are involved in motor vehicle accidents at elevated rates, which, unfortunately, may lead to death (Salinsky, Wegener, & Sinnema, 1992). Much of the time, children with absence seizures are involved in accidents and sustain injuries after beginning treatment with Anti-Epileptic Drugs (AED). In response, neurologists often advise children and their caregivers to take special precautions both at home and at school (Wirrel et al., 1996). For example, children may be mandated to wear a helmet during activities that pose a special risk, such as bicycling (Wirrel et al., 1996).

Treatment

Treatment for epilepsy may include medication, special diet, and less commonly surgery. The most common form of treatment for epilepsy is Anti-Epileptic Drugs (AEDs). Valproate (Depakene) and Ethosuximide are the most commonly prescribed drugs for absence seizures (Leppik, 2000). Given that absence seizures are often considered benign, Ethosuximide is usually recommended first; Valproate is reserved for when Ethosuximide is ineffective or when the child also experiences Tonic-clonic seizures (Leppik, 2000). Neurologists formerly considered Lamotrigine to be a second line drug; however, its use has increased significantly over time (Posner, Mohamed, & Marson, 2005). Treatment with AEDs has been linked with improvements in neurocognitive functioning, especially on visual memory and fine-motor fluency tasks (Siren et al., 2007). Surprisingly, however, seizure variables and cognitive functioning often play a minimal role in academic underachievement among children with epilepsy (Fastenau et al., 2008). Family environment (e.g., emotional climate, stimulation, and parental involvement), in contrast, has been found to have a positive, significant impact on

achievement, especially in writing (Fastenau et al., 2008). Therefore, treatment often extends beyond medical intervention, and may involve the broader familial system and cross-disciplinary collaboration.

Summary

Epilepsy, characterized by abnormal electrical activity in the brain, is an umbrella term covering many different seizure disorders. Absence seizures are the most common type of childhood epilepsy, and are characterized by impaired consciousness that is unaccompanied by convulsive movements (Leppik, 2000). Subtle and brief, absence seizures are often considered benign (Wirrel, 2003). However, increasingly, research documents that impaired consciousness due to absence seizures is associated with significant dysfunction, particularly at school (Svoboda, 2004). Optimistically, most children with absence seizures respond positively to treatment, which usually involves AEDs (Leppik, 2000). Proper treatment, however, depends on accurate diagnosis. Currently, diagnosis depends heavily on behavioral descriptors during clinical events (Williams et al., 1996). Parents are almost exclusively responsible for describing children's behavior and for relaying important information to practitioners (Williams et al., 1996). Unfortunately, recognizing absence seizures can be complex, especially given the subtlety of their associated symptoms (Williams et al., 1996; Williams et al., 2002).

Overlapping and Distinguishing Symptoms

Overlapping Symptoms

Overlapping behavioral symptomology can complicate the differential diagnosis of seizure disorders and ADHD. Absence seizures and ADHD-PI are particularly difficult to differentiate. Both disorders are characterized by subtle behaviors (e.g., staring), share similar cognitive profiles, and are associated with many of the same undesirable educational outcomes. For example, in general, children with both disorders have general cognitive ability within normal

limits. However, they commonly experience deficits within narrower cognitive domains, such as attention, memory, and executive functioning (Barkley et al., 1990; Binnie et al., 1990; Garcia-Sanchez et al., 1997; Williams et al., 1996). Moreover, both epilepsy and ADHD predispose children to academic underachievement, learning disability, grade-retention, and special education placement (Table 1-3) (Hynd et al., 1991; Mash & Barkley, 2003; Morgan et al., 1996, Svoboda, 2004).

Regarding their conduct and behavior, children with ADHD-PI and absence seizures are described similarly. For example, children with absence seizures are often described as being absentminded or day-dreamy, and often lose items that are necessary to complete a task (Adams & Victor, 1993; Agnew et al., 1998). They are also described as having difficulty listening, responding when spoken to, sustaining attention on tasks, remembering daily activities, following through on instructions, and organizing tasks (Adams & Victor, 1993; Agnew et al., 1998). These descriptors mirror many of those used to describe children with ADHD-PI (e.g., day-dreamy, hypoactive, passive, apathetic, lethargic, confused, and sluggish) (Mash & Barkley, 2003). However, what some researchers and practitioners find most troubling is that many of these descriptors parallel diagnostic criteria for ADHD-PI as outlined in the DSM-IV (Agnew et al., 1998). As a result, children with absence seizures may meet diagnostic criteria for ADHD-PI, despite exhibiting inattention that is originating from a disparate etiology.

A last factor complicating the differentiation of ADHD-PI and absence seizures is that they often occur co-morbidly (Schubert, 2005). For example, in a study involving children with epilepsy, Hesdorffer et al. (2004) found that 28-39% had problems with hyperactivity-impulsivity, 42% had problems with inattention, and 14% met diagnostic criteria for ADHD. Results across studies converge to suggest that, as compared to children with focal epilepsies,

children with generalized epilepsies, such as absence seizures, are more likely to exhibit problems with inattention (Schubert, 2005). Absence seizures, in particular, predispose children to problems with inattention, even when seizures are controlled with AEDs (Schubert, 2005).

Researchers have proposed several hypotheses to clarify the relationship between ADHD and epilepsy. One hypothesis is that epilepsy, or its treatment, causes ADHD (Hesdorffer et al., 2004). Another leading hypothesis is that both disorders arise from central nervous system damage, or from a tertiary condition (Schubert, 2005). For example, in a study conducted by Becker, Fennel, and Carney (2004), parents described their children with epilepsy as having significant problems with inattention and hyperactivity. However, neither the severity of the epilepsy nor the frequency of the seizures predicted problems with inattention and hyperactivity. Instead, sleep disturbances predicted seizure activity, inattention, and hyperactivity. Findings suggest that a significant number of individuals presenting with ADHD, epilepsy, or both disorders may be experiencing sleep disturbances as well (Becker et al., 2004). More importantly, the findings may suggest that improving quality of sleep may indirectly lead to a reduction or elimination of seizure activity, problems with inattention and hyperactivity, or both (Becker et al., 2004). Finally, considered a third and increasingly viable hypothesis, researchers propose that epilepsy is often preceded by the development of ADHD (Hesdorffer et al., 2004). ADHD, then, may be considered a risk factor for developing epilepsy. That ADHD precedes epilepsy is particularly true of the ADHD-PI subtype (Hesdorffer et al., 2004). While researchers have yet to substantiate the exact mechanisms underlying the relationship between ADHD and epilepsy, clearly, when a child presents with ADHD-PI, the possibility that they are experiencing co-morbid absence seizures should be explored (Schubert, 2005).

Distinguishing Symptoms

Persons familiar with ADHD-PI and absence seizures can differentiate between the disorders by attending to the nature of their associated symptoms (Table 1-4). Specifically, while both disorders are characterized by episodes of inattention, they differ with respect to their onset, pervasiveness, and stability. For example, while both disorders tend to emerge during the school years, ADHD-PI is often predicated by increased demands on attention and concentration. As a result, children are not generally diagnosed with ADHD-PI prior to upper-elementary school (e.g., grades three through five). Girls with inattention problems tend to go more unnoticed, given that they are less likely to exhibit overt or disruptive behavior in the classroom (Wright, 2002). Once ADHD-PI emerges, it tends to be stable (i.e., the behavior generalizes to most situations that require sustained attention and persists across the person's lifespan). Inattention stemming from ADHD-PI tends to arise gradually, occurring after the person grows uninterested in a task or activity. The episodes usually last until something interesting happens, or until an outside agent (e.g., a teacher or caregiver) verbally or physically interrupts the episode.

Absence seizures, in contrast, begin abruptly irrespective of environmental demands. They may occur in all situations, even during enjoyable activities, such as play. Hyperventilation provokes absence seizures, and they may occur during physical activity as a result (e.g., during physical education or during recess) (Pearl et al., 2001). Inattention stemming from absence seizures is discrete; the onset and offset of the episodes are clearly demarcated. In general, the episodes last 10-15 seconds during which the child may be unresponsive to verbal or physical redirection. Absence seizures may occur frequently (occurring hundred of times a day), or they may be sporadic. In either case, the inattention is unpredictable, which differentiates it from the predictable episodes of inattention characteristic of ADHD-PI. Differentiating atypical absence seizures from ADHD-PI may prove to be more difficult, given that children with atypical

absence seizures can retain some purposive movement, and the onset and offset of the episodes tend to be less discrete (Leppik, 2000).

Concerns regarding accuracy of seizure diagnosis prompted researchers to investigate whether specific behaviors can be used to differentiate reliably between ADHD-PI and absence seizures. Williams et al. (1996) launched an initial research effort to identify behaviors that are unique to seizure activity. First, they provided parents of children with epilepsy and parents of children without epilepsy with a set of 40 behavioral descriptors (i.e., the Seizure Behavior Checklist). Next, they analyzed parents' responses and identified descriptors that were endorsed differently across the groups. Overall, parents of children with epilepsy endorsed 12 descriptors more often: does not remember what happened, moves mouth funny, drools, jerking/twitching, becomes stiff, changes in breathing, stares off, bites or chews tongue, eyes look glassy, will not respond, murmurs or slurs words, and eyes or head turn to one side (Williams et al., 1996). Parents of children without seizures endorsed one behavior most often: fidgets in seat. Descriptors particularly characteristic to generalized seizures were those that were highly physiologic and visible (e.g., eyes roll up, cries out, drooling, twitching/jerking, and changes in breathing) (Williams et al., 1996). The hallmark distinction between absence seizures and nonseizure events was lack of responsiveness. That is, parents of children with absence seizures perceived them as not only experiencing an altered state of consciousness, but, also, as being unable to make a response (Williams et al., 1996). While replication of this study should be conducted to determine the robustness of the results, preliminary findings suggest that behavioral descriptors can be used to screen children for seizure events.

Williams et al. (2002a) conducted a follow-up study to assess whether the 13 aforementioned behavioral descriptors could distinguish between patients with new-onset seizure

disorders and ADHD. The groups differed significantly on all items, except one: mumbles/slurs words. Additionally, with the exception of fidgets in seat, parents of children with seizures endorsed all descriptors more often than parents of children with ADHD. Upon further analysis, the investigators determined that four items were able to distinguish between the diagnoses with a high degree of specificity (i.e., the correct overall classification rate was 89%). The most important behavioral indicators included: eyes look glassy, changes in breathing, jerking/twitching, and fidgeting. Children whose parents endorsed that they had glassy eyes but did not fidget were correctly classified as having epilepsy 96% of the time. Conversely, children whose parents endorsed that their eyes were not glassy, that they did not experience changes in breathing, but that they did fidget were correctly classified as having ADHD 96% of the time. The results of this study suggest that specific descriptors can be used to differentiate between seizure events and ADHD.

Williams et al. (2002b) conducted a third study to determine whether a parent-completed structured instrument could facilitate the diagnostic process for seizures and, ultimately, improve diagnostic accuracy. The *Attention Deficit Disorders Evaluation Scale-Home Version* (ADDES-HV), a scale that is used regularly in clinical and educational settings, was used to measure the intensity of the children's inattention. Parents completed the instrument prior to their child receiving a diagnosis of ADHD-PI or absence seizures. Staring behavior was common to children with ADHD-PI and absence seizures (i.e., it was endorsed by 80% and 95% of parents, respectively), suggesting that the behavior is not useful for differential diagnosis. While both groups of children demonstrated elevated levels of inattention, the level of intensity was significantly higher for children with ADHD-PI. Specifically, children with absence seizures' mean standard scores on the inattentive scale of the ADDES-HV fell in the normal range,

whereas standard scores for children with ADHD-PI fell in the moderate to severe range. These results suggest that the inattentive scale on the ADDES-HV may be assistive in distinguishing between the diagnoses. Finally, two specific behaviors on the ADDES-HV reliably differentiated between the diagnoses: failing to complete homework assignments and being unable to stay on task. Whereas these behaviors were characteristic to children with ADHD, they were not characteristics to children with absence seizures.

Summary

Clearly, ADHD-PI and absence seizures share many overlapping symptoms. Both disorders are characterized by relatively subtle behaviors (e.g., staring), share similar cognitive profiles (i.e., average cognitive abilities with deficits in narrower domains), and, unfortunately, predispose children to many of the same undesirable educational outcomes (e.g., grade retention) (Barkley et al., 1990; Binnie et al., 1990; Garcia-Sanchez et al., 1997; Hynd et al., 1991; Mash & Barkley, 2003; Morgan et al., 1996; Svoboda, 2004). Parents and teachers describe children with both disorders similarly (e.g., absent-minded and day-dreamy), and despite that their inattention stems from disparate etiologies, children with both disorders may meet criteria for ADHD-PI (i.e., as outlined in the DSM-IV) (Agnew et al., 1998). That absence seizures and ADHD-PI often occur co-morbidly further complicates accurate differentiation between the disorders (Schubert, 2005). Researchers have begun to identify specific behavioral descriptors that can be used to differentiate reliably between the disorders (Williams et al., 2002). Being familiar with ADHD and epilepsy may also allow a person to differentiate between the disorders according to the nature of their associated inattentive episodes (Williams et al., 2002).

ADHD, Epilepsy, and School

Today, the assessment and treatment of ADHD and epilepsy routinely involves a multidisciplinary team of professionals drawing from medical, health, and educational

communities (“Attention Deficit,” 1994; Wright, 2002). However, historically, these responsibilities were reserved for the medical community (Atkins & Pelham, 1991; Hakola, 1992). The schools, in contrast, sought to identify and help students with high frequency problems that are largely unrelated to health (e.g., specific learning disability [SLD]) (Wodrich, Kaplan, & Deering, 2006). Thus, students with ADHD and epilepsy were only eligible for special education services if they qualified under customary designations, such as SLD, mental retardation (MR), or emotional disturbance (ED) (Wodrich et al., 2006).

Recent research, documenting a high prevalence of chronic health conditions among school-age children (15%) and a health-classroom learning link, prompted educators to establish more avenues for acquiring special education services for children with chronic health conditions (Wodrich et al., 2006). Today, school-based professionals have more options for assisting students with ADHD and epilepsy than they did in the past, even if the child is only experiencing relatively minor academic, developmental, or adjustment problems (Wodrich et al., 2006). Of greatest influence was the addition of the special education category *Other Health Impaired* (OHI) (IDEA, 1990). A memorandum issued by the U.S. Department of Education (USDOE) in 1991 augmented the list of medical disorders for which a student is eligible to receive special services under the category OHI to include ADHD (Wright, 2002). Currently, both ADHD and epilepsy are listed explicitly in the category definition:

Other health impairment means having limited strength, vitality, or alertness, including a heightened alertness to environmental stimuli that results in limited alertness with respect to the educational environment, that—(i) Is due to a chronic or acute health problem such as asthma, attention deficit or attention deficit hyperactivity disorder, diabetes, epilepsy, a heart condition, hemophilia, lead poisoning, leukemia, nephritis, rheumatic fever, sickle cell anemia,; and (ii) Adversely affects a child’s educational performance (Individuals with Disabilities Act, 1991, P.L. 102-119, 20 U.S.C. 140[a][1]).

The inception of Section 504 of the Vocational Rehabilitation Act, later incorporated into the American’s with Disabilities Act (1990), assumed the schools greater responsibility in meeting

the needs of children with ADHD and epilepsy as well (Wodrich et al., 2006). Section 504 guarantees more students with chronic health conditions accommodations by broadly defining a person with a disability as “one who has a physical or mental impairment that substantially limits a major life activity such as learning” (Section 12102).

The aforementioned changes in special education criteria drove up the administrative prevalence of ADHD dramatically (i.e., the rate at which ADHD is recognized and accommodated in the schools); specifically, the administrative prevalence doubled shortly thereafter (Nigg, 2006; Swanson et al., 1998). For example, in general, children with ADHD are eligible for three special education categories: LD, ED, and OHI. Rates of children with ADHD being served in programs for LD and ED have remained consistent since the official school recognition of ADHD, accounting for approximately 25% and 40% of children in the programs, respectively (Forness & Kavale, 2001). In contrast, the number of students being served in programs for OHI tripled since the official school recognition of ADHD (Forness & Kavale, 2001). Forness and Kavale (2001) estimate that children with ADHD account for 68.7% of children entering special education under the OHI category.

Children with epilepsy are also remarkably frequent users of special services (Wodrich et al., 2006). Wodrich et al. (2006) conducted a study to examine special education usage and related assessment procedures, and found that approximately 56% of children with epilepsy receive special education services. Most students were assigned to the traditional developmental category MR (30%). Approximately one in five (16%) students had an OHI designation; however, only 10% of the sample was receiving services based on OHI alone (Wodrich et al., 2006). Stated differently, the remainder of the participants had at least one other non-health designation (e.g., language impaired or SLD) (Wodrich et al., 2006). No studies to date have

examined special education usage or placement decisions for children with absence seizures in particular.

School-Based Assessment

Under the mandates of IDEA and Section 504, if a child is referred for a school-based assessment, schools are required to evaluate children with any disorder that may have a detrimental impact on school performance (Wright, 2002). The goal of the school-based assessment is to determine the presence and severity of an educationally-related disability, and to determine the assignment of services (Wright, 2002). Since ADHD and epilepsy are not traditional special education categories, educators often have to adopt diagnostic procedures developed in clinic settings and adapt them to the school setting (Forness & Kavale, 2001). The school-based evaluation involves a multidisciplinary team of professionals who jointly decide on the nature and extent of services that are necessary to meet the child's individual needs. One member, the school psychologist, is expected to understand the impact of health on learning, and to work to ameliorate the impact of chronic illness on functioning at school (Wodrich et al., 2006).

The School Psychologist

Teachers regularly refer children to the school psychologist for concerns regarding inattention, given that inattention can substantially impair functioning at school (Wright, 2002). In fact, in a study conducted by Lloyd et al. (1991), teachers' third most common reason for initiating a referral was concerns about inattention, accounting for nearly one-fourth of all of referrals made. Within the school system, school psychologists are regarded as experts in assessment, and they may be expected to have specialized knowledge about pediatric disorders (Atkins & Pelham, 1991; DuPaul, 1992; DuPaul & Stoner, 1994; Montague, McKinny, & Hocutt, 1994; Wright, 2002). This assumption may be reasonably close to the truth with respect

to ADHD. For example, Herbert et al. (2004) demonstrated that school psychologists scored significantly higher than teachers on the Knowledge of Attention Deficit Disorders Scale (KADDS), which measures knowledge and misconceptions about ADHD.

School psychology programs, however, spend relatively little time on the recognition of neurological disorders, such as epilepsy (Sbordone & Rudd, 1986, Wright, 2002). No studies to date have explored whether school psychologists recognize neurological disorders (Sbordone & Rudd, 1986). However, it may be reasonable to hypothesize that, like teachers, school psychologists may mistake various medical and neurological problems for ADHD-PI (Ball, Wooten, Crowell, 1999). Licensed psychologists may have greater expertise in the areas of child psychopathology and pediatric disorders. Although, only a small minority of school psychologists employed by the schools are licensed as psychologists. For example, in their study, McGrath and Yalof (2008, February) found that 22.1% of school psychologists in their sample were licensed as psychologists. However, considering that the sample included college professors and private practitioners (i.e., whom are significantly more likely to hold a Ph.D. and, thus, be licensed as a psychologist), this figure could be expected to be much lower in practice.

Historically, when a school psychologist conducted a school-based assessment, the primary purpose of the assessment was to determine whether the child presented with an educationally-related disability, and whether a change in placement was necessary for the child to receive an appropriate education (Macey, 2005). However, in recent times, school psychologists are being involved earlier in the education process to complete less formal assessments and, more importantly, to implement interventions. Typically, *pre-referral* interventions involve providing the teacher with support and resources so that he or she can implement effective interventions in the classroom (Macey, 2005). State agencies are

increasingly in support of pre-referral interventions, since they may decrease the number of students requiring formal assessment and special education placement (Macey, 2005).

The Integration of Medical and Educational Information

It is critical to note that, although school-based assessments generate important educational-related information, they do not yield a medical diagnosis. Therefore, if a teacher suspects that a child has an underlying medical disorder and initiates a referral for a school-based evaluation, the child may or may not go on to receive an accurate medical diagnosis (i.e., it will depend largely on the school psychologist's prowess). An accurate medical diagnosis is critical to effective, comprehensive treatment. For example, an early and accurate medical diagnosis can prevent a child from struggling at school by qualifying the child for special services before his or her problems become severe (Wodrich et al., 2006). Diagnostic labels are also helpful for their ability to allow a child to receive pharmacotherapy. Finally, by assigning a label to the behavior, practitioners can implement research-based interventions, proven to be effective (Semrud-Clikeman, 2005).

Pharmacotherapy

Pharmacotherapy, an effective treatment for ADHD and epilepsy, requires a formal medical diagnosis. If a child is misdiagnosed as having ADHD-PI when, in reality, they are experiencing absence seizures, the child will fail to receive appropriate treatment, which typically involves AEDs. Moreover, some researchers and practitioners purport that stimulant medications, which is considered a first-line treatment for ADHD-PI, may actually lower seizure threshold. That is, if a child with absence seizures is incorrectly diagnosed with ADHD and prescribed stimulant medication, they may experience a worsening of symptoms, or may experience an greater frequency of seizures (Williams, 2002; Schubert, 2005). Notably, no controlled studies conducted to date support this contention (Schubert, 2005; Tan & Appleton,

2005). Therefore, if a child exhibits symptoms consistent with a medical disorder, or if the child exhibits symptoms that are inconsistent with an existing diagnosis (e.g., the child is diagnosed with ADHD-PI, however his or her symptoms seem irregular), teachers should be encouraged to initiate a referral.

School-Based interventions

Children with epilepsy and ADHD-PI are guaranteed a free public education appropriate to their specific needs as mandated by P.L. 94-142 (Dreisbach, Ballard, Russo, & Schain, 1982). A free and appropriate public education often includes school-based interventions. Children with ADHD-PI and epilepsy are largely heterogeneous groups or, stated differently, there are no specific educational deficits that are common to all children with the disorders (DuPaul & Stoner, 2002; Dreisbach et al., 1982). Therefore, when designing interventions, consideration must be given to both the characteristics of the child and the environment, so that services may be tailored to meet each child's individual needs. Specific care must be taken to ensure that services are provided in the least restrictive environment possible (Dreisbach et al., 1982).

Since inattention stemming from ADHD-PI and absence seizures manifest similarly, they predispose students to many of the same school related problems (e.g., learning disability, memory deficits, and difficulty with sustained attention) (Forness & Kavale, 2001). As a result, interventions for either disorder may have a number of elements in common. For example, well designed interventions targeting inattention may take into account the child's (a) current level of functioning, (b) current presenting problem behaviors, (c) the possible environmental functions of the presenting inattentive behavior, (d) the target behaviors of greatest concern to the teacher and student, and (e) elements of the classroom environment and teaching approach that may limit the effectiveness of the interventions (DuPaul & Stoner, 2002).

Increasingly, the educational community is in favor of providing students with assistance, regardless of the cause of the problem (Gresham, 2004). That is, when students present with inattention, interventions should be implemented immediately, regardless of the student's disability status (Hale, Kaufman, Naglieri, & Kavale, 2006). By implementing services early, it may reduce unnecessary student failure, labeling, and placement in special education (Gresham, 2004; Hale et al., 2006). Response to intervention (RTI) may be used as a basis for decision-making, particularly regarding the modification of interventions (Gresham, 2004). RTI relies on a consultative model of service delivery in which specialists, such as school psychologists, design and evaluate interventions. Teachers are typically responsible for implementing the interventions directly to students (Gresham, 2004).

Fuchs, Mock, Morgan, & Young (2003) described the general RtI model in vague and nonspecific terms as (1) Students are provided with generally effective instruction by their classroom teacher (Tier1); (2) Their progress is monitored; (3) Those who do not respond get something else (Tier 2); (4) Again, their progress is monitored; and (5) Those who do not respond either qualify for special education or for special education evaluation (Tier 3). Many researchers and practitioners diverge over how much problem-solving should occur at Tier 2, reflecting two, competing RtI paradigms, the standard protocol versus the problem-solving model (Hale, Kaufman, Naglieri, & Kavale, 2006). The standard protocol emphasizes scientifically-based classroom instruction and experimental group designs, whereas the problem-solving model emphasizes increasingly individualized interventions and measurement practices for nonresponsive students as they ascend the tiers (Hale et al., 2006). The implicit assumption underlying both paradigms is that insufficient growth must signify an inherent deficit or disability (Hale et al., 2006). Implementation and decision-making under the competing models,

however, will differ, and the trade-off will be one of external validity (i.e., the standardized approach) versus internal validity (i.e., the problem-solving approach) (Hale et al., 2006). Given that both models possess clear merits, some researchers and practitioners advocate the use of a blended approach, which calls for implementation of a standard treatment protocol with some, limited problem-solving starting as early in the process as Tier 2.

According to the Office of Special Education Programs (OSEP), Tier 2 services include programs, strategies, and procedures designed and employed to supplement, enhance, and support Tier 1 instruction to all students. Recall that, at Tier 2, the level of problem analysis that occurs will depend largely on the paradigm adhered to (i.e., the standard protocol or problem solving approach). Students at Tier 2, particularly adhering to the standard protocol paradigm, are grouped according to presenting, arguably superficial, characteristics. For example, students presenting with decoding problems may constitute a group and receive the same research-based reading intervention, regardless of *why* they are exhibiting difficulties with decoding. Similarly, students exhibiting inattention may receive the same research-based interventions to enhance independent functioning, regardless *why* they are experiencing difficulties sustaining their attention. If a student responds positively to an intervention, then, arguably, the cause of the problem is inconsequential. However, if a school-related problem is a symptom of an underlying organic condition, such as a medical or neurological disorder, identifying the source of the problem is critical, even when the student appears to be responding positively to an intervention.

Given that children with ADHD and children with absence seizures present similarly, they may be assigned to the same group (i.e., at Tier 2) and receive the same research-based interventions. While some components of interventions for children with ADHD and absence seizures may be similar, other aspects may differ considerably. The most notable distinction

pertains to whether the child's behavior is perceived as being controllable, or volitional. Many parents, teachers, and practitioners perceive inattention stemming from ADHD and epilepsy as being, at least somewhat, uncontrollable. They believe that the efficacy of pharmacotherapy working at the neurotransmitter level bolsters this contention (DuPaul & Stoner, 2002). However, research suggests that behavioral modification strategies, such as contingency management programming (e.g., token reinforcement), are also effective for children with ADHD, suggesting that they have some control over their behavior (DuPaul & Stoner, 2002). With age, children with ADHD-PI can be taught self-management strategies, which require them to recognize and record whether they have demonstrated a specific behavior (e.g., inattention) (DuPaul & Stoner, 2002).

Conversely, practitioners rarely recommend that inattention stemming from absence seizures be controlled through environmental interventions. Absence seizures occur without warning and are usually unprovoked. Individuals experiencing the seizures are often unaware of their occurrence. Therefore, in most cases, behavioral management would be an inappropriate and ineffective intervention strategy. Some researchers have demonstrated that highly demanding and stressful situations, such as taking tests, may produce increased absence activity in children (Dreisbach, Ballard, Russo, & Schain, 1982). Others advise that, at times, seizure activity is reinforced inadvertently, since it allows children to avoid noxious environmental events (Dreisbach et al., 1982; Cataldo, Russo, & Freeman, 1979). When designing interventions for inattention, then, it may be best practice to conduct a functional behavior assessment (FBA) to ascertain the function of the behavior, even when the behavior appears to stem from an underlying neurological problem (Dreisbach et al., 1982).

However, waiting to assess the effectiveness of school-based interventions for students with pediatric disorders, such as absence seizures and ADHD may not only be ineffectual, but may actually be harmful, given that untreated medical and neurologically-based problems may portend a myriad of health and safety concerns, such as traumatic brain injury and death. Like academic and behavior problems, pediatric disorders respond best to early and accurate diagnosis and treatment. Failure to recognize medical and neurologically-based indicators denies children access to appropriate medical treatment (e.g., pharmacological regimens). In the absence of appropriate medical treatment, academic and behavior problems at school will likely persist, given that even interventions implemented with exceptional intensity and integrity will fail to address the source of the problem. With time, children's academic and behavior problems may intensify or grow more pervasive, which, eventually, may negatively affect their self-concept and self-esteem.

Absence seizures, a subtle yet potentially debilitating type of pediatric epilepsy, perfectly illustrate how waiting to assess the effectiveness of standard, predetermined interventions may be inappropriate in certain, limited circumstances. It may be best practice to bypass/discontinue/postpone the Tier process when students present with specific medical and neurological indicators, such as (a) paroxysmal changes in consciousness, (b) acute changes in functioning, (c) progressive loss of previously mastered developmental milestones or skills, (d) behavioral or attention problems with possible organic bases, and (e) the presence of physical stigmata or dysmorphic features (Wodrich, 2005). Perhaps commonly occurring medical and neurological indicators should be reflected on class- and school-wide screening instruments, and personnel responsible for screening students (i.e., likely teachers under the standard protocol

paradigm and specialists, such as school psychologists, under the problem-solving paradigm) should be familiarized with them.

Summary

All students, including those with ADHD and epilepsy, are guaranteed FAPE (Dreisbach et al., 1982). Today, children with either disorder can receive special services under traditional special education categories, such as LD, ED, or MR, or they may qualify under OHI (Forness & Kavale, 2001; Wodrich et al., 2006). They may also receive school-based accommodations according to Section 504 (Forness & Kavale, 2001; Wodrich et al., 2006). The school-based assessment is designed to determine the presence and severity of an educationally related disability, and to establish the assignment of services (Wright, 2002). The school psychologist is often responsible for conducting the school-based assessment, which does not yield a medical diagnosis (Ball et al., 1999; Miller, 2006; Wodrich et al., 2006). Accurate medical diagnoses can be critical, given that they inform effective treatment. For example, despite presenting similarly, children with ADHD and epilepsy benefit from different treatments (Dreisbach et al., 1982; DuPaul & Stoner, 2002). Implementing school-based interventions, with disregard for the cause of the presenting problem, can be harmful in certain limited circumstances, given that untreated medical and neurological problems may portend a myriad of health and safety concerns.

The Instrumentality of Teachers

Teachers spend more time with students than any other school personnel and interact with students across a variety of structured and unstructured activities and settings (Gresham, 2004). They are in an ideal position to play a direct and indirect role in diagnosis and treatment, and, as a result, are regarded as key members in the lives of children with chronic health conditions (Sciutto, Terjesen, & Bender-Frank, 2000). Teachers are responsible for implementing school-based interventions, making appropriate referrals, and are regularly relied upon to provide

accurate information to those responsible for making a diagnosis. They are often regarded as carryover agents, responsible for collaborating with diverse professionals and incorporating findings into their practice (Haslam & Valletutti, 2004). Unfortunately, teachers often have limited knowledge and hold inaccurate beliefs about these disorders, which negatively influences their classroom behaviors and the decisions they make (Dunn & Kuntos, 1997).

Direct Influence

Teachers are responsible for implementing school-based interventions and for employing developmentally appropriate classroom practices for all students, including those with ADHD and epilepsy (Gresham, 2004). Unfortunately, teachers regularly fail to implement interventions as intended, and rarely abide by intervention scripts they are provided with (Gresham, 2004). Researchers have identified several factors that predict teachers' willingness to abide by an intervention script for prolonged periods of time, including (1) whether they condone the use of the intervention strategy, (2) whether they view the problem behavior as mutable, and (3) whether they hold negative attitudes toward the child or the child's disorder (Ysseldyke, Pianta, Christenson, Wang, & Algozzine, 1983). Some teachers, for example, consider behavioral management strategies to be inappropriate, equating reinforcement to bribery (Schloss & Smith, 1988). Moreover, many teachers attribute problem behaviors, such as inattention, to causes *within* the child, or to sources out of their control (e.g., the child's home situation) (Ysseldyke et al., 1983). They do not consider it the schools responsibility, then, to address these behaviors (Gresham, 2004). Teachers rarely attribute deviations in student performance to a medical condition (Haslam & Valletutti, 2004, p. 5). Given that approximately 85% of children do not have a chronic medical condition that affects their performance at school, this assumption is reasonable (Haslam & Valletutti, 2004, p. 5).

Studies suggest that, in general, regular and special education teachers differ with respect to the classroom practices they engage in. For example, as compared to regular education teachers, special education teachers are more willing to and implement behavioral interventions more often (Forness & Kavale, 2001). They also consult with specialists (e.g., school psychologists, behavior specialists, and other special education teachers) for purposes of intervention planning and development more regularly than regular education teachers do (Forness & Kavale, 2001). Finally, they are much more likely to use one-on-one instruction, which may be an effective strategy for children who experience lapses in attention (Forness & Kavale, 2001).

Regular education teachers, in contrast, are described as desiring little assistance with classroom strategies. Instead, they make referrals for the purposes of testing and special education placement (Forness & Kavale, 2001). Regular education teachers, then, are thought to operate from a medical model of diagnosis (i.e., they initiate referrals for *within* child problems) (Leone, 1989). Undoubtedly, these differences reflect, at least to a degree, differences in training and beliefs about behavior and disorders. For example, historically, special education preparation programs have relied much more heavily on behavioral theory (Forness & Kavale, 2001). With the current shift toward inclusion and unified programs (i.e., those that emphasize elementary education and mild disabilities), differences in classroom practices and beliefs about behavior among regular and special education teachers may become less pronounced.

Indirect Influence

Teachers can play an important indirect role as well through the referrals they make and by providing reliable information to practitioners (Sciutto et al., 2000). Typically, the referral process involves three steps (1) referral, (2) assessment, and (3) placement (Bocian, Beebe, MacMillan, & Gresham, 1999). Given school initiatives to move away from *labeling* children

and placing them in special education, teachers may be reluctant to initiate referrals. Instead, they may be more inclined to request pre-referral interventions (i.e., to remediate the problem and, hopefully, avoid special education placement) (Gresham, 2004). Therefore, specialists participating in pre-referral interventions, such as school psychologists, also have an opportunity to recognize a medical problem and initiate an appropriate referral. Other factors that, reportedly, discourage teachers from making referrals are (1) having received inadequate training on behaviors that warrant a referral, (2) the hassle of making a referral, and (3) that the referral process can be unclear and confusing (Christenson et al., 1982; Haslam & Valletutti, 2004).

Making a referral to an outside agency or professional is even more convoluted, since structured procedures for initiating a referral are not always in place (Haslam & Valletutti, 2004). As a result, teachers must often make decisions on an ad hoc basis (Haslam & Valletutti, 2004). Macey (2005) asked teachers whether they had ever referred a parent to a physician, psychologist, or psychiatrist to obtain an ADHD evaluation. Many teachers responded that they had not, indicating that for a teacher to suggest a diagnosis is against the law. Other teachers, however, indicated that they had (Macey, 2005). Clearly, there is significant variation between school district policies and procedures. Given the gravity of receiving an accurate medical diagnosis, teachers should be encouraged to investigate and to become familiar with their particular school district's policies and procedures for initiating a referral to an outside agency or professional (Haslam & Valletutti, 2004).

With respect to ADHD, teachers are often the first to make referrals for assessment (Sciutto et al., 2000). Unfortunately, teacher accuracy for ADHD diagnosis tends to be low. For example, Cotugno (1993) found that only 22% of children referred to a clinic specializing in ADHD by teachers received a primary diagnosis of ADHD (Cotugno, 1993). In another study,

only 38% of students suspected of having ADHD by their teachers received a confirmatory diagnosis of ADHD. There are no studies to date describing the accuracy of teacher referrals for children with epilepsy; diagnosis of epilepsy relies almost exclusively on parental reports (Williams et al., 1996). However, teachers can be instrumental to the early and accurate diagnosis of epilepsy for the same reasons they are valuable to the assessment of ADHD: they have close and continuing contact with students, they observe students directly at various times and in multiple settings, and they have the ability to compare the student's behavior to peers whom are of the same developmental level and are placed under similar learning conditions.

While exact prevalence rates are unavailable, researchers contend that a significant percentage of children are misdiagnosed as having ADHD-PI, when in fact they have epilepsy, or both disorders. It logically follows that teachers, too, may mistake absence seizures for ADHD, a more common pediatric disorder. This contention is bolstered by teachers' tendency to *over-identify* ADHD, and by their tendency to overgeneralize other problematic behaviors to ADHD (Cotugno, 1993; Macey, 2005). That teachers are familiar with epilepsy is critical. However, that teachers understand the relationship between ADHD and epilepsy is equally important. Recall that researchers consider ADHD-PI a risk-factor for developing absence seizures (Hersdorffer et al., 2004). That is, when a child receives a diagnosis of ADHD-PI, they are at increased risk for going on to develop epilepsy (Hersdorffer et al., 2004). Therefore, if a student has received a diagnosis of ADHD-PI, teachers should not automatically assume that their presenting behavior is attributable to ADHD-PI. Instead, they should explore numerous causes and reasons for attention difficulties, since the child may be experiencing co-morbid seizures (Macey, 2005).

To facilitate the accuracy and usefulness of teacher referrals, practitioners recommend that they compile anecdotal information about the child and his or her behavior into a written report (Haslam & Valletutti, 2004). The written report describes the student's behavior in sufficient detail and in behavioral terms. For example, the report should describe the conditions under which the behavior occurs, record the frequency and duration of the behaviors, and attest to the consistency of the behavior over time (Haslam & Valletutti, 2004). The teacher should rely less on labels that are ambiguous and involve a level of interpretation (e.g., lazy or inattentive). Finally, teachers can provide extremely valuable information about the ways the behavior affects the child's daily functioning (Haslam & Valletutti, 2004).

Knowledge and Beliefs

Some researchers hypothesize that teachers' unwillingness to work with students with difficulties, inability to implement interventions effectively in the classroom, and tendency to *misidentify* students (i.e., over-identify in the case of ADHD and under-identify in the case of epilepsy) all stem from limited knowledge and inaccurate beliefs about the disorders. Studies investigating teachers' knowledge of ADHD corroborate that they have a poor understanding of the disorder's nature, causes, course, and outcomes (Sciutto et al., 2000). For example, in a study conducted by Ghanizadeh, Bahredar, and Moeini (2006), only 46.9% of elementary school teachers knew that ADHD is caused by biological or genetic vulnerabilities. Moreover, the majority of teachers (53.1%) attributed the disorder to parental spoiling (Ghanizadeh et al., 2006). Another study conducted by Sciutto, Terjesen, and Bender-Frank (2000) revealed that a majority of teachers held the startling misconception that ADHD symptoms are caused by, and can be controlled by, dietary restrictions. Teachers were most knowledgeable about symptoms, or the diagnosis of ADHD as outlined in the DSM-IV; they answered more than 80% of items correctly (Sciutto et al., 2000). In one study, teachers who received information on ADHD were

more likely to use positive teaching techniques (e.g., reduction in amount of coursework, use of praise, preferential seating, and allowing for movement) (Ghanizadeh et al., 2006; Glass, 2000). This finding implies that teachers rely on knowledge to inform their practices. Perhaps the most encouraging trend noted across the disparate research studies was that, by and large, teachers desire additional ADHD-related knowledge and training (Macey, 2005).

Studies concerning teachers' knowledge and beliefs about epilepsy in the United States (U.S.) are scant in the literature (Bishop & Slevin, 2004). The results of international investigations converge to reveal several trends (Bishop & Boag, 2006; Bishop & Slevin, 2004). Almost universally in these studies teachers had insufficient knowledge about epilepsy, held erroneous and potentially dangerous beliefs about the disorder (i.e., first-aid management), and reported receiving little or inadequate training and preparation in disease management (Bishop & Boag, 2006; Bishop & Slevin, 2004; Prpic et al., 2003). For example, in one study, more than 30% of teachers associated epilepsy with insanity (Bishop & Boag, 2006). A positive relationship between teacher knowledge and attitudes appears to exist; the more knowledge teachers' possess about epilepsy the more willingly they accept a child with epilepsy in their classroom (Bannon, Wilding, & Jones, 1992; Dantas et al., 2001). Additionally, studies suggest that better-educated individuals, such as U.S. teachers, tend to be more knowledgeable and hold more positive attitudes toward individuals with the disorder (Bannon et al., 1992; Dantas et al., 2001). Finally, while the majority of teachers participating in these studies had not received formal instruction on epilepsy, encouragingly, the vast majority desired additional information and training (Bishop & Slevin, 2004).

Numerous studies have sought to identify whether teacher characteristics (e.g., teaching regular or special education, age, and experience) predict knowledge of ADHD and epilepsy.

The results have been inconsistent across studies and across disorders. For example, Sciutto et al. (2000) found that knowledge of ADHD was unrelated to age, education level, and number of special education classes taken. Knowledge of epilepsy, in contrast, was positively related to teacher confidence (i.e., the ability to effectively teach a child with epilepsy) and experience (i.e., the number of children with epilepsy they had taught) (Sciutto, 2000). Another large-scale study investigating teachers' knowledge of epilepsy suggested that level of education, teaching experience, currently teaching a student with epilepsy, self-reported knowledge of epilepsy, frequency of contact with persons with epilepsy, and ethnicity all predict knowledge of epilepsy (Bishop & Boag, 2006).

Teacher Efficacy

Countless studies have demonstrated that efficacy expectations affect teachers' decision-making and behavior in the classroom, such as their decision to initiate a referral (Macey, 2005). An efficacy expectation refers to having confidence that one can successfully execute a behavior to produce a desired outcome (Bandura, 1977, p. 193). When forming efficacy expectations, teachers must analyze the task or assess what will be required of them (Tschannen-Moran, Hoy, & Hoy, 1998). For example, to initiate an appropriate referral a teacher must be aware of the problems and behaviors that warrant a referral, be able to recognize those problems and behaviors, be familiar with the steps for initiating a referral, and be able to carry out those steps effectively. After determining what will be required of them, teachers make inferences regarding the difficulty of the task (Tschannen-Moran et al., 1998).

Typically, efficacy is divided into two dimensions: teaching efficacy and personal efficacy (Ashton & Webb, 1986; Gibson & Dembo, 1984). Teaching efficacy pertains to the belief that one's teaching can affect certain educational outcomes (Macey, 2005). Personal efficacy pertains to the belief that one possesses the skills necessary to teach students successfully (Macey, 2005).

Woolfolk, Rosoff, and Hoy (1990) found that personal efficacy (i.e., confidence in one's instructional abilities) is related to more humanistic attitudes about classroom control, such as the attitude that all humans can be taught. Unsurprisingly, studies suggest that teacher's with higher self-efficacy are more likely to agree with regular education placement and are less likely to initiate referrals for special education evaluation (Macey, 2005; Podell & Soodak, 1993).

Social-cognitive theory proposes another type of expectation: outcome expectancy (Tschannen-Moran et al., 1998). Whereas an efficacy expectation relates to an individual's conviction that he or she can orchestrate the necessary actions to perform a given task, outcome expectancy relates to the individual's estimate of the likely consequences of performing the task at the expected level of competence (Tschannen-Moran et al., 1998). For example, when considering whether he or she should initiate a referral for a student, a teacher may take into account the outcomes of previous referrals and special education evaluations. Outcome expectancies are thought to add little to the predictive power of efficacy measures, and, as a result, have received little research attention (Tschannen-Moran et al., 1998). Researchers do concede, however, that outcome expectancies provide incentives or disincentives for behavior, especially in the form of physical or social rewards, recognition, punishments, or criticisms (Tschannen-Moran et al., 1998). For example, if a teacher perceives that teachers who initiate high rates of referrals are criticized and teachers who manage children with problem behaviors in the classroom are lauded, he or she may be less inclined to initiate a referral.

In general, expectations of personal efficacy come from four sources: (1) performance accomplishments, (2) vicarious experience, (3) verbal persuasion, and (4) emotional arousal (Bandura, 1977). Performance accomplishments refers to personal mastery experiences or, stated differently, depends on whether a person has experienced success in the past. Vicarious

experience suggests that expectations can be learned from observing others perform tasks without negative consequences (Bandura, 1977). Verbal persuasion refers to the use of verbal suggestion in order to convince an individual that he or she can successfully handle a task. Finally, arousal refers to the fact that individuals often become emotionally and physiologically aroused in the face of difficult situations, and this information can be indicative about level of skill or ability (Bandura, 1977).

Teacher efficacy is conceptualized as being both context and subject-matter specific. That is, a teacher may feel very competent in one situation or working with one kind of student and less competent in other situations or working with other kinds of students (Tschannen-Moran et al., 1998). Teachers' efficacy, or confidence, in a situation depends largely on their *subjective knowledge* (i.e., perceived competence) (Liljedahl, n.d.; Tschannen-Moran et al., 1998). For example, Reid et al. (1994) found that teachers who had read more about ADHD and who had more experience working with individuals with ADHD were more confident that they could meet the needs of students with ADHD. Similarly, Bishop and Boag (2006) found that teachers who were currently teaching a child with epilepsy and teachers with more years of experience were more confident that they could meet the needs of children with epilepsy. In general, teachers report being more familiar with ADHD than epilepsy, which is not surprising, since ADHD is significantly more prevalent and has received considerable attention in popular literature and the media (Bishop & Slevin, 2004; Tschannen-Moran et al., 1998).

However, the distinction between objective and subjective knowledge is important, given that teachers regularly overestimate or underestimate their abilities (Tschannen-Moran et al., 1998). Whereas objective knowledge pertains to the acquisition of facts and accurate information, subjective knowledge is anchored in beliefs (Liljedahl, n.d.). The phrase subjective

knowledge, then, is a misnomer. However, objective and subjective knowledge are not necessarily opposing constructs and, instead, may be viewed as complementary subsets of things we believe (Liljedahl, n.d.). For example, whereas the former refers to things we *more than believe*, the latter refers to things we *just believe* (Liljedahl, n.d.). Although teachers' beliefs may be shaped by education and teaching experiences, they are often resistant to change, especially those that are formulated early on in life.

Many researchers agree that it is teachers' subjective knowledge that determines for the most part what happens in the classroom, given that subjective knowledge influences teachers' sense of self-efficacy (Liljedahl, n.d.). Teachers' sense of self-efficacy has received considerable research attention as a result. In general, studies suggest that slightly overestimating one's actual capability is associated with the best outcomes (Tschannen-Moran et al., 1998). Although researchers and theorists agree that efficacy is context- and subject-matter specific, consensus regarding the appropriate level of specificity for measuring the construct has not been reached. Most current measures of efficacy are considered too general. Single item measures, in contrast, are often found to be unreliable, have limited generalizability, and cannot capture multi-faceted dimensions of the construct (Tschannen-Moran et al., 1998). Therefore, researchers wishing to assess efficacy of a given population should strive to balance specificity and generality.

Preservice Teacher Preparation Programs

Knowledge of ADHD and epilepsy, experience with individuals with the disorders (i.e., frequency of contact), and self-efficacy appear to be among the most important variables for predicting whether a teacher will initiate a referral. An important question, then, is where teachers can acquire this knowledge and experience, and where they can develop a sense of self-efficacy? Preservice teacher preparation programs are ideal for transmitting accurate knowledge to teachers, and for providing them with valuable training experiences; they are particularly

effective for overcoming public health problems such as ADHD and epilepsy (Bertolote, 1994; Bishop & Boag, 2006; Ojinnaka, 2002). Increasingly, preservice teacher preparation programs include instruction on disabilities in their curricula (Haslam & Valletutti, 2004). For example, preservice teachers preparation programs may include formal instruction on ADHD in courses pertaining to inclusion and classroom management, whereas they may include information about epilepsy and seizure management in health science courses (S. Halsall, personal communication, December 3, 2007).

To improve preservice teachers' sense of self-efficacy, or their confidence that they can accurately recognize pediatric disorders and initiate appropriate referrals, preparation programs should include field-based experiences, allowing preservice teachers to experience personal mastery. The opportunity to work successfully with these students while under the guidance of an experienced teacher should increase personal mastery (Macey, 2005). The opportunity to observe experienced teachers working successfully with students with disabilities would increase self-efficacy through vicarious experience (Macey, 2005). Clearly, experienced teachers can build preservice teachers' confidence verbally, and through gaining experience with students and working through situations their physiological arousal should diminish. Finally, preservice teacher preparation programs could address issues of teacher confidence and "involvement in their professional roles" (e.g., whether it is their responsibility to initiate a referral when they suspect that a student has an underlying medical problem) (Fritz et al., 1995, p. 207).

Efficacy depends largely on teachers' subjective knowledge, which may or may not correspond to their objective knowledge. Studies suggest that teachers regularly overestimate their level of knowledge, and that slightly overestimating one's abilities can result in optimal outcomes (Tschannen-Moran et al., 1998). However, clearly, overestimating one's skill level or

abilities can have negative consequences as well. For example, a teacher may incorrectly assume that he or she is managing a problem behavior effectively and, as a result, fail to investigate and acquire a more effective skill set. Preservice teacher preparation programs can help preservice teachers form more accurate appraisals by assessing their knowledge formally with tests and providing them with direct feedback. Unfortunately, traditional tests can lack important contextual details, and, as a result, may not necessarily predict how a teacher will behave in the classroom. More valid ways of assessment should be developed to measure if, and to what extent, preservice teachers incorporate knowledge of ADHD and epilepsy into daily practice, and to what extent frequency of contact and personal efficacy affects their decision making.

Summary

Teachers can be extremely influential to the accurate diagnosis and treatment of ADHD and epilepsy (Gresham, 2004; Sciotto et al., 2000). Unfortunately, teachers often fail to implement interventions as intended, and provide inaccurate or inconsequential information to practitioners (Bishop & Boag, 2006; Cotugno, 1993; Sciotto et al., 2000). These shortcomings are believed to be due, at least in part, to inadequate knowledge and ill-conceived beliefs about the disorders (Bishop & Slevin, 2004; Ghanizadeh et al., 2006). Although findings have been inconsistent across studies, experiential variables appear to affect knowledge the most. More importantly, knowledge, frequency of contact, and efficacy appear to influence preservice and practicing teachers' behavior and decision-making (Macey, 2005). Preservice teacher preparation programs are ideal for transmitting knowledge to preservice teachers. Moreover, well-designed field experiences can provide preservice teachers with exposure to individuals with disabilities, which should help to improve their sense of self-efficacy (Macey, 2005).

Assessing Professional Judgment

Helping professionals, such as teachers, make decisions daily and must exercise professional judgment across diverse domains (Taylor, 2006). Clearly, some decisions are more important than others (i.e., their consequences are serious), making the factors that affect those decisions of interest to researchers. Information and increased understanding of decision processes may be used to improve training, evidence-based practices, and policy development (Taylor, 2006). A failure to recognize ADHD-PI or absence seizures can delay appropriate treatment (i.e., both disorders respond positively to pharmacotherapy). Moreover, the misdiagnosis of absence seizures for ADHD may actually worsen the child's condition, since stimulant medications may lower seizure threshold (i.e., raise seizure frequency) (Williams, 2002; Schubert, 2005). Thus, recognizing a seizure and making an appropriate referral may be considered an extremely important decision that a teacher must make. When presented with the aforementioned scenario, teachers are ethically expected to exercise professional judgment (e.g., make an appropriate referral) and collaborate with professionals (e.g., the school psychologist). However, assessing how teachers react in these scenarios and what decisions they make can be remarkably complex.

Traditional methods used to investigate decision-making issues, such as classical experiments and qualitative techniques (e.g., diary methods and interviews), are constrained by practical and ethical limitations; they are also criticized for having inadequate validity and limited generalizability (Taylor, 2006; Zeller, 2003). Traditional surveys and questionnaires also, arguably, are not suited for the study of human attitudes and behavior, since they can elicit unreliable and biased self-reports (Alexander & Becker, 1978). Furthermore, they do not allow for strong causal inferences (Zeller, 2003). Vignettes, a method popularized by Star in 1950, have been used extensively over the last 50 years. However, researchers often pass up this

approach for its inability to provide insight into *which* factors contribute *most* to decision-making (Thurman, Lam, & Rossi, 1988). Finally, for researching mental illness, Coie, Costanzo, and Cox (1975) came up with a list approach to studying decision-making. The list approach involves providing participants with lists of descriptions of personal attributes and behaviors, and having the participants rate them in order of importance. Unfortunately, the list approach is unable to consider contextual factors that influence decision-making in real-life situations (Coie et al., 1975).

The Factorial Survey

The factorial survey, which may be considered a blend of laboratory experiments and social surveys, addresses many of the aforementioned methodological limitations (Ludwick & Zeller, 2001). Some clear merits of the research design include high internal validity (i.e., due to the randomization of the factors the vignettes), high external validity (i.e., the decisions closely resemble those in daily life), robustness (i.e., due to large numbers and the unit of analysis), and the ability to relate the findings to other factors and demographic information (Taylor, 2006). The factorial survey research design utilizes true-to-life vignettes that are designed to simulate an event or situation that would otherwise be prohibited from investigation (e.g., practical, logistical, or ethical reasons).

The factorial survey has already proven to be a method for rigorous study in the social sciences and, more recently, in the fields of social work and school psychology (e.g., trauma-specific assessment skills) (Butkerei, 2004; Taylor, 2006). The method can be used to elicit participants' knowledge, attitudes, and judgments in a situation of interest (Zeller, 2003). Ludwick (2004) provided an important contribution to the literature by demonstrating that, as a measure, the factorial survey design is valid and reliable for assessing judgments and decision-making. The factorial survey, then, may be an ideal method for investigating whether teachers

recognize absence seizures, differentiate them from ADHD, and exercise good professional judgment by anticipating that they would initiate an appropriate referral (Barter & Renold, 1999; Finch, 1987).

Peter H. Rossi pioneered the factorial survey approach (Byers & Zeller, 1995). The factorial survey uses vignettes to assess the effects of important independent variables on an outcome decision of interest (Zeller, 2003). A vignette is a short story that contains factors relevant to the decision to be made. Each vignette is comprised of a series of sentences that are fixed in a certain order (Taylor, 2006). However, the characteristics of the story (i.e., independent variables) are varied and manipulated so that they are randomly assigned to subjects (Zeller, 2003). It is this randomization that gives the factorial survey the robustness of an experimental method, yet the complexity of the factors is what upholds the external validity (Ashton, 1999; Taylor, 2006). The information included in the vignettes may be drawn from the available literature, practice knowledge, or a preliminary qualitative study (Taylor, 2006). The construction of the vignettes may be facilitated with computer programs, such as VIGWRITE, which randomly selects characteristics to include (i.e., every level of each IV has an equal chance of being selected). Minor adjustments of the vignettes may be necessary as they must be coherent, logical, and internally consistent (Zeller, 2003).

Independent variables

The independent variables are called dimensions. Each dimension consists of multiple levels (Taylor, 2006; Zeller, 2003). The dimensions are usually categorical but may be ordinal or interval as well (i.e., they can be converted into categorical variables) (Zeller, 2003). There is no limit on the number of dimensions and levels that can be used, with some researchers including up to 20 of each (Thurman, Lam, & Rossi., 1988). However, it is important to consider the respondent's ability to assimilate large amounts of information, subject willingness, and subject

fatigue (Thurman et al., 1988; Zeller, 2003). With respect to mental illness, previous research has revealed that longer vignettes with more problematic behaviors are more likely to elicit more severe judgments from participants. This tendency has been coined “snow-balling” (Thurman et al., 1988). Thus, when designing the factorial survey, the researcher should balance brevity with complexity, and, ultimately, should match the degree of descriptiveness to the real-life situation he or she is attempting to simulate. Finally, the researcher should consider the way the vignette levels are weighted. More specifically, if some levels are presented as positive and others negative, it will lead to an inconsistent vignette (e.g., a child who is described as being inattentive, alert, and always on-task) (Thurman et al., 1988).

The more dimensions and levels a researcher includes, the larger the factorial object universe (Byers & Zeller, 2003). The factorial object universe refers to the set of all unique objects formed by all possible combinations of one level from each of the dimensions. It is the product of the number of levels for each dimension multiplied across all dimensions (Byers & Zeller, 2003). The factorial object sample refers to the sample of vignettes the researcher elects to use. The factorial object sample should possess the same characteristics of orthogonality and rectangularity as the universe and, thus, is considered an unbiased sample. Researchers have used Monte Carlo studies to demonstrate that, for all intents and purposes, all of the dimensions in the sample are uncorrelated with one another (Zeller, 2003). As a result, every respondent’s sample is considered to be statistically equivalent (Thurman et al., 1988).

Dependent variables

The dependent variable is of primary importance. Anywhere between one and three dependent variables can be specified using a factorial survey research designs (i.e., above three things get jumbled) (Zeller, 2003). Given that the purpose of the study is to measure variance in the dependent variable(s), each DV must be capable of showing significant variance. As a result,

researchers often elect to measure the DVs with Likert scales. When utilizing Likert scales for dependent variables, there is a potential that some respondents will exhibit a tendency to provide high or low ratings (Zeller, 2003). Many researchers conceptualize this tendency as a subject characteristic (i.e., it may express the subject's particular interpretation of the rating scale) (Thurman et al., 1988). To deal with rater tendency, a subject's mean rating can be formed by averaging their ratings across the vignettes, and may be included in the OLS regression analysis as a control variable or covariate (Thurman et al., 1988). Rossi and Anderson (1982) described another method of dealing with rater tendency, which entails including *give-away* vignettes that precede the actual test vignettes. The give-away vignettes include ambiguous indicators of the variable of interest. For example, in the current case, they may include some, but all not all indicators of ADHD-PI or absence seizures. Afterward, analyses may be conducted on the actual test vignettes (a) as deviations from their mean, or (b) as residuals from the scores predicted from the give away vignettes (Zeller, 2003). These analyses have, on occasion, resulted in different substantive results, bolstering the inclusion of give-away vignettes.

Subgroup Variation

The factorial survey is a powerful research method for detecting and describing differences across structural conditions. While not its original purpose, researchers have found that the factorial survey can sufficiently detect subgroup variation (Byers & Zeller, 1998). Thus, variability in factorial surveys, as determined by the coefficient of determination, can be interpreted in two general ways: due to changes in the independent variables, and due to sample characteristics (Byers & Zeller, 1998). Samples of subjects may be delineated or described based on a range of social or demographic characteristics (Thurman et al., 1988). However, when modeling subgroup variation, there are several assumptions to consider (Table 1-5).

Attempts to measure subgroup variation in factorial survey research have generated mixed findings (i.e., it has been detected in some studies and not in others) (Byers & Zeller, 1998). In a study examining perceptions of mental illness, demographic factors, such as age and gender, influenced decision-making. More specifically, females were more likely to rate persons as mentally ill and were more likely to be classified as mentally ill by raters. A study concerning teacher reporting of child abuse, in contrast, revealed that males provided higher ratings (i.e., they were less tolerant of child abuse and more likely to report it to the appropriate authorities) (O'Toole et al., 1999). Preservice teachers' ratings, then, may be expected to vary with respect to these and other educational and experiential variables (e.g., knowledge, experience, and efficacy).

Level of Analysis

Most researchers utilizing the factorial survey methodology agree that, for practical purposes, the appropriate level of analysis is the vignette. As a result, factorial survey data can be analyzed using ordinary least squares (OLS) regression, which allows the unique contribution of each level and the total contribution of the levels to be ascertained (R^2) (Byers & Zeller, 1995). OLS, in effect, conceptualizes the ratings as linear functions of the person described in the vignette and the characteristics of the rater (Thurman et al., 1988). This type of analysis is aided by the asymptotic orthogonality of the factorial survey and the fact that the respondent characteristics are also uncorrelated with the levels (Thurman et al., 1988). While linearity is an assumption of the model, some dimensions may not be linear. In these cases, binary dummy coding can be used to carry out the regression analysis. The unstandardized regression coefficients, then, indicate the relative contribution of each dummy variable to scores on the dependent variable (i.e., compared to the net of the effects of the other variables in the equation) (Thurman et al., 1975).

Criticisms

While the factorial design is a powerful research tool, the methodology is not without flaws. For example, some researchers have reservations about the validity of the methodology and, more specifically, the generalizability of the findings. They claim that, because the decisions and judgments are hypothetical, the results cannot be interpreted to suggest what a participant would do if faced with the situation that the vignette is attempting to simulate (Ludwick & Zeller, 2001). Another potential problem relates to the extent to which the vignettes represent the realities of the real life events they are portraying. While impossible to simulate real life events precisely, both of the aforementioned criticisms can be addressed by ensuring that the vignettes are sufficiently complex and incorporate a sufficient number of IVs (Ludwick & Zeller, 2001).

Some debate exists regarding the level of analysis with factorial survey data. Specifically, some researchers claim that treating the vignette as the level of analysis is inappropriate, since treating participant responses as independent causes the sample sizes to be artificially inflated. They contend that the more appropriate level of analysis is the respondent, suggesting that hierarchical models (i.e., logit) are better suited for analyzing factorial survey data. Degenholtz, Kane, Kane, and Finch (1999) enumerate four distinct advantages to hierarchical models. First, they allow the researcher to take the nested structure of the data into account, which allows for the accurate specification of effects of variables at different levels of aggregation (Hox & Kreft, 1994). Second, there may be substantial intra-class correlation (ICC), which may lead to inaccurate estimates of standard errors (Degenholtz et al., 1999). This is not unusual of factorial survey data, since the method is often conducted with intact social units, such as teachers. Third, hierarchical models allow the analyst to test the hypothesis that a variable has a different effect in different cross sectional units (i.e., a random coefficients model) (Degenholtz et al., 1999).

Finally, hierarchical models specify fixed-effects, in which dummy variables are included for each higher-level unit (Degenholtz et al., 1999). Hierarchical models, then, may be more suitable for analyzing factorial survey data when the dependence between observations is substantial.

Rebuttal

In response to claims that hierarchical modeling is more appropriate for factorial survey data, researchers in support of OLS concede that, strictly speaking, the systematic probability samples do not meet the independent sample selection assumption (Zeller, 2003). Moreover, they grant that major deviations from independent measures are not robust. That is why, whenever possible, researchers attempt to use independent measures (Zeller, 2003). However, when researching practical problems, it may be impossible to obtain purely independent measures. In response, researchers may choose to use measures in which the departure from independence is so slight that it is still reasonable to assume that the measures are independent (Zeller, 2003). Most factorial survey research operates on this reasonable and robust assumption (Zeller, 2003); researchers tolerate minor deviations inherent to the factorial survey as robust. Zeller (2003) conducted an analysis plus simulation to answer the question “how much dependency can we have in the data without artificially inflating sample sizes?” Zeller (2003) concluded:

There can be substantial dependency among observations without seriously altering the pattern of the findings. As much as half of the variance in the dependent variable can be driven by the subject, not the vignette, with only a minor alteration in the nature of the relationship between the independent variables and the dependent variable.

Summary

Recognizing a medical disorder and initiating an appropriate referral is an important decision that many teachers must make (Taylor, 2006). Investigating judgment and decision-making can be remarkably complex for a variety of reasons. The factorial survey research design addresses many of the methodological limitations associated with traditional methods of

assessing judgment and decision-making (Taylor, 2006; Zeller, 2003). Although an imperfect methodology, researchers have found the factorial survey suitable for rigorous research (Butkereit, 2004; Taylor, 2006). Merits of the methodology are that it can be used to make causal inferences and detect subgroup variation (Byers & Zeller, 1998). However, some debate exists regarding the appropriate level of analysis for analyzing factorial survey data (Zeller, 2003). Until the debate is resolved, it may be best practice to estimate the dependence between observations to determine which type of regression analysis is most appropriate (i.e., OLS or HLM).

Conclusion

Absence seizures and ADHD-PI are relatively common pediatric disorders that predispose children to a wide-range of problems, especially at school (Schubert, 2005). With early recognition and treatment, many of the undesirable educational and psychosocial outcomes associated with the disorders can be redirected (American Academy of Pediatrics, 2000). However, differentiating between the disorders can be remarkably complex, given that they share subtle and overlapping symptomology (Williams et al., 2002). Teachers—who have close and continuing contact with their students—are in an ideal position to recognize pediatric disorders and initiate appropriate referrals (Bishop & Boag, 2006; Cotugno, 1993; Sciutto et al., 2000). Unfortunately, research suggests that teachers tend to over-identify children with ADHD, implying that they under-identify children with absence seizures (i.e., they mistake absence seizures for ADHD) (Cotugno, 1993; Sciutto et al., 2000). Teacher characteristics such as efficacy, knowledge, and frequency of contact with persons with pediatric disorders are known to affect professional judgment and decision-making, such as the decision to initiate a referral (Bandura, 1977, p. 193; Bishop & Slevin, 2004; Sciutto et al., 2000). Teachers' difficulty recognizing pediatric disorders and initiating appropriate referrals, then, likely stems from

having limited knowledge, inaccurate beliefs, and a poor sense of self-efficacy (Bishop & Slevin, 2004; Macey, 2005; Sciutto et al., 2000). Preservice teacher preparation programs are ideal for transmitting accurate knowledge to preservice teachers and for exposing them to pediatric populations, which, theoretically, should enhance their self-efficacy (Bishop & Boag, 2006). Therefore, assessing if—and to what extent—these attributes are being transmitted to preservice teachers in preservice teacher preparation programs is of significant practical importance.

Purpose of the Study

The purpose of this study was to explore whether preservice teachers recognized absence seizures, differentiated them from ADHD, and anticipated that they would initiate referrals for hypothetical children presenting with absence seizures; and to identify the child- and respondent-level characteristics that affected their decision-making. More specifically, this study answered the following seven research questions:

1. Do preservice teachers recognize absence seizures?
2. What is the unique contribution of each child characteristic (i.e., levels included in the vignettes) and selected respondent characteristic (i.e., knowledge, experience, efficacy, beliefs, etc.) on preservice teachers' recognition ratings?
3. Do preservice teachers differentiate absence seizures from ADHD?
4. What is the unique contribution of each child characteristic (i.e., levels included in the vignettes) and selected respondent characteristic (i.e., knowledge, experience, efficacy, beliefs, etc.) on preservice teachers' differentiation ratings?
5. What referral decision do preservice teachers make for hypothetical children presenting with absence seizures?
6. What is the unique contribution of each child characteristic (i.e., levels included in the vignettes) and selected respondent characteristic (i.e., knowledge, experience, efficacy, beliefs, etc.) on preservice teachers' referral ratings?
7. Do preservice teachers provide different referral ratings for hypothetical children presenting with absence seizures and hypothetical children presenting with ADHD?

This study will contribute to the existing literature on preservice teachers' knowledge, beliefs, and referral decisions with respect to ADHD and epilepsy. Additionally, by understanding *which* child- and respondent-level characteristics affect decision-making, results can be used to make recommendations for programmatic changes to preservice teacher preparation programs (e.g., regarding formal instruction or hands-on experiences).

Table 1-1. Criteria for Attention-Deficit/Hyperactivity Disorder as outlined in the Diagnostic and Statistical Manual of Mental Disorders – Fourth Edition – Text Revision

A. Either (1) or (2)

(1) Frequent demonstration of six or more of the following symptoms of inattention.

Inattention

- a. Fails to give close attention to details or makes careless mistakes in schoolwork, work, or other activities
- b. Has difficulty sustaining attention in tasks or play activities
- c. Does not seem to listen when spoken to directly
- d. Does not follow through on instructions, and fails to complete homework and chores
- e. Has difficulty organizing tasks and activities
- f. Avoids, dislikes, or is reluctant to engage in activities that require sustained mental effort (such as schoolwork or homework)
- g. Loses things necessary for tasks or activities
- h. Is easily distracted by extraneous stimuli
- i. Is forgetful in daily activities

(2) Frequent demonstration of six or more of the following symptoms of hyperactivity-impulsivity

Hyperactivity

- a. Fidgets with hands or feet or squirms in seat
- b. Leaves seat in classroom or in other situations in which remaining in seat is expected
- c. Runs about or climbs in situations in which it is inappropriate
- d. Has difficulty playing or engaging in leisure activities quietly
- e. Is “on the go” or often acts as if “driven by a motor”
- f. Talks excessively

Impulsivity

- a. Blurts out answers before questions have been completed
- b. Has difficulty awaiting turn
- c. Interrupts or intrudes on others

B. Some hyperactive-impulsive or inattentive symptoms that caused impairment were present before age 7 years.

C. Some impairment from symptoms is present in 2 or more settings.

D. There must be clear evidence of clinically significant impairment in social, academic, or occupational functioning.

Note. Reprinted with permission from the *Diagnostic and Statistical Manual of Mental Disorders*, Copyright 2000. American Psychiatric Association.

Table 1-2. Seizure classification

Generalized	Partial
Caused by general biochemical dysfunction	Arise from specific parts of the brain (localization related)
Examples: tonic-clonic seizures, absence seizures, myoclonic	Examples: temporal lobe epilepsy, frontal lobe epilepsy.

Table 1-3. Overlapping symptoms of ADHD-PI and absence seizures

Domain	Symptom
Physiological	Staring
Cognitive	Average general cognitive ability (typical absence seizures) Inattention Impaired executive functioning and memory
Educational	Learning disability Underachievement Grade-retention Special education placement
Behavioral descriptors	Day-dreamy Absent-minded, or forgetful

Table 1-4. Distinguishing symptoms of ADHD-PI and absence seizures

ADHD-PI	Absence seizures
Fidgeting in seat	Changes in breathing, drooling, eyes become glassy, becomes stiff
High frequency of problems with sustained attention	Low frequency of problems with sustained attention
Behavior intensity in the clinical, or severe range	Behavior intensity in the normal, or average range
Onset in school years (with increased demands for attention and concentration)	Onset during school years or adolescence (juvenile absence epilepsy)
Behavior stable and predictable (i.e., occurs most situations that require sustained attention)	Behavior frequent and discreet (i.e., clear onset) in typical absence seizures Behavior sporadic lasting for protracted periods in atypical seizures.
Episodes occur in boring situations	Episodes occur any time; often during physical activity with hyperventilation.
Do not begin abruptly	Do begin abruptly
Last until something interesting happens	Usually last between 15 and 20 seconds
Episodes occur infrequently	May occur many times a day

Table 1-5. Subgroup variation assumptions*

Assumption 1: Subgroups may vary in the average levels of judgments rendered (i.e., judgment thresholds)

Assumption 2: Subgroups may vary in the variability of their judgments (i.e., judgment variance)

Assumption 3: Subgroups may vary in the extent of normal stochastic error in the model (i.e., judgment error) (can just compare coefficients of determination)

Assumption 4: Subgroups may vary in the weights given to different dimensions.

*Adapted from Byers and Zeller, 1998.

CHAPTER 2 METHODS AND PROCEDURES

Participants and Settings

The participants included 100 preservice teachers from the Unified Elementary Proteach Program (UEP) at the University of Florida. Permission to conduct research was received from the Elementary Coordinator/Assistant Director of the UEP prior to data collection. A letter describing the study (Appendix A) and inviting participation was sent to nine instructors who taught a required course during the semester in which data were collected. All nine agreed to recruit their students during a regularly scheduled class period. However, since two instructors co-taught one class, they granted the researcher permission to collect data from students in eight different classes. The researcher distributed the research packets, including consent forms (Appendix B) and measurement instruments (Appendix C for a sample instrument), to preservice teachers and discussed the study with participants in person. All preservice teachers were treated fairly as prescribed by the American Psychological Association's ethical guidelines (American Educational Research Association et al., 1999).

One hundred research packets were distributed to preservice teachers in eight different seminar classes across a three-week time span (i.e., 3/19/2008 through 4/2/2008). Of the 100 preservice teachers recruited, all 100 elected to participate, resulting in a sample size of $N = 100$. Table 2-1 provides a summary of the demographic information provided by participants on the Proteach Demographic Information Survey (PDIS) (Appendix D). Participants were primarily female (95%), and ranged in age from 19 to 49 ($M = 22.40$, $SD = 3.19$). Most participants were Non-Hispanic, white (83%).

The UEP is designed to prepare teachers with a dual emphasis in elementary education and mild disabilities. The purpose of the program is to prepare teachers who are capable of: (1)

creating and maintaining supportive and productive classrooms for diverse student populations and (2) working collaboratively with school personnel, families, and members of the community to develop alternative ways of educating all children, including those who present with unique instructional challenges, behavioral challenges, or both (as cited in the UEP handbook). UEP students who complete a department approved undergraduate degree in the College of Education are awarded the Bachelor of Arts in Education (B.A.E.). However, to be recommended for certification, UEP students are required to complete an additional year in the UEP Master's program. During their master's year in the program, students may choose to specialize in elementary education (K-6), which would make them eligible for a single certification, or they may chose to specialize in exceptional student education (K-12), which would make them eligible for dual certifications. Although the UEP admonishes students against withdrawing from the program after their eighth semester to enter the work force with their B.A.E. (i.e., a student is not eligible for certification), on average, up to one-third of pre-service teachers (30%) make this decision (S. Halsall, personal communication, December 3, 2007).

For the purposes of this study, participants were recruited toward the end of their eighth semester. The majority of participants indicated that they plan to teach in a regular education setting (83.80%). Approximately one-fourth of the participants (23%) indicated that they were not working toward certification. Of those participants working toward becoming certified, 75% planned to earn a single-certification, while the remaining 25% planned to earn dual certifications. Approximately half of participants (50.5%) reported having received formal instruction on ADHD, while only 10% of participants indicated that they had received formal instruction on seizure disorders. Ten percent of participants indicated that they had received formal instruction on the process of initiating a referral (Table 2-1).

The UEP is a standardized program of study, requiring both the completion of formal coursework and field experiences. During their first two years in the program, or for their first four semesters, UEP students are required to complete 60 general education credit hours. Semester five marks the beginning of their core requirements, and they are awarded their B.A.E. at the completion of semester eight. Beginning semester five, and every semester thereafter, students are required to complete a field component. With each semester, preservice teachers spend more time and are granted more responsibility in the classroom. For example, beginning in semester five, they are mentored by a classroom teacher. However, by semester eight, they are spending 20 hours a week in the classroom, co-leading lessons. See Appendix E for a summary of UEP core curriculum and field requirements.

A summary of the instruction preservice teachers received on ADHD and seizure disorders in each of their core courses is provided in Appendix F. To obtain this information, the researcher began by reviewing the syllabi on file (i.e., in the office of the Department of Teaching and Learning) for each of their core courses. The researcher browsed the syllabi for anything pertaining to ADHD or seizure disorders. When relevant information was identified the researcher contacted the course instructor via email and asked the instructor to answer the following questions: (1) Was ADHD covered in this course, and (2) Were seizure disorders covered in this course. If the instructor answered *yes* to either of the aforementioned questions, they were asked to specify to what extent they covered the disorders with respect to (1) symptom recognition, (2) symptom management, and (3) making a referral. Finally, they were asked to indicate the number of questions they included on tests pertaining to each of the disorders. Overall, instructors' responses suggest that ADHD was discussed modestly, while seizure disorders were not discussed at any length.

With respect to ADHD, students received the most instruction in their special education courses. However the instruction was limited in scope, relating mostly to legal obligations, classroom accommodations, and behavioral management. For example, classroom accommodations for students with ADHD were discussed in EDF 3115 (*Child Development for Inclusive Education*) and students' understanding of the material was assessed with a case study on a course examination (constituting 25% of the test). In EEX 3070 (*Teachers and Learners in Inclusive Schools*) special education law was covered and ADHD was included in the discussion. However, no test questions related directly to ADHD. ADHD was not discussed specifically in EEX 3616 (*Core Classroom Management Strategies*); however, classroom management strategies for behaviors consistent with ADHD (e.g., inattention, impulsivity, and hyperactivity) were discussed. Notably, no instructors endorsed that they discussed recognition of ADHD symptoms or the process of initiating a referral for a student suspected of having ADHD.

No instructors indicated that they discussed seizure disorders at any length. In EEX 3070 (*Teachers and Learners in Inclusive Schools*) the health conditions that qualify a student for special education services under the category OHI were discussed. Epilepsy was among those conditions. However, seizure disorders were only mentioned and were not discussed in any detail. While not considered to be a core course, the researcher contacted the instructor of HSC 3301 (*Health Science in Elementary Education*), since seizure management is often taught in health science courses. The instructor indicated that neither disorder was discussed specifically.

Participants' subjective knowledge (i.e., perceived knowledge) of, beliefs about, and experience with ADHD and seizure disorders were assessed (Table 2-2). Comparisons of participants' responses were made using the Wilcoxon Signed Rank Test, a nonparametric test that does not require assumptions about the form of the distribution of the measurements. As a

group, participants' perceived themselves as possessing more ADHD-related knowledge than seizure disorder related knowledge ($z = -6.16, p = .000$). Participants also reported having had more contact with persons with ADHD than persons with seizure disorders ($z = -7.52, p = .000$). Finally, participants' recognition efficacy, or their confidence that they can identify the disorders accurately, was higher for ADHD than for seizure disorders ($z = -5.51, p = .000$). Frequency of contact with persons with ADHD was significantly correlated with efficacy for recognizing ADHD ($r = .54, p = .000$). Likewise, frequency of contact with persons with seizure disorders was significantly correlated with efficacy for recognizing seizure disorders ($r = .48, p = .000$). Interestingly, frequency of contact with persons with seizure disorders was also significantly correlated with efficacy for recognizing ADHD ($r = .26, p = .011$).

The vast majority of participants expressed the belief that referring a student suspected of having an underlying medical disorder is part of the teacher's role or responsibility ($M = 4.96, SD = 0.97$); 92% of participants provided ratings on the top half of the scale. Having received formal instruction on ADHD was significantly and positively associated with preservice teachers' subjective knowledge of ADHD, and, likewise, having received formal instruction on epilepsy was significantly and positively associated with preservice teachers' subjective knowledge of epilepsy (Table 2-3). Surprisingly, having received formal instruction on seizure disorders was also significantly and positively correlated with preservice teachers' subjective knowledge of ADHD (Table 2-3). As expected, having received formal instruction on the process of initiating a referral was significantly correlated with referral efficacy ($r = .24, p = .000$). Referral efficacy, or preservice teachers' confidence that they can initiate a referral effectively, was low ($M = 2.02, SD = .94$); 96% of participants provided ratings on the bottom half of the scale.

Measures

Vignette Instrument

Information on preservice teachers' ability to recognize absence seizures and differentiate them from ADHD, and the referral decisions they anticipated that they would make was obtained through ratings on six vignettes about hypothetical children (Appendix C). Three of the vignettes were computer generated using a factorial survey research design (Rossi & Anderson, 1982). Each computer-generated vignette was comprised of 10 sentences fixed in a certain order; however, one important variable in each sentence was varied. The 10 factors that were varied described characteristics of an absence seizure and, according to the literature, were relevant to the decision to be made (Taylor, 2006). Using a random numbers procedure, the vignettes were generated randomly so that all levels of each independent variable had an equal probability of being included (Ludwick, 2004). The randomized vignettes were produced in SPSS. The file that was produced was transferred into Microsoft Excel for data transformation, and then transferred into Microsoft Word where minor editing was completed prior to the vignettes being printed and distributed.

Fourteen variables were held constant across the vignettes since they are common to absence seizures and ADHD and, as a result, could not be used to differentiate between the disorders: race, gender, grade placement, academic underachievement, learning disability, difficulty paying attention, difficulty concentrating, difficulty remembering daily activities, difficulty listening when spoken to, difficulty following through on instructions in class, and, behaviorally, being absent-minded, sluggish, day-dreamy, and staring blankly. More specifically, the cover page on the vignette instrument that indicated that each of the six hypothetical children had the following characteristics in common:

They are all Caucasian females in the third grade. Academically, they are struggling and are described as absent-minded, sluggish, and day-dreamy. Specifically, each of the children has difficulty, to some extent, paying attention, concentrating, remembering daily activities, listening when spoken to, and following through on instructions in class. Recently, each of the children were referred to and evaluated by the child-study team at your school. None of them met educational criteria for Specific Learning Disability (SLD); both their general cognitive ability and academic achievement fell within age and grade level expectations.

Independent variables

The independent variables (IV), on the other hand, were varied systematically. Ten IVs were used in this study: (1) behavior during episode, (2) response to redirection, (3) problems with sustained attention, (4) intensity of inattention, (5) onset of episodes, (6) situations episodes occur, (7) duration of episodes, (8) frequency of episodes, (9) post-episode behavior, and (10) history of episodes. The IVs were selected for their ability to differentiate between the disorders (Ludwick, 2004; Taylor, 2006). Each IV was comprised of two or more levels that were either categorical or ordinal in nature. The levels were randomly assigned within each vignette, giving the factorial survey the essential elements of an experimental design (Taylor, 2006; Ashton, 1999).

For the present study, the factorial object universe in formula form is: $3 \times 2 \times 4 \times 2 \times 3 \times 2 \times 2 \times 2 \times 3 \times 2 = 6,912$. The value of 6,912 represents the entire population of dimension and level combinations possible to create the vignettes (Byers & Zellers, 2003). Three unique absence seizure vignettes were created for each respondent, resulting in the creation of three hundred unique vignettes. The participants also completed three more vignettes: one fixed vignette depicting *ADHD* (Table 2-3) and two fixed, *give-away* vignettes depicting ambiguous indicators of ADHD and absence seizures. The participants' responses on the fixed, give-away vignettes were used to derive a mean rating score, which allowed the researcher to account for participants' rater tendency. The ADHD vignette was used to assess whether the preservice

teachers' provided different ratings for the hypothetical children presenting with ADHD and the hypothetical children presenting with absence seizures (i.e., regarding their recognition and referral decisions). See Table 2-4 for a summary of the IVs and levels assigned within the absence seizure test vignettes and to see the levels included in the fixed, ADHD vignette.

Dependent variables

Participants were asked to respond to four questions following each vignette. Three of the items were Likert-type, and were used as dependent variables in the regression analyses. Likert items were utilized for their capability to demonstrate significant variance. The first question asked participants to rate on a Likert-type scale the extent to which the child's behavior was consistent with ADHD, with 1 representing *Definitely Not ADHD* and 9 representing *Definitely ADHD*. The second question was similar in format to the first, and asked participants to rate to what extent they thought the child's behavior was consistent with a seizure disorder, with 1 representing *Definitely Not a Seizure Disorder* and 9 representing *Definitely a Seizure Disorder*. The third question was open ended and asked participants to specify the best explanation for the child's presenting behavior. Item three allowed participants the freedom to provide a tertiary, unnamed explanation. Responses to question three were coded qualitatively according to theme. Finally, participants were asked to rate on a Likert-type scale how likely they were to make a referral for the hypothetical child, with 1 representing *Not At All Likely* and 9 representing *Very Likely*.

Proteach Demographic Information Survey (PDIS)

Important demographic and experiential information about the participants was obtained through the Proteach Demographic Information Survey (PDIS) (Appendix D), a survey developed by the researcher. Completion of the scale involved responding to 16 items. Participants provided information about their background (i.e., their age, gender, and ethnicity),

their education (i.e., the type of certification they are seeking; the type of population they intend to teach; and whether they have received formal instruction on ADHD, epilepsy, or on the process of initiating a referral), their experience (i.e., their frequency of contact with persons with ADHD and seizure disorders), their knowledge (i.e., their subjective or self-assessed knowledge of ADHD and seizure disorders), their efficacy (i.e., their confidence that they can accurately identify ADHD and a seizure disorder, and their confidence they know the correct procedure to take when they would like to initiate a referral), and their beliefs (i.e., their beliefs regarding whether it is the teacher's role or responsibility to initiate a referral when he or she suspects that a student has an underlying medical problem).

Instrument Development

Cognitive interviews were conducted as part of instrument development to assess possible sources of response error, both on the vignette instrument and on the PDIS (Willis, 1999). To complete the cognitive interviews, five preservice teachers were asked to sign the informed consent form (Appendix G), to read the vignettes, to answer the corresponding questions, and to complete the PDIS. Afterward, the researcher led a structured session via probing techniques to assess participants' comprehension of the questions and to ensure that they were familiar with all of the vocabulary. The researcher also assessed whether there was anything structurally or aesthetically wrong with the instruments (Willis, 1999).

Several changes were made to the instruments based on the participants' feedback. For example, a question on the PDIS, asking participants to calculate how many credit hours they had completed, was removed (i.e., it was judged to be too difficult and likely to elicit unreliable responses). Response categories were added to several questions on the PDIS, while response categories were removed from others (e.g., the option allowing preservice teachers to indicate that they plan to teach in an inclusive setting was removed, since, today, regular education

classrooms are inclusive settings). These changes were made prior to conducting the reliability study.

A pilot study was also conducted as part of instrument development to assess the reliability of the vignette instrument. More specifically, the researcher assessed the internal consistency (Cronbach's alpha) and alternate forms reliability of the vignette instrument. The participants were 45 preservice teachers enrolled in the UEP at the University of Florida: 25 master's level interns and 20 undergraduate level pre-interns. The researcher obtained permission from course instructors to recruit preservice teachers from their classes. The researcher met with preservice teachers in five classes to discuss the study and to distribute the consent forms (Appendix H) and study materials (i.e., a cover sheet with general instructions and the child vignette packets) (Appendix B). Of the 45 preservice teachers recruited, all 45 elected to participate in the pilot study and returned their completed materials to the researcher.

The participants were asked to read the child vignettes and to complete the questions corresponding to each vignette. The give-away vignettes were presented randomly in the first and second positions. The actual test vignettes were presented randomly in positions three through six. Participant responses on the three absence seizure vignettes were used to establish the reliability of the instrument. However, since the three static questions on the instrument pertained to three separate constructs (i.e., differentiating, recognizing, and referring), they were conceptualized as subscales. The internal consistency of participants' responses to item one across the three vignettes, to item two across the three vignettes, and to item three across the three vignettes was calculated. Since items one and three were Likert-type items, Cronbach's alpha analyses were conducted to calculate internal consistency. Based on 45 cases, item one yielded an $\alpha = .83$. Again, 45 cases were analyzed for item three, yielding an $\alpha = .88$. The

Kuder-Richardson Formula 20 (K-R 20) is most appropriate for assessing internal consistency of dichotomous data, and, as a result, was utilized for item two. Three of the 45 data sets (i.e., respondents) were excluded from analysis due to missing data (i.e., participants did not rate all three items). Based on 42 cases, item two yielded $K-R\ 20 = .87$. Alternate forms, or parallel forms, reliability is calculated with the Pearson Product Moment Correlation Coefficient. That the three absence seizure vignettes were conceptualized as an instrument for the internal consistency procedure resulted in an estimate of alternate forms reliability. That is, for questions one, two, and three, the alternate forms reliability was equivalent to the internal consistency (.83, .88, and .87, respectively). Test scores that yield a reliability coefficient of at least .80 are considered sufficiently reliable for most research purposes (Gall, Borg, & Gall, 1996).

Although the open-ended item on the vignette instrument was sufficiently reliable, participants' limited variability in responding was judged to be problematic for a regression analysis; only six participants were able to provide an acceptable response, such as seizures, absence seizures, or epilepsy. In general, participants tended to provide more general responses, such as a medical disorder, despite that they were encouraged to provide as specific a response as possible. Therefore, the question was retained on the instrument for qualitative purposes, but would no longer be used as a DV in the regression analysis. When debriefing the participants, several suggested that the relationship between ADHD and ADHD-PI was unclear to them. Therefore, upon subsequent administration of the instrument, ADHD-PI was replaced with ADHD to avoid confusion. Finally, after debriefing the participants, four Likert-type items were added to the PDIS. The new items pertained to preservice teachers' beliefs about whether it is the teacher's role or responsibility to initiate a referral when they suspect that a student has an underlying medical disorder, whether they feel confident that they know the correct procedure to

take when they would like to initiate a referral, and how confident they are that they can accurately identify the disorders (i.e., recognition efficacy).

Knowledge of Attention Deficit Disorders

Participants were asked to complete the Knowledge of Attention Deficit Disorders Scale (KADDS), a scale designed to measure knowledge and beliefs about ADHD (Appendix I). The KADDS scale includes 36 items that are presented in a true (T), false (F), or don't know (DK) format (Sciutto & Feldhamer, 2007). By including the response option *don't know* the KADDS can be used to differentiate what preservice teachers do not know from what they believe incorrectly (i.e., misconceptions) (Sciutto & Feldhamer, 2007). The KADDS measures knowledge and misconceptions in the areas of (1) symptoms/diagnosis of ADHD, (2) the treatment of ADHD, and (3) the associated features of ADHD (Sciutto & Feldhamer, 2007). The KADDS also includes negative indicators of ADHD or, stated differently, behaviors that are not characteristic of ADHD. This provided preservice teachers the opportunity to demonstrate that they know what ADHD is, and what it is not (Sciutto & Feldhamer, 2007).

Sciutto and Feldhamer (2007) reported estimates of the KADDS reliability and validity. Internal consistency was estimated with a Coefficient alpha procedure. Coefficient alpha for the 36-item instrument was good ($\alpha = .81$). The three subscales, symptoms/diagnosis, treatment, and associated features, had moderate levels of internal consistency ($\alpha = .50$, $\alpha = .61$, and $\alpha = .60$, respectively). The stability of the scale was assessed with a test-retest procedure with two weeks between the administrations. The test-retest correlation for the overall instrument was high (.76), whereas the stability of the subscales ranged from moderate to high (.59, .72, .70, respectively). Individuals who had previous exposure to ADHD (e.g., having taught a student with ADHD, or having a family member with the disorder) performed significantly better on the scale than

individuals who had no experience with the disorder. The finding that previous exposure enhanced performance on the KADDS supports that the KADDS is a valid measure of ADHD knowledge. Individuals with more training and greater exposure to information about the disorder also received higher scores on the measure.

Knowledge and Attitudes Toward Epilepsy and Persons with Epilepsy

Participants were asked to complete The Scale of Knowledge and Attitudes Toward Epilepsy and Persons with Epilepsy (ATPE -Form S) (Appendix J). The ATPE-Form S is a psychometrically sound instrument designed to measure preservice teachers' knowledge and attitudes toward epilepsy and persons with the disorder (Antonak & Rankin, 1982). Clear advantages of the instrument are that it is easy to administer and score. The ATPE, a 28-item Likert-type scale, is comprised of 17 attitude items, 7 knowledge items, and 4 combined knowledge and attitude items. Each item is presented as a statement. Respondents indicate their agreement with each statement on a 6-point scale, with -3 representing *I disagree very much* and +3 representing *I agree very much*. The responses are weighted and summed to generate a global knowledge and attitude score (Antonak & Rankin, 1982). The higher an individual's score on the knowledge scale (i.e., the 7 knowledge items and the 4 knowledge and attitude items), the more epilepsy-related knowledge they possess. Likewise, higher scores on the attitudes scale (i.e., the 17 attitude items and the 4 combined knowledge and attitude items) indicate more favorable attitudes towards individuals with epilepsy.

Antonak and Rankin (1982) reported estimates of the ATPE's reliability and validity. The corrected Spearman-Brown reliability coefficient was .81, whereas the Coefficient alpha internal consistency homogeneity index based upon item variances was .87 (Antonak & Rankin, 1982). With regard to the validity of the ATPE, Antonak and Rankin (1982) reported that an iterative principal-factors analysis of the attitudes items yielded three non-trivial factors (i.e., prejudicial

stereotypes, behavioral misconceptions, and behavioral optimism), which accounted for 68% of the variance in attitudes scores. Factor analysis of the knowledge item correlation matrix yielded five non-trivial factors; however, only one factor (i.e., optimistic views of the personal competence of persons with epilepsy) was interpretable. The findings that age ($r = 0.13, p < .05$), educational level ($r = 0.14, p < .05$), and being a special service provider (i.e., special educators) ($r = 0.15, p < .05$) were positively correlated with attitude and knowledge scores on the ATPE supports that it is a valid measure of epilepsy related knowledge and attitudes.

Procedure

Child Vignettes

Participating preservice teachers were asked to read and respond to questions pertaining to six vignettes (Appendix C). The participants received a packet containing a cover sheet and the vignettes presented in random order, with the exception of the give-away vignettes, which always preceded the test vignettes, but were randomly presented in the first or second position. The preservice teachers were instructed to assume that they are elementary teachers in a medium-sized school district. The school is located in a lower-middle class neighborhood and has approximately 500 students in Kindergarten through grade five. The preservice teachers were told to assume that they are the children's teacher and that it is the end of the third nine-week grading period. Based on the information presented in each vignette, participants were asked to respond to corresponding questions. They were informed that, although each vignette would have the same basic structure, the details of the vignettes would vary. They were also asked to consider each child separately. Specific instructions for completing the questions were included on each vignette. The preservice teachers were informed that each of the six children has certain characteristics in common:

They are all Caucasian females in the third grade. Academically, they are struggling and are described as absent-minded, sluggish, and day-dreamy. Specifically, each of the children has difficulty, to some extent, paying attention, concentrating, remembering daily activities, listening when spoken to, and following through on instructions in class. Recently, each of the children were referred to and evaluated by the child-study team at your school. None of them met educational criteria for Specific Learning Disability (SLD); both their general cognitive ability and academic achievement fell within age and grade level expectations.

Preservice teachers were asked to rate on a Likert-type scale to what extent the child's behavior was consistent with Attention Deficit Hyperactivity Disorder from 1 (*definitely not ADHD*) to 9 (*definitely ADHD*), to what extent the child's behavior was consistent with a seizure disorder from 1 (*definitely not a seizure disorder*) to 9 (*definitely a seizure disorder*), and how likely they were to initiate a referral from 1 (*not at all likely*) to 9 (*extremely likely*). They were also asked to specify the best explanation for the child's presenting behavior on an open-ended item.

Participants' responses to item two on the vignette instrument, which asked them to indicate to what extent the child's presenting behavior was consistent with a seizure disorder, were used to represent their *recognition* of absence seizures. Participants' recognition ratings were used as the DV in the *recognition* regression analysis. However, first, the ratings had to be transformed to account for rater tendency. Residuals were calculated by subtracting each participant's rating on question two on the give-away vignette, *Anne*, which contained ambiguous indicators of an absence seizure, from their ratings on the actual test vignettes. Using this procedure, ratings could range from -8 to 8. Transformed recognition ratings ranged from -6 to 8 ($M = 1.89$, $SD = 2.39$). Ratings transformed into positive integers (72.7%) when participants rated the hypothetical child's behavior depicted in the absence seizure vignette as being more consistent with a seizure disorder than the hypothetical child's behavior depicted in the give-away vignette. Conversely, ratings transformed into negative integers (5.3%) when participants rated the hypothetical child's behavior depicted in the give-away vignette as being more

consistent with a seizure disorder than the hypothetical child's behavior depicted in the absence seizure vignette.

Participants' responses to items one and two, which asked them to indicate to what extent the child's presenting behavior was consistent with ADHD and to what extent the child's presenting behavior was consistent with a seizure disorder, were used to derive their differentiation scores to be used in the in the *differentiation* regression analysis. For each absence seizure vignette, the respondent's rating on item one was subtracted from their rating on item two. By transforming the scores in this fashion, participants' *differentiation* ratings could range from -8 (indicating the smallest, most inaccurate degree of differentiation) to 8 (indicating the largest, most accurate degree of differentiation). Transformed differentiation ratings ranged from -6 to 8 ($M = 5.20$, $SD = 2.73$). Ratings transformed into positive integers (91.6%) when participants differentiated between the disorders correctly (i.e., they rated the hypothetical child's behavior as being more consistent with a seizure disorder than ADHD). Ratings transformed into negative integers (3.2%) when participants differentiated between the disorders incorrectly (i.e., they rated that hypothetical child's behavior depicted in the absence seizure vignette as being more consistent with ADHD than a seizure disorder).

Participants' ratings on question four, which asked them to indicate how likely they were to initiate a referral for the hypothetical children depicted in the vignettes, were used as the DV in the *referral* regression analysis. Like recognition ratings, *referral* ratings had to be transformed to account for rater tendency. Residuals were calculated by subtracting participants' ratings on question four on the give-away vignette, Anne, which contained ambiguous indicators of an absence seizure, from their ratings on question four on the actual absence seizure test vignettes. Using this procedure, referral ratings could range from -8 to 8. Transformed referral

ratings ranged from -5 to 8 ($M = 1.15$, $SD = 1.97$). Ratings transformed into positive integers (87%) when participants anticipated that they would be more likely to initiate a referral for the child depicted in the absence seizure vignette than the child depicted in the give-away vignette. Ratings transformed into negative integers (5%) when participants anticipated that they would be more likely to initiate a referral for the child depicted in the give-away vignette than the child depicted in the absence seizure vignette.

Participants' responses on item three on the vignettes, which was the open-ended item that allowed participants to specify the best explanation for the child's presenting episodes of inattention, were entered into a database verbatim. A significant number of preservice teachers failed to respond to the open-ended item on the absence seizure and ADHD vignettes (14.7% and 12%, respectively). *Nonresponse error* occurs when a significant number of participants in a survey sample fail to respond to a question (or questionnaire) *and* have different characteristics from those who did respond, when these characteristics are important to the study (Dillman, 2000). To test for nonresponse error, participant groups (i.e., those who did and those who did not respond to item three) were compared across eight respondent-level variables that were judged to be important to the study. Comparisons were made using the Mann-Whitney Test, a nonparametric test used to compare groups of data that may not be normally distributed. Results suggest that participant groups came from identical populations (Table 2-5). Therefore, despite the relatively high nonresponse rate, data are considered unbiased with respect to the variables tested.

Responses were then coded according to theme (Table 2-6). Seven themes, or codes, were used: 1 = ADHD; 2 = seizure disorder; 3 = medical or neurological disorder; 4 = environmental explanation; 5 = no problem; 6 = problem is internal to the child, but not pathological; and 7 =

participant misunderstood the question. For a response to be coded 1, it had to reflect that the child had ADHD (e.g., ADHD or ADD). Similarly, for a response to be coded 2, it had to reflect that the child had a seizure disorder (e.g., “seizure disorder,” “seizures,” or “epilepsy”). To be coded 3, the participant’s response had to reflect that something was distinctly wrong with the child (e.g., “medical disorder” or “neurological problem”). Responses were coded 4 when they reflected that the inattention stemmed from an external source, or that the inattention could be mediated through the environment (e.g., “schoolwork not challenging enough” or “lessons are too boring”). For a response to be coded 5, the participant had to indicate that the child did not have a problem with inattention (e.g., “no problem” or “there is nothing wrong with her”). To be coded 6, the response had to reflect that the problem was internal to the child, but that the problem behavior was not inherently *abnormal* (e.g., “she has difficulty paying attention” or “she gets distracted easily”). Stated differently, responses were coded 6 when the problem was one of *degree* (i.e., everyone gets distracted at times) and not *type* (i.e., a behavior that is not expected to occur under any circumstances, such as losing consciousness). Finally, responses were coded 7 when it was clear that the participant misunderstood the question (e.g., “her eyelids flutter,” “the episodes last up to 30 seconds,” or she does not respond to redirection”).

Demographic Information

Participants were asked to complete the 16-item Proteach Demographic Information Survey (PDIS). Participants’ responses to the PDIS were coded numerically and entered into a database. Several of the items were dummy-coded and included as respondent characteristics, or predictor variables, in the regression analyses.

Knowledge and Beliefs About ADHD

Participants were asked to respond to the Knowledge of Attention Deficit Disorders Scale (KADDS). Specific instructions were included on the scale. They directed the participant to

respond to each of the questions regarding Attention-Deficit/Hyperactivity Disorders (ADHD) by circling their answer: True, False, or Don't Know. The directions indicated that participants should not guess when they are unsure of an answer and, instead, should respond by circling the response option *Don't Know* (DK). Finally, participants were reminded not to leave any items blank. Completed KADDS scales were scored as prescribed in the KADDS manual. Participants' responses were entered into a database as follows: True = 1, False = 2, Don't Know = 3. In order to obtain total scale scores and subscale scores, all responses were recoded so that correct answers were assigned a score of 1 and incorrect and don't know answers were assigned a score of 0. Participants' scores were then summed, generating subscale scores and a total scale score. Participants' total scale scores on the KADDS ranged from 8 to 32 and, on average, they answered half of the items correctly (49.82%) ($M = 19.43$, $SD = 4.76$). Total scale scores were used as a respondent characteristic, or as a predictor variable, in the regression analyses. Consistent with the broader body of literature, preservice teachers answered more questions correctly on the symptoms and diagnosis subscale (66.33%) than on the associative features and treatment subscales (44.47% and 49.25%, respectively) (Sciutto et al., 2000).

Preservice teachers' subjective knowledge of ADHD (i.e., as per their ratings on the PDIS) was not significantly correlated with their objective knowledge of ADHD (i.e., their global score on the KADDS) ($r = .20$, $p = .052$). Their scores on the symptoms and diagnosis subscale of the KADDS, however, were significantly correlated with their subjective knowledge of ADHD ($r = .26$, $p = .009$). Although having received formal instruction on ADHD was significantly correlated with preservice teachers' subjective knowledge of ADHD ($r = .37$, $p = .000$), it was not significantly correlated with objective knowledge of ADHD ($r = -.14$, $p = .170$). See Table 2-

7 for a summary of correlations between preservice teachers' subjective and objective knowledge of ADHD.

Knowledge and Beliefs About Epilepsy

Participants were asked to respond to The Scale of Knowledge and Attitudes Toward Epilepsy and Persons with Epilepsy (ATPE -Form S). Specific instructions were included on the scale. They directed the participant to read each statement carefully and then to circle the appropriate number, ranging from -3 to 3, that best corresponded to how they felt. They were informed that there was no time limit for the questionnaire, but that they should work as rapidly as they could. Finally, participants were reminded to respond to every statement. Participants' responses to the ATPE were entered into a database as follows: -3 = 1, -2 = 2, -1 = 3, 1 = 4, 2 = 5, 3 = 6. Sixteen of the items (i.e., ten of the attitude items and six of the knowledge items) were reverse scored, since disagreement to these items indicates either a positive attitude or a correct answer. Participants' scores on the 28 items were then summed to generate a global ATPE score. Participants' global ATPE scores ranged from 60 to 174 ($M = 143.95$, $SD = 17.82$). Global ATPE scores were used as a respondent characteristic, or predictor variable, in the regression analyses. Participants' *knowledge* scores on the ATPE ranged from 17 to 63 ($M = 48.56$, $SD = 6.90$), which equates to answering 73.58% of items correctly. Their *attitudes* scores ranged from 43 to 117 ($M = 95.39$, $SD = 11.68$). Research suggests that a positive relationship between teacher knowledge and attitudes exists (Bannon, Wilding, & Jones, 1992; Dantas et al., 2001). Consistent with this finding, participants' scores on the knowledge subscale of the ATPE were highly correlated with their scores on the attitudes subscale on the ATPE ($r = .841$, $p = .000$).

Preservice teachers' subjective knowledge of seizure disorders (i.e., as per their ratings on the PDIS) was significantly correlated with their objective knowledge of seizure disorders (i.e., their global score on the ATPE) ($r = .24$, $p = .015$). However, when separating ATPE scores into

subscales, *knowledge* and *attitudes*, only scores on the attitudes subscale were significantly correlated with preservice teachers' subjective knowledge of seizure disorders ($r = .26, p = .008$). Although having received formal instruction on seizure disorders was significantly correlated with preservice teachers' subjective knowledge of seizure disorders ($r = .35, p = .000$), it was not significantly correlated with their objective knowledge of seizure disorders ($r = .17, p = .095$). See Table 2-7 for a summary of correlations between preservice teachers subjective and objective knowledge of seizure disorders.

Table 2-1. Preservice Teacher-Related Demographic Information as Reported on the Proteach Demographic Information Survey (PDIS)

Variable	Mean/SD	%
Age (n = 100)	22.40/3.19	
Gender (n = 100)		
Female		95
Male		5
Ethnicity (n = 100)		
Non-Hispanic, White		83
African American		7
Hispanic		4
Asian		2
Multiracial		3
Other		1
Intended setting (n = 100)		
Regular education		84
Special education		16
Certification seeking (n=100)		
Bachelor's degree, no certification		23
Master's degree, single certification		58
Master's degree, dual certification		19
Formal ADHD instruction (n = 99 ^a)		
Yes		50.5
No		49.5
Formal seizure disorder instruction (n = 100)		
Yes		10
No		90
Formal referral instruction (n= 100)		
Yes		10
No		90

^aEvery participant did not complete this item.

Table 2-2. Preservice teachers' knowledge, attitudes, and experiential information as reported on the Proteach Demographic Information Survey (PDIS)

Variable	Mean/SD	Percent
Subjective ADHD knowledge (n = 100)	3.22/0.89	
1 (No knowledge)		0
2		23
3		39
4		32
5		5
6 (Extensive knowledge)		1
Frequency of contact with ADHD (n = 100)	3.70/1.31	
1 (Very infrequent)		4
2		15
3		27
4		24
5		21
6 (Very frequent)		9
ADHD identification efficacy (n = 100)	3.11/1.02	
1 (Not at all confident)		4
2		23
3		41
4		23
5		8
6 (Extremely confident)		1
Subjective seizure disorder knowledge (n = 100)	2.31/1.13	
1 (No knowledge)		22
2		47
3		17
4		7
5		6
6 (Extensive knowledge)		1
Frequency of contact with seizure disorders (n = 100)	1.85/1.39	
1 (Very infrequent)		61
2		20
3		6
4		2
5		8
6 (Very frequent)		3
Seizure disorder identification efficacy (n = 100)	2.34/1.13	
1 (Not at all confident)		23
2		41
3		22
4		8
5		5
6 (Extremely confident)		1

Variable	Mean/SD	Percent
Referral efficacy (n = 100)	2.02/0.94	
1 (Not at all confident)		35
2		34
3		27
4		2
5		2
6 (Extremely confident)		
Role beliefs (n = 100)	4.96/0.97	
1 (Definitely not responsibility)		0
2		1
3		7
4		22
5		35
6 (Definitely responsibility)		35

Note. Variables were presented as Likert-type items

Table 2-3. Correlation matrix for selected preservice teacher characteristics as reported on the Proteach Demographic Information Survey (PDIS)

Characteristics	1	2	3	4	5	6	7	8	9	10	11
1. ADHD knowledge	—	.42	.41	.21	.75	.40	.29	.28	.37	.26	.14
2. SD knowledge		—	.25	.60	.38	.78	.23	.25	-.12	.35	-.06
3. ADHD frequency			—	.32	.54	.13	.08	.15	.35	.08	.13
4. SD frequency				—	.26	.48	.06	.09	.02	.08	-.16
5. ADHD efficacy					—	.43	.29	.13	.33	.13	.10
6. SD efficacy						—	.21	.22	-.03	.31	-.13
7. Referral efficacy							—	.14	.04	.10	.24
8. Beliefs about role								—	.17	.12	.01
9. ADHD instruction									—	.20	.31
10. SD instruction										—	.22
11. Referral instruction											—

Note. $N = 100$. ADHD knowledge = respondents' subjective knowledge of ADHD; SD knowledge = respondents' subjective knowledge of seizure disorders; ADHD frequency = frequency of contact with persons with ADHD; SD frequency = frequency of contact with persons with seizure disorders; ADHD efficacy = respondents' confidence that they can recognize ADHD; SD efficacy = respondents' confidence that they can recognize a seizure disorder; Referral efficacy = respondents' confidence that they can initiate a referral correctly; Beliefs about role = respondents' belief about whether it is the teachers role to refer; ADHD instruction = formal instruction on ADHD; SD Instruction = formal instruction on seizure disorders; Referral instruction = formal instruction on initiating a referral.

Table 2-4. Independent variables and levels assigned within the vignettes

IV	Levels	Vignette levels	
		Absence seizure	ADHD-PI
Behavior	4	(Categorical) Eyes role upward Head drops slightly Eyelids flutter Smacks her lips	Fidgets
Response	2	(Categorical) Unresponsive to physical redirection Unresponsive to verbal redirection	Usually responds to redirection
Sustained attention	2	(Categorical) Usually completes homework assignments Usually stays on-task in class	Starts, but does not complete homework assignments and does not remain on-task in class.
Intensity	2	(Ordinal) Normal, or average range Moderate, or at-risk range	Severe, or clinical range.
Onset	2	(Categorical) Abrupt; stops talking mid-sentence Abrupt; stops walking mid-step	Begins gradually
Situations	3	(Categorical) In all situations, even during play Most often during physical activity (hyperventilation) Early in the morning and directly following lunch	In boring situations, or those that require sustained attention and concentration
Duration	2	(Categorical) Up to 30 seconds Up to 60 seconds	Until something interesting happens
Frequency	3	(Categorical) Frequent Sporadic Consecutive	Occasional and predictable
Post-episode behavior	2	(Categorical) Has no recollection of what happened during the elapsed time Resumes to previous train of thought as shown by speech or action	Alert

Table 2-4. Continued

IV	Levels	Vignette levels	
		Absence seizure	ADHD-PI
History	3	(Categorical) Indicates that she has received a diagnosis of ADHD-PI Documents a pattern of problems that began suddenly in the second grade Provides no indication that she has had problems with inattention or concentration in the past	Documents a pervasive and longstanding history of attention and concentration problems

Note. Behavior = behavior during episode; Response = response to redirection; Sustained attention = problems with sustained attention; Intensity = intensity of inattention; Onset = onset of episodes; Situations = situations episodes occur; Duration = duration of episodes; Frequency = frequency of episodes; History = history of episodes.

Table 2-5. Mann-Whitney test statistics to assess for nonresponse error on the open-ended item across the vignettes

Variable	Absence Seizure		ADHD	
	<i>z</i>	(<i>p</i>)	<i>z</i>	(<i>p</i>)
ADHD knowledge	-1.31	(.258)	-0.80	(.426)
SD knowledge	-0.03	(.975)	-1.50	(.132)
ADHD frequency	-0.72	(.472)	-0.86	(.391)
SD frequency	-0.67	(.500)	-1.49	(.135)
ADHD efficacy	-1.03	(.304)	-0.69	(.491)
SD efficacy	-0.60	(.550)	-0.69	(.495)
Referral efficacy	-1.69	(.091)	-0.31	(.758)
Beliefs about role	-0.23	(.821)	-0.15	(.885)

Note. Comparisons were made across participants who did and who did not provide a response on item three on the vignette instrument, which asked them to specify the best explanation for the child's presenting episodes of inattention. ADHD knowledge = respondents' objective knowledge of ADHD; SD knowledge = respondents' objective knowledge of seizure disorders; ADHD frequency = frequency of contact with persons with ADHD; SD frequency = frequency of contact with persons with seizure disorders; ADHD efficacy = respondents' confidence that they can recognize ADHD; SD efficacy = respondents' confidence that they can recognize a seizure disorder; Referral efficacy = respondents' confidence that they can initiate a referral correctly; and Beliefs about role = respondents' belief about whether it is the teachers role to refer.

Table 2-6. Preservice teachers' explanations for the hypothetical children's presenting episodes of inattention

Explanation	Vignette	
	Absence Seizure	ADHD
1. ADHD	5 (2.0%)	120 (45.5%)
2. Seizure disorder	158 (61.7%)	0 (0%)
3. Medical or neurological problem	27 (10.5%)	3 (1.1%)
4. Environmental source	7 (2.7%)	45 (17.0%)
5. No problem	1 (0.4%)	6 (2.3%)
6. Internal (degree)	3 (1.2%)	63 (23.9%)
7. Participant misunderstood	48 (18.8%)	27 (10.2%)
Total	256 ^a (100%)	264 ^b (100%)

Note. Numbers in parentheses indicate percent of participants endorsing the response.

^aTotal number of participants who responded to the item on the absence seizure vignettes.

^bTotal number of participants who responses to the item on the ADHD vignettes.

Table 2-7. Correlations between preservice teachers' objective and subjective knowledge

Variables	1	2	3	4	5	6	7	8	9	10	11
1. Subjective ADHD knowledge	--	.42**	.16	.26**	.18	.06	.07	.04	.09	.37**	.26*
2. Subjective SD knowledge		--	.10	.25*	.04	-.01	.24*	.18	.26**	-.01	.35**
3. KADDS global score			--	.65**	.80**	.79**	-.08	-.08	-.07	-.14	.03
4. KADDS symptoms/diagnosis				--	.32**	.38**	.05	.04	.05	.08	.16
5. KADDS associated features					--	.42**	-.05	-.02	-.06	-.08	-.05
6. KADDS treatment						--	-.13	-.17	-.10	-.27	-.02
7. ATPE global score							--	.94**	.98**	.11	.17
8. ATPE knowledge								--	-.10	-.27**	-.02
9. ATPE attitudes									--	.10	.15
10. Formal instruction ADHD										--	.20*
11. Formal instruction SD											--

Note. SD = seizure disorder. Subjective ADHD knowledge = self-assessed knowledge of ADHD rating; Subjective SD knowledge = self-assessed knowledge of seizure disorders rating; KADDS global score = Knowledge of Attention Deficit Disorders Scale summed score; KADDS symptoms/diagnosis = Knowledge of Attention Deficit Disorders Scale symptoms and diagnosis subscale score; KADDS associative features = Knowledge of Attention Deficit Disorders Scale associative features subscale score; KADDS treatment = Knowledge of Attention Deficit Disorders Scale treatment subscale score; ATPE global score = The Scale of Knowledge and Attitudes Toward Epilepsy and Persons with Epilepsy total summed score; ATPE knowledge = The Scale of Knowledge and Attitudes Toward Epilepsy and Persons with Epilepsy knowledge subscale score; ATPE attitudes = The Scale of Knowledge and Attitudes Toward Epilepsy and Persons with Epilepsy attitudes subscale score.

*p <.05. **p <.01

CHAPTER 3 RESULTS

This study examined whether preservice teachers' recognized absence seizures, differentiated them from ADHD, and anticipated that they would initiate a referral; and it explored whether child- and respondent-level variables affected their ratings. More specifically, this study was designed to answer seven research questions. The results of this investigation will be presented by research question.

Question 1

Do preservice teachers recognize absence seizures?

Descriptive statistics for item two on the absence seizure test-vignettes, which asked participants to rate to what extent the child's presenting behavior was consistent with a seizure disorder, were calculated. Participants were asked to provide ratings on a Likert-type scale from 1 (Definitely Not a seizure Disorder) to 9 (Definitely a Seizure Disorder). Participants' mean rating was 7.71 (SD = 1.42). Both the median and mode ratings were 8, and participants' ratings ranged from 1 to 9. The vast majority of participants (92.33%) provided ratings above the midpoint on the scale (i.e., they provided ratings between 6 and 9), indicating that they thought the child's presenting behavior was consistent with a seizure disorder. Very few participants (3.33%) rated the child's behavior as being inconsistent with a seizure disorder, or provided ratings between 1 and 4. The remaining percentage of participants provided neutral ratings, or provided a rating of 5.

Descriptive statistics were also calculated for item three on the absence seizure test-vignettes, which was the open-ended item that asked participants to specify the best explanation for the child's presenting episodes of inattention. See Table 2-6 for a summary of participants' responses to item three. The majority of participants (61.7%) correctly specified that the child's

inattention could be explained by a seizure disorder. An additional 10.5% of participants provided a more general explanation: that something was distinctly wrong with the child (e.g., a medical or neurological disorder). Of the participants who responded to item three, all but one recognized that the child was experiencing problems with inattention, and very few participants incorrectly attributed the child's inattention to ADHD (2%) or to an environmental origin (2.7%). Participants' responses on item three were significantly correlated with their ratings on item two on the absence seizure test vignettes ($r = .17, p = .003$). That is, the more a participant thought that the child's presenting behavior was consistent with a seizure disorder the more likely he or she was to indicate that a seizure disorder was the best possible explanation.

Seizure disorder ratings across the give-away vignettes and the test vignette depicting absence seizures were compared using the Wilcoxon Signed Rank Test, a nonparametric test that does not require assumptions about the form of the distribution of the measurements. Theoretically, if participants recognized absence seizures, they should have provided significantly higher ratings on the absence seizure test vignettes, given that they contained many more indicators than the give-away vignettes (i.e., they contained ten explicit indicators vs. a few ambiguous indicators, respectively). As a group, the preservice teachers provided significantly higher ratings on the absence seizure test vignette than on the give-away vignettes ($z = -14.57, p = .000$), suggesting that they did accurately recognize absence seizures.

Question 2

What is the unique contribution of each child characteristic (i.e., levels included in the vignettes) and selected respondent characteristic (i.e., knowledge, experience, efficacy, beliefs, etc.) on preservice teachers' recognition ratings?

Since preservice teachers graduating from the UEP program do appear to be able to recognize absence seizures, a multilevel regression analysis was conducted to identify those

characteristics, both child and respondent, that allowed them to recognize absence seizures. To determine which type of regression analysis was most appropriate (i.e., OLS or HLM), an unconditional model was estimated, which allowed the researcher to calculate the intra-class correlation (ICC = .284). Given the nested structure of the data (i.e., each respondent responded to three absence seizure test vignettes), and that a substantial amount of the variance in responding was due to respondent characteristics (28%), the researcher determined that HLM was most appropriate (i.e., *Type 1 error* would have been considerable had it been assumed that the data came from a simple random sample) (Willms & Smith, 2005). The data were analyzed using *HLM 6 Hierarchical Linear and Nonlinear Modeling* software. Cases with missing data were excluded, essentially performing listwise deletion on the level-two data file. Restricted maximum likelihood (REML) estimation method was selected, which estimates variances and covariances assuming regression coefficients are unknown (Raudenbush, Bryk, Cheong, Congdon, & Toit, 2004). Given that the DV was a Likert-type variable, and that the data may have violated one or more normality assumptions, the fixed effects were estimated with robust standard errors (Raudenbush et al., 2004).

The combined model specified for the *recognition* regression analysis contained a total of 23 predictor variables (Equation 1-1). The 10 IVs (25 levels) that were randomly combined in the absence seizure test vignettes, and that were dummy coded into 15 variables (X_{ij}), were included as the level-one explanatory variables (Table 2-4). Eight selected respondent characteristics derived from the PDIS, KADDS, and ATPE were specified as the level-two explanatory variables: (1) knowledge/beliefs about ADHD (W_{1j}), (2) knowledge/beliefs about seizure disorders (W_{2j}), frequency of contact with ADHD (W_{3j}), frequency of contact with seizure disorders (W_{4j}), efficacy for recognizing ADHD (W_{5j}), efficacy for recognizing a seizure

disorder (W_{6j}), efficacy for initiating a referral (W_7), and beliefs about whether it is the teacher's role or responsibility to initiate a referral when they suspect that a student has an underlying medical problem (W_{8j}). All predictor variables in the model were specified as having fixed effects. Level-two predictor variables were grand-mean centered to facilitate interpretation (i.e., recognition ratings were adjusted as if all respondents had the overall sample-average level of each respondent characteristic).

$$\begin{aligned}
 Y_{ij} = & \gamma_{00} + \gamma_{01}W_{1j} + \gamma_{02}W_{2j} + \gamma_{03}W_{3j} + \gamma_{04}W_{4j} + \gamma_{05}W_{5j} + \gamma_{06}W_{6j} + \gamma_{07}W_7 \\
 & + \gamma_{08}W_{8j} + \beta_1X_{1j} + \beta_2X_{2j} + \beta_3X_{3j} + \beta_4X_{4j} + \beta_5X_{5j} + \beta_6X_{6j} + \beta_7X_{7j} + \beta_8X_{8j} + \beta_9X_{9j} \\
 & + \beta_{10}X_{10j} + \beta_{11}X_{11j} + \beta_{12}X_{12j} + \beta_{13}X_{13j} + \beta_{14}X_{14j} + \beta_{15}X_{15j} + u_{oj} + r_{ij}
 \end{aligned} \tag{3-1}$$

Note. Y_{ij} = Recognition rating on particular vignette j ; γ_{00} = Grand Mean Recognition rating; u_{oj} = Level-two residual; r_{ij} = (Respondent Recognition rating on vignette j) – (Respondent Mean Recognition rating).

In terms of predicting preservice teachers' recognition of absence seizures, the coefficients estimated for knowledge of ADHD, eyelids flutter, no recollection of what happened during the elapsed time, and having a previous diagnosis of ADHD-PI were all statistically significant: $t(90) = -2.034$ ($p = .045$), $t(275) = 2.231$ ($p = .026$), $t(275) = 2.264$ ($p = .024$), and $t(275) = -2.301$ ($p = .022$), respectively. The coefficient estimated for knowledge of ADHD, which was a level-two predictor variable, was negative ($\gamma_{01} = -0.040$, $SE = 0.020$), meaning that greater knowledge of ADHD predicted lower recognition ratings for preservice teachers average on every other respondent characteristic. Regarding the level-one explanatory variables, the coefficients for eyelids flutter ($\beta_6 = 0.429$, $SE = 0.192$) and having no recollection of what happened during the elapsed time ($\beta_{11} = 0.295$, $SE = 0.130$) were positive, indicating that the presence of these characteristics predicted higher recognition ratings. The coefficient for having received a previous diagnosis of ADHD-PI ($\beta_{13} = -0.425$, $SE = 0.185$), in contrast, was negative, meaning

that the presence of this characteristic predicted lower recognition ratings. See Table 3-1 for the complete recognition regression analysis.

Question 3

Do preservice teachers differentiate absence seizures from ADHD?

A Chi-Square Test of Independence was conducted to test the association between participants' ratings on item two on the vignettes and type of disorder (i.e., whether participants' ratings depended on whether the child presented with absence seizures or ADHD). The data used in this analysis were participants' responses to question two, which asked them to rate on a Likert-type scale to what extent the child's presenting behavior was consistent with a seizure disorder, with 1 representing *Definitely Not a Seizure Disorder* and 9 representing *Definitely a Seizure Disorder*. The data were set up so that the rows were respondents' responses to the Likert-type item and the columns were the groups, which in this case were absence seizures and ADHD. See Table 3-2 for the crosstabulation results of this analysis. On the vignette depicting ADHD, the vast majority of respondents (96%) indicated that they did not think that the child's presenting behavior was consistent with a seizure disorder; they provided ratings below five, or below the mid-point on the scale (i.e., participants provided a rating between one and four). On the vignettes depicting absence seizures, in contrast, the vast majority of participants (92.33%) provided ratings above the mid-point on the scale (i.e., they provided ratings between six and nine), indicating that they did believe that the child's presenting behavior was consistent with a seizure disorder. The Pearson χ^2 (8, N = 600) = 535.309 was statistically significant ($p = .000$), meaning that participants' ratings did depend on whether the hypothetical children presented with absence seizures or ADHD. Results suggest that preservice teachers are able to differentiate between the disorders.

Chi-Square Tests of Independence were also calculated with responses to item three, which asked participants to specify the best explanation for the child's presenting episodes of inattention. The analyses served to assess whether participants' explanations depended on the disorder depicted in the vignettes. Theoretically, if participants could differentiate between the disorders, they should have provided the explanation *ADHD* significantly more on the ADHD vignette, and, conversely, they should have provided the explanation *seizure disorder* significantly more on the seizure disorder vignettes. The data used in this analysis were participants' responses coded 1 and 2 on question three, which represented ADHD and seizure disorder, respectively (see Table 2-6 for a summary of themes and their corresponding codes). The data were then dummy-coded into dichotomous variables (i.e., 0 and 1). See Table 3-3 for the crosstabulation results of these analyses. More than half of participants (61.7%) correctly specified that the hypothetical children in the absence seizure vignettes had a seizure disorder. Moreover, not a single participant incorrectly identified the hypothetical child in the ADHD vignette as having a seizure disorder. The Pearson $X^2 (2, N = 600) = 227.586$ for the seizure disorder explanation was statistically significant ($p = .000$), indicating that participants were significantly more likely to provide the explanation on the absence seizure test vignettes. The Pearson $X^2 (2, N = 600) = 135.127$ for the ADHD explanation was also statistically significant ($p = .000$), indicating that participants were significantly more likely to provide the explanation on the ADHD vignette. Overall, results indicate that preservice teachers' explanations did depend on the type of disorder depicted in the vignettes, which suggests that they are able to differentiate between the disorders.

Question 4

What is the unique contribution of each child characteristic (i.e., levels included in the vignettes) and selected respondent characteristic (i.e., knowledge, experience, efficacy, beliefs, etc.) on preservice teachers' Differentiation Ratings?

Since preservice teachers graduating from the UEP do seem to be able to differentiate between the disorders, a regression analysis was conducted to identify which characteristics, both child and respondent, allowed them to differentiate between the disorders. That is, on any given vignette, what lead preservice teachers to conclude that the child's presenting behavior was consistent with a seizure disorder and not consistent with ADHD? The process of deriving participants' *differentiation* ratings was discussed in the procedures section (chapter two). To determine which type of regression analysis was most appropriate, OLS or HLM, an unconditional model was estimated, which allowed the researcher to calculate the intra-class correlation ($ICC = .28$). Given the nested structure of the data, and that a substantial amount of the variance in responding was due to respondent characteristics (28%), the researcher determined that HLM was most appropriate (i.e., *Type I error* would have been considerable had it been assumed that the data came from a simple random sample) (Willms & Smith, 2005). The data were analyzed using *HLM 6 Hierarchical Linear and Nonlinear Modeling* software. Cases with missing data were excluded, essentially performing listwise deletion on the level-two data file. Restricted maximum likelihood (REML) estimation method was selected, which estimates variances and covariances assuming regression coefficients are unknown (Raudenbush et al., 2004). Given that the DV was a Likert-type variable, and that the data may have violated one or more normality assumptions, the fixed effects were estimated with robust standard errors (Raudenbush et al., 2004).

The combined model specified for the *differentiation* regression analysis contained a total of 23 predictor variables (Equation 3-2). The 10 IVs (25 levels) that were randomly combined in the absence seizure test vignettes, and that were dummy coded into 15 variables (X_{ij}), were included as the level-one explanatory variables (Table 2-4). Eight selected respondent characteristics, derived from the PDIS, KADDS, and ATPE were considered the level-two explanatory variables: (1) knowledge/beliefs about ADHD (W_{1j}), (2) knowledge/beliefs about seizure disorders (W_{2j}), frequency of contact with ADHD (W_{3j}), frequency of contact with seizure disorders (W_{4j}), efficacy for recognizing ADHD (W_{5j}), efficacy for recognizing a seizure disorder (W_{6j}), efficacy for initiating a referral (W_{7j}), and beliefs about whether it is the teacher's role or responsibility to initiate a referral when they suspect that a student has an underlying medical disorder (W_{8j}). All predictor variables in the model were specified as having fixed effects. Level-two predictor variables were grand mean centered to facilitate interpretation (i.e., variance in differentiation ratings were adjusted as if respondents had the overall sample-average level of each respondent characteristic).

$$Y_{ij} = \gamma_{00} + \gamma_{01}W_{1j} + \gamma_{02}W_{2j} + \gamma_{03}W_{3j} + \gamma_{04}W_{4j} + \gamma_{05}W_{5j} + \gamma_{06}W_{6j} + \gamma_{07}W_{7j} + \gamma_{08}W_{8j} + \beta_1X_{1j} + \beta_2X_{2j} + \beta_3X_{3j} + \beta_4X_{4j} + \beta_5X_{5j} + \beta_6X_{6j} + \beta_7X_{7j} + \beta_8X_{8j} + \beta_9X_{9j} + \beta_{10}X_{10j} + \beta_{11}X_{11j} + \beta_{12}X_{12j} + \beta_{13}X_{13j} + \beta_{14}X_{14j} + \beta_{15}X_{15j} + u_{oj} + r_{ij} \quad (3-2)$$

Note. Y_{ij} = Differentiation rating on particular vignette j ; γ_{00} = Grand Mean Differentiation rating; u_{oj} = Level-two residual; r_{ij} = (Differentiation rating on vignette j) – (Respondent Mean Differentiation rating).

In terms of predicting preservice teachers' differentiation ratings, the coefficients estimated for referral self-efficacy and having received a previous diagnosis of ADHD-PI were statistically significant: $t(90) = -2.328$ ($p = .022$) and $t(275) = -4.678$ ($p = .000$), respectively. The coefficient for referral efficacy, a respondent level variable that assessed how confident preservice teachers

were that they knew how to initiate a referral correctly, was negative ($\gamma_{07} = -0.379$, $SE = 0.163$).

This suggested that, for a preservice teacher who was average on every other respondent characteristic, higher referral efficacy predicted lower ratings, or poorer differentiation. The coefficient for having received a previous diagnosis of ADHD-PI was also negative ($\beta_{13} = -1.616$, $SE = 0.346$), meaning that the presence of this child characteristic predicted lower, less accurate differentiation ratings. See Table 3-4 for the complete differentiation regression analysis.

Question 5

What referral decisions do preservice teachers make for students presenting with absence seizures?

Descriptive statistics for question four on the absence seizure test vignettes, which asked participants to indicate how likely they were to initiate a referral, were calculated. Participants were asked to provide ratings on a Likert-type scale from 1 (*Not At All Likely*) to 9 (*Extremely Likely*). Participants' mean rating was 7.52 ($SD = 1.62$). The median rating was 8, and the mode rating was 9. Participants' ratings ranged from 1 to 9. The vast majority of participants (86.29%) provided ratings above the mid-point on the scale (i.e., they provided ratings between 6 and 9), indicating that they anticipated that they would be likely to initiate a referral for a student presenting with absence seizures. Moreover, only 5.65% of participants anticipated that they would be unlikely to initiate a referral (i.e., they provided ratings on the bottom half of the scale, or below the mid-point on the scale). Results suggest that, as a group, preservice teachers graduating from the UEP do anticipate that they would initiate a referral for a student presenting with absence seizures.

Question 6

What is the unique contribution of each child characteristic (i.e., levels included in the vignettes) and selected respondent characteristic (i.e., knowledge, experience, efficacy, beliefs, etc.) on preservice teachers' Referral Ratings?

Since preservice teachers do anticipate that they would initiate a referral for a student presenting with absence seizures, a regression analysis was conducted to identify which characteristics, both child and respondent, predict preservice teachers' referral ratings. To determine which type of regression analysis was most appropriate (i.e., OLS or HLM), an unconditional model was estimated, which allowed the researcher to calculate the intra-class correlation ($ICC = .62$). Given the nested structure of the data, and that a significant amount of the variance in responding was due to respondent characteristics (62%), the researcher determined that HLM was most appropriate (i.e., *alpha inflation* would have been considerable had it been assumed that the data came from a simple random sample) (Willms & Smith, 2005). The data were analyzed using *HLM 6 Hierarchical Linear and Nonlinear Modeling* software. Cases with missing data were excluded ($n = 10$), essentially performing listwise deletion on the level-two data file. Restricted maximum likelihood (REML) estimation method was selected, which estimates variances and covariances assuming regression coefficients are unknown (Raudenbush et al., 2004). Given that the DV was a likert-type variable, and that the data may have violated one or more normality assumptions, the fixed effects were estimated with robust standard errors (Raudenbush et al., 2004).

The combined model specified for the *referral* regression analysis contained a total of 24 predictor variables (Equation 3-3). The 10 IVs (25 levels) that were randomly combined in the absence seizure test vignettes, and that were dummy coded into 15 variables (X_{ij}), were included as level-one explanatory variables (Table 2-4). Eight selected respondent characteristics, derived

from the PDIS, KADDS, and ATPE were specified as level-two explanatory variables: (1) knowledge/beliefs about ADHD (W_{1j}), (2) knowledge/beliefs about Seizure Disorders (W_{2j}), frequency of contact with ADHD (W_{3j}), frequency of contact with seizure disorders (W_{4j}), efficacy for recognizing ADHD (W_{5j}), efficacy for recognizing a seizure disorder (W_{6j}), efficacy for initiating a referral (W_{7j}), and beliefs about whether it is the teacher's role or responsibility to initiate a referral when they suspect that a student has an underlying medical disorder (W_{8j}).

Level-two predictor variables were grand mean centered to facilitate interpretation (i.e., referral ratings were adjusted as if all respondents had the overall sample-average level of each respondent characteristic). *Mean recognition rating* (X_{16}), another explanatory variable added to the model, was modeled as a cross level interaction. Mean recognition rating was group-mean centered, or centered around the respondent's mean. All predictor variables in the model were specified as having fixed effects, except for mean recognition rating, which was allowed to have random effects.

$$\begin{aligned}
 Y_{ij} = & \gamma_{00} + \gamma_{01}W_{1j} + \gamma_{02}W_{2j} + \gamma_{03}W_{3j} + \gamma_{04}W_{4j} + \gamma_{05}W_{5j} + \gamma_{06}W_{6j} + \gamma_{07}W_{7j} & (3-3) \\
 + & \gamma_{08}W_{8j} + \gamma_{09}W_{9j} + \beta_1X_{1j} + \beta_2X_{2j} + \beta_3X_{3j} + \beta_4X_{4j} + \beta_5X_{5j} + \beta_6X_{6j} + \beta_7X_{7j} + \beta_8X_{8j} \\
 + & \beta_9X_{9j} + \beta_{10}X_{10j} + \beta_{11}X_{11j} + \beta_{12}X_{12j} + \beta_{13}X_{13j} + \beta_{14}X_{14j} + \beta_{15}X_{15j} + \beta_{16}X(W_{01} + W_{02} + W_{03} \\
 + & W_{04} + W_{05} + W_{06} + W_{07} + W_{08})_{16j} + u_{oj} + r_{ij}
 \end{aligned}$$

Note. Y_{ij} = Referral rating on particular vignette j ; γ_{00} = Grand Mean Referral rating; u_{oj} = Level-two residual; r_{ij} = (Referral rating on vignette j) – (Respondent Mean Referral rating).

In terms of predicting preservice teachers' referral ratings, the coefficient for beliefs about role and the intercept for recognition were statistically significant: $t(90) = 3.98, p = .022$ and $t(90) = 6.40, p = .000$, respectively (Table 3-6). The coefficient for beliefs about role, which was a respondent level variable that assessed preservice teachers' beliefs about whether it is the teacher's role or responsibility to initiate a referral when they suspect that a student has an

underlying medical problem, was positive ($\gamma_{08} = 0.474$, $SE = 0.111$). This suggests that, for a preservice teacher average on every other respondent characteristic, the more he or she believes that referring a student is part of the teacher's role, the more he or she anticipated that he or she would initiate a referral. The intercept for recognition was also positive, indicating that the higher a preservice teacher's mean recognition rating, the more he or she anticipated that he or she would initiate a referral. However, modeled as a cross-level interaction, mean recognition depended on frequency of contact with persons with seizure disorders ($t = 2.176$, $p = .032$, $df = 90$) and on beliefs about the teacher's role ($t = -2.563$, $p = .012$, $df = 90$). See Table 3-5 for the complete referral regression analysis.

Question 7

Do preservice teachers provide different referral ratings for hypothetical children presenting with absence seizures and hypothetical children presenting with ADHD?

A Chi-Square Test of Independence was conducted to assess whether referral rating depended on type of disorder (i.e., absence seizures or ADHD). The data used in this analysis were participants' responses to question four, which asked them to rate on a Likert-type scale how likely they were to initiate a referral. The data were set up so that the rows were respondents' responses to the Likert-type item and the columns were the groups, which in this case were ADHD and absence seizures. See Table 3-6 for the crosstabulation results of this analysis. On the vignette depicting ADHD, the majority of respondents (79.80%) anticipated that they were likely to initiate a referral by providing ratings above five, or above the mid-point on the scale (i.e., participants provided a rating between 6 and 9). However, participants anticipated that they would be even more likely to initiate a referral for the students depicted in the absence seizures vignettes; 86.29% provided ratings above the mid-point on the scale (i.e., they provided

ratings between 6 and 9). The Pearson X^2 (8, N = 596) = 39.220 was statistically significant ($p = .000$), indicating that referral ratings did depend on type of disorder. Results suggest that, although preservice teachers anticipate that they would initiate referrals for students presenting with both disorders, they anticipate that they would be more likely to initiate a referral for a student presenting with absence seizures.

Table 3-1. Summary of hierarchical linear modeling analysis for variables predicting preservice teachers' ability to recognize absence seizures

Variable	$\beta(\gamma)$	SE	t	df	p.
Level-one explanatory variables					
Frequency					
Frequent (X_1)	-0.111	0.197	-0.562	275	.574
Sporadic (X_2)	0.313	0.197	1.591	275	.113
Situations					
In all situations (X_3)	0.082	0.218	0.377	275	.706
Physical activity (X_4)	0.318	0.184	1.727	275	.085
Onset					
Stop talking (X_5)	-0.181	0.164	-1.102	275	.272
Physiological					
Eyelid flutters (X_6)	0.429	0.192	2.231	275	.026*
Lip-smacking (X_7)	-0.162	0.244	-0.666	275	.506
Eyes roll back (X_8)	0.313	0.189	1.653	275	.099
Duration					
Up to 30 seconds (X_9)	-0.142	0.158	-0.897	275	.371
Response to Redirection					
Verbal redirection (X_{10})	-0.142	0.169	-0.835	275	.405
Post Behavior					
No recollection (X_{11})	0.295	0.130	2.264	275	.024*
Sustained attention					
Completes homework (X_{12})	0.136	0.161	0.843	275	.400
History					
Diagnosis of ADHD-PI (X_{13})	-0.425	0.184	-2.301	275	.022*
No indication (X_{14})	0.089	0.174	0.513	275	.608
Intensity					
Normal intensity (X_{15})	-0.232	0.142	-1.642	275	.101
Level-two explanatory variables (Respondent characteristics)					
ADHD knowledge (W_1)	-0.400	0.020	-2.034	90	.045*
SD knowledge (W_2)	-0.001	0.007	-0.206	90	.837
Frequency ADHD (W_3)	-0.064	0.107	-0.593	90	.554
Frequency SD (W_4)	0.049	0.086	0.568	90	.571
Efficacy ADHD (W_5)	0.204	0.128	1.600	90	.113
Efficacy SD (W_6)	0.026	0.129	0.199	90	.843
Referral efficacy (W_7)	-0.058	0.091	-0.632	90	.529
Role/beliefs (W_8)	0.165	0.112	1.479	90	.142

Note. SD = Seizure disorder. See Table 2-4 for a description of all level-one variables. ADHD knowledge = Knowledge of Attention Deficit Disorders Scale score; SD knowledge = Scale of Knowledge and Attitudes Toward Epilepsy and Persons with Epilepsy score; Frequency of ADHD = frequency of contact with persons with ADHD; Frequency SD = frequency of contact with persons with a SD; Efficacy ADHD = efficacy for recognizing ADHD; Efficacy SD = efficacy for recognizing a seizure disorder; Referral efficacy = efficacy for initiating a referral effectively; Role/beliefs = belief about whether it is the teacher's responsibility to initiate a referral.

* $p < .05$.

Table 3-2. Crosstabulation results for preservice teachers' seizure disorder ratings across the ADHD and absence seizure vignettes.

Vignette	Ratings									Total
	1	2	3	4	5	6	7	8	9	
ADHD	41% (123)	42% (126)	12% (36)	1% (3)	3% (9)	1% (3)	0% (0)	0% (0)	0% (0)	100% (300)
Absence seizure	0.33% (1)	1.33% (4)	0.67% (2)	1% (3)	4.33% (13)	6.33% (19)	17% (51)	38% (114)	31% (93)	100% (300)
Total	20.67% (124)	43.33% (130)	6.33% (38)	1% (6)	3.67% (22)	3.67% (22)	8.5% (51)	19% (114)	15.5% (93)	100% (600)

Note. N = 600. Numbers in parentheses indicate frequency of responses. Seizure disorder ratings represent participants' responses to item two on the vignettes, which asked them to rate on a Likert-type scale to what extent the child's presenting behavior was consistent with a seizure disorder, with 1 representing *Definitely Not a Seizure Disorder*, and 9 representing *Definitely a Seizure Disorder*.

Table 3-3. Crosstabulation results for preservice teacher' explanations for the hypothetical children's presenting episodes of inattention

Explanation	Vignette	
	Absence seizure	ADHD
Seizure disorder	165 (61.7%)	0 (0.0%)
ADHD	7 (2.0%)	120 (45.5%)

Note. Numbers in parentheses indicate percent of preservice teachers that endorsed that response.

Table 3-4. Summary of hierarchical linear modeling analysis for variables predicting preservice teachers' ability to differentiate absence seizures from ADHD

Variable	$\beta(\gamma)$	SE	t	df	p
Level-one explanatory variables					
Frequency					
Frequent (X_1)	-0.364	0.348	-1.047	275	.297
Sporadic (X_2)	0.438	0.373	1.174	275	.242
Situations					
In all situations (X_3)	0.069	0.392	0.177	275	.860
Physical activity (X_4)	0.444	0.334	1.331	275	.185
Onset					
Stop talking (X_5)	-0.237	0.302	-0.786	275	.433
Physiological					
Eyelid flutters (X_6)	0.495	0.324	1.527	275	.128
Lip-smacking (X_7)	-0.324	0.446	-0.726	275	.468
Eyes roll back (X_8)	0.343	0.392	0.875	275	.382
Duration					
Up to 30 seconds (X_9)	-0.044	0.277	-0.158	275	.875
Response to redirection					
Verbal redirection (X_{10})	-0.116	0.322	-0.361	275	.718
Post behavior					
No recollection (X_{11})	0.401	0.237	1.690	275	.092
Sustained attention					
Completes homework (X_{12})	-0.008	0.291	-0.028	275	0.978
History					
Diagnosis of ADHD-PI (X_{13})	-1.616	0.345	-4.678	275	0.000**
No indication (X_{14})	0.067	0.293	0.229	275	0.819
Intensity					
Normal intensity (X_{15})	-0.134	0.284	-0.473	275	0.636
Level-two explanatory variables (Respondent characteristics)					
ADHD knowledge (W_1)	-0.036	0.038	-0.963	90	.339
SD knowledge (W_2)	0.007	0.011	0.592	90	.555
Frequency ADHD (W_3)	-0.184	0.191	-0.962	90	.339
Frequency SD (W_4)	-0.020	0.159	-0.125	90	.901
Efficacy ADHD (W_5)	0.040	0.237	1.434	90	.155
Efficacy SD (W_6)	0.279	0.205	1.363	90	.177
Referral efficacy (W_7)	-0.379	0.163	-2.328	90	.022*
Role/beliefs (W_8)	0.228	0.210	1.083	90	0.282

Note. SD = Seizure disorder. See Table 2-4 for a description of all level-one variables. ADHD knowledge = Knowledge of Attention Deficit Disorders Scale score; SD knowledge = Scale of Knowledge and Attitudes Toward Epilepsy and Persons with Epilepsy score; Frequency of ADHD = frequency of contact with persons with ADHD; Frequency SD = frequency of contact with persons with a SD; Efficacy ADHD = efficacy for recognizing ADHD; Efficacy SD = efficacy for recognizing a SD; Referral efficacy = efficacy for initiating a referral effectively; Role/beliefs = belief about whether it is the teacher's responsibility to initiate a referral.

* $p < .05$. ** $p < .01$.

Table 3-5. Summary of hierarchical linear modeling analysis for variables predicting preservice teachers' referral decision

Variable	$\beta(\gamma)$	SE	t	df	p.
Level-one explanatory variables					
Frequency					
Frequent (X_1)	0.163	0.132	-0.749	266	.216
Sporadic (X_2)	-0.011	0.116	-0.091	266	.928
Situations					
In all situations (X_3)	0.014	0.106	0.135	266	.893
Physical activity (X_4)	-0.002	-.109	-0.019	266	.985
Onset					
Stop talking (X_5)	0.035	0.104	0.338	266	.736
Physiological					
Eyelid flutters (X_6)	-0.111	0.167	-0.666	266	.506
Lip-smacking (X_7)	-0.102	0.172	-.590	266	.555
Eyes roll back (X_8)	-0.007	0.157	-0.043	266	.966
Duration					
Up to 30 seconds (X_9)	-0.052	0.093	-0.563	266	.573
Response to redirection					
Verbal redirection (X_{10})	0.075	0.103	0.730	266	.466
Post behavior					
No recollection (X_{11})	-0.047	0.122	-0.384	266	.701
Sustained attention					
Completes homework (X_{12})	-0.0617	0.100	-0.618	266	.536
History					
Diagnosis of ADHD-PI (X_{13})	-0.031	0.109	-0.285	266	.776
No indication (X_{14})	0.075	0.115	0.653	266	.514
Intensity					
Normal intensity (X_{15})	-0.115	0.096	-1.198	266	.232
Recognition (X_{16})					
Intercept	0.592	0.092	6.460	90	.000**
Knowledge of ADHD	-0.011	0.017	-0.644	90	.521
Knowledge of SD	0.002	0.004	0.527	90	.599
Frequency ADHD	-0.023	0.071	-0.320	90	.749
Frequency SD	0.151	0.070	2.176	90	.032*
Efficacy ADHD	0.034	0.134	0.257	90	.798
Efficacy SD	-0.127	0.086	-1.473	90	.144
Efficacy referral	-0.018	0.078	-0.233	90	.817
Roles/beliefs	-0.187	0.073	-2.563	90	.012*
Level-two explanatory variables (Respondent characteristics)					
ADHD knowledge (W_1)	-0.020	0.027	-0.749	90	.456
SD knowledge (W_2)	0.001	0.007	0.155	90	.878
Frequency ADHD (W_3)	-0.004	-.126	-0.032	90	.975

Table 3-5. Continued

Variable	$\beta(\gamma)$	SE	t	df	p.
Frequency SD (W_4)	0.132	0.077	1.716	90	.089
Efficacy ADHD (W_5)	0.163	0.163	1.001	90	.320
Efficacy SD (W_6)	-0.040	0.124	-0.324	90	.747
Referral efficacy (W_7)	0.034	0.130	0.263	90	.747
Role/beliefs (W_8)	0.474	0.119	9.983	90	.000**

Note. SD = Seizure disorder. See Table 2-4 for a description of all level-one variables. ADHD knowledge = Knowledge of Attention Deficit Disorders Scale score; SD knowledge = Scale of Knowledge and Attitudes Toward Epilepsy and Persons with Epilepsy score; Frequency of ADHD = frequency of contact with persons with ADHD; Frequency SD = frequency of contact with persons with a SD; Efficacy ADHD = efficacy for recognizing ADHD; Efficacy SD = efficacy for recognizing a seizure disorder; Referral efficacy = efficacy for initiating a referral effectively; Role/beliefs = belief about whether it is the teacher's responsibility to initiate a referral.

* $p < .05$. ** $p < .01$.

Table 3-6. Crosstabulation results for preservice teachers' referral decisions on the vignettes

Vignette	Ratings									Total
	1	2	3	4	5	6	7	8	9	
ADHD	0% (0)	1.01% (3)	6.06% (18)	6.06% (18)	7.07% (21)	10.10% (30)	28.28% (84)	22.22% (66)	19.19% (57)	100% (297)
Absence seizure	0.33% (1)	0.67% (2)	1.34% (4)	3.34% (10)	8.03% (24)	8.70% (26)	15.72% (47)	26.42% (79)	35.45% (106)	100% (299)
Total	0.17% (1)	0.84% (5)	3.70% (22)	4.70% (28)	7.55% (45)	9.40% (56)	21.24% (131)	24.33% (145)	27.35% (163)	100% (596)

Note. N = 596. Numbers in parentheses indicate frequency of responses. Percentages are rounded to the nearest hundredth and may not total 100% when summed.

CHAPTER 4 DISCUSSION

Introduction

Absence seizures are the most common type of pediatric epilepsy, occurring in approximately 2-10% of children with epilepsy (Agnew et al., 1998). Characterized by impaired consciousness that is unaccompanied by large convulsive movements, (typical) absence seizures are often considered benign, given that they rarely cause permanent neurological damage (Leppik, 2000). However, prolonged periods of unconsciousness that result from absence seizures are associated with adverse outcomes, particularly at school (Svoboda, 2004). With proper diagnosis and treatment, much of the long-term sequelae of absence seizures can be prevented or redirected. However, unfortunately, absence seizures are frequently overlooked or misidentified for other pediatric disorders due to the subtlety of their symptoms (Williams et al., 1996). ADHD, and more specifically ADHD-PI, is another common pediatric disorder characterized by inattention that may mimic absence seizures (Pearl et al., 2001). ADHD and absence seizures often occur co-morbidly, which further complicates accurate differentiation between the disorders (Schubert, 2005). While researchers and practitioners allege that the misdiagnosis of absence seizures for ADHD is a real problem, the magnitude of the problem remains unknown, given that the topic has never been directly investigated.

Teachers, perhaps more than any other adult, are in an ideal position to identify absence seizures. Working with a diversity of children, they know what is developmentally normal. Moreover, teachers observe children under demanding learning conditions where problems with inattention might be expected to arise. Unfortunately, previous research has demonstrated that teachers often have limited knowledge of and hold inaccurate beliefs about seizure disorders and ADHD (Bishop & Slevin, 2004; Ghanizadeh et al., 2006). More disconcerting is that while their

referral accuracy for ADHD tends to be low, they do not appear to participate in the evaluation process for seizure disorders (Bishop & Boag, 2006; Cotugno, 1993; Scitutto et al., 2000). Given the unique and influential role they can play in the diagnostic and evaluation process, teachers should be familiarized with absence seizures (i.e., regarding their symptomology and the ways they impair functioning, especially at school) and encouraged to initiate appropriate referrals.

The purpose of this study was to investigate relationships among a number of child- and respondent-level characteristics that may affect preservice teachers' judgment and decision-making with respect to absence seizures. More specifically, this study examined investigated (1) whether preservice teachers recognized absence seizures, (2) what characteristics predicted preservice teachers' recognition ratings, (3) whether preservice teachers differentiated absence seizures from ADHD, (4) what characteristics predicted preservice teachers' differentiation ratings, (5) whether preservice teachers anticipated initiating referrals for hypothetical children presenting with absence seizures, (6) what characteristics predicted preservice teachers' referral ratings, and (7) whether preservice teachers anticipated making different referral decisions for hypothetical children presenting with absence seizures and hypothetical children presenting with ADHD? If characteristics that predict recognition, differentiation, and anticipated referral likelihood are identified, researchers and practitioners may gain a better understanding of why some teachers refer some children and not others. More importantly, this information can be used to make recommendations for programmatic changes to preservice teacher preparation programs so that teachers are prepared to display good judgment and decision-making from the moment they enter the field.

Results of the current study suggest that preservice teachers do recognize absence seizures. Recognition ratings depended on respondent- and child- level characteristics. Preservice teachers

were able to differentiate reliably between unambiguous cases of absence seizures and ADHD. However, their proficiency declined when the hypothetical children presented with co-morbid disorders (i.e., when the children presenting with absence seizures had received a previous diagnosis of ADHD-PI). Preservice teachers' differentiation ratings were not significantly affected by any other child-level characteristics, which may suggest that they were basing their ratings on their global impressions of the children. In general, preservice teachers anticipated initiating referrals for students presenting with absence seizures. Surprisingly, variance in referral ratings depended exclusively on respondent-level characteristics. As a group, preservice teachers anticipated being more likely to initiate a referral for a student presenting with absence seizures than a student presenting with ADHD.

Question 1

Do preservice teachers recognize absence seizures?

Given the limited, broader body of literature, the finding that preservice teachers in the current study were able to recognize absence seizures was unexpected (Ghanizadeh et al., 2006; Sciotto et al., 2000). Research suggests that practical skills, such as being able to recognize an absence seizure, depend on knowledge (Ghanizadeh et al., 2006; Glass, 2000). Preservice teachers in the current study reliably recognized absence seizures despite having limited knowledge. For example, the vast majority of preservice teachers (92.33%) rated the hypothetical child's behavior depicted in the absence seizure vignettes as being consistent with a seizure disorder. Moreover, only 3.33% of preservice teachers rated the child's presenting behavior as being inconsistent with a seizure disorder (i.e., the remaining 4.33% of preservice teachers provided neutral ratings). More than half of preservice teachers (61.7%) correctly specified that a seizure disorder was the best explanation for the child's presenting episodes of inattention. However, the phrase *seizure disorder*, which appeared in the stem of the preceding

question on the vignette instrument (i.e., item two asked participants to specify to what extent the child's presenting behavior was consistent with a seizure disorder), may have served as a cue and enhanced preservice teachers' performance on this item.

An additional 10.5% of preservice teachers provided a more general explanation: that the hypothetical child's inattention stemmed from an underlying medical or neurological problem. Given preservice teachers' job function and training (i.e., they are not medical professionals responsible for making a diagnosis), this represents a correct response. The response signifies that something is distinctly wrong with the child, but that the preservice teacher recognizes that he or she is not in a position to assign a medical label to the behavior. Recognizing the specific disorder affecting a child is helpful in that it can facilitate early and accurate diagnosis. For example, recognizing a seizure disorder may compel a teacher to initiate a referral promptly, and may increase the likelihood that an appropriate specialist (e.g., a neurologist) evaluates the child. However, more important is that a teacher recognizes that something is distinctly wrong with a child and initiates an appropriate referral. Once the referral is initiated, he or she can provide the parent or the professional responsible for conducting the evaluation with detailed information, describing the presenting concern(s) in behavioral terms. The professional can use this information to assign an appropriate label to the behavior, or provide the child with an accurate diagnosis.

Given the results of international studies indicating that teachers have limited knowledge and hold erroneous, often dangerous, beliefs about seizure disorders, preservice teachers' limited knowledge in the current study was not surprising (Bishop & Boag, 2006; Bishop & Slevin, 2004; Prpic, et al., 2003). While researchers and educators have not established a benchmark for seizure disorder-related knowledge, defining what constitutes low, average, or high levels of

knowledge, it seems reasonable to expect highly educated individuals, such as preservice teachers in the U.S., to answer more items correctly. While seizure disorder-related knowledge and information can be transmitted to preservice teachers through a range of educational experiences, most researchers and educators consider formal instruction the most efficient mechanism. For this, the researcher asked preservice teachers to specify whether they had received formal instruction on seizure disorders in the past.

Consistent with existing research, only a small minority of preservice teachers in the current study indicated that they had received formal instruction on seizure disorders (Bishop & Boag, 2006; Bishop & Slevin, 2004; Prpic, et al., 2003). Theoretically, formal instruction should enhance knowledge (Bishop & Boag, 2006). Surprisingly, however, formal instruction was not significantly correlated with objective seizure disorder-related knowledge (i.e., as measured by the ATPE) in the current study. The significance of this finding remains unclear, since many factors may explain the absence of this important relationship. For example, since the relationship between formal instruction and knowledge was ancillary to the main research questions, the researcher did not ask the participants to elaborate on the type and nature of the instruction they received (e.g., how much instruction they received, or what types of seizure disorders were covered). Preservice teachers' classification of formal instruction, then, was subjective, and could not be controlled for systematically (e.g., by the amount of formal instruction they received). Moreover, since only 10% of the sample, or 10 participants, endorsed that they had received formal instruction on seizure disorders, the analysis may not have had enough statistical power to detect a significant relationship.

Although formal instruction did not correlate significantly with objective seizure disorder-related knowledge (i.e., as measured by the ATPE), formal instruction was significantly

associated with participants' subjective knowledge of seizure disorders (i.e., perceived knowledge). The preservice teachers, it seems, assumed that they were more knowledgeable just for receiving the formal instruction. Preservice teachers' subjective knowledge was significantly correlated with their objective knowledge of seizure disorders (i.e., their global ATPE score). However, when separating ATPE scores into their corresponding subscales (i.e., knowledge and attitudes), subjective knowledge was only significantly associated with attitudes. This finding suggests that preservice teachers who perceived themselves as being more knowledgeable did not actually possess more seizure disorder-related knowledge, but, instead, held more positive attitudes towards persons with seizure disorders.

The literature suggests that subjective knowledge underlies efficacy, and that efficacy motivates behavior (Tschannen-Moran et al., 1998). As expected, preservice teachers' subjective seizure disorder knowledge correlated very strongly with their efficacy for recognizing a seizure disorder in the current study ($r = .78$). Therefore, the researcher hypothesized that the relationship between subjective knowledge of seizure disorders and attitudes towards persons with seizure disorders (i.e., as measured on the ATPE) was mediated by efficacy. That is, preservice teachers who provided higher subjective knowledge ratings held more favorable attitudes towards persons with seizure disorders because they were more confident that they could recognize seizure disorders accurately. Surprisingly, preservice teachers' efficacy for recognizing a seizure disorder was not significantly associated with their attitudes towards persons with seizure disorders. This finding does not suggest that all types of efficacy are unrelated to preservice teachers' attitudes towards persons with seizure disorders. For the purposes of the current study, the researcher assessed very specific types of efficacy. Other types

of efficacy that were not assessed (e.g., efficacy for managing children's problem behaviors) may very well influence preservice teachers' attitudes.

Question 2

What is the unique contribution of each child characteristic (i.e., levels included in the vignettes) and selected respondent characteristic (i.e., knowledge, experience, efficacy, beliefs, etc.) on preservice teachers' recognition ratings?

Respondent characteristics

Considering previous research stressing the relationship between knowledge and practice, the researcher hypothesized that seizure disorder-related knowledge would have a significant, positive effect on preservice teachers' ability to recognize absence seizures (Bishop & Boag, 2006; Ghanizadeh et al., 2006; Glass, 2000). Surprisingly, seizure disorder-related knowledge did not predict preservice teachers' ability to recognize absence seizures in the current study. Stated differently, preservice teachers were able to recognize absence seizures with roughly the same accuracy independent of the level of seizure disorder-related knowledge they possessed. This finding challenges the fundamental assumption that preservice teachers draw on their knowledge to inform their practice (Ghanizadeh et al., 2006; Glass, 2000). However, several explanations may clarify the absence of this important relationship. For example, although researchers often select Likert-type scales for their ability to detect variability in responding, preservice teachers in the current study demonstrated limited variability in responding on the *recognition* item. More specifically, they tended to provide ratings on the upper end of the scale. This may suggest that, for research purposes, the absence seizure test vignettes designed for the current study were too easy (i.e., the correct response was obvious to all preservice teachers, regardless of their knowledge or background). More importantly, this may have diluted the

relationships assessed between the predictor variables (e.g., knowledge of seizure disorders), and the DV, which was recognition of absence seizures.

ADHD-related knowledge, in contrast, another respondent-level characteristic included in the regression analysis, did have a significant effect on recognition in the current study. However, the direction of the relationship was astounding. The more ADHD-related knowledge preservice teachers' possessed, the lower, less accurate recognition ratings they provided on the absence seizure test vignettes. The researcher's rationale for including objective ADHD-related knowledge as a predictor variable was that, by knowing what *was* ADHD, preservice teachers would be able to deduce what *was not* ADHD (Macey, 2005; Sciotto & Feldhamer, 2007). This assumption seemed particularly plausible considering that preservice teachers were only presented with two competing disorders: seizure disorder or ADHD.

The reason that greater ADHD-related knowledge predicted lower, less accurate recognition ratings remains unclear, especially given preservice teachers' performance on the symptoms and diagnosis subscale of the KADDS (i.e., they performed particularly well on this subscale). One, tenuous hypothesis explaining this relationship is that preservice teachers with more ADHD-related knowledge were more aware of allegations that ADHD is over-diagnosed and that teachers' tend to *over-identify* the disorder (Cotugno, 1993; Macey, 2005; Sciotto et al., 2000). To avoid over-identifying children with seizure disorders, then, preservice teachers with more ADHD-related knowledge may have been more cautious in responding and provided more moderate ratings. However, if preservice teachers with more ADHD-related knowledge were concerned about over-identification, theoretically, they should have provided more moderate ADHD ratings on the ADHD vignette as well (i.e., to avoid over-identification of ADHD). They did not, calling the veracity of this hypothesis into question.

To clarify the relationship between preservice teachers' knowledge of ADHD and their recognition ratings, supplementary correlation analyses were conducted. Overall, preservice teachers' objective knowledge of ADHD (i.e., as measured by the KADDS) was not significantly correlated with their subjective knowledge of ADHD (i.e., as per their ratings on the PDIS). However, when breaking preservice teachers' objective knowledge down by area, or by subscale on the KADDS, their objective knowledge on the symptoms and diagnosis subscale was significantly correlated with their subjective knowledge of ADHD. This finding may suggest that preservice teachers define knowledge of ADHD narrowly (i.e., in terms of symptoms and diagnosis). Consistent with the previous finding relating to formal instruction and subjective seizure disorder-related knowledge, preservice teachers who had received formal instruction on ADHD perceived themselves as possessing more ADHD-related knowledge. However, objectively, they did not. Once more, it seems that the preservice teachers assumed that they were more knowledgeable just for receiving the formal instruction.

Correlation analyses revealed that preservice teachers' subjective knowledge of ADHD correlated significantly with their recognition ratings on the absence seizure vignettes ($r = .28, p = .005$). That is, the more ADHD-related knowledge preservice teachers believed that they possessed, the more likely they were to provide accurate recognition ratings (i.e., extreme ratings in the correct direction). This may suggest that, like the researcher, preservice teachers assumed that the more ADHD-related knowledge they possessed, the better able they would be at recognizing what *was not* ADHD (Macey, 2005). However, more importantly, this finding may suggest that preservice teachers are more likely to base their decisions on subjective, inaccurate beliefs than objective, accurate knowledge. While discouraging, the premise that preservice teachers base their decision-making and behavior on erroneous beliefs is not surprising. In fact,

many researchers allege that it is teachers' subjective knowledge that determines for the most part what happens in the classroom (Liljedahl, n.d.).

The literature suggests and the preservice teachers in the current study corroborated that teachers tend to overestimate their knowledge and abilities (Tschannen-Moran et al., 1998). Clearly, overestimating one's level of knowledge or competence can have negative consequences. For example, in the current sense, it may stifle a teacher's motivation to investigate pediatric disorders. However, numerous studies suggest that slightly overestimating one's ability can have positive consequences as well, since it may lead to an increased sense of self-efficacy, which has been found to enhance teachers' decision-making and behavior (Tschannen-Moran et al., 1998). That subjective knowledge and efficacy are interrelated constructs is bolstered by the sizable correlations found between subjective seizure disorder-related knowledge and efficacy for recognizing a seizure disorder ($r = .78$) and subjective ADHD-related knowledge and efficacy for recognizing ADHD ($r = .75$) in the current study. In fact, the subjective knowledge and efficacy variables were so interrelated that having included both of them in the regression analyses could have caused coefficients to be unstable and unreliable due to multicollinearity, making it difficult or impossible to partition out their individual effects on the dependent variables.

The aforementioned findings relating to knowledge, both objective and subjective, have several important practical implications. First, they suggest that, for research purposes, when studying preservice teachers or any other participant group of interest, objective measures should accompany or replace subjective measures of knowledge. Subjective measures lack the precision that objective measures afford researchers and, unfortunately, can tap into unintended constructs (e.g., questions gauging knowledge may actually be assessing efficacy). With respect to inservice

needs, results suggest that preservice teachers should not be relied on to identify when they are in need of additional information about pediatric disorders (i.e., they tend to overestimate their knowledge and abilities). Moreover, preservice teachers should not be responsible for judging the success of an inservice; in the current study, they assumed they were more knowledgeable just for receiving formal instruction. Instead, their mastery of important information and skills should be assessed formally with tests. This type of direct feedback should allow them to form more realistic appraisals of their level of knowledge.

Child characteristics

Two child characteristics predicted preservice teachers' recognition ratings: (1) eyelids flutter and (2) no recollection for what happened during the elapsed time. When a child's eyelids flutter, this behavior is highly visible and physiological (Williams et al., 1996). When a child has no recollection of what happened during an elapsed time, it suggests that the child lost consciousness, an event that is unusual and qualitatively abnormal (i.e., no degree of unconsciousness is normal) (Williams et al., 1996). Therefore, it is not surprising that preservice teachers provided higher ratings when these characteristics were present. When the vignettes indicated that the hypothetical child had received a previous diagnosis of ADHD-PI, preservice teachers tended to provide lower recognition ratings. The preservice teachers, it seems, assumed that the presenting symptomology was a manifestation of ADHD-PI, despite the irregularity of the symptoms. This finding is consistent with the broader body of literature, which suggests that teachers tend to *over-identify* ADHD, and that they have a tendency to overgeneralize other problematic behaviors to ADHD (Cotugno, 1993; Macey, 2005; Scituito et al., 2000). Given that children with ADHD-PI are at increased risk for developing absence seizures, this finding was alarming.

Question 3

Do preservice teachers differentiate absence seizures from ADHD?

Overall, preservice teachers in the current study differentiated reliably between absence seizures and ADHD. When comparing their ratings across the vignettes, preservice teachers were significantly more likely to rate the child's behavior depicted in the absence seizure vignettes as being consistent with a seizure disorder than the child's behavior depicted in the ADHD vignette (i.e., 92% vs. 1%, respectively). Moreover, while the majority of preservice teachers (61.7%) specified that a seizure disorder was the best explanation for the child's presenting episodes of inattention on the absence seizure vignettes, not a single preservice teacher provided this explanation on the ADHD vignette. According to the literature, teachers regularly misidentify a range of pediatric disorders for ADHD (Cotugno, 1993; Macey, 2005). Therefore, preservice teachers' ability to differentiate between absence seizures and ADHD in the current study was surprising. Perhaps, preservice teachers' proficiency can be explained by the fact that the vignettes depicted unambiguous, extreme cases of absence seizures and ADHD.

Through examining preservice teachers' responses on the open-ended item, the researcher noted an important trend. Although absence seizures and ADHD are both medical disorders, preservice teachers seemed to delineate them according to whether they differed quantitatively or qualitatively from normal behavior. More specifically, they were more likely to perceive inattention stemming from ADHD as being a problem of *degree*, whereas they seemed to perceive inattention stemming from absence seizures as being of a different *type*.

For example, on the ADHD vignette, preservice teachers' most common explanation for the child's presenting episodes of inattention was ADHD. However, the next most common response type reflected that *Jennifer*, the child depicted in the vignette, had a problem that was internal to her but not abnormal per se. For example, preservice teachers provided explanations

such as “she has difficulty paying attention,” “she gets bored easily,” or “she has a hard time focusing.” For an elementary school student, these behaviors are both normal and expected. Therefore, the behavior itself is not problematic, but the degree or amount that the child exhibits the behavior. Given the broader body of literature indicting that teachers tend to attribute problem behaviors to internal sources, or to sources *within* the child, the finding that 17% of preservice teachers in the current study attributed the child’s inattention to external sources was surprising (Ysseldyke et al., 1983). For example, participants provided explanations such as “the assignments are too boring” or “the work is not challenging enough,” which implies that the behavior can be modified through the environment. That a significant number of preservice teachers provided external or environmental explanations was encouraging, since ADHD is usually amenable to environmental intervention. Consistent with the literature, few preservice teachers (1.1%) attributed the child’s behavior to a medical or physiological condition aside from ADHD (Haslam & Valletutti, 2004, p. 5).

On the absence seizure vignettes, in contrast, the majority of preservice teachers (61.7%) attributed the hypothetical child’s episodes of inattention to a seizure disorder. However, preservice teachers’ next most common explanation was that the child’s behavior stemmed from an underlying medical or physiological problem (10.5%). A substantial number of preservice teachers (18.8%) misinterpreted the open-ended item; rather than specifying the best explanation for the child’s presenting episodes of inattention, many preservice teachers listed the details of the vignettes that caused them to rate the child’s behavior as being consistent with a seizure disorder. These responses, serendipitously, were informative. For example, they revealed that preservice teachers were particularly bothered by behaviors that seemed physiological and involuntary (e.g., eyelids flutter, eyes roll back, smacks lips, and head drops) (Williams et al.,

1996). Several preservice teachers' responses suggested that they found it unusual that the child appeared to lose consciousness for a discrete period of time (e.g., up to 30 seconds) (Williams et al., 1996). It is not surprising, then, that only a small minority of preservice teachers (2.7%) attributed the problem behavior to an external source, which is good, since absence seizures are not typically amenable to environmental intervention. Very few preservice teachers incorrectly attributed the child's behavior to ADHD (2%) and even fewer indicated that the child did not have a problem with inattention (0.4%). Taken together, these findings suggest that preservice teachers can differentiate between children presenting with unambiguous cases of ADHD and absence seizures and perceive them as involving different types of inattention.

Question 4

What is the unique contribution of each child characteristic (i.e., levels included in the vignettes) and selected respondent characteristic (i.e., knowledge, experience, efficacy, beliefs, etc.) on preservice teachers' Differentiation Ratings?

Respondent characteristics

Given that the preservice teachers were able to differentiate between unambiguous cases of absence seizures and ADHD, the researcher identified the specific child- and respondent-level characteristics that predicted preservice teachers' *differentiation* ratings (i.e., to what extent they rated that the hypothetical child's behavior was consistent with a seizure disorder and was not consistent with ADHD). Generally speaking, an efficacy expectation refers to having confidence that one can successfully execute a behavior to produce a desired outcome (Bandura, 1977, p. 193). Researchers hypothesize that efficacy, or confidence, affects teachers' decision-making and behavior (Macey, 2005; Reid et al., 1994). Therefore, several types of efficacy were assessed and included as respondent-level characteristics in the current study, and the effect they had on preservice teachers' judgment and decision-making was assessed. Referral efficacy, or preservice

teachers' confidence that they knew how to initiate a referral correctly, had a significant effect on preservice teachers' differentiation ratings. Specifically, it had a negative effect, suggesting that the more referral efficacy a preservice teacher possessed, the worse he or she was at differentiating between the disorders.

The mechanisms underlying this relationship cannot be concluded from the present study. However, a number of plausible hypotheses may be considered. First, recall that efficacy is both context and subject-matter specific and that the appropriate level of specificity for assessing efficacy has not been established (Tschannen-Moran, 1998). For the purposes of the current study, three specific types of efficacy were assessed: (1) efficacy for recognizing ADHD, (2) efficacy for recognizing a seizure disorder, and (3) efficacy for initiating a referral. However, limiting assessment to specific types of efficacy did not preclude other types of efficacy from influencing preservice teachers' ratings. For example, perhaps referral efficacy is related to other types of efficacy, such as personal teaching efficacy. Studies suggest that, among regular education teachers, higher personal teaching efficacy predicts greater willingness to work with students who are experiencing difficulties and a reduced likelihood for initiating a referral (i.e., to special education) (Tschannen-Moran, 1998). Therefore, preservice teachers in the current study with higher referral efficacy may have been more confident that they could effectively teach and manage the hypothetical children depicted in the vignettes, and may have provided lower recognition ratings as a result (i.e., to avoid attributing the behavior to a *within* child problem, which are often perceived as immutable).

When considering the method used to derive differentiation scores, another plausible hypothesis emerges. Recall from the description afforded in the procedures section of chapter two that differentiation scores were derived by subtracting preservice teachers' ratings on item

one, which asked them to indicate to what extent the child's presenting behavior was consistent with ADHD, from their ratings on item two, which asked them to indicate to what extent the child's presenting behavior was consistent with a seizure disorder. Participants who provided the most extreme ratings in the correct direction were assigned the highest differentiation scores. Theoretically, preservice teachers with higher referral efficacy should initiate referrals at higher rates. It is possible that, assuming they were going to refer the child to a practitioner qualified to make a diagnosis, preservice teachers with higher referral efficacy provided more moderate ratings to avoid *labeling* the child's behavior (i.e., they reserved the responsibility of diagnosing the child for the qualified practitioner).

Surprisingly, no other respondent characteristics had a significant effect on preservice teachers' differentiation ratings. Again, preservice teachers' limited variability in responding in the current study (i.e., they tended to provide ratings on the upper-half of the scale) may have undermined the detection of important relationships. It is also possible that, given the restricted nature of the sample (i.e., preservice teachers were deliberately recruited at the same point in their program to control for their training), respondent characteristics may have been too homogenous to reveal certain relationships. Moreover, given that several of the respondent characteristics relied on self-report, variability may have reflected preservice teachers' interpretation of the scale rather than real differences (i.e., theoretically, preservice teachers should have comparable levels of referral self-efficacy, since they have received similar educational experiences and training).

Child characteristics

Although preservice teachers were able to differentiate between extreme cases of absence seizures and ADHD consistently, only one child characteristic significantly affected their differentiation ratings: having received a previous diagnosis of ADHD-PI. More specifically,

having received a previous diagnosis of ADHD-PI had a negative effect on differentiation, meaning that when the characteristic was present in a vignette, preservice teachers provided lower differentiation ratings, or differentiated between the disorders less accurately. This finding suggests that, although preservice teachers were able to recognize and differentiate between unambiguous cases of absence seizures and ADHD, their proficiency declined when the hypothetical children depicted in the vignettes presented with co-morbid disorders. This finding was not surprising given results of previous research, suggesting that teachers tend to *over-identify* and generalize other problematic behaviors to ADHD (Cotugno, 1993; Macey, 2005). That none of the other child characteristics had a significant effect was surprising and may suggest that preservice teachers were attending to the whole picture of the child rather than specific characteristics.

Question 5

What referral decisions do preservice teachers make for students presenting with absence seizures?

The results of the current study suggest that, overwhelmingly, preservice teachers anticipate that they would initiate a referral for a child presenting with absence seizures. The vast majority of preservice teachers (86%) provided ratings on the top half of the scale, suggesting that they anticipated that they would initiate a referral. However, most encouraging was that preservice teachers' mode response was 9, which was the highest possible rating and corresponded to being *extremely likely* to initiate a referral. Of the decisions examined in this study, the researcher considered preservice teachers' referral decision most important. Recognizing and differentiating pediatric disorders, such as absence seizures and ADHD, are important; they facilitate early and accurate diagnosis, which, logically, leads to prevention and early intervention. However, initiating a referral when a child is suspected of having an

underlying medical problem is critical. Trained professionals qualified to make a diagnosis are responsible for assigning a label to the child's behavior (Haslam & Valletutti, 2004). Other adults responsible for the child's well-being, such as parents and teachers, are responsible for alerting those professionals to a potential problem (Haslam & Valletutti, 2004).

Question 6

What is the unique contribution of each child characteristic (i.e., levels included in the vignettes) and selected respondent characteristic (i.e., knowledge, experience, efficacy, beliefs, etc.) on preservice teachers' Referral Ratings?

Respondent characteristics. Since preservice teachers in the current study anticipated that they would initiate a referral for a student presenting with absence seizures, the researcher identified those child- and respondent-level characteristics that predicted their referral ratings. Beliefs about whether it is the teacher's role or responsibility to initiate a referral when he or she suspects that a student has an underlying medical problem, a respondent characteristic included in the current study, was significant. That is, the more a preservice teacher believed that initiating a referral was part of the teacher's responsibility the more he or she anticipated that he or she would initiate a referral. This finding is particularly encouraging. It suggests that even with limited knowledge, experience, and efficacy preservice teachers can still be expected to initiate appropriate referrals assuming that they believe that it is their responsibility.

Mean seizure disorder recognition rating had a significant, positive effect on referral ratings as well. That is, the higher a preservice teacher's mean recognition rating the more he or she anticipated that he or she would initiate a referral. However, modeled as a cross level interaction, preservice teachers' mean recognition ratings depended on frequency of contact with persons with seizure disorders and beliefs about the teacher's role (i.e., whether it is the teacher's responsibility to initiate a referral when he or she suspects that a student has an underlying

medical problem). Frequency of contact with persons with seizure disorders had a positive effect on mean recognition ratings, which may suggest that contact with persons with seizure disorders enhances preservice teachers' ability to recognize absence seizures. Preservice teachers' beliefs about the teacher's role, in contrast, predicted lower mean recognition ratings. That is, the more a preservice teacher believed that initiating a referral is the teacher's responsibility, the lower recognition ratings he or she provided on average. Perhaps, preservice teachers who felt more responsible for initiating referrals provided lower recognition ratings because they were more likely to initiate a referral and reserved the responsibility of labeling the behavior for the person conducting the evaluation. This premise seems consistent with the previous finding that preservice teachers with higher referral-efficacy provided lower differentiation ratings.

Question 7

Do preservice teachers provide different referral ratings for hypothetical children presenting with absence seizures and hypothetical children presenting with ADHD?

Since preservice teachers differentiated between unambiguous cases of absence seizures and ADHD reliably, the researcher examined whether they provided different referral ratings for children presenting with the competing disorders. Results suggest that, while preservice teachers anticipated that they would initiate a referral for a child presenting with either disorder, they anticipated that they would be significantly more likely to initiate a referral for a child presenting with absence seizures. Given previous research suggesting that teachers *over-identify* children with ADHD and *under-identify* children with seizure disorders, the finding that preservice teachers anticipated that they would be more likely to initiate a referral for a student with absence seizures was surprising (Cotugno, 1993; Macey, 2005; Williams et al., 1996).

Several theories may explain why the majority of preservice teachers in the current study anticipated that they would initiate a referral for a child presenting with absence seizures, while

the literature suggests that few teachers participate in the evaluation process for seizure disorders. One plausible hypothesis is that, since the vignettes depicted unambiguous cases of absence seizures, they were much easier to identify than *real life* absence seizures. Perhaps, practicing teachers would initiate referrals for seizure disorders at rates comparable to those anticipated by preservice teachers in the current study if *real life* absence seizures were as easily identifiable. Another viable explanation is that preservice teachers provided what they perceived as the socially desirable response. That is, because they deduced that the researcher had an interest in seizure disorders and a concern for children with undiagnosed seizure disorders, they may have exaggerated their *true* anticipated likelihood of initiating a referral. While it remains unclear to what extent preservice teachers' ratings in the current study generalize to real life situations, that they indicated that they would be likely to initiate a referral is encouraging. It may suggest that, at least on some level, they believe that initiating a referral for a student suspected of having a seizure disorder is the appropriate thing to do.

Practical Implications

The results of this study have several important implications for practice. For example, although formal instruction on seizure disorders did not improve seizure disorder-related knowledge in the current study, the literature suggests that formal instruction is an effective and efficient mechanism for transmitting knowledge to teachers (Bishop & Boag, 2006; Macey, 2005; Sciutto et al., 2000). Therefore, the finding that only 10% of preservice teachers in the current study had received formal instruction on seizure disorders is disconcerting. While seizure disorder-related knowledge did not predict preservice teachers' recognition, differentiation, or referral ratings in the current study, theoretically, knowledge informs practice (Ghanizadeh et al., 2006; Glass, 2000). To ensure that preservice teachers possess sufficient knowledge, which will allow them to engage in best practices, more formal instruction designed to convey specific,

important information about seizure disorders should be incorporated into preservice teacher preparation programs (Bishop & Boag, 2006; Sciutto & Feldhamer, 2007). Whenever possible, the instruction should focus on practical skills the teacher will be expected to display, such as recognizing a disorder, initiating an appropriate referral, and managing children's behavior in the classroom. To ensure that preservice teachers master the material, instructors can formally assess their knowledge with tests. This type of direct, objective feedback may allow preservice teachers to form more accurate appraisals of their level of knowledge.

Although the literature suggests that teachers often misidentify a range of pediatric disorders for ADHD, the preservice teachers in the current study were able to recognize unambiguous cases of absence seizures and differentiate them from unambiguous cases of ADHD reliably (Cotugno, 1993; Macey, 2005). However, their proficiency declined when the hypothetical children presented with co-morbid disorders (i.e., they presented with absence seizures, yet their cumulative record indicated that they had received a medical diagnosis of ADHD-PI). The finding that preservice teachers were less likely to recognize absence seizures in children with ADHD-PI is discouraging, given that children with ADHD-PI are at increased risk for developing absence seizures. Moreover, only roughly half of preservice teachers reported having received formal instruction on ADHD, which is surprising considering the prevalence of the disorder and the attention it has received in popular literature and the media. Clearly, more formal instruction on ADHD is warranted.

However, while knowledge is theorized to inform better, more educated decision-making (Ghanizadeh et al., 2006; Glass, 2000), recall that greater ADHD-related knowledge predicted poorer recognition of absence seizures in the current study. This finding may suggest that a great deal of the ADHD-related information being transmitted to teachers via formal instruction is

superfluous (i.e., it will have little constructive effect on their practice). For example, as evidenced by preservice teachers' performance on the symptoms and diagnosis subscale of the KADDS, formal instruction on ADHD usually includes a discussion on symptoms and diagnosis. However, out of context, this information may do little to help teachers accurately recognize ADHD in real life. Recognizing ADHD, or any other pediatric disorder, may depend more on exposure to individuals with the disorder than formal instruction. This highlights the importance of including practicum experiences as part of preservice teachers' preparation training (Macey, 2005). For teachers, knowledge of ADHD encompasses knowing how to effectively teach and manage children with the disorder. Clearly, principles of teaching and behavioral management can be conveyed via formal instruction; however, again, practicum experiences may afford preservice teachers the opportunity to master and hone these important skills (Macey, 2005).

While ADHD is generally amenable to environmental intervention, successful treatment frequently calls for stimulant medication, which requires a formal medical diagnosis. Formal instruction, then, should emphasize the role that teachers can play in the diagnostic process by recognizing ADHD, initiating appropriate referrals, and by providing important, accurate information to practitioners (Sciutto & Feldhamer, 2007). To facilitate teachers' ability to recognize ADHD and initiate appropriate referrals, formal instruction should move beyond understanding ADHD as a discrete disorder and should elucidate similarities and differences among ADHD and other commonly occurring, often co-morbid pediatric disorders. Preservice teachers must understand that pediatric disorders are not mutually exclusive, and should be taught to explore numerous causes for children' attention difficulties. Therefore, perhaps formal instruction on ADHD provided to preservice teachers in preservice teacher preparation programs should prioritize conveying practical skills over scholastic-type knowledge?

Of the constructs assessed, the researcher considered preservice teachers' referral decision most important. Medical disorders, such as absence seizures and ADHD, affect children in a variety of ways, especially at school. Fortunately, with early and accurate diagnosis, the long-term sequelae of many pediatric disorders can be redirected and, in the best of cases, prevented entirely. Teachers are often in the best position to recognize deviations in behavior due to both their understanding of what is developmentally normal and the sheer amount of time they spend with students (Gresham, 2004; Sciotto et al., 2000). Therefore, teachers should be encouraged to participate actively in the diagnostic and evaluation process, namely, by initiating appropriate referrals (Haslam & Valletutti, 2004). Preservice teachers in the current study anticipated that they would initiate a referral for a student presenting with absence seizures, which is encouraging, given that the literature implies that, by and large, teachers do not participate in the diagnostic and evaluation process. Although the results of the current study are hypothetical (i.e., whether preservice teachers would actually initiate a referral remains unknown), they may suggest that preservice teachers believe that initiating a referral is the appropriate thing to do.

Perhaps the most encouraging finding in the current study is that beliefs about the teacher's role or responsibility (i.e., to initiate a referral when he or she suspects that a student has an underlying medical problem) predicted referral ratings. This finding suggests that even with limited knowledge, experience, and efficacy, preservice teachers can still be expected to initiate appropriate referrals assuming they believe that it is their responsibility. Therefore, if increasing teachers' referral likelihood is the ultimate goal, then preservice teacher preparation programs should allocate more time to clarifying the teacher's role and responsibilities. Principally, the instruction could emphasize the benefits of accurate medical diagnoses and provide preservice teachers with guidelines for initiating appropriate referrals. However, the instruction could also

outline steps that preservice teachers can take when a student's presenting behaviors seem inconsistent with an existing diagnosis (e.g., the child has received a diagnosis of ADHD-PI but seems to lose consciousness during his or her episodes of inattention). Finally, the instruction could inform preservice teachers that, even when a student is exhibiting behaviors that are consistent with an existing diagnosis and those behaviors are interfering with his or her functioning at school, it may still be appropriate for a teacher to initiate a referral, given that the student's treatment regimen may not be working effectively. Often, the teacher is in the best position to note the effectiveness of treatment, especially for subtle behaviors like inattention.

An important, unexpected trend that emerged in the current study is that the more a preservice teacher anticipated that he or she would initiate a referral, the less likely he or she was to label the child's behavior. Theoretically, referral efficacy and beliefs about the teacher's role/responsibility to initiate a referral are positively associated with referral likelihood. Surprisingly, preservice teachers in the current study possessing *higher* referral efficacy and *stronger* beliefs about the teacher's role/responsibility provided lower, less extreme recognition ratings. Therefore, it seems that the more they anticipated initiating a referral, the less likely they were to conclude that the child depicted in the vignette possessed a seizure disorder. Given teachers' job function and training (i.e., they are not responsible for or qualified to make a medical diagnosis), this tendency is sensible. They, presumably, reserved the responsibility of labeling the child's behavior for a professional qualified to make a diagnosis. That preservice teachers understand that they can facilitate an accurate diagnosis (i.e., by initiating appropriate referrals and providing professionals with important information) but that they do not have the authority to suggest or imply diagnoses is critical. To avoid over-stepping this important boundary, preservice teachers should be taught to integrate information about the child's

presenting behavior into a written report that describes the presenting concerns in detail and in behavioral terms. The report can then be provided a professional who is qualified to interpret the information and to assign a label to the behaviors (e.g., ADHD or seizures).

Limitations

While this study contributed to the existing literature, a number of important limitations must be considered. First, recruiting preservice teachers from the UEP may have limited the generalizability of the findings, since, unlike most preservice teacher preparation programs, the UEP prepares preservice teachers to work in elementary education and with students with mild disabilities. Therefore, results may not generalize to preservice teachers in different preparation programs or to preservice teachers in general.

Additionally, for the purposes of the current study, all preservice teachers were recruited at the same point in their program. While restricting the sample eliminated the need to control for numerous variables relating to participants' training and experience, it also limited the generalizability of the findings. That is, results of the current study only apply to preservice teachers in their eighth semester of the UEP, or to preservice teachers graduating with their B.A.E.

Restricting the sample may have had other unintended consequences as well. For example, the homogeneity of the sample may explain why several respondent characteristics demonstrated to affect decision-making did not have a significant effect in the current study. That is, by receiving roughly the same instruction, participants demonstrated little variability on respondent characteristics, which may have diluted the strength of the relationships measured between the respondent characteristics and the dependent variables.

Given that the sample of participants was predominately female and White/Causasion, the results mat not generalize to male preservice teachers or preservice teachers of other ethnicities.

Notably, however, most teachers are White and Caucasian; thus, the results are generalizable to the general teaching population. Additionally, given the relatively large number of child- and respondent- level characteristics being investigated in the current study and that effect sizes were smaller than expected, a larger sample size may have revealed more relationships by increasing statistical power and reducing the chances of a Type II error.

Participants' ratings on the vignette instrument were based on descriptions of hypothetical children rather than actual children. Although the factorial survey research design is posited to have good external validity, in that participants' decisions closely resemble those in daily life, whether participants would have made the same decisions in real life scenarios remains unknown.

To control for extraneous factors, many child characteristics were identical across the vignettes or were held constant. For example, among a number of other variables, participants were informed that all of the hypothetical children were female and in the third grade. As a result, preservice teachers' decisions in the current study can only be generalized to children with similar characteristics.

For the purposes of the current study, three specific types of efficacy were assessed: (1) efficacy for recognizing ADHD, (2) efficacy for recognizing a seizure disorder, and (3) efficacy for initiating a referral. Unfortunately, no standard exists clarifying the appropriate level of specificity for assessing efficacy. The results of the current study may suggest that other, broader types of efficacy that were not included as independent variables were influencing preservice teachers' ratings.

A significant number of preservice teachers failed to respond to or misunderstood the open-ended item on the vignette instrument. While missing data did not cause significant

nonresponse error (i.e., the respondents that did not respond to the item did not differ significantly from the respondents who did respond to the item on one or more important variables), participants' misinterpretation of the question did result in significant measurement error (i.e., respondents' answers could not be compared in any useful way) (Dillman, 2000).

For the purposes of the current study, the researcher designed the vignette instrument so that the words *seizure disorder* appeared in a question stem of item two. Clearly, this may have enhanced preservice teachers' performance on item three, which was the open-ended item asking them to specify the best explanation for the child's presenting episodes on inattention. Therefore, the finding that the majority of preservice teachers correctly specified that a seizure disorder was the best explanation for the child's presenting episodes of inattention may not generalize to vignettes that do not contain this type of cue or to real life situations.

A final limitation relating to the vignette instrument was that the vignettes depicted unambiguous, or extreme, cases of ADHD and absence seizures (i.e., many indicators were present in each of the vignettes). In real life children commonly display some but not all indicators of a disorder. Therefore, recognizing absence seizures on the vignette instrument was, in all likelihood, much easier than recognizing absence seizures in real life. As a result, preservice teachers' decisions in the current study may not generalize to real life situations, or to situations in which they are provided with incomplete or ambiguous information.

Implications for Future Research

The results of the current study suggest that both child- and respondent- level variables affect preservice teachers' ability to recognize absence seizures and differentiate them from ADHD, and, surprisingly, that only respondent-level characteristics affect their anticipated referral likelihood. Additional exploration of these relationships should be conducted to provide further support of these relationships. Several studies suggest that child demographic variables,

such as gender and SES, affect teachers' decisions (e.g., their decision to initiate a referral for special education) (Podell & Soodak, 1993; Tschannen-Moran, 1998). Therefore, to extend the current study, child demographic variables may be included as child-level independent variables.

Since relationships between respondent characteristics and outcome decisions may have been diluted due to the homogeneity of the sample, the study could be replicated using a more diverse, representative sample (e.g., by recruiting preservice teachers at all stages of training). This would have the added benefit of improving the generalizability of the findings. Additionally, given the importance that all teachers (i.e., preservice and practicing) are prepared to recognize pediatric disorders and initiate appropriate referrals, it may be interesting to replicate the study using practicing teachers. A positive consequence of using practicing teachers is that it would, without doubt, lead to greater variability in respondent characteristics (i.e., knowledge, experience, and efficacy). Perhaps, more relationships between respondent variables and outcome decisions would emerge as a result.

Clearly, for a number of reasons, the results of the current investigation may not generalize to real life situations. It may be interesting, then, to explore whether preservice and practicing teachers recognize, differentiate, and initiate appropriate referrals for actual students with seizure disorders. Additionally, while the literature suggests that teachers do not initiate referrals for students presenting with absence seizures, this supposition has not been investigated directly or substantiated by data. Identifying how often teachers initiate referrals for students presenting with seizure disorders and to what extent they participate in the diagnostic and evaluation process may be extremely informative. Finally, while the literature suggests that misdiagnosis of absence seizures for ADHD is a common occurrence, estimates of the incidence are not readily available.

Surprisingly, although preservice teachers in the current study were able to differentiate reliably between unambiguous cases of absence seizures and ADHD, only one child-characteristic, previous diagnosis of ADHD-PI, had a significant effect on differentiation. This may suggest that preservice teachers were attending to the whole picture of the child rather than specific child characteristics. Temperament, which “concerns the *way* (author’s emphasis) in which an individual behaves,” may explain this tendency (Thomas & Chess, 1977), especially the sensing-intuitive continuum. Individuals who prefer sensing focus mainly on the five senses. Individuals who prefer intuition, in contrast, focus on patterns or interrelationships (Myers & McCaulley, 1985). These preferences affect both *what* individuals attend to and *how* they perceive (Myers & McCaulley, 1985). Preservice teachers in the current study seemed to prefer intuition, or to focus on the big picture. Since preservice teachers’ temperament may have influenced their outcome decisions, it may be interesting to extend the study by including temperament as a respondent-level characteristic.

Research suggests that efficacy, or confidence that one can successfully execute a behavior to produce a desired outcome, influences teachers’ decision-making and behavior (Macey, 2005; Reid et al., 1994). Researchers have yet to determine the appropriate level of specificity for measuring efficacy and, as a result, researchers wishing to investigate efficacy must rely on their judgment (Tschannen-Moran, 1998). For the purposes of the current study, three specific types of efficacy were assessed: (1) efficacy for recognizing ADHD, (2) efficacy for recognizing a seizure disorder, and (3) efficacy for initiating a referral. However, limiting assessment to specific types of efficacy did not preclude other types of efficacy from influencing preservice teachers’ decisions. For future extensions and replications of this study, it may be interesting to assess additional types of efficacy, such as personal teaching efficacy or efficacy for classroom

management. Assessing broader types of efficacy provides the researcher with the added benefit of being able to utilize existing efficacy measures.

Preservice teachers demonstrated limited variability in responding on the dependent variables in the current study. Specifically, they tended to provide ratings on the upper-end of the Likert-type scales. Given that the goal was to detect variability in responding, this tendency may suggest that the vignettes were too easy. Since this study represented the first systematic attempt to learn about preservice teachers and absence seizures, all of the vignettes depicted unambiguous, or extreme, cases of absence seizures and ADHD (i.e., many indicators were present in each of the vignettes). However, upon subsequent administrations of the vignette instrument, it may be beneficial to include a null level for each dimension. The null level would cause the dimension to be left blank in some vignettes, or stated differently, would systematically create incomplete vignettes. The incomplete vignettes should mirror real-life absence seizures more closely and, because they would be more difficult, should increase variability in responding. This would also allow the researcher to ascertain the effect of a dimension on a decision of interest.

A significant number of preservice teachers failed to respond to or misinterpreted the open-ended item on the vignette instrument. To enhance participants' comprehension of the question and their motivation for completing the item, the open-ended item could be moved to the beginning of the vignette instrument (Dillman, 2000). The item may also be transformed into a closed-ended item (Dillman, 2000). The response categories used for the closed-ended item could be based on the results of this preliminary study (Dillman, 2000).

Finally, the study could be replicated using participants other than current and future teachers. For example, teachers often refer students suspected of having problems with

inattention to the school psychologist. School psychologists receive little, if any, instruction on the recognition of neurological disorders. In general, they tend to have time-limited interactions with students, which is particularly problematic for recognizing episodic disorders like epilepsy. Taken together, these facts may suggest that school psychologists are unprepared to recognize pediatric disorders and to display good decision-making by initiating an appropriate referral (Wodrich et al., 2006).

APPENDIX A
INSTRUCTOR INVITATION LETTER

Dear PROTEACH Instructor,

My name is Nicole Nasewicz and I am a doctoral candidate in school psychology at the University of Florida. As part of my graduate research, I would like to invite your PROTEACH students to participate in a research study that I am conducting, exploring whether preservice teachers can differentiate between qualitatively different forms of inattention. The study will also explore whether case characteristics or respondent characteristics predict classification accuracy.

Participating students will be asked to complete a couple of questionnaires. First, they will be asked to read six vignettes about hypothetical children. After reading each vignette, they will be asked to respond to a series of questions about the child presented. Second, they will be asked to complete a questionnaire that will provide me with information about their background and experiences (for example, whether they have completed a formal internship). These questionnaires should take 20 minutes or less to complete.

I am inviting all PROTEACH preservice teachers in your class to participate; they were selected to participate in this study based on their status as PROTEACH preservice teachers. There is no risk to your students. They are free to withdraw their permission for participation at any time without consequence. Each participating student will be assigned a confidential number. Their names will not be revealed to anyone, with the exception of my advisor and I, or appear in any written work.

If you give your permission for me to collect data from your students, please email me at nicolecn@ufl.edu to discuss logistics (i.e., what day and time to come to your class). Also, please complete the bottom half of this form and mail it to me, Nicole Nasewicz, at 3724 NW 26th st Gainesville, Fl 32605. If you have any questions, please do not hesitate to contact me at (941)545-8812 or by email at nicolecn@ufl.edu, or to contact my supervisor, Tina Smith-Bonahue, at (352)392-0273. Questions or concerns about human participants' rights may be directed to the University of Florida Institutional Review Board (UFIRB) office at PO Box 112250 Gainesville, Fl 32611 or (352)392-0433.

Thank you in advance for your support.

Sincerely,
Nicole Nasewicz

Please read the above description and return the bottom portion

I, _____, give the researcher permission to collect data on preservice teachers in my class.

Phone:

Email:

Do you prefer that I contact you through email or by telephone?

At what location is your PROTEACH seminar held? _____

On what days and time is your PROTEACH seminar held? _____

APPENDIX B INFORMED CONSENT

Protocol Title: Can Preservice Teachers Differentiate Attention Deficit Hyperactivity Disorder from Seizure Disorders?

Please read this consent document carefully before you decide to participate in this study.

Purpose of the research study:

The purpose of this study is to assess whether preservice teachers differentiate Attention Deficit Hyperactivity Disorder from Seizure Disorders, and to explore the factors that affect their decision to make a referral. This information can be used in future research, and for making recommendations for programmatic changes to preservice teacher preparation programs.

What you will be asked to do in the study:

If you participate in this study, you will be asked to complete several instruments. You will be asked to answer questions that correspond to vignettes about hypothetical children, to complete an instrument pertaining to ADHD and an instrument pertaining to epilepsy, and to complete a teacher information survey.

Time required:

40 minutes

Risks and Benefits:

This study involves very few discomforts or risks. You will be asked to answer questions that require some thinking. Some of the questions may be challenging for you to answer or you may have emotional feelings towards some of the questions.

You will not necessarily benefit directly by participating in this experiment.

Compensation:

No compensation is offered for participation in this study.

Confidentiality:

Your confidentiality will be kept confidential to the extent provided by law. You will not be asked to put your name anywhere on the study materials. Therefore, your name will not, and cannot, be linked to any of your responses. Your name will not be used in any report.

Voluntary participation:

Your participation in this study is completely voluntary. There is no penalty for not participating.

Right to withdraw from the study:

You have the right to withdraw from the study at anytime without consequence.

Whom to contact if you have questions about the study:

Nicole Nasewicz, B.S., Graduate Student, Department of Educational Psychology, 1403 Norman Hall, P.O. Box 117047, Gainesville, FL 32611 (352) 334-1713

Tina Smith-Bonahue, Ph.D., Associate Professor, Department of Educational Psychology, 1403 Norman Hall, P.O. Box 117047, Gainesville, FL 32611 (352) 334-1713

Whom to contact about your rights as a research participant in the study:

UFIRB Office, Box 112250, University of Florida, Gainesville, FL 32611-2250; ph 392-0433.

Agreement:

I have read the procedure described above. I voluntarily agree to participate in the procedure and I have received a copy of this description.

Participant: _____ Date: _____

Principal Investigator: _____ Date: _____

APPENDIX C
SAMPLE VIGNETTE INSTRUMENT

Research Vignettes

Assume you are an elementary school teacher in a medium-sized school district. The school is located in a lower-middle class neighborhood and has approximately 500 students in Kindergarten through grade five.

You will be asked to answer questions about case descriptions that briefly describe six children. For each case, you should assume that you are the child's teacher and that it is the end of the third nine-week grading period.

Each of the six children has certain characteristics in common. They are all Caucasian females in the third grade. Academically, they are struggling and are described as absent-minded, sluggish, and day-dreamy. Specifically, each of the children has difficulty, to some extent, paying attention, concentrating, remembering daily activities, listening when spoken to, and following through on instructions in class. Recently, each of the children were referred to and evaluated by the child-study team at your school. None of them met educational criteria for Specific Learning Disability (SLD); both their general cognitive ability and academic achievement fell within age and grade level expectations.

Please read each case and answer the questions based on the information presented. Each case has the same basic structure, but the details will vary. Please consider each child separately. Remember to respond to the questions from the perspective of a teacher, not an intern.

Jennifer

Jennifer experiences predictable episodes of inattention that occur, on average, several times a day. The episodes occur in many academic situations, especially those that require sustained attention and concentration. Typically, the episodes begin gradually; she first grows bored or uninterested in the assignment or task at hand. During the episodes, she stares blankly and fidgets in her seat. The episodes last, in general, until something interesting happens. Notably, Jennifer responds reliably to redirection and startles easily. After the episodes, she is alert, but she is reluctant to resume the assignment or task and tends to procrastinate.

Regarding her schoolwork, Jennifer is distracted easily by extraneous stimuli and, as a result, is almost always off-task. She seldom completes her homework assignments. Her cumulative record documents a pervasive and longstanding history of attention and concentration problems. A behavioral rating scale, completed by one of her parents for her most recent school-based evaluation, suggests that her inattention falls in the severe, or clinically significant, classification range

Remembering the attributes common to all the children (i.e., Caucasian female, absent-minded, sluggish, day-dreamy, etc.), that it is the end of the third 9-week grading period, and that you are the child's teacher, please provide your professional judgment about the child described above by responding to the following questions. For items one, two, and four, please use the corresponding rating scales by circling the appropriate number for each item.

1. To what extent is this child's behavior consistent with Attention Deficit Hyperactivity Disorder (ADHD)?

<i>Definitely Not ADHD</i>										<i>Definitely ADHD</i>
1	2	3	4	5	6	7	8	9		

2. To what extent is this child's behavior consistent with a seizure disorder?

<i>Definitely Not a Seizure Disorder</i>										<i>Definitely a Seizure Disorder</i>
1	2	3	4	5	6	7	8	9		

3. What is the best explanation for this child's presenting episodes of inattention?

4. How likely are you to make a referral for this child?

<i>Not At All Likely</i>										<i>Extremely Likely</i>
1	2	3	4	5	6	7	8	9		

Katie

Katie experiences occasional episodes of inattention that occur, on average, several times a week. The episodes occur most in academically challenging situations. Typically, the episodes begin gradually; she grows uninterested in the task and will gaze around the room. During the episodes, she stares blankly and taps her foot repetitively on the floor. The episodes last, in general, until something interesting happens. Notably, Katie responds reliably to redirection. After the episodes, she is alert, but she will avoid resuming the assignment or task.

Regarding her schoolwork, Katie is often off-task. She sometimes completes her homework assignments. Her cumulative record indicates that she began to experience problems with attention and concentration in the second grade, around the same time she began to struggle academically. A behavioral rating scale, completed by one of her parents for her most recent school-based evaluation, suggests that her inattention falls in the moderate, or at-risk, classification range.

Remembering the attributes common to all the children (i.e., Caucasian female, absent-minded, sluggish, day-dreamy, etc.), that it is the end of the third 9-week grading period, and that you are the child’s teacher, please provide your professional judgment about the child described above by responding to the following questions. For items one, two, and four, please use the corresponding rating scales by circling the appropriate number for each item.

1. To what extent is this child’s behavior consistent with Attention Deficit Hyperactivity Disorder (ADHD)?

Definitely Not ADHD 1 2 3 4 5 6 7 8 *Definitely ADHD* 9

2. To what extent is this child’s behavior consistent with a seizure disorder?

Definitely Not a Seizure Disorder 1 2 3 4 5 6 7 8 *Definitely a Seizure Disorder* 9

3. What is the best explanation for this child’s presenting episodes of inattention?

4. How likely are you to make a referral for this child?

Not At All Likely 1 2 3 4 5 6 7 8 *Extremely Likely* 9

Anne

Anne experiences regular episodes of inattention that occur, in general, on most days. The episodes occur most when she is tired and while completing tasks that are monotonous. Typically, the episodes begin abruptly; she will grow sluggish and begin to mumble or slur her words. During the episodes, she stares blankly. The episodes last up to one minute and usually end abruptly. Notably, Anne responds to redirection but only after loud and repeated attempts. After the episodes, she is alert, and she usually indicates that the task is boring or that she is tired.

Regarding her schoolwork, Anne is sometimes off-task. She usually completes her homework assignments. Her cumulative record does not provide any indication that she has had difficulty with attention or concentration in the past. A behavioral rating scale, completed by one of her parents for her most recent school-based evaluation, suggests that her inattention falls in the moderate, or at-risk, classification range.

Remembering the attributes common to all the children (i.e., Caucasian female, absent-minded, sluggish, day-dreamy, etc.), that it is the end of the third 9-week grading period, and that you are the child's teacher, please provide your professional judgment about the child described above by responding to the following questions. For items one, two, and four, please use the corresponding rating scales by circling the appropriate number for each item.

1. To what extent is this child's behavior consistent with Attention Deficit Hyperactivity Disorder (ADHD)?

<i>Definitely Not ADHD</i>									<i>Definitely ADHD</i>
1	2	3	4	5	6	7	8	9	

2. To what extent is this child's behavior consistent with a seizure disorder?

<i>Definitely Not a Seizure Disorder</i>									<i>Definitely a Seizure Disorder</i>
1	2	3	4	5	6	7	8	9	

3. What is the best explanation for this child's presenting episodes of inattention?

4. How likely are you to make a referral for this child?

<i>Not At All Likely</i>									<i>Extremely Likely</i>
1	2	3	4	5	6	7	8	9	

Julie

Julie experiences frequent episodes of inattention that occur, on average, 10 to 12 times a day. The episodes occur most during physical activity. Typically, the episodes begin abruptly; she stops talking suddenly, mid-sentence. During the episodes, Julie stares blankly and her eyes role upward. The episodes end abruptly and last, on average, up to 30 seconds. Notably, Julie does not respond reliably to physical redirection. After the episodes, she is alert, but she has no recollection of what happened during the elapsed time.

Regarding her schoolwork, Julie is seldom off-task while completing assignments and activities. Her cumulative record documents a pattern of problems with inattention that began suddenly in the first grade. A behavioral rating scale, completed by one of her parents for her most recent school-based evaluation, suggests that her inattention falls in the normal, or average, classification range.

Remembering the attributes common to all the children (i.e., Caucasian female, absent-minded, sluggish, day-dreamy, etc.), that it is the end of the third 9-week grading period, and that you are the child's teacher, please provide your professional judgment about the child described above by responding to the following questions. For items one, two, and four, please use the corresponding rating scales by circling the appropriate number for each item.

1. To what extent is this child's behavior consistent with Attention Deficit Hyperactivity Disorder (ADHD)?

<i>Definitely Not ADHD</i>									<i>Definitely ADHD</i>
1	2	3	4	5	6	7	8	9	

2. To what extent is this child's behavior consistent with a seizure disorder?

<i>Definitely Not a Seizure Disorder</i>									<i>Definitely a Seizure Disorder</i>
1	2	3	4	5	6	7	8	9	

3. What is the best explanation for this child's presenting episodes of inattention?

4. How likely are you to make a referral for this child?

<i>Not At All Likely</i>									<i>Extremely Likely</i>
1	2	3	4	5	6	7	8	9	

Kelly

Kelly experiences consecutive episodes of inattention that occur, seemingly, continuously throughout the day. The episodes occur in all situations, even during play. Typically, the episodes begin abruptly; she stops walking suddenly, standing nearly motionless. During the episodes, Kelly stares blankly and her eyelids flutter. The episodes end abruptly and last, on average, up to one minute. Notably, Kelly does not respond reliably to physical redirection. After the episodes, she is alert, but she has no recollection of what happened during the elapsed time.

Regarding her schoolwork, Kelly is seldom off-task while completing assignments and activities. Her cumulative record documents that she has received a medical diagnosis of ADHD-Primarily Inattentive Subtype. A behavioral rating scale, completed by one of her parents for her most recent school-based evaluation, suggests that her inattention falls in the moderate, or at-risk, classification range.

Remembering the attributes common to all the children (i.e., Caucasian female, absent-minded, sluggish, day-dreamy, etc.), that it is the end of the third 9-week grading period, and that you are the child's teacher, please provide your professional judgment about the child described above by responding to the following questions. For items one, two, and four, please use the corresponding rating scales by circling the appropriate number for each item.

1. To what extent is this child's behavior consistent with Attention Deficit Hyperactivity Disorder (ADHD)?

<i>Definitely Not ADHD</i>									<i>Definitely ADHD</i>
1	2	3	4	5	6	7	8	9	

2. To what extent is this child's behavior consistent with a seizure disorder?

<i>Definitely Not a Seizure Disorder</i>									<i>Definitely a Seizure Disorder</i>
1	2	3	4	5	6	7	8	9	

3. What is the best explanation for this child's presenting episodes of inattention?

4. How likely are you to make a referral for this child?

<i>Not At All Likely</i>									<i>Extremely Likely</i>
1	2	3	4	5	6	7	8	9	

Tracy

Tracy experiences frequent episodes of inattention that occur, on average, 10 to 12 times a day. The episodes occur in all situations, even during play. Typically, the episodes begin abruptly; she stops walking suddenly, standing nearly motionless. During the episodes, Tracy stares blankly and her head drops slightly. The episodes end abruptly and last, on average, up to one minute. Notably, Tracy does not respond reliably to physical redirection. After the episodes, she is alert, but she has no recollection of what happened during the elapsed time.

Regarding her schoolwork, Tracy is seldom off-task while completing assignments and activities. Her cumulative record provides no indication that she has had difficulty with attention or concentration in the past. A behavioral rating scale, completed by one of her parents for her most recent school-based evaluation, suggests that her inattention falls in the moderate, or at-risk, classification range.

Remembering the attributes common to all the children (i.e., Caucasian female, absent-minded, sluggish, day-dreamy, etc.), that it is the end of the third 9-week grading period, and that you are the child's teacher, please provide your professional judgment about the child described above by responding to the following questions. For items one, two, and four, please use the corresponding rating scales by circling the appropriate number for each item.

1. To what extent is this child's behavior consistent with Attention Deficit Hyperactivity Disorder (ADHD)?

<i>Definitely Not ADHD</i>									<i>Definitely ADHD</i>
1	2	3	4	5	6	7	8	9	

2. To what extent is this child's behavior consistent with a seizure disorder?

<i>Definitely Not a Seizure Disorder</i>									<i>Definitely a Seizure Disorder</i>
1	2	3	4	5	6	7	8	9	

3. What is the best explanation for this child's presenting episodes of inattention?

4. How likely are you to refer this child for an evaluation?

<i>Not At All Likely</i>									<i>Extremely Likely</i>
1	2	3	4	5	6	7	8	9	

APPENDIX D
PROTEACH DEMOGRAPHIC INFORMATION SURVEY

1. **What is your age?** _____

2. **What is your sex? (check one)**
____ Female
____ Male

3. **What is your ethnicity? (check one)**
____ Non-Hispanic, White
____ African American
____ Hispanic
____ Asian
____ Multiracial
____ Other (please specify) _____

4. **Which best describes the setting in which you intend to teach? (check one)**
____ Regular Education
____ Special Education

5. **Which best describes the degree and certification you are seeking? (check one)**
____ Bachelor's Degree – No certification
____ Master's Degree - Single Certification
____ Master's Degree- Dual Certification

6. **Have you received formal instruction on ADHD (e.g., coursework, in-service, seminar, etc.)? (check one)**
____ Yes (please describe) _____
____ No

7. **Have you received formal instruction on seizure disorders (e.g., coursework, in-service, seminar, etc.)? (check one)**
____ Yes (please describe) _____
____ No

8. **Have you received formal instruction on how to initiate a referral (check one)**
____ Yes (please describe) _____
____ No

9. **Please rate your general knowledge of ADHD:**

No Knowledge

1

2

3

4

5

6

Extensive Knowledge

10. How would you describe your frequency of contact with persons with ADHD?

Very Infrequent 1 2 3 4 5 *Very Frequent*
6

11. How confident are you that you can accurately identify ADHD?

Not at all 1 2 3 4 5 *Extremely*
Confident 6

12. Please rate your general knowledge of seizure disorders:

No Knowledge 1 2 3 4 5 *Extensive Knowledge*
6

13. How would you describe your frequency of contact with persons with a seizure disorder?

Very Infrequent 1 2 3 4 5 *Very Frequent*
6

14. How confident are you that you can accurately identify a seizure disorder?

Not at all 1 2 3 4 5 *Extremely*
Confident 6

15. How confident are you that you know how to initiate a referral correctly?

Not at all 1 2 3 4 5 *Extremely*
Confident 6

16. To what extent do you believe that it is a teacher's role or responsibility to initiate a referral when a student is suspected of having an underlying medical disorder?

Definitely not 1 2 3 4 5 *Definitely*
Responsibility 6

Thank you for participating!!!

APPENDIX E
UNIFIED ELEMENTARY PROTEACH PROGRAM CORE REQUIREMENTS

Table E-1. Unified Elementary Program (UEP) core curriculum and field experiences

Semester	Course prefix	Course title	Field component
5 Fall 2006	EDF 3115	Child Development for Inclusive Education	Mentoring
	EEX 3070	Teachers and Learners in Inclusive Schools	
	SDS 3430	Family and Community Involvement in Education	
	LAE 3005	Children's Literature in Childhood Education	
6 Spring 2007	EEX 3257	Core Teaching Strategies	Integrated into EEX 3257, EEC 3706, and EEX 3616
	EEX 3616	Core Classroom Management Strategies	
	RED 3307	Teaching Reading in the Primary Grades	
	LAE 4314	Language Arts for Diverse Learners	
7 Fall 2007	SCE 4310	Elementary Science Methods for the Inclusive Classroom	Placement integrating Math/Science/Technology experience; Placement for TSL 3526
	MAE 4310	Teaching Mathematics in the Inclusive Elementary Classroom	
	TSL 3526	ESOL: Language and Culture	
	EME 4401	Integrating Technology in the Classroom	
8 Spring 2008	RED 4324	Reading Intermediate Grades	EDE 4942 (Monday – Friday, 7:30 to 11:30)
	EEX 4905	Integrated Teaching Seminar	
	SSE 4312	Social Studies for Diverse Learners	
	EDE 4942	Integrated Teaching in Elementary Education	

Note. Students have already fulfilled four semesters, or 60 credit hours, of general undergraduate coursework.

APPENDIX F
INSTRUCTION ON ADHD AND ABSENCE SEIZURES

Table F-1. Instruction on ADHD and seizure disorders provided in Unified Elementary Program (UEP) core courses

Course			
Prefix	Title	Instructor description	Test items
EDF 3115	Child Development for Inclusive Education	Discuss accommodations for students with ADHD No discussion on seizure disorders	ADHD: 1 case study pertaining to accommodations SD: none
EEX 3070	Teachers and Learners in Inclusive Schools	Special Education law is covered. ADHD is included in discussion. Seizure disorders are not discussed specifically	None
EEX 3257	Core Teaching Strategies	ADHD nor seizure disorders are discussed specifically	None
EEX 3616	Core Classroom Management Strategies	Neither ADHD nor seizure disorders are discussed specifically Classroom management techniques for students demonstrating behaviors consistent with ADHD (e.g., impulsivity and hyperactivity) are discussed.	None
HSC 3301	Health Science Education in Elementary	ADHD is not discussed in great length	None

Note. SD = seizure disorder. HSC 3301, Health Science Education in Elementary, is not a core course in the UEP. Instead, the course was included because, traditionally, health conditions, such as seizure disorders, are covered. Chart may not include all instruction preservice teachers received on ADHD and seizure disorders, since some instructors failed to respond to the researcher via email.

APPENDIX G
COGNITIVE INTERVIEWS INFORMED CONSENT

Protocol Title: Assessing Preservice Teachers' Accuracy at Differentiating Between Qualitatively Different Forms of Inattention

Please read this consent document carefully before you decide to participate in this study.

Purpose of the research study:

The purpose of this study is to assess sources of response error in a questionnaire measuring preservice teachers' ability to differentiate between qualitatively different forms of inattention. More specifically, the questionnaire will provide the researchers with information about preservice teachers' accuracy at classifying students with Attention Deficit Hyperactivity Disorder-Primarily Inattentive Subtype and the factors that affect their decision to make a medical referral. This information can be used in future research, and eventually, can be used to facilitate teachers' understanding of organic causes of inattention. Ultimately, it is hoped that the information may serve to help prevent and remediate the problems common to children with organic bases of inattention at school.

What you will be asked to do in the study:

If you participate in this study, you will be asked to read six case descriptions about hypothetical children. After each case, you will be asked to respond to a few questions about the child presented. Afterward, you will be asked to participate in a focus group meeting, during which we will discuss the vignettes and the questionnaires.

Time required:

1 hour. Reading the cases and answering the questions should take approximately 30 minutes. The focus group meeting will take approximately 30 minutes.

Risks and Benefits:

This study involves very few discomforts or risks. You will be asked to answer questions that require some thinking. Some of the questions may be challenging for you to answer or you may have emotional feelings towards some of the questions.

You will not necessarily benefit directly by participating in this experiment. However, I would be happy to provide you with a summary of the research results when the study is completed (upon request).

Compensation:

You will be provided with a \$25.00 gift certificate for participating in this study.

Confidentiality:

Your confidentiality will be kept confidential to the extent provided by law. Your information will be assigned a code number. The list connecting your name to this number will be kept in a locked file in my office. When the study is completed and the data have been analyzed, the list will be destroyed. Your name will not be used in any report.

Voluntary participation:

Your participation in this study is completely voluntary. There is no penalty for not participating.

Right to withdraw from the study:

You have the right to withdraw from the study at anytime without consequence.

Whom to contact if you have questions about the study:

Nicole Nasewicz, B.S., Graduate Student, Department of Educational Psychology, 1403 Norman Hall, P.O. Box 117047, Gainesville, FL 32611 (352) 334-1713

Tina Smith-Bonahue, Ph.D., Associate Professor, Department of Educational Psychology, 1403 Norman Hall, P.O. Box 117047, Gainesville, FL 32611 (352) 334-1713

Whom to contact about your rights as a research participant in the study:

UFIRB Office, Box 112250, University of Florida, Gainesville, FL 32611-2250; ph 392-0433.

Agreement:

I have read the procedure described above. I voluntarily agree to participate in the procedure and I have received a copy of this description.

Participant: _____ Date: _____

Principal Investigator: _____ Date: _____

APPENDIX H
PILOT STUDY CONSENT FORM

Protocol Title: Assessing Whether Preservice Teachers Can Differentiate Between Qualitatively Different Forms of Inattention.

Please read this consent document carefully before you decide to participate in this study.

Purpose of the research study:

The purpose of this study is to assess the accuracy and consistency of a questionnaire measuring preservice teachers' accuracy at differentiating between qualitatively different forms of inattention, more specifically, their ability to accurately identify Attention Deficit Disorder-Primarily Inattentive Subtype. This information can be used in future research, and eventually, can be used to facilitate teachers' understanding of ADHD-PI, which may serve to remediate many of the problems common to children with ADHD-PI at school.

What you will be asked to do in the study:

If you participate in this study, you will be asked to complete a teacher information survey, which provides the researchers with important demographic information, and to respond to questions that correspond with six vignettes of hypothetical children.

Time required:

20 minutes

Risks and Benefits:

This study involves very few discomforts or risks. You will be asked to answer questions that require some thinking. Some of the questions may be challenging for you to answer or you may have emotional feelings towards some of the questions.

You will not necessarily benefit directly by participating in this experiment. Your professor may elect to give you extra credit points towards your grade in his/her class if you elect to participate.

Compensation:

No compensation is offered for participation in this study.

Confidentiality:

Your confidentiality will be kept confidential to the extent provided by law. Your information will be assigned a code number. The list connecting your name to this number will be kept in a locked file in my office. When the study is completed and the data have been analyzed, the list will be destroyed. Your name will not be used in any report.

Voluntary participation:

Your participation in this study is completely voluntary. There is no penalty for not participating.

Right to withdraw from the study:

You have the right to withdraw from the study at anytime without consequence.

Whom to contact if you have questions about the study:

Nicole Nasewicz, B.S., Graduate Student, Department of Educational Psychology, 1403 Norman Hall, P.O. Box 117047, Gainesville, FL 32611 (352) 334-1713

Tina Smith-Bonahue, Ph.D., Associate Professor, Department of Educational Psychology, 1403 Norman Hall, P.O. Box 117047, Gainesville, FL 32611 (352) 334-1713

Whom to contact about your rights as a research participant in the study:

UFIRB Office, Box 112250, University of Florida, Gainesville, FL 32611-2250; ph 392-0433.

Agreement:

I have read the procedure described above. I voluntarily agree to participate in the procedure and I have received a copy of this description.

Participant: _____ Date: _____

Principal Investigator: _____ Date: _____

APPENDIX I
KADDS INSTRUMENT

Please answer the following questions regarding Attention-Deficit/Hyperactivity Disorders (ADHD). If you are unsure of an answer, respond Don't Know (DK), DO NOT GUESS.

True (T), False (F), or Don't Know (DK) (circle one):

1. T F DK Most estimates suggest that ADHD occurs in approximately 15% of school age children.
2. T F DK Current research suggests that ADHD is largely the result of ineffective parenting skills.
3. T F DK ADHD children are frequently distracted by extraneous stimuli.
4. T F DK ADHD children are typically more compliant with their fathers than with their mothers.
5. T F DK In order to be diagnosed with ADHD, the child's symptoms must have been present before age 7.
6. T F DK ADHD is more common in the 1st degree biological relatives (i.e. mother, father) of children with ADHD than in the general population.
7. T F DK One symptom of ADHD children is that they have been physically cruel to other people.
8. T F DK Antidepressant drugs have been effective in reducing symptoms for many ADHD children.
9. T F DK ADHD children often fidget or squirm in their seats.
10. T F DK Parent and teacher training in managing an ADHD child are generally effective when combined with medication treatment.
11. T F DK It is common for ADHD children to have an inflated sense of self-esteem or grandiosity.
12. T F DK When treatment of an ADHD child is terminated, it is rare for the child's symptoms to return.
13. T F DK It is possible for an adult to be diagnosed with ADHD.
14. T F DK ADHD children often have a history of stealing or destroying other people's things .

15. T F DK Side effects of stimulant drugs used for treatment of ADHD may include mild insomnia and appetite reduction.
16. T F DK Current wisdom about ADHD suggests two clusters of symptoms: One of inattention and another consisting of hyperactivity/impulsivity.
17. T F DK Symptoms of depression are found more frequently in ADHD children than in non- ADHD children.
18. T F DK Individual psychotherapy is usually sufficient for the treatment of most ADHD children.
19. T F DK Most ADHD children "outgrow" their symptoms by the onset of puberty and subsequently function normally in adulthood.
20. T F DK In severe cases of ADHD, medication is often used before other behavior modification techniques are attempted.
21. T F DK In order to be diagnosed as ADHD, a child must exhibit relevant symptoms in two or more settings (e.g., home, school).
22. T F DK If an ADHD child is able to demonstrate sustained attention to video games or TV for over an hour, that child is also able to sustain attention for at least an hour of class or homework.
23. T F DK Reducing dietary intake of sugar or food additives is generally effective in reducing the symptoms of ADHD.
24. T F DK A diagnosis of ADHD by itself makes a child eligible for placement in special education.
25. T F DK Stimulant drugs are the most common type of drug used to treat children with ADHD
26. T F DK ADHD children often have difficulties organizing tasks and activities.
27. T F DK ADHD children generally experience more problems in novel situations than in familiar situations.
28. T F DK There are specific physical features which can be identified by medical doctors (e.g. pediatrician) in making a definitive diagnosis of ADHD.
29. T F DK In school age children, the prevalence of ADHD in males and females is equivalent.
30. T F DK In very young children (less than 4 years old), the problem behaviors of ADHD

children (e.g. hyperactivity, inattention) are distinctly different from age-appropriate behaviors of non-ADHD children.

31. T F DK Children with ADHD are more distinguishable from normal children in a classroom setting than in a free play situation.

32. T F DK The majority of ADHD children evidence some degree of poor school performance in the elementary school years.

33. T F DK Symptoms of ADHD are often seen in non-ADHD children who come from inadequate and chaotic home environments.

34. T F DK Behavioral/Psychological interventions for children with ADHD focus primarily on the child's problems with inattention.

35. T F DK Electroconvulsive Therapy (i.e. shock treatment) has been found to be an effective treatment for severe cases of ADHD.

36. T F DK Treatments for ADHD which focus primarily on punishment have been found to be the most effective in reducing the symptoms of ADHD.

37. T F DK Research has shown that prolonged use of stimulant medications leads to increased addiction (i.e., drug, alcohol) in adulthood.

38. T F DK If a child responds to stimulant medications (e.g., Ritalin), then they probably have ADHD.

39. T F DK Children with ADHD generally display an inflexible adherence to specific routines or rituals.

APPENDIX J
ATPE INSTRUMENT

Directions: Listed below are a number of statements expressing opinions or ideas about persons with epilepsy. There are many differences of opinion; many persons agree and many persons disagree with each statement. We would like to know your opinion about them. Read each statement carefully and then circle the appropriate number, from -3 to +3, that best corresponds with how you feel about the statement. There is no time limit for the completion of this questionnaire, but you should work as rapidly as you can.

KEY	
-3: I disagree very much	+1: I agree a little
-2: I disagree pretty much	+2: I agree pretty much
-1: I disagree a little	+3: I agree very much

Please Respond To Every Statement

1. Schools should not place children with epilepsy into regular classrooms.	-3	-2	-1	+1	+2	+3
2. Persons with epilepsy have the same rights as all people.	-3	-2	-1	+1	+2	+3
3. Persons with epilepsy can safely operate machinery.	-3	-2	-1	+1	+2	+3
4. The individual with epilepsy does not possess a normal life expectancy.	-3	-2	-1	+1	+2	+3
5. Insurance companies should not deny insurance to an individual with epilepsy.	-3	-2	-1	+1	+2	+3
6. The individual with epilepsy should not be prevented from having children.	-3	-2	-1	+1	+2	+3
7. Persons with epilepsy should be prohibited from driving.	-3	-2	-1	+1	+2	+3
8. Children with epilepsy should attend regular public schools.	-3	-2	-1	+1	+2	+3
9. The onset of epileptic seizures in a spouse is sufficient reason for divorce.	-3	-2	-1	+1	+2	+3
10. Individuals with epilepsy are also mentally retarded.	-3	-2	-1	+1	+2	+3
11. Persons with epilepsy are a danger to the public.	-3	-2	-1	+1	+2	+3
12. The responsibility for educating children with epilepsy rests with the community.	-3	-2	-1	+1	+2	+3
13. Individuals with epilepsy are accident-prone.	-3	-2	-1	+1	+2	+3

> **Over Please** >

Please Respond To Every Statement

KEY

-3: I disagree very much
 -2: I disagree pretty much
 -1: I disagree a little

+1: I agree a little
 +2: I agree pretty much
 +3: I agree very much

- | | | | | | | |
|---|----|----|----|----|----|----|
| 14. Children need to be protected from classmates who have epilepsy. | -3 | -2 | -1 | +1 | +2 | +3 |
| 15. Parents should expect of their child who has epilepsy what they expect of other children. | -3 | -2 | -1 | +1 | +2 | +3 |
| 16. Persons with epilepsy can safely participate in strenuous activity. | -3 | -2 | -1 | +1 | +2 | +3 |
| 17. Persons with epilepsy are more likely to develop and express criminal tendencies than are other people. | -3 | -2 | -1 | +1 | +2 | +3 |
| 18. Persons with epilepsy should not be prohibited from marrying. | -3 | -2 | -1 | +1 | +2 | +3 |
| 19. Laws citing epilepsy as the basis for the annulment of adoption should be repealed. | -3 | -2 | -1 | +1 | +2 | +3 |
| 20. Persons with epilepsy prefer to live with others of similar characteristics. | -3 | -2 | -1 | +1 | +2 | +3 |
| 21. Equal employment opportunities should be available to individuals with epilepsy. | -3 | -2 | -1 | +1 | +2 | +3 |
| 22. You can expect the condition of a person with epilepsy to deteriorate. | -3 | -2 | -1 | +1 | +2 | +3 |
| 23. The offspring of parents with epilepsy will also have epilepsy. | -3 | -2 | -1 | +1 | +2 | +3 |
| 24. When their seizures are controlled by medication, persons with epilepsy are just like anyone else. | -3 | -2 | -1 | +1 | +2 | +3 |
| 25. Families of children with epilepsy should not be provided supportive social services. | -3 | -2 | -1 | +1 | +2 | +3 |
| 26. Epilepsy is not a contagious disease. | -3 | -2 | -1 | +1 | +2 | +3 |
| 27. Children with epilepsy in regular classes have an adverse effect on the other children. | -3 | -2 | -1 | +1 | +2 | +3 |
| 28. Individuals with epilepsy can cope with a 40-hour work week. | -3 | -2 | -1 | +1 | +2 | +3 |

Thank You For Your Assistance In Completing This Questionnaire

LIST OF REFERENCES

- Adams, R., & Victor, M. (1993). *Principles of neurology* (5th ed.). New York: McGraw-Hill.
- Agnew, C., Nystul, M., & Conner, M. (1998). Seizure disorders: An alternative explanation for students' inattention. *Professional School Counseling, 2*(1), 54-59.
- Alexander, C., & Becker, H. (1978, Spring). The use of vignettes in survey research. *Public Opinion Quarterly, 42*(1), 93-104.
- American Academy of Pediatrics (2007). *A process for developing community consensus regarding the diagnosis and management of attention-deficit/hyperactivity disorder* (Illinois 2005 No. 10.1542). Pediatrics: Committee on Quality Improvement, Subcommittee on Attention-Deficit Hyperactivity Disorder.
- American Academy of Pediatrics (2007). *A process for developing community consensus regarding the diagnosis and management of attention-deficit/hyperactivity disorder* (Illinois 2000 No. 10.1542). Pediatrics: Meschan, J., & Earls, M.
- American Educational Research Association, American Psychological Association, National Council on Measurement in Education. (1999). *Standards for educational and psychological testing*. Washington, DC: American Psychological Association.
- American Psychiatric Association (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text revision). Washington, DC: Author.
- Antonak, R., & Rankin, P. (1982). Measurement and analysis of knowledge and attitudes toward epilepsy and persons with epilepsy. *Social Science and Medicine, 16*, 1591-1593.
- Applegate, B., Lahey, B., Hart, E., Waldman, I., Biederman, J., Hynd, G., Barkley, R., Ollendick, T., Frick, P., Greenhill, L., McBurnett, K., Newcorn, J., Kerdyk, L., Garfinkel, B., & Shaffer, D. (1997). Validation of the age-onset criterion for ADHD: A report of the DSM-IV field trials. *Journal of American Academy of Child and Adolescent Psychiatry, 36*, 1211-122
- Ashton, V. (1999). Worker judgments of seriousness about and reporting of suspected child maltreatment. *Child Abuse and Neglect, 23*(6), 5390548.
- Ashton, P., & Webb, R. (1986). *Making a difference: Teacher's sense of self-efficacy and student achievement*. New York: Longman.
- Atkins, M., & Pelham, W. (1991). School-based assessment of attention deficit hyperactivity disorder. *Journal of Learning Disabilities, 24*, 197-205.
- Attention deficit disorder advocates support school psychologists' role in diagnosis.* (1994, June). NASP Communique' pp. 1-4.

- Ball, J., Wooten, V., & Crowell, T. (1999). Adult ADHD and/or sleep apnea? Differential diagnostic considerations with six case studies. *Journal of Clinical Psychology in Medical Settings*, 6(3), 259-271.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavior change. *Psychological Review*, 84, 191-215.
- Bannon, M., Wilding, C., & Jones, P. (1992). Teachers' perceptions of epilepsy. *Archives of Disease in Childhood*, 67, 1467-1471.
- Barkley, R., DuPaul, G., & McMurray, M. (1990). A comprehensive evaluation of attention deficit hyperactivity disorder with and without hyperactivity. *Journal of Consulting and Clinical Psychology*, 58, 775-798.
- Barkley, R., Karlsson, J., & Pollard, S. (1985). Effects of age on mother-child interactions of ADD-H and normal boys. *Journal of Abnormal Child Psychology*, 13(4), 631-637.
- Barter, C., & Renold, E. (1999). The use of vignettes in qualitative research. *Social Research Update*, 25, Surrey, University of Surrey.
- Becker, D., Fennell, E., Y Carney, P. (2004). Daytime behavior and sleep disturbances in childhood epilepsy. *Epilepsy & Behavior*, 5, 708-715.
- Bertolote, J. (1994). Epilepsy as a public health problem. Role of the World Health Organization and of the cooperation between WHO and non-governmental organizations. *Trop Geogr Med*, 46(3), S28-S30.
- Binnie, C., Channon, S., & Marston, D. (1990). Learning disabilities in epilepsy: Neurophysiological aspects. *Epilepsia*, 31(4), S2-S8.
- Bishop, M., & Boag, E. (2006). Teachers' knowledge about epilepsy and attitudes toward students with epilepsy: Results of a national survey. *Epilepsy and Behavior*, 8, 397-405.
- Bishop, M., and Slevin, B. (2004). Teachers' attitudes toward students with epilepsy: Results of a survey of elementary and middle school teachers. *Journal of Epilepsy and Behavior*, 5, 308-315.
- Bocian, K.M., Beebe, M.E., MacMillan, D.L., & Gresham, F.M. (1999). Competing paradigms in learning disabilities classification by schools and the variations in the meaning of discrepant achievement. *Learning Disabilities Research and Practice*, 14, 1-14.
- Butkerei, M. (2004). School children with trauma reactions: What are the assessment-based knowledge and skills of school psychologists? Abstract obtained from *Dissertation Abstracts International: Section B: The Sciences and Engineering*, 65(5-B), 2266.
- Byers, B., & Zeller, R. (1995). Social judgments of responsibility in elder self-neglect cases. *The Journal of Psychology*, 129(3), 331-344.

- Byers, B., & Zeller, R. (1998). Measuring subgroup variation in social judgment research: A factorial survey approach. *Social Science and Research, 27*, 73-84.
- Cataldo, M., Russo, D., & Freeman, J. (1979). A behavior analysis approach to high-rate myoclonic seizures. *Journal of Autism and Developmental Disorders, 9*(4), 413-427.
- Camfield, C., Camfield, P., Dooley, J. & Gordon, K. (1996). Accidental injury is a serious risk in children with typical absence seizures. *Archives of Neurology, 53*, 929-932.
- Cantwell, D., & Baker, L. (1992). Attention deficit disorder with and without hyperactivity: A review and comparison of matched groups. *Journal of Amer Academy of Child & Adolescent Psychiatry, 111*(1), 127-155.
- Centers for Disease Control and Prevention (1994). Current trends prevalence of self-reported epilepsy – United States, 1986-1990. *Morbidity and Mortality Weekly Report, 43*(44), 810-811.
- Coie, J., Costanzo, P., & Cox, G. (1975). Behavioral determinants of mental illness concerns: A comparison of “gate-keeper” professions. *Journal of Consultation and Clinical Psychology, 43*(5), 626-636.
- Cotugno, A. (1993). The diagnosis of attention deficit hyperactivity disorder (ADHD) in community mental health centers: Where and when. *Psychology in the Schools, 30*(4), 338-344.
- Cull, C., & Goldstein, L. (1997). An introduction to epilepsy. In C. Cull & L. Goldstein (Eds.), *The clinical psychologist's handbook of epilepsy: Assessment and management* (pp. 4-17). New York: Routledge.
- Dantas, F., Cariri, G., Cariri, G., & Filho, A. (2001). Knowledge and attitudes toward epilepsy among primary, secondary, and tertiary level teachers. *Arquivos de Neuropsiquiatr, 59*, 712-716.
- Degenholtz, H., Kane, R., Kane, R., & Finch, M. (1999). Long-term care case managers' out-of-home placement decisions. *Research on Aging, 21*(2), 240-274.
- Dillman, D. (2000). *Mail and internet surveys: The tailored design method* (2nd ed.). New York: John Wiley & Sons, Inc.
- Dreisbach, M., Ballard, M., Russo, D., & Schain, R. (1982). Educational intervention for children with epilepsy: A challenge for collaborative service delivery. *The Journal of Special Education, 16*(1), 111-121.
- Dulmer, H. (2007). Experimental plans in factorial surveys. *Journal of Sociological Methods and Research, 35*(3), 382-409.

- Dunn, L., & Kontos, S. (1997). What have we learned about developmentally appropriate practice? Research in review. *Young Children*, 52(5), 4-13.
- DuPaul, G. (1992). How to assess attention deficit disorder within school settings. *School Psychology Quarterly*, 7, 60-74.
- DuPaul, G., & Stoner, G. (1994). *ADHD in the schools: Assessment and intervention strategies*. New York: Guilford Press.
- DuPaul, G., & Stoner, G. (2002). Interventions for attention problems. In M. Shinn, H. Walker, and G. Stoner, *Interventions for academic and behavioral problems II: Preventive and remedial approaches* (pp. 913-938). Bethesda: National Association of School Psychologists.
- Fastenau, P., Shen, J., & Austin, J. (2008). Academic underachievement among children with epilepsy: Proportion exceeding psychometric criteria for learning disability and associated risk factors. *Journal of Learning Disabilities*, 41(3), 195-207.
- Finch, J. (1987). The vignette technique in survey research. *Sociology*, 21(1), 105-114.
- Forness, S., & Kavale, K. (2001). ADHD and a return to the medical model of special education. *Education and Treatment of Children*, 24(3), 224-247.
- Fritz, J., Miller-Heyl, J., Kreutzer, J., & MacPhee, D. (1995). Fostering personal teaching efficacy through staff development and classroom activities. *Journal of Educational Research*, 88, 200-208.
- Fuchs, D., Mock, D., Morgan, P., & Young, C. (2003). Responsiveness-to-intervention: Definitions, evidence, and implications for the learning disabilities construct. *Learning Disabilities Research & Practice*, 18, 157-171.
- Garcia-Sanchez, C., Estevez-Gonzalez, A., Suarez-Romero, E., & Junque, C. (1997). Right hemisphere dysfunction in subjects with attention deficit disorder with and without hyperactivity. *Journal of Child Neurology*, 12, 107-115.
- Gastaut, H. (1973). *Dictionary of Epilepsy*. World Health Organization: Geneva.
- Ghanizadeh, A., Bahredar, M., & Moeini, S. (2006). Knowledge and attitudes towards attention deficit hyperactivity disorder among elementary school teachers. *Patient Education and Counseling*, 62, 84-88.
- Gibson, S., & Dembo, M. (1984). Teacher efficacy: A construct validation. *Journal of Educational Psychology*, 76, 569-582.
- Glass, C. S. (2000). Factors influencing teaching strategies used with children who display attention deficit hyperactivity disorder characteristics. *Education*, 122, 70-79.

- Gresham, F. (2004). Current status and future directions of school-based behavioral interventions. *School Psychology Review*, 33(3), 326-343.
- Hakola, S. (1992). Legal rights of students with attention deficit hyperactivity disorder. *School Psychology Quarterly*, 7, 285-297.
- Hale, J., Kaufman, A., Naglieri, J., & Kavale, K. (2006). Implementation of IDEA: Integrating response to intervention and cognitive assessment methods. *Psychology in the Schools*, 43(7), 753-769.
- Haslam, R., & Valletutti, P. (2004). *Medical problems in the classroom: The teacher's role in diagnosis and management*. Austin: Pro-Ed, Inc.
- Herbert J. D., Crittenden, K., & Dalrymple, K. L. (2004). Knowledge of social anxiety disorder relative to attention deficit hyperactivity disorder among education professional. *Journal of Clinical Child and Adolescent Psychology*, 33, 366-372.
- Hesdorffer, D., Ludvigsson, P., Olafsson, E., Gudmundsson, G., Kjartansson, O., & Hauser, A. (2004). ADHD as a risk factor for incident unprovoked seizures and epilepsy in children. *Archives of General Psychiatry*, 61, 731-736.
- Hinshaw, S., Morrison, D., Carte, E., & Cornsweet, C. (1987). Factorial dimensions of the revised behavior problem checklist: Replication and validation within a kindergarten sample. *Journal of Abnormal Child Psychology*, 15, 309-327.
- Hox, J., & Kreft, I. (1994). Multilevel analysis methods. *Sociological Methods & Research*, 22(3), 283-299.
- Hynd, G., Lorys, A., Semrud-Clikeman, M., Nieves, N., Huettner, M., & Lahey, B. (1991). Attention deficit disorder without hyperactivity: A distinct behavioral and neurocognitive syndrome. *Journal of Child Neurology*, 6, S37-S43.
- International League Against Epilepsy. (2003). Living with epilepsy. *Epilepsia*, 44(6), 45-48.
- Kaleyias, J., Tzoufi, M., Kotsalis, C., Papavasiliou, A, and Diamantopoulos, N. (2005). Knowledge and attitude of the greek educational community toward epilepsy and the epileptic student. *Journal of Epilepsy and Behavior*, 6, 179-186.
- Leone, P. (1989). Beyond fixing bad behavior and boys: Multiple perspectives on education and treatment of troubled and troubling youth. In R.B. Rutherford, Jr., & S.A. DiGangi (Eds.), *Severe behavioral disorders of children and youth*. (Vol. 12, pp. 1-10). Reston, VA: Council for Children with Behavioral Disorders.
- Leppik, I. (2000). *Contemporary diagnosis and management of the patient with epilepsy* (5th ed.). Newtown, Pennsylvania: Handbooks in Healthcare.

- Liljedahl, P. (n.d.). *Teachers' beliefs as teachers' knowledge*. Retrieved June 19, 2008 from <http://www.unige.ch/math/EnsMath/Rome2008/WG2/Papers/LILJED.pdf>
- Lishman, W. (1987). *Organic Psychiatry* (2nd ed.), Oxford: Blackwell Scientific Publications.
- Loyd, J.W., Kauffman, J.M., Landrum, T.J., & Roe, D.L. (1991). Why do teachers refer pupils for special education? An analysis of referral records. *Exceptionality*, 2, 115-126.
- Ludwick, R., Jones, S., & Zeller, R. (2004). Validity and Reliability of the factorial Survey for Assessing Nursing Decision-Making. Presentation presented at: Sigma Theta International. , Kent State University College of Nursing: Ravenna, Ohio.
- Ludwick, R., Wright, M., Zeller, R., Dowding, D., Lauder, W., & Winchell, J. (2004). An advanced methodology for advancing nursing research: Factorial surveys. *Advances in Nursing Science*, 27(3), 224-238.
- Ludwick, R., & Zeller, R. (2001). The factorial survey: An experimental method to replicate real world problems. *Nursing Research*, 50(2), 129-133.
- Lynam, D., Moffitt., & Stouthamer-Loeber, M. (1993). Explaining the relation between IQ and delinquency: Class, race, test motivation, school failure, or self-control? *Journal of Abnormal Psychology*, 102, 187-196.
- Macey, K. (2005). Attention deficit/hyperactivity disorder: Teacher knowledge and referral for assessment. Unpublished doctoral dissertation, Texas A&M University, College Station.
- Maltzberg, B. (1959). Important statistical data about mental illness. In S. Arieti (Ed.). *American handbook of psychiatry*, 1 (pp. 161-174). New York: Basic Books.
- Mash, E., & Barkley, R. (2003). *Child Psychopathology* (2nd ed.). New York: The Guilford Press.
- McGee, R, Williams, S., & Feeham, M. (1992), Attention deficit disorder and age of onset of problem behaviors. *Journal of Abnormal Child Psychology*, 20, 487-502.
- McGrath, M., & Yalof, J. (2008, February). *School neuropsychology: Practitioners' perceptions of training*. Poster session presented at the annual meeting of the National Association of School Psychologists, New Orleans, LA.
- Milich. R., Balentine, A., & Lynam, D. (2001). ADHD combined type and ADHD predominately inattentive type are different and unrelated disorders. *Clinical Psychology: Science and Practice*, 8, 463-488.
- Montague, M., McKinney, J., & Hocutt, A. (1994). Assessing students for attention deficit hyperactivity disorder. *Intervention in School and Clinic*, 29, 212-218.

- Morgan, A., Hynd, G., Riccio, C., & Hall. (1996). Validity of DSM-IV predominately inattentive and compulsive types: relationship to previous DSM diagnoses/subtypes differences. *Journal of American Academy of Child and Adolescent Psychiatry*, 35, 325-333.
- Myers, I., & McCaulley, M. (1985). *Manual: A guide to the development and use of the of the Myers-Briggs Type Indicator* (3rd ed.). Palo Alto, CA: Consulting Psychologists Press.
- Nigg, J. (2006). ADHD controversies. In *What causes ADHD? Understanding what goes wrong and why* (pp. 3-29). Guilford Publications.
- Ojinnaka, N. (2002). Teachers' perception of epilepsy in nigeria: A community-based study. *Seizure*, 11, 382-391.
- O'Toole, R., Webster, S., O'Tolle, A., & Lucal, B. (1999). Teachers' recognition and reporting of child abuse: A factorial survey. *Child Abuse and Neglect*, 23(11), 1083-1101.
- Panayiotopoulos, C., Chroni, E., Dasklopoulos, C., Baker, A., Rowlinson, S., & Walsh, P. (1992). Typical absence seizures in adults: Clinical EEG, video-EEG findings and diagnostic/syndromic considerations. *Journal of Neurology, Neurosurgery, and Psychiatry*, 55, 1002-1008.
- Pearl, P., Weiss, R., & Stein, M (2001). Medical mimics: Medical and neurological conditions simulating ADHD. *Annals of the New York Academy of Sciences*, 931, 97-112.
- Podell, D., & Soodak, L. (1993). Teacher efficacy and bias in special education referrals. *Journal of Educational Research*, 86, 247-253.
- Posner, E., Mohamed, K., Marson, A. (2005). A systematic review of treatment of typical absence seizures in children and adolescents with ethosuximide, sodium valproate or lamotrigine. *Elsevier*, 14(2), 117-122.
- Powell, S. E., Welch, E., Ezell, D., Klein, C. E., & Smith, L. (2000). Should children receive medication for symptoms of attention deficit hyperactivity disorder? *Peabody Journal of Education*, 78(3), 107-115.
- Prpic, I., Korotaj, Z., Via ic-Cicvaric, I., Paucic-Kirincic, E., Valerjev, A., & Tomac, V. (2003). Teachers' opinions about capabilities and behavior of children with epilepsy. *Epilepsy & Behavior*, 4(2), 142-145.
- Raudenbush, S., Byrk, A., Cheong, Y., Congdon, R., and Toit, M. (2004). *HLM 6: Hierarchical linear modeling and nonlinear modeling*. Lincolnwood, IL: Scientific Software International.
- Reid, R., Vasa, S., Maag, J., & Wright, G. (1994). An analysis of teachers' perceptions of attention deficit-hyperactivity disorder. *The Journal of Research and Development in Education*, 27, 195-202.

- Rossi, P., & Anderson, A. (1982). The factorial survey approach. In P.H. Rossi & S.L. Nock (Eds.), *Measuring social judgments* (pp. 15-67). Newbury Park, CA: Sage.
- Safer, D., & Zito, J. (1999). Psychotropic medication for ADHD. *Mental Retardation and Developmental Disabilities Research Reviews*, 5, 237-242.
- Salinsky, M., Wegener., K., Sinnema, F. (1992). Epilepsy, driving laws, and patient disclosure to physicians. *Epilepsy*, 33(3), 496-472.
- Sbordone, R., & Rudd, M. (1986). Can psychologists recognize neurological disorders in their patients? *Journal of Clinical and Experimental Neuropsychology*, 8(3), 285-291.
- Schloss, P. J., & Smith, M. A. (1998). *Applied behavior analysis in the classroom* (Rev. ed.). Boston: Allyn and Bacon.
- Schubert, R. (2005). Attention deficit disorder and epilepsy. *Pediatric Neurology*, 32,1-10.
- Sciutto, M., & Feldhamer, E. (2007). The knowledge of attention deficit disorders scale: Test manual. Manuscript in preparation.
- Sciutto, M., Terjesen, M., & Bender-Frank, A. (2000). Teachers' knowledge and misperceptions of attention-deficit hyperactivity disorder. *Psychology in the Schools*, 37(2), 115-122.
- Scott, A. M. (2003). Factors affecting goodness of fit in kindergarten classrooms (Doctoral dissertation, University of Florida, 2003). *Dissertation Abstracts International*, 64(7), 2385. (AAT No. 3096669).
- Semrud-Clikeman, M. (2005). Neuropsychological aspects for evaluating learning disabilities. *Journal of Learning Disabilities*, 38(6), 563-568.
- Siren, A., Kylliainen, A., Tenhunen, M., Hirvonen, K., Riita, T., & Koivikko, M. (2007). Beneficial effects of antiepileptic medication on absence seizures and cognitive functioning in children. *Journal of Epilepsy and Behavior*, 11, 85-91.
- Smith, B., & Bredenkamp, S. (1998). Foreword. In L.J. Johnson, M.L. Lamontagne, P.M. Elgas, & Bauer, A M. (Eds.). *Early Childhood Education: Blending theory, blending practice* (pp. xv-xx). Baltimore, MD: Paul H. Brookes.
- Svoboda, W. (2004). *Childhood epilepsy: Language, learning, and behavioral complications*. New York: Cambridge University Press.
- Swanson, S., Castellanos, F., Murias, M., LaHoste, G., & Kennedy, J. (1998). Cognitive neuroscience of attention deficit hyperactivity disorder. *Current Opinion in Neurobiology*, 8(2), 263-271.
- Tan, M. & Appleton, R. (2005). Attention deficit hyperactivity disorder, methylphenidate, and epilepsy. *Archives of Disease in Childhood*, 90, 57-59.

- Taylor, B. (2006). Factorial surveys: Using vignettes to study professional judgment. *British Journal of Social Work, 36*, 1187-1207.
- Tschannen-Moran, M., Hoy, A., & Hoy, W. (1998). Teacher efficacy: Its meaning and measure. *Review of Educational Research, 68*(2), 202-248.
- Thomas, A., & Chess, S. (1977). *Temperament and development*. New York: Brunner/Mazel.
- Thurman, Q., Lam, J., & Rossi, P. (1988). Sorting out the cuckoo's nest: A factorial survey approach to the study of popular conceptions of chronic illness. *The Sociology Quarterly, 29*(4), 565-588.
- Tripp, G., Schaughency, E., & Clarke, B (2006). Parent and teacher rating scales in the evaluation of attention-deficit hyperactivity disorder: Contribution to diagnosis and differential diagnosis in clinically referred children. *Journal of Developmental and Behavioral Pediatrics, 27*(3), 209-221.
- Williams, J., Grant, M., Jackson, M., Sherma, S., Sharp, G., Griebel, M., Lange, B., Mancias, P., & Bates, S. (1996). Behavioral descriptors that differentiate between seizure and nonseizure events in a pediatric population. *Clinical Pediatrics, 35*(5), 243-249.
- Williams, J., Griebel, M., Sharp, G., Lange, B., Phillips, T., DelosReyes, E., Bates, S., Schultz, E., & Simpson, P. (2002). Differentiating between seizures and attention deficit hyperactivity disorder (ADHD) in a pediatric population *Clinical Pediatrics, 41*, 565-568.
- Williams, J., Lange, B., Phillips, T., Sharp, G., Delosrayes, E., Bates, S., Griebel, M., & Simpson, P. (2002). The course of inattentive and hyperactive-impulsive symptoms in children with new onset seizures. *Epilepsy and Behavior, 3*, 517-521
- Williams, J., Sharp, E., DelosRayes, E., Bates, S., Phillips, T., Lange, B., Griebel, M., Edwards, M., & Simpson, P. (2002). Symptom differences in children with absence seizures versus inattention. *Epilepsy and Behavior, 3*, 245-248.
- Willis, G. (1999). *Cognitive Interviewing: A how to guide*. Short course presented at the annual meeting of the American Statistical Association.
- Willms, J. D., and Smith, T. (2005). *A Manual for Conducting Analyses with Data from TIMSS and PISA*. Report prepared for UNESCO Institute for Statistics.
- Wirrel., E. (2003). Is absence epilepsy benign? Retrieved September 26, 2007 from http://www.epilepsy.com/articles/ar_1068157195.html
- Wirrell, E., Camfield, P., Camfield, C., Dooley, J., & Gordon, K. (1996). Accidental injury is a serious risk in children with typical absence epilepsy. *Archives of Neurology, 53*, 929-932.

- Wodrich, D. (2005). Indications for seeking a medical consultation. *Journal of Applied School Psychology, 22*(1), 1-28.
- Wodrich, D., Kaplan, A., & Deering, W. (2006). Children with epilepsy in school: Special services usage and assessment practices. *Psychology in the Schools, 43*(2), 169-181.
- Woolfolk, A., Rosoff, B., & Hoy, W. (1990). Teachers' sense of self-efficacy and their beliefs about managing students. *Teaching and Teacher Education, 6*, 137-148.
- Wright, J. (2002). Attention-deficit hyperactivity disorder: A school-based evaluation manual. Retrieved online from: www.interventioncentral.org.
- Ysseldyke, J., Pianta, R., Christenson, S., Wang, J., & Algozzine, B. (1983). An analysis of preferential interventions. *Psychology in the Schools, 20*, 184-196.
- Zeller, R. (2003). Challenging the contention in the factorial survey method that sample sizes are artificially inflated. Presentation presented at: Advances in Factorial Survey Technique: An International Forum, Kent State University College of Nursing: March 6, 2003: Kent, Ohio.

BIOGRAPHICAL SKETCH

Nicole Nasewicz was born in 1982 on Long Island, New York. The oldest of two siblings, she spent her formative years in Bradenton, Florida, graduating from Manatee High School (MHS) in 2000. She earned her B.S. in psychology and her M.Ed. in school psychology from the University of Florida (UF) in 2000 and 2007, respectively. Specializing in pediatric populations, Nicole completed many unique practicum rotations to further her knowledge, including the public school system, a multidisciplinary center, a craniofacial clinic, a pediatrics clinic, and a private practice setting. A year long internship with the Pinellas County Schools culminated her formalized training experience, equipping her with skills to function independently and as an important member of a team. Nicole married Warren Pies, a fellow MHS and UF graduate, in December of 2006. Geographically, the couple anticipates settling permanently in the Bradenton area, so that they remain in close proximity to their families and to Warren's job with a private, local law firm. Nicole's future plans include leading a fulfilling career as a licensed psychologist, and to spending time with and expanding her family.