

Epilepsy and School Performance: The Influence of Teacher Factors and Seizure

Control on Children with Epilepsy

by

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## ABSTRACT

Epilepsy is a chronic illness impacting the lives of over 300,000 children nationally. Sexson and Madan-Swain offer a theory that addresses successful school reentry in children that are chronically ill. Their theory posits that successful school reentry is influenced by school personnel with appropriate attitudes, training experiences, and by factors relating to the child's illness.

The parents of 74 students, between second and twelfth grades, completed a questionnaire addressing their child's epilepsy and their current level of seizure control. Each child's homeroom teacher also completed a survey regarding their training experiences about epilepsy and their attitudes towards individuals with epilepsy. Additional information was gathered from the child's school regarding attendance rates, most recent Terra Nova test scores (a group achievement test), and special education enrollment status. Data were analyzed via four multiple regression analyses and one logistic regression analysis.

It was found that seizure control was a significant predictor for attendance, academic achievement (i.e., mathematics, writing, and reading), and special education enrollment. Additionally, teachers' attitudes towards epilepsy were a significant predictor of academic achievement (writing and reading) and special education enrollment. Teacher training experience was not a significant predictor in any of the analyses.

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## **Chapter 1**

### **Introduction and Review of Literature**

This chapter presents a background of the problem and an overview of epilepsy that acquaints the reader with the prevalence and general presentation of this chronic illness. This is subsequently followed by a review of the relevant literature. The predictor variables under investigation are based on the Sexson and Madan-Swain (1993) theory of chronic illness in school. Using the Sexson and Madan-Swain theory of successful school reentry, the predictor variables are teachers' attitudes towards epilepsy, teachers' training experiences regarding epilepsy and seizure control. The following measures of school performance will be assessed as outcome variables: academic achievement, school attendance, and special education enrollment. Following the review of literature, a rationale and purpose for this study, together with three hypotheses, are presented.

#### **Background of the Problem**

Epilepsy is a relatively common disorder, especially among young children and adults who fall in the elderly age range (Fejerman, 2002). Epilepsy affects 0.5% to 1.0% of the total population in the world. In the United States (U.S.), about 2.7 million people have been diagnosed with epilepsy and of those, 326,000 (12%) are children 14 years old or younger (The Epilepsy Foundation, 2008a). The following section explains the physiology of epilepsy, the most efficacious treatment, and the effects of that treatment upon epilepsy patients.

## **Physiology of Epilepsy**

The human brain contains nerve cells (neurons) that relay electrical signals to one another in an effort to maintain the body's general functions. When a seizure occurs, electrical signals from neurons misfire and subsequently disrupt usual brain function (The National Society for Epilepsy, 1999). In other words, a seizure is abnormal behavior or physical movement caused by unusual electrical activity in the brain. A seizure disorder, in which two or more seizures have occurred with no known etiology, is referred to as epilepsy (International League Against Epilepsy (ILEA), 2008). The specific definition of epilepsy varies from profession to profession (Fisher et al., 2005); however, for simplicity of communication, Fisher et al. defined epilepsy as, "a brain disorder characterized predominately by recurrent and unpredictable interruptions of normal brain function, called epileptic seizures" (p. 470).

According to the ILAE, seizures can be broadly dichotomized as local and generalized (2008). A number of the various types of seizures are depicted in Table 1 (ILAE, 2008).

Table 1

*International League Against Epilepsy Seizure Classification*

Local seizures (partial seizures)		Generalized seizures		
Simple partial seizures	Complex partial seizures	Non-convulsive seizures		Convulsive seizures
		Atonic seizures	Myoclonic seizures	Absence seizures (petit mal)

**Local seizures.** The first universal type of seizure defined by the ILAE (2008) is termed a local seizure. A local seizure is also commonly referred to as a partial onset seizure, or simply, a partial seizure. Partial seizures begin in a specific area of the brain where the physical expression of the seizures reflects the location of the seizure (ILAE). There are two types of partial seizures: simple partial seizures, and complex partial seizures. Simple partial seizures involve no alteration of consciousness. In contrast, complex partial seizures involve impaired awareness of consciousness and are often preceded by feelings of nausea, feelings of fear, or experiencing foul odors or unusual tastes that may warn of the impending seizure (Williams, 2004). During complex partial seizures, the

individual may appear as confused and could possibly exhibit automatisms (lip smacking, facial grimacing, mumbling, humming, fumbling hand movements, picking at clothing, altered or halted speech). These seizures are often accompanied by fatigue, and the seizure may spread from the original focus point in the brain (ILAE, 2008).

**Generalized seizures.** The second type of seizure identified by the ILAE (2008) is one with a generalized onset, or simply a generalized seizure. In contrast to partial seizures, generalized seizures involve "whole brain" electrical activity stimulation. This type of seizure has an abrupt onset without warning and typically results in a loss of consciousness. There are two types of generalized seizure: convulsive seizures and non-convulsive seizures. A convulsive generalized seizure is commonly referred to as a tonic-clonic seizure (ILAE). A convulsive seizure is characterized by stiffening of the trunk and extremities and repeated rhythmic jerking movements. This type of seizure is typically followed by unresponsiveness and fatigue (ILAE).

There are three types of non-convulsive seizures: atonic seizures, myoclonic seizures, and absence seizures (petit mal). Atonic seizures are characterized by the individual demonstrating an abrupt loss of muscle tone that causes them to fall. This type of seizure can result in repetitive injuries (Williams, 2004). A myoclonic seizure results in single symmetrical jerks of the head and upper extremities that occur in a cluster. A myoclonic seizure occurs most

frequently after awakening (ILAE, 2008). Absence seizures occur when the individual evidences brief staring episodes that include a cessation of all activity (ILAE).

**Treatments and medication effects.** For the reader to appreciate the effect of epilepsy treatments on school-aged children, he/she must first be aware of the treatment methodology. Despite the fact that epilepsy manifests in various ways, there are common themes and procedures for its treatment. Physicians often start with the least invasive treatment, only moving to more invasive procedures (i.e., surgical treatments) when all other less invasive therapies have proven unsuccessful.

By far the most common treatment for epilepsy is drug treatment (Deckers et al., 2001; Kwan & Brodie, 2000). Although medications often reduce or eliminate seizures, they carry the risk of side effects, including cognitive changes, which are particularly relevant for understanding epilepsy's impact on schooling. Loring and Meador (2004) found that only a small number of anti-epileptic drug (AED) studies examined the cognitive effects that these medications had on children. Aside from the meta-analysis related to children's cognition and AEDs gathered by Loring and Meador (2004), information gathered from studies exploring the relationship between adult cognition and AEDs is crucial for understanding the overall cognitive impact resulting from AED use.

When utilizing anti-epileptic drugs (AEDs), there have been two identified processes to treat patients: monotherapy (the use of only one AED), and polytherapy (the use of two or more AEDs). In a study of 130 adults recently diagnosed with untreated generalized tonic–clonic, complex partial, and/or simple partial seizures living in the Netherlands, Deckers et al. (2001) found that monotherapy was the preferred treatment because using only one drug to treat patients resulted in fewer drug interactions. Additionally, researchers found that using this method of drug treatment also improved adherence to the medication schedule and reduced the physical and cognitive side effects. In this study, polytherapy was used only after monotherapy had failed (Deckers et al.). Deckers et al. found that the use of AEDs resulted in complete seizure control in 86% of study participants who were treated with monotherapy and in 74% of study participants who were treated with polytherapy.

Similarly, a study of 525 patients, aged 9 to 93, diagnosed with epilepsy, from the Epilepsy Unit of the Western Infirmary in Glasgow, Scotland, found that 67% of patients treated with monotherapy and 69% of patients treated with polytherapy experienced full remission from seizures (Kwan & Brodie, 2000).

A major factor that physicians and parents face when deciding to use medications is the potential side effects, of which cognitive impairment is a critical one (Loring & Meador, 2004). In a meta-analysis of past research on anti-epileptic drugs and children, Loring and Meador explored the cognitive side effects (i.e.,

blunting effects and slowing of the mental processing speed) of traditional and newer AED's. These investigators found that research assessing the cognitive effects of AEDs had study-design limitations. This resulted in inconclusive and conflicting result. However, Loring and Meador concluded in their meta-analysis that children with epilepsy are at an increased risk for cognitive impairment and learning disabilities, as measured by formal psychological assessments. Table 2 summarizes the meta-analysis regarding AED use and the common side effects found in children. In general, AEDs in children can produce cognitive and behavioral side effects; however, this was not seen in all AEDs or in all children using the same AED (Loring & Meador).

Table 2

*Anti-Epileptic Drugs and Common Side Effects Seen in Children*

Anti-epileptic drugs (AEDS)	Effects
<b>Phenobarbital</b>	<p>Declining IQ that continues after drug withdrawal.</p> <p>Appears to contribute to lingering effects on academic achievement years later. May decrease fine motor skills and performance in time-related tasks. Research suggests that children never fully catch up to their cognitive potential after using this AED.</p>



**Carbamazepine**

Does not appear to affect global IQ. Research does support findings that suggest a negative effect on memory.

**Phenytoin**

Appears to create a smaller negative effect on cognition when compared to Phenobarbital.

Memory impairment was similar to Carbamazepine.

**Valproate**

Current studies are not adequate to determine cognitive effects.

Clobazam

No differences between the cognitive effects of this AED and Carbamazepine and Phenytoin.

Felamate

No current studies on cognition.

Gabapentin

Children are at risk for behavioral changes including hyperactivity, irritability, agitation, and aggression.

Lamotrigine

Children are at risk for behavioral changes.

Levetiracetam

Children are at risk for behavioral changes.

Oxcarbazepine

No change in IQ was noted with this AED.

Tiagabine

Associated with asthenia, nervousness, and somnolence.

Topiramate

Associated with emotional fragility, fatigue, attention and concentration problems, and impaired

memory.

Vigabatrin

Not approved for use in the US.

Zonisamide

Increased risk of psychotic episodes.

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Note. Drug names in bold indicate an older medication.

Note. Table 2 was adapted from the Loring and Meador's (2004) meta-analysis of AED studies.

Meador (2002) found similar results in a comprehensive literature review of seizure medications, which indicated that AEDs (Phenobarbital, Carbamazepine, Gabapentin, Topiramate, and Phenytoin) could produce undesirable side effects, including problems with attention, vigilance, and psychomotor speed in children. Adverse side effects were not present in all patients and most were observed in higher AED doses, higher plasma concentrations, and polytherapy (Meador). The same study also found that children with existing behavior disorders could become susceptible to even greater adverse behavioral side effects (Meador).

Concurrently, in a study of adults with epilepsy, Deckers et al. (2001) identified frequently reported side effects of AEDS as cognitive impairment (32% for monotherapy and 26% for polytherapy), affect and mood disturbances (38% for monotherapy and 16% for polytherapy), and sedation (41% for monotherapy and 53% for polytherapy). Researchers theorize, based on these commonly

reported side effects, that AEDs affect school performance by affecting cognitive abilities and creating a blunting effect (Deckers et al.).

In contrast to previous studies, a study of 54 school-aged children with epilepsy examining the effect of chronic use of any AED on academic achievement found no significant difference in performance on the California Achievement Test between the study participants and the test's normative sample (Tennison et al., 1998). The children participating in the study scored at the national average while taking AEDs. Their percentile scores were as follows: 51.8 (test total), 53.1 (math), and 51.5 (language; Tennison et al., 1998).

In examining research regarding children and AEDs, researchers agree that many of the current AED studies have limited generalizability due to small sample sizes, absence of appropriate controls, and nonrandomized samples, among other design limitations. Bourgeois (2002) illuminated the dissent within the AED research community in a review of the medical literature, when he stated, "cognitive side effects caused by antiepileptic drugs in children are neither the rule nor the exception" (p.2532).

Despite dissent among researchers regarding the cognitive side effects of AEDs, many agree that sharing medically relevant information (i.e., medications) with people who take on a caregiver role (i.e., teachers) for children with epilepsy cannot be harmful, but rather only helpful for the children, parents, and medical professionals (Bourgeois, 2002; Deckers et al., 2001; Tennison et al., 1998)

## Theoretical Framework

In two theoretical articles exploring the relationship between chronic illness and successful school reentry, Sexson and Madan-Swain (1993, 1995) posited that four sets of factors influence successful school reentry among children with chronic illness. There are factors related to (a) the illness, (b) caregivers' attitudes, (c) factors associated with the child (patient) him or herself, and (d) education and health care resources available within school systems. The Sexson and Madan-Swain (1993, 1995) model of chronic illness and successful school reentry is illustrated in Table 3.

Table 3

*Sexson and Madan-Swain's List of General Factors Associated with Successful School Reentry and Specific Predictors Used in This Study*

General model predictors for successful school reentry	Epilepsy specific predictors for successful school reentry
Illness Factors	Treatments and medication effects for epilepsy <b>Seizure activity (e.g., type, frequency)</b>
Attitudes of Caregivers	<b>Teachers' attitude towards epilepsy</b> <b>Teachers' training experience with</b>

## **epilepsy**

	Epilepsy-related cognitive effects
Child Factors	Epilepsy-related behavior and attention effects
Education and Healthcare Resources	Access to appropriate healthcare and educational resources in the school

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Note. Items in bold are specific predictor variables used in this study

In support of Sexson and Madan-Swain's model, subsequent researchers have found that chronic illnesses affect children across numerous scholastic areas. A review of the relevant literature found that chronic illnesses affected children's cognitive abilities, school attendance, and created social and emotional difficulties (Shapiro & Manz, 2004). Academic difficulties and persistent underachievement were common among children diagnosed with chronic illnesses (Sexson & Madan-Swain, 1995). Many teachers appear unaware of the potential effects that chronic illnesses may have on school-age children (Bannon, Wildig, & Jones, 1992). This lack of knowledge may be due to a breakdown in communication between the children's families and the children's school systems. There appears to be a gap in schools' knowledge regarding the potential impact of chronic illnesses, such as epilepsy, on school performance, as discussed in detail later.

School performance outcome variables in the present study will be measured through attendance, achievement scores, and special education

enrollment variables. The present study’s epilepsy-specific variables are illustrated in the Table 4.

Table 4

*School Performance Outcome Domains and the Specific Variables Used in This Study*

General Domain	Specific variables used in the present study
Attendance	School absences (full days of school missed)
Academic achievement	Math Standardized Scores (group administered)
	Writing Standardized Scores (group administered)
	Reading Standardized Scores (group administered)
School Service	Enrollment in special education

Note. Math, Writing, and Reading standardized scores will be obtained from Terra Nova tests scores.

Shapiro and Manz (2004) theorize that epilepsy, as a chronic illness, may affect children’s cognitive abilities, behaviors, attending skills, social skills, and enrollment in special education. With children attending school most of their waking hours, schools and school personnel become crucial in the implementation of treatments and interventions (Shapiro & Manz). Having school personnel with positive attitudes and appropriate training experiences with epilepsy may

improve school performance for children with epilepsy (Sexson & Madan-Swain, 1995). For that reason, it is only natural that schools and school personnel should collaborate with parents, physicians, and patients on the treatment of epilepsy.

The purpose of the present study is to assess teachers' attitudes towards epilepsy, their training experiences regarding epilepsy, and the level of seizure control among students with epilepsy that they are teaching in order to determine the effect of these factors on school performance. A description of this study's setting and participants, research design and instrumentation, and method of data analysis are presented in detail in Chapter 2.

## **Review of Literature**

The first broad factor, Attitudes of Caregivers, is comprised of two variables (teacher attitudes and teacher training experiences). It is noteworthy that Sexson and Madan-Swain places teachers' training experiences in the "Attitude" factor despite its competence and knowledge components. In addition, the literature review indicates that teachers' attitudes include information about stigmatization and misinformation about epilepsy in schools. The second broad factor, Illness Factors, a single variable is used, entitled Seizure Control. Following a review of relevant literature, the present study's research questions with associated hypotheses are presented.

**Predictor: Caregivers' (teachers') attitudes.** Attitudes of teachers are an integral aspect of the Sexson and Madan-Swain (1993, 1995) model that this study will address. Sexson and Madan-Swain theorize that school performance is impacted by "caregiver" attitudes in all functional settings (i.e., home, school, after school care, etc.). It is hypothesized that caregivers' attitudes can inadvertently stigmatize students through misinformation, and thus alienate them from their peers. It is also believed that they sometimes disseminate incorrect information about the student and his/her illness to others (Sexson & Madan-Swain, 1993).

**Teachers' attitudes.** Attitudes and beliefs about chronic illnesses held by influential school personnel are hypothesized to directly impact children's comfort levels in schools. Often teachers and other school personnel may be



concerned that they are not prepared for a medical emergency, and, thus, they are distant and unsure when interacting with chronically ill children (Sexson & Madan-Swain, 1995). Additionally, teachers may feel added pressure to take care of a chronically ill student emotionally, physically, and attentionally, all the while properly teaching the other students in the class. This can create anxiety and frustration for chronically ill children, parents, teachers, other students, and other school personnel (Sexson & Madan-Swain, 1993).

Bishop and Slevin (2004) found that in the last two decades very little research has been focused on epilepsy in the schools and particularly teachers' attitudes regarding epilepsy. An empirical study by these researchers attempted to bridge this apparent gap by exploring teachers' knowledge and attitudes towards epilepsy. One hundred and thirty-five teachers from elementary and middle schools in Kentucky participated. Of the participants 58% reported that they knew a person with epilepsy, 44% had taught a person with epilepsy, but only 12% were currently teaching a student diagnosed with epilepsy (Bishop & Slevin, 2004). This study used the Test of Knowledge about Epilepsy (KAE; Antonak & Livneh, 1995), which is a 40-question error-choice test. The KAE is presented as an "information" test, however all responses are incorrect and the respondent selects the answer that most closely aligns with their personal attitude towards epilepsy (Bishop & Slevin, 2004). Respondents on the KAE receive a single attitude score ranging from -20 (most negative attitude) to +20 (most

positive attitude) based on the responses chosen. Nearly 30% of teachers' attitude ratings were in the negative range, meaning they had an overall negative attitude towards epilepsy, and 11% had negative scores greater than one standard deviation below the mean (Bishop & Slevin, 2004). Researchers found more positive attitude scores, as measured by the KAE were associated with length of teaching experience, currently teaching a student with epilepsy, and having taught a person with epilepsy in the past. Of these variables, teaching experience was the most important predictor of attitude towards epilepsy (accounting for 22.8% of the variance; Bishop & Slevin, 2004). Although this study does impart valuable information regarding teachers' attitudes towards epilepsy, it does not link teachers' attitudes and students' school success, which is one purpose of the present study.

Additionally, a study of 346 Turkish teachers found noteworthy results on an attitude towards epilepsy survey (Bekiroglu, Ozkan, Gurses, Arpaci, & Dervent, 2004). Of the participants, 6.1% felt that a child with epilepsy could not be successful in school, 6.6% felt they should not participate in sports, and 8.6% felt that they should not participate in social activities (Bekiroglu, Ozkan, Gurses, Arpaci, & Dervent).

In a similar study conducted in the United States, 512 teachers completed the Attitude Towards Persons with Epilepsy survey (Antonak, 1990). Predictors associated with a more positive attitude towards epilepsy were length of teaching

experience, being female, having a current student diagnosed with epilepsy, self-reported epilepsy knowledge, and teaching in an urban environment rather than a rural environment (Bishop & Boag, 2006). Scores on the survey were positively correlated with teachers' attitudes towards epilepsy, meaning as scores increased on this measure, attitudes towards epilepsy became increasingly more positive. The mean Total Attitude score for all participating teachers was 109.85 ( $SD=11.04$ , range 40-126), with possible scores between 21 and 126 (Bishop & Boag, 2006). Although the average score indicated a positive attitude towards epilepsy, some items point to a more negative attitude. With individual item ranges between strongly disagree (-3) to strongly agree (3), teachers reported that people with epilepsy are more likely to develop and act on criminal tendency (mean = 2.28), prefer to live in communities with similar people (mean = 2.08), equal employment opportunities should be available to individuals with epilepsy (mean = -2.01), families of children with epilepsy should not be provided supportive social services (mean = 2.68; Bishop & Boag, 2006).

Teachers' instructional grade level also seems to play an important role in shaping their attitudes towards persons with epilepsy. In a study of primary schools, middle schools, and colleges in Brazil, teachers at the college level had a more positive outlook on people with epilepsy (Dantas, Cariri, Cariri, & Filho, 2001). The teachers participating in this study were divided into three groups: primary level teachers (middle school), secondary level teachers (high school), and

tertiary level teachers (college). Of the middle school teachers, 66% taught in public schools, 89% were female, 26% were younger than 29 years of age, 69% were between the ages of 30 and 49 years, and 5% were older than 49 years of age, 27% had only graduated from high school, 70% had graduated from college, and 3% had graduated from a graduate program. Of the high school teachers, 27% taught in public schools, 60% were female, 26% were between the ages of 0 and 29, 65% were between the ages of 30 and 49, and 9% were older than 49, 9% had graduated from high school, 81% had graduated from college, and 10% had graduated from a graduate program. Of the college teachers, 83% taught in public schools, 51% were female, 6% were between the ages of 0 and 29, 81% were between the ages of 30 and 49, and 13% were older than 49, 4% had graduated from high school, 41% had graduated from college, and 55% had graduated from a graduate program (Dantas, Carirr, Carirr, & Filho, 2001). Researchers found many differences among the three instructional levels of teachers. Seven percent of primary school teachers would object to having a student with epilepsy in their classroom versus 5% of middle school teachers, whereas this was true of none of the college teachers. Only 83% of primary school teachers felt that students with epilepsy were as intelligent as their classmates versus 87% of middle school teachers and 93% of college teachers. Lastly, 85% of primary school teachers felt that people with epilepsy could become teachers themselves compare to 86% of

middle school teachers and 91% of college teachers (Dantas, Carirr, Carirr, & Filho, 2001).

Although these studies impart valuable information regarding teachers' attitudes towards epilepsy and people with epilepsy, they do not address how teachers' attitudes affect students with epilepsy, which is one aspect of the present study.

***Misinformation and stigmatization.*** The previously discussed studies indicated that overall teachers have relatively positive attitudes towards persons with epilepsy, however negative perceptions do exist. Negative attitudes towards individuals diagnosed with epilepsy often create misconceptions and stigmatize those affected (Bishop & Boag, 2006; Bishop & Slevin, 2004; Bekiroglu, Ozkan, Gurses, Arpaci, & Derwent, 2004; Dantas, Carirr, Carirr, & Filho, 2001).

In studying 216 Croatian teachers, researchers found that teachers often make concessions for students with epilepsy. Nearly 85% of teachers reported lowering grading standards for students with epilepsy, thereby alienating them from their peers (Prpic et al., 2003). In addition to an educational stigma associated with epilepsy, misinformation about the illness is common. According to the research, 54.2% of teachers believed that there are behavioral differences between children with epilepsy and children without (Prpic et al.). Over 53% of teachers believed that there is a difference in the rates of educational program mastery between children with epilepsy and children without (Prpic et al.).

Furthermore, a study of 159 teachers in Zambia found that only 74.7% of teachers would allow a student with epilepsy in their classroom. The percentage drops to 61.2% for children with active seizures (Birbeck, Chomba, Atadzhanov, Mbewe, & Haworth, 2006).

It appears that children with epilepsy themselves harbor misconceptions. For example, a study of 50 children and adolescents in the eastern U.S. with idiopathic epilepsy found that, of the children who experienced seizures in the third grade through the fifth grade, only 40% said that the brain was involved in their seizures. The percentage decreases to 36% in the sixth through eighth grade (Sanger, Perrin, & Sandler, 1993).

Misconceptions regarding epilepsy come from many sources; however, in schools misconception may often be the result of a lack in communication between parents and teachers. In a review of literature related to the medical care for children with epilepsy, researchers found that, in younger school aged children, the stigma associated with epilepsy could lead to secrecy from both child and parents. This in turn limits the quantity and quality of education about the disorder and the dissemination of appropriate information to school officials (Ziegler, Erba, Holden, & Dennison, 2000). Furthermore, a study of 142 schoolteachers across 12 mainstreamed schools in England indicated that teachers were informed of their students' medical conditions in a variety of manners. Of the 81 teachers who had taught students with epilepsy, only 49% were informed

of the child's medical condition by the child's parents, 30% learned after the first in-class seizure, and 14% of teachers spoke to the school nurse or the child's doctor (Bannon, Wildig, & Jones, 1992). Teachers reported that they welcomed conversations with parents regarding medical conditions. Teachers cited the following questions that would aid in their understanding of children with epilepsy in school: seizure frequency, current medications, indications of an impending seizure, and emergency contact information (Bannon, Wildig, & Jones).

**Predictor: Caregivers' (teachers') training experiences.** Training experience with epilepsy is hypothesized to affect school performance (Sexson & Madan-Swain, 1993). In this study, caregivers' tendencies to stigmatize a student's epilepsy and hold stigma-related misinformation and caregivers' training experience with epilepsy are of interest.

***Teachers' training experience.*** In addition to the educational impact resulting from caregiver attitudes towards epilepsy, caregivers' lack of training experiences with epilepsy can impact school performance. According to Bishop and Boag (2006), training experience (defined as: years teaching, experience teaching a student with epilepsy, currently teaching a student with epilepsy, self-reported general knowledge of epilepsy, frequency of contact with persons with epilepsy, and location of school in an urban or rural district) is a significant predictor of knowledge as it relates to epilepsy ( $R^2=0.091$ ,  $P < .001$ ). However, it appears that very few teachers receive training in chronic illnesses generally, let

alone in epilepsy specifically. For example, a study of Ohio teachers' knowledge regarding chronic illness found only 15.2% of the 247 teachers participating reported being very well informed about epilepsy (Nabors, Little, Akin-Little, & Iobst, 2008). These same teachers had lower confidence in meeting both academic and social needs of students with epilepsy, as 27.9% and 33.6% of teachers were very confident in their abilities in those respective areas (Nabors, Little, Akin-Little, & Iobst).

Concurrently, a study of 142 school teachers across 12 mainstreamed schools in England researchers found that teachers received little or no education and training concerning children with chronic illnesses (Bannon, Wildig, & Jones, 1992). Teachers without appropriate training experiences were often less confident and unsure of teaching students with epilepsy. Researchers determined that only 5% of teachers felt very confident, whereas 64% of teachers stated that they did not feel comfortable or confident teaching children with epilepsy. Of the teachers surveyed, only 3% reported having a course on epilepsy in their training and only 22% had ever read any literature regarding epilepsy (Bannon, Wildig, & Jones). Findings also indicated that teachers would welcome additional training, as it would be applicable to other chronic illnesses. Ninety-two percent reported that additional training in childhood epilepsy would "be of benefit and also requested instruction in asthma, diabetes, haemophilia, cystic fibrosis, hearing impairment, and AIDS" (Bannon, Wildig, & Jones, p.1469). Teachers recognize the need for



additional training to broaden their understanding of epilepsy and their ability to teach children with epilepsy (Bannon, Wildig, & Jones).

Bishop and Boag (2006) found that only 14% of teachers in their study reported receiving adequate training in dealing with students with epilepsy in their teaching programs. Additionally, 95.3% and 92.1% of teachers, respectively, reported wanting information that is more general on epilepsy and wanting more information on dealing with children having a seizure in school (Bishop & Boag, 2006).

In addition to exploring the training experiences of teachers, research has also shown that when teachers are provided training, knowledge about epilepsy and attitudes towards epilepsy improve. The study of Turkish teachers found an overall improvement in knowledge of epilepsy, attitude towards epilepsy, and management of epilepsy after the teachers attended four lectures specifically addressing epilepsy and persons with epilepsy (Bekiroglu, Ozkan, Gurses, Arpaci, & Dervent, 2004). Researchers found that prior to the lectures 39.1% of teachers believed that all patients with epilepsy have the same symptoms, compared to only 6.5% of teachers after the lectures. Before the lecture only 42% of teachers felt they would know how to help a person with epilepsy during a seizure, compared to almost 98% of teachers after the lecture. Prior to the lectures, less than 94% of teachers felt that children with epilepsy could be successful in normal classrooms. However, after the lecture almost 99% of

teachers reported that children with epilepsy could be successful in a normal classroom (Bekiroglu, Ozkan, Gurses, Arpaci, & Derwent).

Overall, these studies do impart valuable information concerning teachers' training and real-world experiences regarding epilepsy; however, they do not include any school-specific variables (e.g., attendance, placement in regular education, standardized test scores), which is a primary goal of the present study.

**Predictor: Illness factors (seizure control).** The Sexson and Madan-Swain model defines illness factors as any treatments and medications children (patients) receive, any illness-related side effects, and any side effects resulting from treatment for the illness. Seizures and their frequency define epilepsy. Therefore, in this study degree of seizure control is the most critical illness factor. Hence, the literature regarding seizure control and its impact on school adjustment and functioning is presented below.

***Seizure control.*** In children with epilepsy, poor seizure control can impact their lives in many ways (The Epilepsy Foundation, 2008b). For example, an Israeli study exploring educational outcome found that poor seizure control (full seizure control was defined as two years without a seizure) was a predictor of special education services (Zelnik, Sa'adi, Silman-Stolar, & Goikhman, 2001). This study examined 102 children with epilepsy, of which 19 patients continued to have multiple seizures despite treatment. Seventeen (89%) of the children without full seizure control (defined as two years without a seizure) needed special

education services in the schools. Of these seventeen, ten required services for mental retardation (Zelnik, Sa'adi, Silman-Stolar, & Goikhman).

Additionally, in a study of 69 primary school children with epilepsy in the United Kingdom, researchers found that seizures were considered well-controlled (fewer than one per month) in 56 percent of children participating in regular education and in only 30 percent of children in special education placements (Tidman, Saravanan, & Gibbs, 2003).

Similar associations may exist between seizure control and behavior. In a study of 59 children with epilepsy, aged 7 to 10 years old and recruited from child neurology clinics and private pediatric neurology practices in Virginia, children without adequate seizure control had higher (more symptomatic) Child Behavior Checklist (CBCL; Achenbach, 1991) parent ratings than children displaying good seizure control. Differences were found in the following symptomological areas: anxiety/depression, social problems, thought problems, and attention problems (Nicholas & Pianta, 1994). In the same study, teacher, rather than parent, ratings of the same 59 children on the CBCL produced no significant differences on any CBCL domains (Nicholas & Pianta). Surprisingly, even though this study obtained behavioral data reported by teachers, no actual school data, such as attendance or standardized scores, were obtained for analysis.

Regarding memory, a study comparing 84 children with epilepsy, ranging in age from 6 years to 16 years old, found children with uncontrolled seizures had

greater difficulty recalling complex verbal information than children with better seizure control. In this study, complex verbal recall was measured by the Wide Range Assessment of Memory and Learning (Sheslow & Adams, 1990; Williams, Sharp, Lange et al., 1996). However, the memory skills of the children studied were commensurate with the children's cognitive scores, as measured by the Wechsler Intelligence Scale for Children, Revised Edition (Wechsler, 1974). Again, in this study, no school data were obtained; findings were derived exclusively from cognitive and memory tests administered outside of school.

In summary, research indicates that degree of seizure control is associated with several school based and non-school based outcomes. These include need for educational services, parents' ratings of behavior, and scores on psychometric tests of memory administered outside of school (Alanis-Guevara et al., 2005; Nicholas & Pianta, 1994; Williams, Sharp, Lange et al., 1996; Zelnik, Sa'adi, Silman-Stolar, & Goikhman, 2001). Although research alludes to the impact of epilepsy on school functioning in children with epilepsy, there are no known U.S. studies to date that incorporate school data (i.e., attendance, standardized scores, and enrollment in special education) and epilepsy.

**Summary of literature review.** Given the chronic and potentially life-altering impact of epilepsy and the essential role of schools in its management, this study seeks empirical information on the impact of teachers' attitudes towards epilepsy, teachers' training experiences with epilepsy, and seizure

control on school performance for children with epilepsy. Past research in this area focused on the impact epilepsy has on children's cognitive abilities, learning abilities, attention problems, behaviors, and treatments for the illness without regard for school factors such as attendance, enrollment in special education, and achievement scores. These studies have relied on intelligence testing, behavior rating scales, academic scores, parent and teacher reports, and physician records. The studies, although providing valuable information, do not systematically consider children with epilepsy from an educational point of view. That is, previous studies rarely examine critical school data other than academic assessments and teacher rating scales. No known study to date has assessed school performance as measured by attendance, standardized test scores, and school services. Additionally, previous studies have failed to include the attitudes and training experiences of school personnel as they influence school performance. The present study seeks to bridge this gap in research.

***Research questions and hypotheses.*** The current study is designed to seek answers to the following three research questions and the hypotheses associated with them.

*Research question one.* What effects do teachers' attitudes towards epilepsy, teachers' training experience regarding epilepsy, and student seizure control have on student attendance?

*Hypothesis one.* Teachers' attitudes towards epilepsy, teachers' training experience regarding epilepsy, and student seizure control predict student attendance.

*Research question two.* What effects do teachers' attitudes towards epilepsy, teachers' training experience regarding epilepsy, and student seizure control have on student achievement (mathematics, writing, and reading)?

*Hypothesis two.* Teachers' attitudes towards epilepsy, teachers' training experience regarding epilepsy, and student seizure control predict student achievement (mathematics, writing, and reading).

*Research question three.* What effects do teachers' attitudes towards epilepsy, teachers' training experience regarding epilepsy, and student seizure control have on students' enrollment in special education?

*Hypothesis three.* Teachers' attitudes towards epilepsy, teachers' training experience regarding epilepsy, and student seizure control predict student enrollment in special (vs. regular) education.

## **Chapter 2**

### **Methodology**

This chapter details the present study's setting and participants, instrumentation for collecting data, procedures for collection of data, and processes to analyze the resultant data.

#### **Participants**

Participants were recruited from the Paradise Valley Unified School District and the Mesa School District. Paradise Valley Unified School District encompasses 31 elementary schools, 8 middle schools, and 5 high schools, as well as scattered ancillary programs. The Mesa School District is made up of 57 elementary schools, 13 junior high schools, and 6 senior high schools.

According to national statistics, .5% to 1% of the population of the U.S. has epilepsy (The Epilepsy Foundation, 2008a). The Paradise Valley Unified School District had 34,000 K-12 students enrolled and the Mesa School District had 72,604 K-12 students enrolled during the 2007-2008 school year. Thus, 533 to 1066 students are likely to have epilepsy, based on a frequency rate of .5 percent to 1 percent. The inclusion criteria for this study were: enrollment in the Paradise Valley Unified School District or Mesa School District grades 2-12, a diagnosis of epilepsy by a medical professional, and a record of the diagnosis in the student's school medical file. Exclusion criteria were: enrollment in first grade

or lower and enrollment in a self-contained special education program (determined through parental reports and district records).

## **Constructs and Instruments for Measurement**

### **Predictor variables.**

*Measuring teachers' attitudes towards epilepsy.* According to the *Attitude Towards Persons with Epilepsy Scale* (ATPE), attitudes towards epilepsy, for the purposes of the present study, are defined as personally held beliefs and preconceptions relating to epilepsy, persons with epilepsy, and how those with epilepsy should live their lives (Antonak & Rankin, 1982). In the present study, teachers' attitudes towards epilepsy were measured by the ATPE (Appendix F; Antonak & Rankin). The ATPE is a rating scale developed as a "contemporary, brief, easy to administer and score, psychometrically sound instrument" for the assessment of attitudes, knowledge, and training experience regarding epilepsy and persons with epilepsy (Antonak & Rankin, p. 59). In the present study, the attitude and training experience sections were utilized independent of each other. There was no analysis of the scale as a whole.

The ATPE was originally published in 1982 and was used in the Bishop and Boag (2006) study exploring teachers' attitudes towards epilepsy and knowledge of epilepsy. The ATPE scale was originally validated in 1982 and then again in 1990. Item content was gathered through literature reviews, previously published attitudinal scales towards persons with chronic illnesses, interviews



with experts in the fields of epilepsy, neurology, special educators, and rehabilitation counselors. The scale includes 33 items of which there are 5 items related to training experiences, 17 items related to attitude, 7 items related to knowledge, and 4 combined attitude and knowledge items. Participants are asked to rate each of the 28 attitude or knowledge questions on a 6-point scale ranging from “I disagree very much” to “I agree very much.” The scores on each of the three factors comprise Total Attitude, Total Knowledge, and Total Training Experience. Table 5 illustrates the three factors and related questions on the ATPE.

Table 5

*ATPE factors and their individual items*

ATPE	Survey questions
Factors	
Total	1. Schools should not place children with epilepsy into regular classrooms.
Attitude	2. People with epilepsy have the same rights as all people.
Factor	5. Insurance companies should not deny insurance to an individual with epilepsy.
	6. The individual with epilepsy should not be prevented from having children.

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7. People with epilepsy should be prohibited from driving.
  8. Children with epilepsy should attend regular schools.
  9. The onset of epileptic seizures in an adult should be sufficient grounds for divorce.
  11. People with epilepsy are a danger to the public.
  12. The responsibility for educating children with epilepsy rests with the community.
  13. Individuals with epilepsy are accident-prone.
  14. Children need to be protected from classmates with epilepsy.
  15. Parents should expect of their child who has epilepsy what they expect of their other children
  17. People with epilepsy are more likely to develop and express criminal tendencies than other people.
  18. People with epilepsy should not be prohibited from marrying.
  19. Laws citing epilepsy as the basis for the annulment of adoption should be repealed.
  20. People with epilepsy prefer to live with others of similar characteristics.
  21. Equal employment opportunities should be available to individuals with epilepsy.
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	24. When their seizures are controlled by medication, people with epilepsy are just like anyone else.
	25. Families of children with epilepsy should not be provided supportive social services.
	27. Children with epilepsy in regular classes have an adverse effect on the other children.
	3. People with epilepsy can safely operate machinery.
	<hr/>
	4. The individual with epilepsy does not possess a normal life expectancy.
	7. People with epilepsy should be prohibited from driving
	10. Individuals with epilepsy are also mentally retarded.
	13. Individuals with epilepsy are accident-prone.
Total	16. People with epilepsy can safely participate in strenuous activity.
Knowledge	18. People with epilepsy should not be prohibited from marrying.
Factor	22. You can expect the condition of a person with epilepsy to deteriorate.
	23. The offspring of parents with epilepsy will also have epilepsy.
	26. Epilepsy is not a contagious disease.
	28. Individuals with epilepsy can cope with a 40-h workweek.
	How many educational classes, related to your degree, addressed

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	How many educational classes, related to your degree, addressed epilepsy.
	Please rate your educational training (direct classes, in-service, etc.) in understanding treatments for epilepsy.
Total Training Experience Factor	Please rate your educational training (direct classes, in-service, etc.) in understanding medications used to treat epilepsy, including possible side effects.
	Please rate your educational training (direct classes, in-service, etc.) in understanding how epilepsy impacts education for children with epilepsy.
	Please rate your general knowledge of the conditions and life

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Note. Knowledge and Attitude responses range from -3 (I disagree very much) to +3 (I agree very much). Training Experience responses range from 0 classes/training experiences, “no knowledge” to 9 or more classes/training experiences, “extensive knowledge.”

The scale was normed on 292 individuals enrolled in college courses at the University of New Hampshire between July 1983 and September 1987. The current study will use the Total Attitude raw score for all teacher participants. However, an item analysis for the Total Attitude portion of the scale indicated satisfactory item characteristics among all questions, with an item-to-total-scale correlation of 0.42 (range 0.28-0.52; Antonak, 1990). Item analysis for the Total

Knowledge portion of the scale indicated characteristics among all questions to be satisfactory, with an item-to-total scale correlation of 0.46 (range 0.25-0.60; Antonak). The mean Total Attitude mean score was 112.58 (range 69-126;  $SD=10.06$ ), with a common shared variance value of 0.60. The Total Knowledge mean score was 9.65 (range 3-11;  $SD=1.27$ ) with a Kuder-Richardson formula reliability estimate reliability value of 0.54 (Antonak).

*Measuring teachers' training experience regarding epilepsy.* Teachers' training experiences regarding epilepsy was measured by the previously discussed *Attitude Toward Persons with Epilepsy Scale* (ATPE; Appendix F; Antonak & Rankin, 1982). The ATPE contains 5 items targeting training experience with epilepsy, which are illustrated in Table 5.

Antonak and Rankin (1982) allowed for adaptation of their original scale by other researchers in the area of training experiences (Appendix E). In doing so, researchers are able to tailor the training experience factor to address a specific population (i.e., medical doctors, teachers, parents; Antonak & Rankin). The participants are asked to rate each of the training experience questions on a Likert scale ranging from 0 classes/training experiences, "no knowledge" to 9 or more classes/training experiences, "extensive knowledge." The present study used the Total Training Experience score, which is comprised of the 5 items in the training experience section of the ATPE.

Analyses on the training experience factor were not known at the time of publishing, and are dependent upon the adaptations of the researcher (Antonak & Rankin).

***Seizure control.*** Seizure control is a predictor variable in the present study, which is addressed through parental reporting of the number of seizures their child experiences in a typical month. Seizure control was measured by parental reporting on the Seizure Questionnaire (SQ; Appendix G), which was specifically created for the present study. Question Readability, and face validity of the Seizure Questionnaire was established through small focus groups that was comprised of parents, teachers, and university graduate students. Content validity was established through small focus groups comprised of nurses. The questionnaire was revised based on feedback and suggestions given by the focus group. Parents were asked the following questions for generalizability and further understanding regarding their child and epilepsy: when was your child first diagnosed with epilepsy (5+ years ago to within 6 months), is your child being currently treated for epilepsy (yes/no), are they currently taking any medication for epilepsy (yes/no), and how many medications are they taking for epilepsy. Parents were asked the following question to determine the level of seizure control relating to their child: in a typical month, how many seizures does your child have (5 or more to no seizures).

**Outcome variables (academic achievement, absences, and regular education enrollment).** The nationally normed, standard school achievement test administered to all second grade through ninth grade students in Arizona is the Terra Nova (Terra Nova; Appendix H), which measures grade-based reading, writing, and mathematical skills. Scores are reported as national stanines (range 1-9) and as national percentiles (CTB McGraw-Hill, 2000). These data were gathered for every child participating in the study through the school district's student data system. The three academic areas assessed through Terra Nova testing were treated as separate outcome variables. In addition to Terra Nova scores, online student files were reviewed to obtain information about the participating child's history of absences (measured through number of full-day absences during the preceding year) and school services (i.e., enrollment in regular education or enrollment in special education) the child is receiving.

**Demographics for generalization.** Parent-reported demographics on their children and their children's epilepsy-related medical information comprised the first section of the previously discussed SQ. The first section is a brief demographic survey filled out by parents regarding their child/children. General background information (i.e., age of the child, child's gender, child's heritage, and child's grade level) and epilepsy-related medical information (i.e., time of diagnosis, treatments, and number of medications) aided in understanding the participants, their illness, and the treatments that may impact their education.

Teacher-specific demographics comprised the first section of the previously discussed ATPE. The initial section of this questionnaire is a brief demographic survey requesting general information regarding the teacher's background (i.e., age, gender, heritage, marital status, and level of education). These data were reported with findings so that a determination can be made about how results of this study can be generalized.

### **Procedure**

The study began after approval for the use of human subjects by the Arizona State Institutional Review Board (Appendix A). Approval to conduct the study in the Paradise Valley Unified School District was obtained from the Director of Special Education. Approval to conduct the study in the Mesa School District was obtained from the Research and Evaluation department. Parent participation was required from one parent of each student enrolled in the study and all parent forms were forward and backwards translated into Spanish for parents who were more comfortable speaking in their native language. Homeroom teacher participation was required for each student enrolled in the study. School nurses' participation was required in order to obtain the students' permission to participate in the study. At a regularly scheduled monthly meeting of all district nurses, a letter of invitation to participate in the study (Appendix B) was dispersed to each nurse. Nurses who agreed to participate were given a form to document their consent to participate in the present study at that time (Appendix



C) and asked to return the form to a designated location for collection. Afterwards, each nurse was asked to (a) search his/her own school's medical files for students identified as having epilepsy, (b) obtain the addresses of the parents of identified students, (c) address and mail pre-stamped envelopes containing a parental invitation to participate (English and Spanish), parental consent form (English and Spanish), parental consent-to-release-records form (English and Spanish), and parental survey to the parents of children with epilepsy (English and Spanish), and (d) immediately, upon receipt, forward all returned parental consent forms and parental surveys to Larkspur Elementary School (the primary school assigned to the present research study) in the Paradise Valley Unified District. Using these procedures, teachers, who had identified children with epilepsy with returned parental consent forms, were identified through the online student information database maintained by the school districts.

After school nurse and parental consent to participate in the present study were obtained, email addresses of teachers, who were currently teaching the identified students with epilepsy with parental consent forms in their classes, were obtained from the district-wide email system, to which every teacher has access. A teacher invitation to participate in the study was then emailed to each teacher individually, which included information indicating that the student is participating in a research study with ASU/PVUSD/MSD. Parent permission was indicated in the letter, but no information regarding the research hypotheses was

disclosed. In addition to the electronic letter, teachers were individually provided with access to SurveyMonkey (2008) where they found a consent to participate form and the ATPE survey instrument.

**Obtaining school records.** The participants' schools were faxed a copy of the parental consent-to-release-records form. This form requested that available educational records (Terra Nova data, attendance records, and school services) be mailed or e-mailed directly to Larkspur Elementary School.

**Data maintenance.** As forms come in they were kept in a locked cabinet in the Paradise Valley Unified School District. All electronic data received during this study were stored on a Paradise Valley School District computer, and are only accessible by password. Records acquired throughout this study were transferred to Arizona State University with identifying information removed and maintained for five years after the completion of the study and then destroyed.

### **Research hypotheses and analyses of data**

This section discusses the statistical analysis of data and includes discussion regarding how the sample of participants was analyzed, the proposed predictors, and how each predictor was statistically analyzed.

**Descriptive statistics.** Descriptive statistics (mean and range) were calculated prior to hypothesis testing on the following teacher variables: age, sex, highest level of education earned, ethnicity, and teaching level (elementary, middle, or high school). Additionally, descriptive statistics (mean and range) were

calculated prior to hypothesis testing on the following child variables: age, ethnicity, sex, grade, age of epilepsy diagnosis, current treatments, and number of AEDs the child is currently taking. Additionally, a correlation matrix was reported for the predictor variables and coefficient alpha, an internal consistency estimate for scales, was utilized to explore the individual questions on the ATPE Attitude factor.

### **Analyses related to hypotheses.**

*Hypothesis one.* Hypothesis one states that teachers' attitudes towards epilepsy, teachers' training experience regarding epilepsy, and student seizure control predict student attendance. To examine hypothesis one, a multiple regression analysis was conducted to investigate which of the variables, if any, were the best predictors for student attendance.

An *F*-test was used to assess whether the set of independent variables collectively predicts the dependent variable. *R*-squared was reported and used to determine how much variance in the outcome variable could be accounted for by the set of predictor variables. A *t*-statistic was used to determine the significance of each predictor, and beta coefficients were used to determine the extent of prediction for each predictor variable. To determine effect size, a part correlation squared was assessed for each predictor variable. Lastly, a model using interaction effects was used for supplemental analysis. Table 6 illustrates hypothesis one, predictor variables, outcome variable, and statistical analyses performed.

Table 6

*Hypotheses and statistical analyses*

Hypothesis	Teachers' attitudes towards epilepsy	Teachers' training experience regarding epilepsy	Student seizure control	Attendance	Student achievement (mathematics, reading, writing)	Enrollment in special education	Statistical analysis
1	PV	PV	PV	OV			<b>Multiple regression</b> <b>F-test</b> <b>t-test</b>
2	PV	PV	PV		OV (mathematics) OV (reading) OV (writing)		<b>Multiple regression</b> <b>F-test</b> <b>t-test</b>
3	PV	PV	PV			OV	<b>Logistic regression</b> <b>F-test</b> <b>t-test</b>

*Note.* PV=Predictor Variable, OV=Outcome Variable

**Hypothesis two.** Hypothesis two states that teachers' attitudes towards epilepsy, teachers' training experience regarding epilepsy, and student seizure control predict student achievement (mathematics, writing, and reading). To examine hypothesis two, a multiple regression analysis was conducted to investigate which of the variables (teachers' attitudes towards epilepsy, teachers' training experience regarding epilepsy, and student seizure control), if any, were the best predictors for student achievement (mathematics, writing, and reading).

Table 6 illustrates hypothesis two, predictor variables, outcome variables, and statistical analyses performed.

***Hypothesis three.*** Hypothesis three states that teachers' attitudes towards epilepsy, teachers' training experience regarding epilepsy, and student seizure control predict special education enrollment. To examine hypothesis three, a logistic regression analysis was conducted to investigate which of the variables (teachers' attitudes towards epilepsy, teachers' training experience regarding epilepsy, and student seizure control), if any, were the best predictors for special education enrollment. Table 6 illustrates hypothesis three, predictor variables, outcome variable, and statistical analyses performed.

## Chapter 3

### Results

This chapter presents (a) descriptive statistics for student participants, (b) descriptive statistics for teacher participants, (c) preliminary statistical analyses (i.e., means, standard deviations, and Cronbach's alphas) concerning the two different scales in Attitudes Towards Persons with Epilepsy scale, and (d) a correlation analysis for the three predictor variables. This is followed by multiple regression analyses for hypothesis one and two and a logistic regression analysis for hypothesis three.

#### Descriptive Statistics

Seventy-four students with epilepsy took part in the study, including 41 (55.4%) males and 33 (44.6%) females. Based on parent/guardian-report, the majority of the students were Caucasian (36, 48.6%; see Table 7 for a summary of demographic statistics). Students were enrolled in grades 2 through 12, and the greatest concentration was enrolled in middle school (33, 44.6%). Students' ages ranged from 8 to 18 years of age ( $M = 13.15$ ,  $SD = 2.58$ ). Many of the students were diagnosed with epilepsy five or more years ago (27, 36.5%). Twenty-nine students (39.2%) reportedly experienced less than 1 seizure per month, but the majority had at least one seizure per month (45, 60.8%). Fifty-four (73%) were currently being treated, and 54 (73%) were taking between one and three medications. Table 7 provides more details.

Sixty-six teachers (48 females, 72.7%; 18 males, 27.3%) took part in the research study, all of whom are currently instructing a student with epilepsy. Based on their self-reports, teachers ranged in age from 22 to 64 years ( $M = 45.55$ ,  $SD = 11.48$ ). The majority of teachers were Caucasian (56, 84.8%), and most had a Master's degree (35, 53%). Many teachers reported that one or more educational classes related to their degree addressed epilepsy, but 22 (33.3%) reported no such classes. Similarly, many teachers reported they had received at least one educational training experience devoted to understanding treatments for epilepsy, but 31 (47.0%) had no such experience. Similarly, the majority of teachers (39, 59.1%) had never had an educational training experience to help them in understanding medications used to treat epilepsy. A slight majority of the teachers had received at least some educational training experiences in understanding how epilepsy impacts the education of affected students. Nearly one-half of these teachers rated their general knowledge of conditions and life circumstances of persons with epilepsy as average (29, 43.9%) but more than one-third rated themselves as possessing below average knowledge (24, 36.4%). Table 8 provides additional descriptive statistic concerning this sample of teachers.

Table 7

*Frequencies and Percentages for Students with Epilepsy Demographics Based on Parental Reports (N = 74)*

Characteristic	# of Participants	%
<b>Gender</b>		
Female	33	44.6
Male	41	55.4
<b>Ethnicity</b>		
Black	11	15.1
Hispanic	19	26.0
Mixed	7	9.6
White	36	49.3
<b>Education type</b>		
Regular Education	40	54.1
Special Education	34	45.9
<b>School Level</b>		
Elementary School	15	20.3
Middle School	33	44.6
High School	26	35.1
<b>First diagnosed</b>		
1 year ago or sooner	7	9.5
2 years ago	11	14.9
3 years ago	14	18.9
4 years ago	15	20.3
5 or more years ago	27	36.5
<b>Number of seizures per month</b>		
0	29	39.2
1	15	20.3



2	9	12.2
3	7	9.5
4	3	4.1
5 or more	11	14.9
Currently being treated		
No	20	27.0
Yes	54	73.0
Currently taking medication		
No	20	27.0
Yes	54	73.0
Number of medications		
0	20	27.0
1	21	28.4
2	26	35.1
3	7	9.5

Table 8

*Frequencies and Percentages for Teacher Characteristics Based on Self-Reports*

(N = 66)

Characteristic	# of Participants	%
Gender		
Male	18	27.3
Female	48	72.7
Ethnicity		
White	56	84.8
Black	1	1.5
Hispanic	8	12.1
Asian	1	1.5

Highest Level of Education Earned		
College Senior	3	4.5
Bachelor's Degree	26	39.4
Master's Degree	35	53
Specialist Degree	1	1.5
Doctorate	1	1.5
Number of educational classes that addressed epilepsy		
0	22	33.3
1 to 2	26	39.4
3 to 4	17	25.8
5 to 6	1	1.5
Number of educational training experiences* in understanding epilepsy treatments for epilepsy		
0	31	47.0
1 to 2	25	37.9
3 to 4	10	15.2
Number of educational training experiences in understanding* medications to treat epilepsy		
0	39	59.1
1 to 2	21	31.8
3 to 4	6	9.1
Number educational training experiences in understanding* how epilepsy impacts education		
0	27	40.9
1 to 2	25	37.9

3 to 4	13	19.7
5 to 6	1	1.5

Note. \*Educational training experiences defined as direct instruction (i.e., class, field work, seminars, etc.) related to their degree.

### **Attitude Towards Persons with Epilepsy**

There is limited psychometric information about the Attitude Towards Persons with Epilepsy scale, one of the dependent measures used in this study, thus such characteristics of that scale are reported here before turning to results related to this study's several hypothesis. One scale of the ATPE is entitled the training experience scale, made up of four items that uses a six-point Likert scale. This scale measures teachers' exposure to any direct instruction, specific to epilepsy, they received in their degree program. In this study, these four items were recoded to a 1-6 scale (1 = no classes/no knowledge; 6 = nine or more classes/extensive knowledge) that teachers used to characterize their training experiences. After the items were coded, a total training score was creating by summing the items from each scale, with a range of 5-28 points. The mean total training experience score was 9.47 ( $SD = 3.31$ ), which is presented in Table 9. The mean and standard deviation for teacher responses on the training experience portion of the ATPE is presented in Table 9.

Another ATPE scale is the attitude (i.e., measuring personal beliefs and preconceptions relating to epilepsy) scale comprised of 20 items. Participants rated these 20 items in the forms of a Likert-type scale (-3 *disagree very much*; +3

*agree very much*), which were recoded prior to analysis. Ten negatively worded items were reverse scored and all values were computed to a 1-6 scale (1 = *disagree very much*; 6 = *agree very much*). The items were summed to provide an attitude scale total score that could range from 20 to 120, with high scores indicating a more positive attitude towards epilepsy. The means and standard deviations for the ATPE total attitude variable are presented in Table 9. The mean and standard deviation for teacher responses on the attitude portion of the ATPE is presented in Table 9.

Table 9

*Means and Standard Deviations of Self-Reported Teacher Responses on the ATPE*

*(n=66)*

ATPE Training Experience Questions	Mean*	SD
1. How many educational classes, related to your degree, addressed epilepsy?	-2.03	0.86
2. How many educational training experiences (direct classes, in-service, etc.) in understanding treatments for epilepsy, related to your degree, did you participate in?	-2.32	0.73
3. How many educational training experiences (direct classes, in-service, etc.) in understanding medications used to treat epilepsy (including possible side effects), related to your degree, did you participate in?	-2.50	0.66

5. How many educational training experiences (direct classes, in-service, etc.) in understanding how epilepsy impacts education for children with epilepsy, related to your degree, did you participate in?	-2.17	0.85
6. I feel my general knowledge of the conditions and life circumstances of persons with epilepsy is _____.	-0.48	0.81

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ATPE Attitude Questions

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1. Schools should not place children with epilepsy into regular classrooms.	-1.92	1.32
2. Persons with epilepsy have the same rights as all people.	2.70	0.55
3. Persons with epilepsy can safely operate machinery.	0.45	1.63
5. Insurance companies should not deny insurance to an individual with epilepsy.	2.20	1.52
6. The individual with epilepsy should not be prevented from having children.	2.45	1.07
7. Persons with epilepsy should be prohibited from driving.	-0.02	1.84
8. Children with epilepsy should attend regular public schools.	2.18	1.02
9. The onset of epileptic seizures in a spouse is sufficient reason for divorce.	-2.71	1.00
11. Persons with epilepsy are a danger to the public.	-1.21	1.76
12. The responsibility for educating children with epilepsy	0.38	1.85

rests with the community.

13. Individuals with epilepsy are accident-prone.	-0.36	1.87
14. Children need to be protected from classmates who have epilepsy.	-1.89	1.31
15. Parents should expect of their child who has epilepsy what they expect of other children.	2.05	1.16
17. Persons with epilepsy are more likely to develop and express criminal tendencies than are other people.	-2.79	0.48
18. Persons with epilepsy should not be prohibited from marrying.	2.47	1.57
19. Laws citing epilepsy as the basis for the annulment of adoption should be repealed.	2.36	1.15
20. Persons with epilepsy prefer to live with others of similar characteristics.	-0.56	1.96
21. Equal employment opportunities should be available to individuals with epilepsy.	2.33	1.11
24. When their seizures are controlled by medication, persons with epilepsy are just like anyone else.	2.27	0.95
25. Families of children with epilepsy should not be provided supportive social services.	-1.89	1.20
27. Children with epilepsy in regular classes have an adverse	-1.95	1.37

effect on the other children.

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Total Scores		
Training experience	9.47	3.31
Attitude	98.39	12.08

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*Note.* \*Means for the training experience scale are on a continuum from no training experiences as scores become more negative to many training experiences as they become more positive. Means for the attitude scale are on a continuum from “I disagree very much” as scores become more negative to “I agree very much” as they become more positive.

**Preliminary statistics of ATPE.** The ATPE scale was initially developed to assess the general public’s attitudes and knowledge regarding epilepsy and few studies have utilized this scale in an educational setting. As the scale was being administered to teachers, not the general public, Cronbach’s alphas were conducted to assess internal consistency reliability on the 20 items that comprise the ATPE attitude total score and the five items that comprise the ATPE training experience total score. The alpha results indicate good internal consistency reliability for attitude ( $\alpha = .87$ ) and excellent reliability for training experience ( $\alpha = .92$ ).

In addition, so that all data can be reviewed, a correlation matrix was constructed for the predictor variables (i.e., teachers’ attitudes towards epilepsy, teachers’ training experience regarding epilepsy, and student seizure control) and

outcome variables (i.e., attendance, mathematics achievement, writing achievement, reading achievement, and enrollment in special education; see Table 10). Among the correlations regarding the predictor variables, a statistically significant relationship was found between the Total Attitude score and student seizure control ( $r_s = -.23, p = .048$ ), indicating that teachers' attitudes about epilepsy were inversely related to the number of seizures student had per month. The coefficient of .23 is small in magnitude. No other significant relationships between the predictor variables were identified. There were significant correlations between outcome variables; however, in the present study, these variables were analyzed separate from each other.



Table 10

*Correlations between Predictor and Outcome Variables (N = 74)*

		1.	2.	3.	4.	5.	6.	7.	8.
1.Total attitude	Correlation	1.00	0.22	-.23*	-.28*	.30*	.55**	.63**	-.44**
	Sig. (2-tailed)		0.06	0.05	0.02	0.01	0.00	0.00	0.00
	N		74	74	74	74	74	74	74
2.Training total	Correlation		1.00	-0.04	-0.08	0.12	0.14	0.09	-0.03
	Sig. (2-tailed)			0.74	0.51	0.31	0.22	0.45	0.82
	N			74	74	74	74	74	74
3.Seizures control	Correlation			1.00	.83**	-.57**	-.47**	-.44**	.50**
	Sig. (2-tailed)				0.00	0.00	0.00	0.00	0.00
	N				74	74	74	74	74
4.Attendance	Correlation				1.00	-.53**	-.43**	-.41**	.41**
	Sig. (2-tailed)					0.00	0.00	0.00	0.00
	N					74	74	74	74
5.Terra Nova Math	Correlation					1.00	.75**	.67**	-.65**
	Sig. (2-tailed)						0.00	0.00	0.00
	N						74	74	74
6.Terra Nova Writing	Correlation						1.00	.81**	-.69**
	Sig. (2-tailed)							0.00	0.00
	N							74	74
7.Terra Nova Reading	Correlation							1.00	-.69**
	Sig. (2-tailed)								0.00
	N								74
8.Reg Ed/ Special Ed	Correlation								1.00
	Sig. (2-tailed)								
	N								

*Note.* \*\* Correlation is significant at the 0.01 level (2-tailed); \* Correlation is significant at the 0.05 level (2-tailed).

## Results Concerning Research Hypotheses

**Epilepsy and attendance.** Turning to the hypotheses in the study, hypothesis one concerned whether teachers' attitudes towards epilepsy, teachers'

training experience regarding epilepsy, and student seizure control predict student attendance.

To examine the first hypothesis, a multiple regression was conducted to investigate which of the variables, if any, are the best predictors for student attendance. The predictor variables were: teachers' attitudes towards epilepsy, teachers' training experience regarding epilepsy, and student seizure control and the outcome variable was student attendance.

The multiple regression was statistically significant,  $F(3, 70) = 54.48, p < .001, R^2 = 0.70, \text{Adjusted } R^2 = .69$ , indicating that the model of three variables effectively predicted student attendance. The combination of predictors accounted for 70% of the variance in student attendance. Of the three predictors in the model, student seizures control provided a unique contribution when the other predictors in the model were held constant ( $t(70) = 12.04$ ) and accounted for 62.1% of the variance in student attendance. The other predictors in the model (i.e., teachers' attitudes towards epilepsy, teachers' training experience regarding epilepsy) did not provide a significant unique contribution toward the prediction of student attendance. Teachers' attitudes towards epilepsy accounted for four-tenths of 1% of the variance and teachers' training experience regarding epilepsy accounted for two-hundredths of 1% of the variance (see Table 11).

Table 11

*Multiple Linear Regressions with Teachers' Attitudes towards Epilepsy, Teachers' Training Experience Regarding Epilepsy, and Student Seizure Control Predicting Student Attendance, Mathematics Scores, Writing Scores, and Reading Scores*

	B	SE	$\beta$	<i>t(df)</i>	<i>p</i>	Part
<b>Attendance*</b>						
Teacher attitude	-0.02	0.02	-0.07	-0.99	.325	-.065
Teacher training experience	-0.02	0.09	-0.02	-0.23	.821	-.015
Student seizure control	1.85	0.15	0.82	12.04	.001	.788
<b>Mathematics **</b>						
Teacher attitude	0.30	0.21	0.15	1.46	.150	.140
Teacher training experience	0.41	0.76	0.05	0.54	.593	.052
Student seizure control	-7.18	1.36	-0.53	-5.30	.001	-.510
<b>Writing***</b>						
Teacher attitude	1.08	0.23	0.46	4.67	.001	.428
Teacher training experience	0.12	0.84	0.01	0.14	.891	.013
Student seizure control	-5.54	1.51	-0.35	-3.68	.001	-.337
<b>Reading****</b>						
Teacher attitude	1.24	0.20	0.57	6.15	.001	.531
Teacher training experience	-0.54	0.73	-0.07	-0.74	.462	-.064
Student seizure control	-4.37	1.31	-0.30	-3.33	.001	-.288

*Note.* \* $F(3, 70) = 54.48, p < .001, R^2 = 0.70$ ; \*\*  $F(3, 70) = 12.61, p < .001, R^2 = 0.35$ ; \*\*\* $F(3, 70) = 16.47, p < .001, R^2 = 0.41$ ; \*\*\*\*  $F(3, 70) = 21.40, p < .001, R^2 = 0.48$ .

**Epilepsy and student achievement.** To examine the second hypothesis (that teachers' attitudes towards epilepsy, teachers' training experience regarding epilepsy, and student seizure control predict student achievement), three multiple regressions were conducted to investigate which of those three variables, if any, were the best predictors for student achievement (mathematics, writing, and reading). The predictor variables were: teachers' attitudes towards epilepsy, teachers' training experience regarding epilepsy, and student seizure control and the three outcome variables were: mathematics, writing, and reading. One regression was conducted for each outcome variable.

**Mathematics.** The multiple regression model for mathematics was statistically significant,  $F(3, 70) = 12.61, p < .001, R^2 = 0.35, \text{Adjusted } R^2 = 0.32$ , indicating that the model of three variables effectively predicted student mathematics performance. The combination of predictors accounted for 35% of the variance in student mathematics performance. Of the three predictors in the model, student seizure control provided a unique contribution when the other predictors in the model were held constant ( $t(70) = -5.30$ ), and accounted for 26% of the variance in student mathematics performance. The other predictors in the model (teachers' attitudes towards epilepsy, teachers' training experience regarding epilepsy) did not provide a significant unique contribution toward the prediction of student mathematics performance. Teachers' attitudes towards epilepsy accounted for 2% of the variance and teachers' training experience

regarding epilepsy accounted for three-hundredths of 1% of the variance (see Table 11).

**Writing.** The multiple regression model for writing was statistically significant,  $F(3, 70) = 16.47$ ,  $p < .001$ ,  $R^2 = 0.41$ , Adjusted  $R^2 = 0.40$ , indicating that the model of three variables effectively predicted student writing performance. The combination of predictors accounted for 41% of the variance in student writing performance. Of the three predictors in the model, two variables provided a unique contribution. Teachers' attitudes towards epilepsy provided the strongest unique contribution when the other predictors in the model were held constant ( $t(70) = 4.67$ ), and accounted for 18.3% of the variance in student writing performance. Student seizures control also provided a unique contribution when the other predictors in the model were held constant ( $t(70) = -3.68$ ), and accounted for 11.4% of the variance in student writing performance. Teachers' attitudes towards epilepsy also provided a unique contribution when the other predictors in the model were held constant ( $t(70) = 4.67$ ). The other predictor in the model (teachers' training experience regarding epilepsy) did not provide a significant unique contribution toward the prediction of student writing performance and accounted for two-hundredths of 1% of the variance (see Table 11).

**Reading.** The multiple regression model for reading was statistically significant,  $F(3, 70) = 21.40$ ,  $p < .001$ ,  $R^2 = 0.48$ , Adjusted  $R^2 = 0.46$ , indicating

that the model of three variables effectively predicted student reading performance. The combination of predictors accounted for 48% of the variance in student reading performance. Of the three predictors in the model, two variables provided a unique contribution. Teachers' attitudes towards epilepsy provided the strongest unique contribution when the other predictors in the model were held constant ( $t(70) = 6.15$ ), and accounted for 28.2% of the variance in student reading performance. Student seizures control also provided a unique contribution when the other predictors in the model were held constant ( $t(70) = -3.33$ ), and accounted for 8.3% of the variance in student reading performance. Teachers' attitudes towards epilepsy also provided a unique contribution when the other predictors in the model were held constant ( $t(70) = 6.15$ ). The other predictor in the model (teachers' training experience regarding epilepsy) did not provide a significant unique contribution toward the prediction of student reading performance and accounted for four-tenths of 1% of the variance (see Table 11).

**Epilepsy and special education enrollment.** To examine the third hypothesis (that teachers' attitudes towards epilepsy, teachers' training experience regarding epilepsy, and student seizure control predict special education enrollment), a logistic regression analysis was conducted to investigate which of the variables if any, are the best predictors for student enrollment in special education (vs. regular education). The predictor variables were: teachers' attitudes towards epilepsy, teachers' training experience regarding epilepsy, and

student seizure control and the outcome variable was special education enrollment. This is a dichotomous variable with two levels: regular education was coded 0 and special education was coded 1.

The logistic regression examined the impact of the predictor variables on student enrollment in special education. The model was statistically significant,  $\chi^2(3) = 30.96, p < .001$ , suggesting that the model of three variables adequately predicted student enrollment in special education. Two variables in the model provided a statistically significant contribution. This included teachers' attitude toward epilepsy,  $B = -0.08, SE = .03, Wald(1) = 8.86, p = .003, Exp(\beta) = 0.92$ . This indicates that as teachers report more positive attitudes regarding epilepsy, the less likely students are enrolled in special education. The odds of a student being enrolled in special education decreases 0.92 times as teachers' attitudes about epilepsy increase by one standard deviation unit. It also included student seizure control,  $B = 0.65, SE = .19, Wald(1) = 11.19, p = .001, Exp(\beta) = 1.91$ . This indicates as students have more seizures per month, the more likely students are enrolled in special education. The odds of a student being enrolled in special education increases 1.91 times as seizures increase by one standard deviation unit (see Table 12).

Table 12

*Logistic Regression with Teachers' Attitudes toward Epilepsy, Teachers' Training Experience Regarding Epilepsy and Student Seizure Control Predicting Special Education Enrollment*

Independent Variable	<i>B</i>	<i>SE</i>	Wald	<i>p</i>	Exp( $\beta$ )	95% C.I for EXP ( <i>B</i> )	
						Lower	Upper
Teacher attitude	-0.08	0.02	8.86	.003	0.92	.88	0.97
Teacher training	0.08	0.10	0.66	.417	1.08	.89	1.32
Student seizure	0.65	0.19	11.19	.001	1.91	1.31	2.79

*Note.*  $\chi^2(3) = 30.96, p < .001, R^2 = .457$



## **Chapter 4**

### **Discussion**

This chapter presents the current study's results in the context of its hypotheses and previous literature. This is followed by limitations and future implications of the present study.

#### **Attendance**

The first purpose of the present study was to establish whether teachers' attitudes towards epilepsy, teachers' training experience regarding epilepsy, and student seizure control predict student attendance.

Although the model, as a whole, is associated with student attendance, seizure control appears to be the single most influential component of the model. In the present study, the combination of predictors accounted for 70% of the variance in student attendance, with seizure control explaining over 62% of the variance. Results of the current study indicate that as seizures increase, the number of student absences increase. In other words, the more seizures a student has the more school he/she misses. For example, in the present study students with five or more reported seizures in the last month missed an average of eleven days of school, whereas students with no reported seizures in the last month only missed an average of just two days. The findings in this study are commensurate with findings in a previous study that indicated that seizure control is a critical component when addressing attendance rates for children with epilepsy. In a

study by Aguiar, Guerreiro, McBrian, and Montenegro (2007), 60% of participants missed school due to a recent seizure and 40% of participants were sent home after having a seizure during school hours. Additionally, in a study by Serdari et al. (2009), 100% of study participants (N= 74) missed at least one day of school due to epilepsy. Similarly, the present study found that 93% of children with epilepsy missed at least one day of school and almost 38% of children with epilepsy missed five or more days.

Few studies to date have examined the association between epilepsy and student attendance as it relates to academic success. Of the studies that explored school absences for children with epilepsy, both found that students with epilepsy missed more days of school than their peers without epilepsy (Aguiar, Guerreiro, McBrian, & Montenegro, 2007; Serdari et al., 2009). Findings from the present study confirm the belief that epilepsy, as it relates to teachers' attitudes, training experiences, and seizure control, has an association with school attendance.

A shortcoming of past studies is their execution outside of the United States (i.e., Brazil and Greece) in medical settings, where the method of collecting attendance data is of concern. In both studies, attendance data were collected through parental reports. No actual school records were accessed. Furthermore, the study by Aguiar, Guerreiro, McBrian, and Montenegro (2007) never specified a time period encompassed by parental report; parents were only questioning

whether their child had missed school due to a seizure. Furthermore, relying on parental reporting of school absences, rather than gathering this data directly from school records, could lead to biased data. This is so because parents may forget absences or attribute absences on days that the school was closed.

The finding that poor seizure control is associated with school absences is relevant because missing school has consequences. It can be argued that attending school not only exposes children to academic learning, but also provides opportunities to develop social skills outside the confines of the home. Furthermore, exposure to classmates, who assume an increasingly important role as children age, is also critical in the social, emotional, and personal development of children (Serdari et al., 2009). Research has shown that children with chronic illnesses, such as epilepsy, have social and emotional difficulties (Shapiro & Manz, 2004). Increased absences in children with epilepsy may compound existing difficulties or may themselves be a cause of these difficulties.

The present study did not explore why school absences occurred among these children with epilepsy. Additional information regarding the cause of the absences (i.e., medical appointments, a recent, in-class seizures, etc.), if they were absent for multiple days at a time, and what the missed instructional activities were, may aid understanding the magnitude of school absences among children with epilepsy.

Findings also indicated that neither teachers' training nor their attitude

toward epilepsy was associated with attendance. Seeing as teachers' attitudes are a significant predictor regarding other outcome variables in the present research (writing, reading, and special education enrollment), the results, as they pertain to teachers' attitudes, appear to document a true absence of association with student attendance. In regards to teacher training experiences, although this result was unanticipated, it may have been related to two factors: the limited sample size and the scale used to measure both attitudes and training experience. Utilizing teachers from only two school districts may have constituted a sample unrepresentative of teachers in general regarding training experiences.

### **Achievement**

The second purpose of the present study was to establish whether teachers' attitudes towards epilepsy, teachers' training experience regarding epilepsy, and student seizure control predict student achievement (mathematics, writing, and reading). In the present study, the combination of predictors accounted for 35% of the variance in student mathematics achievement, 41% of the variance in student writing achievement, and 48% of the variance in student reading achievement, with seizure control and teacher attitudes contributing the majority of the variance.

**Seizure control and achievement.** Although the model, as a whole, is associated with academic achievement, seizure control appears to be the single most influential factor of the model. In all academic subjects measured (math,

writing, and reading), seizure control was inversely proportional to academic achievement. Results of the present study indicate that as the number of seizures increase, student mathematics, writing, and reading scores decrease. In the present study students with five or more reported seizures during the last month had significantly lower average test scores (mathematics- 27.73, writing- 29.09, and reading- 25.18) than students with no reported seizures (mathematics- 61.38, writing- 65.17, and reading- 56.07), as measured by the Terra Nova (scores are reported as national percentiles [normal curve equivalents]). Seizure control accounted for 26% of the variance in mathematic standardized scores, over 11% of the variance in writing standardized scores, and over 8% of the variance in reading standardized scores.

In the current study, mathematics was the academic area in which poor seizure control had the greatest negative association. Similarly, the study by McNelis, Dunn, Johnson, Austin, and Perkins (2007) found that teacher ratings of academic achievement improved for children without recurrent seizures and academic achievement continued to decline in children with recurrent seizures. One explanation for the differences in these findings is in the method of collecting academic achievement data. The present study and the study by Jones et al. (2010) used standardized test scores to determine academic achievement. However, the study by McNelis et al. (2007) relied on teacher reports of academic achievement. Relying on teachers' observations is a subjective measure and it

could lead to biased data. The present study utilized standardized test scores, which is a more objective way to understand student achievement and therefore less likely to be biased.

There seems to be little contradictory research regarding seizure control's relationship with academic achievement. Research indicates that having seizures negatively alters academic achievement. The present study fortifies the idea that as seizures increase, academic achievement, as measured by math, writing, and reading scores on a standardized, group-administered achievement, decreases. The present research did not address why this difference may be occurring.

Speculating, there may a variety of reasons why seizure control is associated with academic achievement. One reason may be that students with poor seizure control miss more school and thus miss critical learning time and exposure to curriculum. Another hypothesis may be that students with poor seizure control have compromised central nervous systems and thus more frequent seizures and impaired learning abilities. Future research into these areas would expand on the present research and clarify why seizure control is so strongly associated with academic achievement.

Additionally, current research differs on whether that association is lasting or improves when seizures are properly controlled. For example, the negative association regarding seizures may improve once seizures are controlled. Good control may signal that physicians have found the correct AED combination, one

that minimizes side effects of both overmedication and break-through seizures of undermedication.

**Teacher attitudes and achievement.** Whereas seizure control appears to have an association with all areas of academic achievement, as measured in the present study, the association of academic achievement and teachers' attitudes towards epilepsy on academic achievement was only to be significant in the areas of writing and reading achievement (not mathematics).

Results in the present study show that teachers' favorable attitudes toward epilepsy can be associated with academic performance. In the present study, writing and reading are both positively associated with teachers' attitudes towards epilepsy, as measured by the ATPE. Results indicate that as teachers' attitudes towards epilepsy become more positive, students' writing and reading scores are better. Teachers' attitudes towards epilepsy accounted for over 18% of the variance in writing standardized scores and over 28% of the variance in reading standardized scores. This model did not address cause-effect relationships. Nonetheless, one might expect that attitude is associated with achievement. For example, when teachers have positive attitudes towards epilepsy and individuals with epilepsy, they may afford more patience to affected with students regarding extra attention or additional time to complete writing and reading assignments. Perhaps these considerations are more influential regarding writing and reading, subjects in which assignments may take longer to complete than math problems.

Furthermore, understanding that cognitive slowing, attention problems, short-term memory problems, and fine-motor impairments are all potential effects of epilepsy and/or AEDs may assuage teacher frustrations and help them empathize with their students (Deckers et al., 2001; Loring & Meador, 2004; Williams, 2004).

Sexson and Madan-Swain (1993, 1995) hypothesized that teachers' attitudes can impact students through misinformation, inadvertent alienation, and lowered self-confidence in their teaching abilities. In other words, teachers may be inadvertently limiting students' academic achievement through their own personal biases towards chronic illnesses in general and epilepsy, which is quite stigmatizing, in particular. Furthermore, previous research has suggested that teachers' attitudes towards students with epilepsy may influence daily interactions with these children, their ability to effectively educate these children, and their ability to objectively evaluate the progress and performance of these children (Antonak & Livneh, 1997; Bishop & Slevin, 2004).

In their research, Bishop and Slevin found that 70% of teachers had an overall positive attitude towards epilepsy. Additionally, Bishop and Boag (2006) found that teachers' scores on the ATPE scale were generally positive. Results from the present study support these findings, as the mean Total Teacher Attitude score was 98.39, indicating a positive attitude towards epilepsy. Furthermore, the present study found similar results regarding the individual



responses on the attitude portion of the ATPE, with the exception of the items that Bishop and Boag identified as “troubling.” Contrary to Bishop and Boag's findings, the present study found that teachers rated the questions “equal employment opportunities should be available to individuals with epilepsy” affirmatively. But participants generally expressed disagreement for the questions “people with epilepsy prefer to live in communities with similar people” and “families of children with epilepsy should not be provided supportive social services” participants generally expressed disagreement.

Additionally, having positive attitudes towards students with epilepsy may aid in setting appropriate goals for their students rather than underestimating their abilities. Prpic et al. (2003) found that 85% of teachers surveyed reported lowering grading standards for students with epilepsy. This practice may initially appear to be a kind gesture on the teacher's behalf, however it only conveys to students with epilepsy that the teacher harbors little belief that they can perform as well, academically, as their peers. Therefore, these students may not be academically challenged, which might only serve to limit their academic growth. Meaning that, teachers' lowered expectations may represent a self-fulfilling prophecy for students with epilepsy, particularly in the areas of reading and writing where teacher support and guidance is crucial. However, research has not been conducted focusing on the relationship between lowered teacher expectations on academic performance for children with epilepsy. Thus, additional research in

these areas may help explain how epilepsy impacts the core academic areas. More research may also elucidate if writing and reading are, in fact, more susceptible to teachers' lowered expectations and teachers' attitudes than mathematics.

**Teacher training and achievement.** Although both seizure control and teachers' attitudes predicted aspects of academic performance, teacher training did not. In general, most teachers in this study appeared to have little preparation regarding epilepsy: over 33% of teachers reported having no educational classes that addressed epilepsy, 47% reported no training experiences regarding treatments for epilepsy, over 59% reported no training experiences regarding medications used to treat epilepsy and their possible effects, over 40% reported no training experiences regarding the educational impact that epilepsy has on students, and 47% reported having 'Poor' or 'Below Average' knowledge of the conditions and life circumstances of persons with epilepsy.

Based on findings in the present study and in previous studies, it appears that teachers, in general, lack substantial training regarding epilepsy, treatments for epilepsy, and educational outcomes for children with epilepsy (Bannon, Wildig, & Jones, 1992; Bishop & Boag, 2006; Nabors, Little, Akin-Little, & Iobst, 2008, Wodrich, Jarrar, Buchholder, Levy, & Gay, 2011). However, past research does indicate that when teachers are exposed to epilepsy-specific training, there is improvement in their knowledge regarding epilepsy, attitude towards affected students and improved management of students with epilepsy (Bekiroglu, Ozkan,

Gurses, Arpaci, & Derwent, 2004). These results imply a need for further research addressing the role of teachers' training regarding academic success for children with epilepsy. This would impart greater understanding of the benefits of including in-depth training experiences regarding chronic illnesses in teacher training programs.

### **Special Education Enrollment**

The third purpose of the present study was to establish whether teachers' attitudes towards epilepsy, teachers' training experience regarding epilepsy, and student seizure control predicts student enrollment in special education. In that regard, the present study fortifies results found previously studies that found high rates of special education enrollment among students with epilepsy. In the present study, 45.9% of student participants received some level of special education. Moreover, the present study found that the odds of a student enrolling in special education increase 91% as seizures increase by one standard deviation unit (e.g., went from x to y). Furthermore, the odds of a student enrolling in special education decrease 8% as teachers' attitudes increase by one standard deviation unit.

Commensurate with the present study, previous research has found that many students with epilepsy participate in some level of special education. A study by Zelnik, Sa'adi, Siman-Stolar, and Goikhman (2001) in Israel, found that 36% of students with epilepsy (idiopathic and symptomatic) received some level

of special education, and Bailet and Turk (2000) similarly found that 34% of students with idiopathic epilepsy received some level of special education.

Although these studies show similar results, a study by Wodrich, Kaplan, and Deering (2006), also conducted in Arizona, found a greater percentage (56%) of student participants received special education services.

Findings in the present study substantiate other prior special education enrollment findings, such as that poor seizure control was a predictor of special education services (Zelnik, Sa'adi, Silman-Stolar, & Goikhman, 2001). In this past research, 89% of students without full seizure control required special education services. Additionally, Tidman, Saravanan, and Gibbs (2003) found that a smaller percentage of special education students had well-controlled seizures (30%, compared to 56% of students with well-controlled epilepsy in regular education). However, past studies were conducted outside of the United States (i.e., Israel and Great Britain), which may have different special education eligibility requirements than the United States. Relying on special education data from outside of the United States may mislead researchers when comparing previous data to results from within the United States.

Regarding teachers' attitudes towards epilepsy, Sexson and Madan-Swain (1993, 1995) posited that teachers' attitudes might be associated with students with chronic illness through student alienation and through lowered self-confidence in their own teaching abilities. Moreover, findings in the present study

support what previous research has suggested: teachers often feel unprepared and uncomfortable teaching children with epilepsy (Bannon, Wildig, & Jones, 1992). Additionally, research has shown that many teachers are not confident that they can meet the academic, social, and emotional needs of a child with epilepsy (Nabors, Little, Akin-Little, & Iobst, 2008; Wodrich, Jarrar, Buchholder, Levy, & Gay, 2011). Teachers' feelings of incompetence may create an inability to effectively teach children with epilepsy, which can lead schools to seek alternative placements (i.e., special education) where teachers are more comfortable teaching children with special needs.

One of the main differences between the present study and its predecessors was an exclusionary factor for student participants. Students who participated in self-contained (all day) special education classrooms were not eligible to participate in the present study. This effectively excluded all students who qualified for special education as students with mental retardation, as many of these students participate in self-contained placements; which, according to Wodrich, Kaplan, and Deering, accounted for 30% of their study participants. In the future, researchers may want to investigate if there are school performance differences between students with epilepsy who participate in pullout special education programs and those who require self-contained special education services.

Additionally, the present study did not more specifically explore the

nature of special education enrollment (i.e., related services only, pullout resource support, or self-contained placement) for children with epilepsy. This additional information, as well as how they qualified for special education services (i.e., Speech-Language Impairment, Other Health Impairment, Mental Retardation, etc.), and how long they have been receiving special education services would aid in understanding the true association of epilepsy and special education enrollment.

### **Limitations**

Whereas the present study presents some significant findings, several factors limit these results and must be addressed. The study's limitations center around the participants, the geographic location of the study, and the survey instrument used to gather teacher data.

The first limitation of this study was the low proportion of participants. Out of the 423 parent survey packets sent out, only 74 parents chose to participate in the study, resulting in a response rate of 17.5%, which could have lead to an unrepresentative sample. It is implausible to believe that these 74 participants are representative of the 423 candidates. Additionally, participants were obtained from only two school districts in one geographical area. Therefore, results may not be generalizable to the population of students with epilepsy and teachers from outside of the Phoenix metro area.

Additionally, the response rate varied between the two participating school districts. Two hundred and fourteen parent packets were sent out in Paradise

Valley Unified School District and only 16 parents chose to participate in the study (response rate of 7.5%), whereas 209 parent packets were sent out in the Mesa School District and 58 parents chose to participate in the study (response rate of 27.8%). When parents opted not to participate, their child's teacher could not participate. Although effort was made to gather more participants, a number of barriers were encountered. First, not all potentially eligible school nurses elected to participate. School nurses were essential in gathering participants for the present study, as health information laws prevented the researcher from examining student health files to gather information about which students had a current diagnosis of epilepsy. Thus, it was inevitable that some otherwise-eligible students were excluded from the present study, as no one was allowed to search the health files for schools where the nurses elected not to participate (where he/she chose not to conduct a preliminary file review) .

Second, due to the time of year that parent packets were distributed, parents may have overlooked them. Initially, parent packets were mailed at the end of the spring semester (2010). This season is typically very busy for parents, students, and teachers, as it is around this time that mandatory state testing takes place and when the fourth quarter ends. The second round of parents packets were mailed toward the end of the fall semester (2010). Again, students and teachers are typically very busy during this time with end of the semester projects, exams, and grading occurring; and many parents are busy getting ready for the upcoming winter

break. Although the overall sample size was sufficient for statistical analyses, many parents elected not to participate. Furthermore, it appears that some teachers taught more than one student with epilepsy, as there were 74 student participants and only 66 teachers. It can be hypothesized that schools and/or parents are aware that some teachers have more experience regarding students with epilepsy; thus, schools are inclined to place students with epilepsy with that teacher. Consequently, some teachers' total attitude scores and total training experience scores were reported more than once, which could bias the data.

A final limitation relates to the survey instrument used to assess teachers' attitudes towards epilepsy and their epilepsy-related training experiences. The ATPE was designed as a measure to be used with the general public, not teachers, to assess attitudes about persons with epilepsy. The scale does not specifically differentiate between the training and understanding that special education teachers may gain in their training programs versus teachers who have had no specific training with children with special needs. The present study sought to limit this by excluding students receiving services in a self-contained placement. Despite this effort, numerous special education teachers did participate in the study, as they served as the homeroom teacher for some of the children who were receiving special education services. The ATPE was selected because no better scale existed to assess teachers' attitudes towards, and training related to, epilepsy.



## **Future Implications**

This study confirms results found in many past research studies in the area of epilepsy and education. Furthermore, the present study supplements research in areas that have not been thoroughly investigated, and it points to areas of future research. According to research, students with epilepsy have difficulty in school performance, especially regarding attendance, academic achievement, and high rates of special education enrollment.

Of the areas under investigation in the present study, seizure control appears to be the most influential factor relating to school performance. Having poor seizure control is associated with diminished student attendance, academic performance (math, writing, and reading), and expanded special education enrollment. Furthermore, teachers' attitudes towards epilepsy also appear to be associated with school performance regarding academics (writing and reading) and school enrollment. Having a teacher with a positive attitude towards epilepsy and persons with epilepsy is positively associated with improved writing and reading performance and lowered odds of needing special education services. Lastly, teacher training experiences did not have a significant association with any of the areas of school performance that were under investigation in the present study. Even as the findings are interesting, the data indicates the importance of proper seizure control and the importance of teachers' attitudes towards epilepsy.

Understanding how teachers' attitudes, training experiences, and personal knowledge of chronic illnesses is associated with children with chronic illness may help guide schools in placement decisions, determining special education services, and may ultimately shape teacher training programs. It is hoped that information gleaned from the present study is used to help children with epilepsy by highlighting the need for appropriate seizure control and the importance of teacher education regarding epilepsy, epilepsy's treatment, and the potential educational ramifications of a diagnosis of epilepsy.

## References

- Achenbach, T. (1991). *Manual for the child behavior checklist/4-18 and 1991 Profile*. Burlington, VT: University of Vermont, Department of Psychiatry.
- Aguiar, B., Guerreiro, M., McBrian, D., & Montenegro, M. (2007). Seizure impact on the school attendance in children with epilepsy. *Seizure, 16*, 698-702.
- Alanis-Guevara, I., Peña, E., Corona, T., López-Ayala, T., López-Meza, E., & López-Gómez, M. (2005). Sleep disturbances, socioeconomic status, and seizure control as main predictors of quality of life in epilepsy. *Epilepsy and Behavior, 7*, 481-485.
- Aldenkamp, A., Arends, J., Overweg-Plandsoen, T., van Bronswijk, K., Schyns-Soeterboek, A., Linden, I., & Diepman, L. (2001). Acute cognitive effects of nonconvulsive difficult-to-detect epileptic seizures and epileptiform electroencephalographic discharges. *Journal of Child Neurology, 16*, 119-123.
- Antonak, R. (1990). Psychometric analysis and validation of the Scale of Attitudes Toward Persons with Epilepsy. *Journal of Epilepsy, 3*, 11-16.
- Antonak, R. & Livneh, H. (1995). Development, psychometric analysis, and validation of an error-choice test to measure attitudes towards persons with epilepsy. *Rehabilitation Psychology, 40*(1), 25-38.
- Antonak, R. & Rankin, P. (1982). Measurement and analysis of knowledge and attitudes toward epilepsy and persons with epilepsy. *Social Science and Medicine, 16*(17), 1591-1593.
- Austin, J., Huberty, T., Huster, G., & Dunn, D. (1999). Does academic achievement in children with epilepsy change over time? *Developmental Medicine and Child Neurology, 41*, 473-479.
- Bailet, L. & Turk, W. (2000). The impact of childhood epilepsy on neurocognitive and behavioral performance: A prospective longitudinal study. *Epilepsia, 41*, 426-431.
- Bannon, M., Wildig, C., & Jones, P. (1992). Teachers' perceptions of epilepsy. *Archives of Disease in Childhood, 67*, 1467-1471.

- Bekiroglu, N., Özkan, R., Gürses, C., Arpacı, B., & Dervent, A. (2004). A study on awareness and attitude of teacher on epilepsy in Istanbul. *Seizure, 13*, 517-522.
- Birbeck, G., Chomba, E., Atadzhanov, M., Mbewe, E., & Haworth, A. (2006). Zambian teachers: What do they know about epilepsy and how can we work with them to decrease stigma. *Epilepsy and Behavior, 9*, 275-280.
- Bishop, M. & Boag, E. (2006). Teachers' knowledge about epilepsy and attitudes towards students with epilepsy: Results of a national survey. *Epilepsy and Behavior, 8*, 397-405.
- Bishop, M. & Slevin, B. (2004). Teachers' attitudes toward students with epilepsy: results of a survey of elementary and middle school teachers. *Epilepsy and Behavior, 5*, 308-315.
- Bourgeois, F. (2002). Differential cognitive effects of antiepileptic drugs. *Journal of Child Neurology, 17*(2), 2S28-2S33.
- CTB McGraw-Hill. (2000). Terra nova, the second edition: Frequently asked questions. California: CTB/McGraw-Hill.
- Dantas, F., Cariri, G., Cariri, G., & Filho, A. (2001). Knowledge and attitudes toward epilepsy among primary, secondary, and tertiary level teachers. *Arq Neuropsiquiatr, 59*, 712-716.
- Deckers, L., Hekster, Y., Keyser, A., van Lier, H., Meinardi, H., & Renier, W. (2001) Monotherapy versus polytherapy for epilepsy: A multicenter double-blind randomized study. *Epilepsia, 42*(11), 1387-1394.
- Fastenau, P., Shen, J., Dunn, D., Perkins, S., Hermann, B., & Austin, J. (2004). Neuropsychological Predictors of Academic Underachievement in Pediatric Epilepsy: Moderating Roles of Demographic, Seizure, and Psychosocial Variables. *Epilepsia, 45*, 1261-1272.
- Fejerman, N. (2002). Epilepsy in children and adolescents. *Epilepsia, 43*(6), 44-46.
- Fisher, R., Boas, W., Blume, W., Elger, C., Genton, P., Lee, P. et al. (2005). Seizure and epilepsy: Definitions proposed by the international league against epilepsy (ILAE) and the international bureau for epilepsy (IBE). *Epilepsia, 46*(4), 470-472.

- Heimenz, J., Hynd, G., & Jimenez, M. (1999). Seizure disorders. In R. Brown (Ed.), *Cognitive aspects of chronic illness in children* (pp. 238-261). New York: Guilford.
- International League Against Epilepsy (ILAE). (2008). *Syndromes and Epilepsies*. Retrieved September 10, 2008, from <http://www.ilaeepilepsy.org/Visitors/Centre/ctf/CTFsyndromes.cfm>.
- Jones, J., Siddarth, P., Gurbani, S., Shields, W., & Caplan, R. (2010). Cognition, academic achievement, language, and psychopathology in pediatric chronic epilepsy: Short-term outcomes. *Epilepsy and Behavior, 18*, 211-217.
- Kwan, P. & Brodie, M. (2000). Early identification of refractory epilepsy. *The New England Journal of Medicine, 342*, 314-319.
- Loring, D. & Meador, K. (2004) Cognitive side effects of antiepileptic drugs in children. *Neurology, 62*(6), 872-877.
- McNelis, A., Dunn, D., Johnson, C., Austin, J., & Perkins, S. (2007). Academic performance in children with new-onset seizures and asthma: A prospective study. *Epilepsy and Behavior, 10*, 311-318.
- Meador, K. (2002). Cognitive outcome and predictive factors in epilepsy. *Neurology, 58*(8), S21-S26.
- Nabors, L., Little, S., Akin-Little, A., & Iobst, E. (2008). Teacher knowledge of and confidence in meeting the needs of children with chronic medical conditions: Pediatric psychology's contribution to education. *Psychology in the Schools, 45*(3), 217-226.
- Nicholas, K. & Pianta, R. (1994). Mother-child interactions and seizure control: Relations with behaviors problems in children with epilepsy. *Journal of Epilepsy, 7*, 102-107.
- Prpic, I., Korotaj, Z., Vlastic-Cicvaric, I., Paucic-Kirincic, E., Valerjev, A., & Tomac, V. (2003). Teachers' opinions about capabilities and behavior of children with epilepsy. *Epilepsy and Behavior, 4*, 142-145.
- Sanger, M., Perrin, E., & Sandler, H. (1993). Development in children's causal theories of their seizure disorders. *Journal of Development and Behavioral Pediatrics, 14*, 88-93.

- Serdari, A., Tsalkidis, A., Tripsianis, G., Vadikolias, K., Chatzimichael, A., Piperidou, C., & Livaditis, M. (2009). Epilepsy impact on aspects of school life of children from different cultural populations in Thrace, Greece. *Epilepsy and Behavior, 15*, 344-350.
- Sexson, S. & Madan-Swain, A. (1993). School reentry for the child with chronic illness. *Journal of Learning Disabilities, 26*(2), 115-125.
- Sexson, S. & Madan-Swain, A. (1995). The chronically ill child in the schools. *School Psychology Quarterly, 10*, 359-368.
- Shapiro, E. & Manz, P. (2004). Collaboration with schools in the provision of pediatric psychological services. In R. Brown (Ed.). *Handbook of pediatric psychology in school settings* (pp. 49-64). New York: Guilford Press.
- Sheslow, D. & Adams, W. (1990). Wide range assessment of memory and learning. Wilmington, DE: Wide Range Inc.
- Stevens, J. (2002). *Applied multivariate statistics for the social sciences* (4th ed.). Lawrence Erlbaum Associates: Mahwah, NJ. SurveyMonkey.com. (2008). *SurveyMonkey.com*. Retrieved March 13, 2008, from <http://www.surveymonkey.com>.
- Tennison, M., Kankirawatana, P., Bowman, M., Greenwood, R., Lewis, D., & Burchinal, M. (1998). Effect of chronic antiepileptic drug therapy on California achievement test scores. *Journal of Epilepsy, 11*(4), 208-214.
- The National Society for Epilepsy. (1999). *Epilepsy and education*. Gerrards Cross, U.K.: Author.
- The Epilepsy Foundation. (2008a). *Epilepsy and seizure statistics*. Retrieved October 9, 2008, from <http://www.epilepsyfoundation.org/about/statistics.cfm>.
- The Epilepsy Foundation. (2008b). *The decision to treat*. Retrieved October 9, 2008, from <http://www.epilepsyfoundation.org/about/treatment/>.
- Tidman, L., Saravanan, K., & Gibbs, J. (2003). Epilepsy in mainstream and special education primary school settings. *Seizure, 12*, 47-51.
- Wechsler, D. (1974). Manual WISC-R: Wechsler Intelligence Scale for Children- Revised Edition. New York: Psychological Corporation.

- Williams, J. (2004). Seizure Disorders. In R. Brown (Ed.), *Handbook of Pediatric Psychology in School Settings* (pp. 221-239). Mahwah, New Jersey: Lawrence Erlbaum Associates, Publishers.
- Williams, J., Phillips, T., Griebel, M., Sharp, G., Lange, B., Edgar, T., & Simpson, P. (2001). Factors associated with academic achievement in children with controlled epilepsy. *Epilepsy and Behavior, 2*, 217-223.
- Williams, J. & Sharp, G. (1999). Epilepsy. In K. Yeates, M. Ris, & H. Taylor (Eds.), *Pediatric neuropsychology* (pp. 47-73). New York: Guilford Press.
- Williams, J., Sharp, G., Lange, B., Bates, S., Griebel, M., Spence, G. et al. (1996). The effects of seizure type, level of seizure control, and antiepileptic drugs on memory and attention skills in children with epilepsy. *Developmental Neuropsychology, 12*(2), 241-253.
- Wodrich, D., Jarrar, R., Buchhalter, J., Levy, R., & Gay, C. (2011). Knowledge about epilepsy and confidence in instructing students with epilepsy: Teachers' responses to a new scale. *Epilepsy and Behavior, 20* (2), 360-365.
- Wodrich, D., Kaplan, A., & Deering, W. (2006). Children with epilepsy in schools: Special service usage and assessment practices. *Psychology in the Schools, 43*(2), 169-181.
- Zelnik, N., Sa'adi, L., Silman-Stolar, Z., & Goikhman, I. (2001). Seizure control and educational outcome in childhood-onset epilepsy. *Journal of Child Neurology, 16*(11), 820-824.
- Ziegler, R., Erba, G., Holden, L., & Dennison, H. (2000). The coordinated psychosocial and neurological care of children with seizures and their families. *Epilepsia, 41*(6), 732-743.

APPENDIX A  
IRB APPROVAL FORM





Office of Research Integrity and Assurance

To: David Wodrich  
EDB

So/ From: Mark Roosa, Chair<sup>SM</sup>  
Soc Beh IRB

Date: 02/19/2010

Committee Action: Expedited Approval

Approval Date: 02/19/2010

Review Type: Expedited F7

IRB Protocol #: 1002004782

Study Title: Epilepsy and School Performance: The Influence of Teach Factors and Seizure Control on Children with Epilepsy

Expiration Date: 02/18/2011

The above-referenced protocol was approved following expedited review by the Institutional Review Board.

It is the Principal Investigator's responsibility to obtain review and continued approval before the expiration date. You may not continue any research activity beyond the expiration date without approval by the Institutional Review Board.

Adverse Reactions: If any untoward incidents or severe reactions should develop as a result of this study, you are required to notify the Soc Beh IRB immediately. If necessary a member of the IRB will be assigned to look into the matter. If the problem is serious, approval may be withdrawn pending IRB review.

Amendments: If you wish to change any aspect of this study, such as the procedures, the consent forms, or the investigators, please communicate your requested changes to the Soc Beh IRB. The new procedure is not to be initiated until the IRB approval has been given.

Please retain a copy of this letter with your approved protocol.

APPENDIX B

LETTERS OF INVITATION TO SCHOOL NURSES, TEACHERS, AND  
PARENTS

**Epilepsy and School Performance: The Influence of Teacher Factors and  
Seizure Control on Children with Epilepsy**

**School Nurse Cover Letter**

To Whom It May Concern:

I am a doctoral student of Dr. David L. Wodrich in the Mary Lou Fulton Institute and Graduate School of Education at Arizona State University conducting a study approved by Arizona State University and the Paradise Valley Unified School District.

You are being asked to take part in this study because we want to learn about factors that lead to successful school performance.

To participate, please fill out and return one copy of the attached consent form in the pre-addressed and stamped envelope. A second copy of the form is for you to keep. Participation in this study will involve you collecting the children's names, parent names, home addresses, and teachers of the children with epilepsy in your school, addressing and mailing pre-stamped packets to the parents of children with epilepsy, and then forwarding returned consent forms to me.

This study requires about 30 minutes, the time it takes for you identify children with epilepsy attending your school and address and mail the pre-stamped packets. There are no foreseeable risks or discomforts in your participation. All data, including all information you release to me (and my supervising professor) is confidential.

Your participation in this study is voluntary. Participants will be given \$5 per returned consent form in the form of a gift card. If you have any questions concerning the research study, please call Dr. David Wodrich at (480) 965-7117 or Genevieve Bohac at (480) 221-7990. If you have any questions about your rights as a subject/participant in this research, or if you feel you or your child have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board (IRB), through the Arizona State University (ASU) Research Compliance Office, at (480) 965-6788. The ASU IRB and the Paradise Valley Unified School District have approved this study.

Thank you so much for your help by participating in this study! It is greatly appreciated!

Sincerely,

Genevieve E. Bohac, M.S.  
Doctoral Student, Mary Lou Fulton Institute and Graduate School of Education

# **Epilepsy and School Performance: The Influence of Teacher Factors and Seizure Control on Children with Epilepsy**

## **Teacher Cover Letter**

To Whom It May Concern:

I am a doctoral student of Dr. David L. Wodrich in the Mary Lou Fulton Institute and Graduate School of Education at Arizona State University conducting a study approved by Arizona State University and the Paradise Valley Unified School District.

You are being asked to take part in this study because we want to learn about factors that lead to successful school performance.

To participate, please fill out and return one copy of the attached consent form in the pre-addressed and stamped envelope. The second copy of the form is for you to keep. Attached you will find the Authorization for Release of Records and a Consent Form filled out by the student's parents/guardians.

Participation in this study will involve you filling out a brief, 10-minute questionnaire regarding your attitude toward epilepsy and your training experience with epilepsy. Once a copy of the consent form is received, a link to the on-line questionnaire to your Paradise Valley Unified School District e-mail

Your participation will take about 10 minutes, the time needed for you to fill out the questionnaire and related forms. There are no foreseeable risks or discomforts in your participation. All data, including your responses, will be confidential.

Your participation in this study is voluntary. Participants will be entered in a raffle for a \$75 gift card after the questionnaire is returned as a token of appreciation for their help. If you have any questions concerning the research study, please call Dr. David Wodrich at (480) 965-7117 or Genevieve Bohac at (480) 221-7990. If you have any questions about your rights as a subject/participant in this research, or if you feel you or your child have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board (IRB), through the Arizona State University (ASU) Research Compliance Office, at (480) 965-6788. The ASU IRB and the Paradise Valley Unified School District have approved this study.

Thank you so much for your help by participating in this study! It is greatly appreciated!

Sincerely,

Genevieve E. Bohac, M.S.

Doctoral Student, Mary Lou Fulton Institute and Graduate School of Education

# **Epilepsy and School Performance: The Influence of Teacher Factors and Seizure Control on Children with Epilepsy**

## **Parent Cover Letter**

Dear Parent,

I am a doctoral student of Dr. David L. Wodrich in the School Psychology Program at Mary Lou Fulton Institute and Graduate School of Education at Arizona State University conducting a study approved by Arizona State University and the Paradise Valley Unified School District.

You are being asked to take part in this study because we want to learn about factors that lead to successful school performance. This research study does not involve any changes to your child's school services. However, all research studies include only participants who chose to take part. Please take your time to make your decision.

I am recruiting parents who have a child or children diagnosed with epilepsy who are currently attending school in the Paradise Valley Unified School District. To participate in the study, please fill out and return the attached consent form in the pre-addressed and stamped envelope. Participation in this study would involve you filling out a brief, 5-minute questionnaire regarding medical and school information regarding your child. The study would also involve a record review of your child's school cumulative files (i.e., # of absences and Terra Nova test scores) and allowing your child's teacher to fill out a brief questionnaire to assess their attitudes towards epilepsy and training experiences with epilepsy.

The duration of your involvement in this study will be about 5 minutes, the time it takes for you to fill out the questionnaire. There are no foreseeable risks or discomforts in your participation. All data, including your responses, will be confidential.

Your participation in this study is voluntary. Participants will be entered in a raffle for a \$75 gift card after the questionnaire is returned as a token of appreciation for their help. If you have any questions concerning the research study, please call Dr. David Wodrich at (480) 965-7117 or Genevieve Bohac at (480) 221-7990. If you have any questions about your rights as a subject/participant in this research, or if you feel you or your child have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board (IRB), through the Arizona State University (ASU) Research Compliance Office, at (480) 965-6788. The ASU IRB and the Paradise Valley Unified School District have approved this study.

Thank you so much for your help by participating in this study! It is greatly appreciated!

Sincerely,

Genevieve E. Bohac, M.S.

Doctoral Student, Mary Lou Fulton Institute and Graduate School of Education



APPENDIX C

CONSENT FORMS FOR SCHOOL NURSES, TEACHERS, AND PARENTS

***SCHOOL NURSE CONSENT FORM***

By providing the information below and signing below, you are giving your consent to participate in the aforementioned study.

Name of the school where you work: \_\_\_\_\_

Number of students in your school with epilepsy:

\_\_\_\_\_

\*It is understood that the CONFIDENTIAL NATURE of this information will be maintained.

\_\_\_\_\_  
School Nurse Signature and Date

\_\_\_\_\_  
Printed Name and Date

\*Please fill out and return one copy of the consent form in the pre-addressed and stamped envelope. The other copy is for you to keep.

***TEACHER CONSENT FORM***

\_\_\_\_\_ has been referred for participation in this study. Attached you will find the Authorization for Release of Records and a Consent Form filled out by the student's parents/guardians. Your help is needed for the study to continue. By providing the information below and signing below, you are giving your consent to participate in the aforementioned study.

My school is: \_\_\_\_\_

Grade/Class I teach: \_\_\_\_\_

\*It is understood that the CONFIDENTIAL NATURE of this information will be maintained.

\_\_\_\_\_  
Teacher Signature and Date

\_\_\_\_\_  
Printed Name

\*Please fill out and return one copy of the consent form in the pre-addressed and stamped envelope. The other copy is for you to keep.

***PARENT CONSENT FORM***

By providing the information below and signing below, you are giving consent for you and your child to participate in the present study.

The name of my child is: \_\_\_\_\_

My address is:  
\_\_\_\_\_

My child's birthday is: \_\_\_\_\_

The name of my child's teacher this year is: \_\_\_\_\_

My child's grade in school this year is: \_\_\_\_\_

I would prefer the 5-minute questionnaire to be sent via  e-mail or via  U.S. Postal Service.

My preferred e-mail address is: \_\_\_\_\_

My preferred mailing address is: \_\_\_\_\_

\_\_\_\_\_

\*It is understood that the CONFIDENTIAL NATURE of this information will be maintained.

\_\_\_\_\_  
Parent Signature

\_\_\_\_\_  
Printed Name

\_\_\_\_\_  
Date

\*Please fill out and return one copy of the consent form and one copy of the Authorization for Release of Records in the pre-addressed and stamped envelope. The other copies are for you to keep.

APPENDIX D

AUTHORIZATION FOR RELEASE OF RECORDS

**AUTHORIZATION for RELEASE of RECORDS**

Date: \_\_\_\_\_

I hereby authorize:

\_\_\_\_\_

School Name

\_\_\_\_\_

School District

To Release To:

Genevieve E. Bohac

Arizona State University

Mary Lou Fulton Institute and Graduate School of Education

Tempe, AZ 85287

Information on file for \_\_\_\_\_

Child's Name

Child's Date of Birth

Which may be of value in determining the influence of school personnel factors on the school performance in children with epilepsy.

This request should include the following records:

\_\_\_\_\_ \* Cumulative School File

\_\_\_\_\_ \* School Absence Records

\_\_\_\_\_ \* Special Education Records

\_\_\_\_\_ \* Teacher Questionnaires

\_\_\_\_\_ \* School Nurse Questionnaires

It is understood that the CONFIDENTIAL NATURE of these records will be maintained.

\_\_\_\_\_

Parent/Guardian Signature and Date

This release expires on 6/01/2010. Please keep one copy of this document for your records and fill out and return the other copy.

## APPENDIX E

### PERMISSION TO USE AND ADAPT THE ATPE

August 17, 2007

Dear Inquirer:

Thank you for your inquiry about the *Scale of Attitudes Toward Persons with Epilepsy*. I have enclosed with this letter a copy of scale in several forms and a scoring key for your use.

You may reproduce the *ATPE* scale in any form that suits your research needs. The only requirement that I have for the use of the instrument is that you ascribe authorship to Ms. Rankin and me somewhere on the instrument and acknowledge us as the authors of the instrument, using the first citation below, in any publication that may arise from your use of it.

Good luck with your research. Please call or write if I can assist you further.

Very truly yours,  
Richard F. Antonak, Ed.D.  
Vice Provost for Research

*Appropriate citations:*

Antonak, R. F., & Rankin, P. (1982). Measurement and analysis of knowledge and attitudes toward epilepsy and persons with epilepsy. *Social Science and Medicine*, 16, 1591-1593.

Antonak, R. F. (1990). Psychometric analysis and validation of the Scale of Attitudes Toward Persons with Epilepsy. *Journal of Epilepsy*, 3, 11-16.



APPENDIX F

ATPE SURVEY INSTRUMENT FOR TEACHERS

## Attitude Towards Persons with Epilepsy (ATPE)

### Personal Information Form

Created by Richard F. Antonak and Patricia R. Rankin

Adapted by Genevieve E. Smith

(1) Today's date: \_\_\_ / \_\_\_ / \_\_\_ (2) Your Name: \_\_\_\_\_

(3) Student(s) with epilepsy:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

(4) Teacher's Age: \_\_\_\_\_ (5) Sex: \_\_\_ M \_\_\_ F

(7) Heritage: \_\_\_ White \_\_\_ Black \_\_\_ Hispanic \_\_\_ Asian \_\_\_ Other: \_\_\_\_\_

(8) Highest educational level attained (Check only one):

\_\_\_ College Freshman \_\_\_ College Sophomore \_\_\_ College Junior

\_\_\_ College Senior \_\_\_ Bachelor's Degree \_\_\_ Master's Degree

\_\_\_ Specialist Degree \_\_\_ Doctorate

(11) School where you work: \_\_\_\_\_

\_\_\_\_\_

***Please Respond To Every Statement***

**How many educational classes, related to your degree, addressed epilepsy:**

*0                    1 or 2                    3 or 4                    5 or 6                    7 or 8                    9 or more*

**How many educational training experiences (direct classes, in-service, etc.) in understanding treatments for epilepsy, related to your degree, did you participate in:**

*0                    1 or 2                    3 or 4                    5 or 6                    7 or 8                    9 or more*

**How many educational training experiences (direct classes, in-service, etc.) in understanding medications used to treat epilepsy (including possible side effects), related to your degree, did you participate in:**

*0                    1 or 2                    3 or 4                    5 or 6                    7 or 8                    9 or more*

**How many educational training experiences (direct classes, in-service, etc.) in understanding how epilepsy impacts education for children with epilepsy, related to your degree, did you participate in:**

*0                    1 or 2                    3 or 4                    5 or 6                    7 or 8                    9 or more*

**Please rate your general knowledge of the conditions and life circumstances of persons with epilepsy:**

*No Knowledge*

*Extensive Knowledge*

*0                    1                    2                    3                    4                    5*

# ATPE - Form S

**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.

- |     |   |           |           |           |           |           |
|-----|---|-----------|-----------|-----------|-----------|-----------|
|     | <b>-3</b>   | <b>-2</b> | <b>-1</b> | <b>+1</b> | <b>+2</b> | <b>+3</b> |
| 7.  | Persons with epilepsy should be prohibited from driving.                                  |           |           |           |           |           |
|     | <b>-3</b>   | <b>-2</b> | <b>-1</b> | <b>+1</b> | <b>+2</b> | <b>+3</b> |
| 8.  | Children with epilepsy should attend regular public schools.                              |           |           |           |           |           |
|     | <b>-3</b>   | <b>-2</b> | <b>-1</b> | <b>+1</b> | <b>+2</b> | <b>+3</b> |
| 9.  | The onset of epileptic seizures in a spouse is sufficient reason for divorce.             |           |           |           |           |           |
|     | <b>-3</b>   | <b>-2</b> | <b>-1</b> | <b>+1</b> | <b>+2</b> | <b>+3</b> |
| 10. | Individuals with epilepsy are also mentally retarded.                                     |           |           |           |           |           |
|     | <b>-3</b>   | <b>-2</b> | <b>-1</b> | <b>+1</b> | <b>+2</b> | <b>+3</b> |
| 11. | Persons with epilepsy are a danger to the public.   |           |           |           |           |           |
|     | <b>-3</b>   | <b>-2</b> | <b>-1</b> | <b>+1</b> | <b>+2</b> | <b>+3</b> |
| 12. | The responsibility for educating children with epilepsy rests with the community.         |           |           |           |           |           |
|     | <b>-3</b>   | <b>-2</b> | <b>-1</b> | <b>+1</b> | <b>+2</b> | <b>+3</b> |
| 13. | Individuals with epilepsy are accident-prone.   |           |           |           |           |           |
|     | <b>-3</b>   | <b>-2</b> | <b>-1</b> | <b>+1</b> | <b>+2</b> | <b>+3</b> |
| 14. | Children need to be protected from classmates who have epilepsy.                          |           |           |           |           |           |
|     | <b>-3</b>   | <b>-2</b> | <b>-1</b> | <b>+1</b> | <b>+2</b> | <b>+3</b> |
| 15. | Parents should expect of their child who has epilepsy what they expect of other children. |           |           |           |           |           |
|     | <b>-3</b>   | <b>-2</b> | <b>-1</b> | <b>+1</b> | <b>+2</b> | <b>+3</b> |

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**

APPENDIX G

SQ SURVEY INSTRUMENT FOR PARENTS



## Seizure Questionnaire

(1) Today's date: \_\_\_ / \_\_\_ / \_\_\_ (2) Your name: \_\_\_\_\_

(3) Name of your child/children with epilepsy:

\_\_\_\_\_

\_\_\_\_\_

(4) Your child's/children's age: \_\_\_\_\_ (5) Your child's/children's gender: \_\_\_ M \_\_\_ F

(6) Your child's/children's heritage: \_\_\_ White \_\_\_ Black \_\_\_ Hispanic \_\_\_ Asian \_\_\_

Other: \_\_\_\_\_

(7) Your child's/children's grade(s) in school: \_\_\_\_\_

(8) Your child's/children's teacher(s): \_\_\_\_\_

*Please Circle or Fill in the Blank with the Appropriate Response*

**When was your child first diagnosed with epilepsy?**

*5+ years ago    Within 4 years    Within 3 years    Within 2 years    Within 1 year    Within 6 months*

**In a typical month, how many seizures does your child have (reported and observed)?**

*5 or more    4 seizures    3 seizures    2 seizures    1 seizure    No Seizures*

**Is your child being currently treated for epilepsy?** *Yes    No*

**Are they currently taking any medication for epilepsy?** *Yes    No*

**How many medications are they taking for epilepsy?** \_\_\_\_\_

*Thank You For Your Assistance In Completing This Questionnaire*

APPENDIX H

TERRA NOVA DATA SUMMARY SHEET

# Arizona's Standards to Measure Distal Purpose Assessment

## Student Report

**Purpose**  
The AIMS DPA is administered to students in third through eighth grade to measure their knowledge and understanding of the AIMS Academic Standards in reading, writing, and mathematics. The AIMS DPA also compares a student's performance to the national norm group. The student's score and measure school performance.

### AIMS Standards Based Results

Performance Levels	Reading	Writing	Mathematics
<b>4</b> Exceeds	Score Range 874-941	Score Range 835-910	Score Range 807-925
<b>3</b> Meets	Score Range 775-873	Score Range 747-845	Score Range 688-806
<b>2</b> Approaches	Score Range 676-774	Score Range 648-746	Score Range 589-707
<b>1</b> Falls Far Below	Score Range 577-675	Score Range 549-647	Score Range 490-608

The performance level indicates your student can consistently perform what is best used for that level and the levels below. Your student may also be capable of performing some of the competencies described at the higher levels, but not enough to have reached that level of performance. More detailed performance level descriptors can be found at [www.azed.gov](http://www.azed.gov).

### TerraNova Norm-Referenced Results

The TerraNova national percentile (NP) and national stanine (NS) scores are based on a group of ethics administered as part of Arizona's instrument to Measure Standards - Dear Purpose Assessment.

The NP score indicates how your student performed in comparison to the national norm group. Average national percentile scores are from 25 - 75. The national stanine is a score that divides the norm population into 9 groups (1 - 9). Stanines 4, 5, and 8 are considered average.

Score	Reading	Language	Mathematics
National Percentile	92	85	88
National Stanine	8	7	9

### AIMS Strand/Concept Results

Strand/Concept Title	Points Possible	Points Earned	Percent Correct
<b>Reading</b>			
Str 1: Reading Process	12	11	91.7
-Can 1: Vocabulary	6	6	100.0
-Can 2: Comprehension Strategies	6	5	83.3
Str 2: Comprehending Literature	17	17	100.0
-Can 1: Elements of Literature	17	17	100.0
Str 3: Comprehending Informational Text	25	24	96.0
-Can 1: Expository Text	13	13	100.0
-Can 2: Functional Text	6	6	100.0
-Can 3: Persuasive Text	6	5	83.3
<b>Writing</b>			
-Can 1: Ideas and Content	6	4	66.7
-Can 2: Organization	6	4	66.7
-Can 3: Voice	6	4	66.7
-Can 4: Sentence Fluency	6	4	66.7
-Can 5: Conventions	6	4	66.7
<b>Mathematics</b>			
-Can 1: Number Sense & Operations	15	15	100.0
-Can 2: Number Sense	4	3	75.0
-Can 3: Numerical Operations	7	7	100.0
-Can 4: Estimation	4	3	75.0
-Can 5: Data Analy. Prob. & Discrete Math	4	4	100.0
-Can 6: Data Analysis (Statistics)	3	3	100.0
-Can 7: Probability	4	4	100.0
-Can 8: Discrete Mathematics	6	6	100.0
-Can 9: Alg. & Functions	16	15	93.8
-Can 10: Algebra & Functions	16	15	93.8
-Can 11: Probability & Statistics	8	7	87.5
-Can 12: Algebra & Functions	8	7	87.5
-Can 13: Probability & Statistics	8	7	87.5
-Can 14: Algebra & Functions	8	7	87.5
-Can 15: Algebra & Functions	8	7	87.5
-Can 16: Algebra & Functions	8	7	87.5
-Can 17: Algebra & Functions	8	7	87.5
-Can 18: Algebra & Functions	8	7	87.5
-Can 19: Algebra & Functions	8	7	87.5
-Can 20: Algebra & Functions	8	7	87.5
-Can 21: Algebra & Functions	8	7	87.5
-Can 22: Algebra & Functions	8	7	87.5
-Can 23: Algebra & Functions	8	7	87.5
-Can 24: Algebra & Functions	8	7	87.5
-Can 25: Algebra & Functions	8	7	87.5
-Can 26: Algebra & Functions	8	7	87.5
-Can 27: Algebra & Functions	8	7	87.5
-Can 28: Algebra & Functions	8	7	87.5
-Can 29: Algebra & Functions	8	7	87.5
-Can 30: Algebra & Functions	8	7	87.5
-Can 31: Algebra & Functions	8	7	87.5
-Can 32: Algebra & Functions	8	7	87.5
-Can 33: Algebra & Functions	8	7	87.5
-Can 34: Algebra & Functions	8	7	87.5
-Can 35: Algebra & Functions	8	7	87.5
-Can 36: Algebra & Functions	8	7	87.5
-Can 37: Algebra & Functions	8	7	87.5
-Can 38: Algebra & Functions	8	7	87.5
-Can 39: Algebra & Functions	8	7	87.5
-Can 40: Algebra & Functions	8	7	87.5
-Can 41: Algebra & Functions	8	7	87.5
-Can 42: Algebra & Functions	8	7	87.5
-Can 43: Algebra & Functions	8	7	87.5
-Can 44: Algebra & Functions	8	7	87.5
-Can 45: Algebra & Functions	8	7	87.5
-Can 46: Algebra & Functions	8	7	87.5
-Can 47: Algebra & Functions	8	7	87.5
-Can 48: Algebra & Functions	8	7	87.5
-Can 49: Algebra & Functions	8	7	87.5
-Can 50: Algebra & Functions	8	7	87.5