

A STUDY OF AUTISM INCIDENCE RATES
IN TENNESSEE SCHOOL DISTRICTS

LARRY DANIEL BURNS

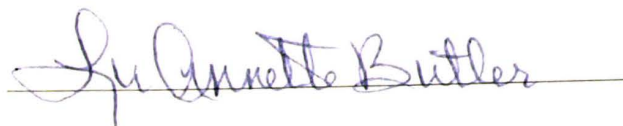
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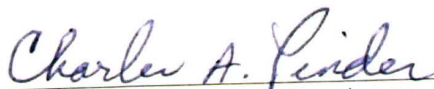


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A Study of Autism Incidence Rates
in Tennessee School Districts

A Field Study Report
Presented for the
Education Specialist
Degree
Austin Peay State University

Larry Daniel Burns
August 2005

DEDICATION

I feel it is only appropriate to dedicate this work to the one who has made it all possible. Without the love and grace of God, I would not be here today. Everything I have and any gift I may possess were his to start with and use for his purpose. Although this work is far from the great text ever written, I give it as a kind of first fruits of my career to him. I do this in recognition and honor of who God is and what he has done.

ACKNOWLEDGEMENTS

I owe a great deal of thanks to my major professor, Dr. Larry Lowrance who has given so much effort and time to help me accomplish what I have over the past years. I certainly owe him a great deal of credit and gratitude for his help with this field study, but I also am in his debt for supervising me during my internship even though it was not required. Additionally, I want to thank Dr. Stuart Bonnington and Dr. LuAnnette Butler for their help and work during this process. Without them this work would not be possible. A special note of thanks must go to Alicia Brimhall who had to endure grueling hours of listening to me complain, vent, celebrate, and stress about this field study in that order. She willingly listened to it all and supported me whole-heartedly. I would not dare to forget my mom and dad in the list of those to thank. Whether it be money, advice, or healthy amounts of nagging, they helped me reach this point. Lastly, to those fellow students in the school psychology program that have come this far with me I can only say thanks and it's about time we finally made it.

ABSTRACT

This study examined several questions pertaining to current trends and statistics about incidence rates of autism in Tennessee. There has been a general increase in the number of reported cases of autism over the last few years. The Tennessee Department of Education has a database of information about total enrollment, numbers of students served under special education, and the total number of reported cases of autism, and this database was analyzed to answer four research questions: Are there relationships between autism rates and total populations, autism and special education populations, are there statistically more students with autism than would be expected, and are there any noticeable trends in autism in Tennessee. Results indicate strong positive correlations between autism, total populations, and total special education enrollment. There were no significantly higher or lower rates of autism than would be predicted in Tennessee, but the number of students labeled as autistic is growing. Results are discussed and recommendations made.

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CHAPTER I

Introduction

This research looked at special education information from several school districts in Tennessee to determine if students are currently being placed in special education under the label autism, as identified by the Individuals with Disabilities Education Act 97 (IDEA 97) definitions, at the same rates as predicted by state and national prevalence data.

Statement of the Problem

It is important that those served under the special education umbrella be identified and placed in accordance with actual need and disability. Misidentification and inappropriate diagnosis are two problems with which school psychologists face, and parental rights to due process allow for legal action against the school systems, which acted inappropriately by choice or accident.

Additionally, labeling is a phenomenon that is difficult to avoid, and once a child receives a diagnosis such as autism, it will likely follow them the rest of their life. It is best practice and in the best interests of the child that a label be descriptive of their condition in the least severe or stigmatizing way possible (Best

practices in School Psychology, 2002). For these reasons, it is therefore important that school psychologists and school personnel be aware of how their identification of disabilities matches national prevalence data.

Implications of the Study

The results of this study should be of interest to special education departments in the districts used in the study as well as researchers who are interested in specific autism trends in Tennessee. In particular, by reviewing this study, special education directors and appropriate review teams will be able to see if there is significant over-identification of autism in their district. This study is also appropriate because of autism's recognition as a so-called "vogue" diagnosis much like ADHD. Many professionals have expressed concern about the apparent increase in the prevalence of autism and in its diagnosis (Merrick, J., Kandel, I., & Morad, M., 2004). By examining the data from this study, districts will be able to evaluate such possible placements under the autism label.

Additionally, this study provides a larger base of information for future research that might wish to examine similar questions pertaining to autism. Implications for future research include identifying trends in special

education placements over a certain period of time, guiding interventions to prevent the over-diagnosis of autism, and guiding research that may wish to explore effects such as the impact of a military presence in a school district's placement numbers for autism.

Hypotheses

There were four research questions this study sought to answer. The research questions and accompanying hypotheses this study investigated are:

1. Did districts with higher populations of special education students have significantly higher incidences of students diagnosed with autism? It was hypothesized that districts with higher populations of special education students would not have significantly higher rates of students diagnosed with autism.

2. Did districts with higher populations have significantly higher instances of students diagnosed with autism? It was hypothesized that the percentage of students with autism in larger districts would not have significantly increased numbers of students with autism.

3. Were there any districts in Tennessee with significantly more diagnosed autism than would be predicted based on national prevalence data? It was hypothesized

that while there would be great diversity between districts, there would be no districts with significantly higher rates of autism than national data suggests.

4. Were there any noticeable trends within participating districts over time? It was hypothesized that there would be a general increase in the number of reported cases of autism over time.

Limitations of Study

There were a few possible limitations of this study. One limitation to consider was the fact that unique regional differences may greatly influence the population that is being examined. For example, the presence of a military bases or universities in local communities could mean that a diverse population comes in and, in the case of the military, frequently leaves the area as part of normal procedure. It was possible that such movements from the military or increased education from universities might bring an over- or under-representation of a given disability such as autism in the areas they serve. Therefore, data might have shown a significantly higher or lower proportion of students diagnosed with autism in those regions, but that discrepancy would be due to the unique features of the region rather than a problem with diagnosis

or placement.

Furthermore, although there is some consensus of identification requirements because of IDEA, the individual states have the power to determine specific details of eligibility requirements and in some cases even diagnostic labels. Thus in some cases, state criteria for special education placement may have altered the incidence rates of autism in that particular state from national expectations.

Lastly, the data was being drawn from many state school districts, and while this would compose the entire population of the area being studied in most cases, it would be problematic to generalize these specific results to other areas of the country. For that reason this study may be beneficial to the school systems where the data was drawn, but other districts might have little or no practical application for this research data.

Review of Related Literature

Introduction

Autism as a recognized disorder has only a brief history, but in that time it has gained considerable attention. The disorder has a number of characteristics that distinguishes it and requires that special interventions be used to help a child or adult achieve their highest potential.

Autism has several definitions depending upon the organization and theoretical perspective of the group offering the definition. Medical professionals, educational specialists, and support groups for families who have children with autism all have an interest in the condition and have developed definitions that are meaningful and useful to them.

History and Characteristics of Autism

Autism was first discussed in a paper by Dr. Leo Kanner in 1943 (NAAR, 2005). In its early years, many professionals believed that autism was the result of uncaring mothers, and the strange observed behaviors were psychological damage the children had suffered. According to the National Alliance for Autism Research, it was Dr.

Bernard Rimland in 1964 that established a biological basis for the condition, and Dr. Susan Folstein and Dr. Michael Rutter found further support for this in 1977 with autism twin studies.

Autism is characterized by delays or abnormalities in areas such as communication, social interaction, and stereotyped behaviors. It is generally observed beginning at or before the third year of life, and it can be very debilitating for individuals with the disorder. Families are often placed under great physical, psychological, and financial strain in caring for the child with autism.

Prevalence Rates of Autism

To date, there is some argument concerning the actual prevalence of autism in the general population. The Autism Society of America (2005) places the number at approximately one in every two hundred fifty births, or about 0.004 of the population. At that rate, they estimate the population number of Americans suffering from some form of autism at about 1.5 million. However, the National Alliance for Autism Research (2005) places the number at one in one hundred sixty-six or approximately 0.006 of the total population. According to Croen, Grether, Hoostrate, & Selvin (2002) in 2000 the Centers of Disease Control

estimated forty in every ten thousand births, which is approximately 0.004 of births.

Most research supports an increase in the prevalence of autism. Croen, Grether, Hoostrate, & Selvin (2002) also report that only Sweden and France had conducted repeated population-based studies in the same area geographically, and Sweden reported a rise in the prevalence of autism from four in ten thousand in 1980 up to eleven and a half per ten thousand births in 1988. Specific numbers about the increase in autism prevalence also vary, but the Autism Society of America places the rise at 10 - 17 percent per year. Newschaffer, Falb, & Gurney (2005) used OSEP and US Census Bureau statistics to determine that there was indeed a cohort effect with successive exhibiting increased autism prevalence over earlier groups.

Current research suggests that the apparent rise in autism is due to increased awareness (AORN, 2005) and improved detection and diagnostic practices (Croen, Grether, Hoostrate, & Selvin, 2002). Autism's inclusion in the Diagnostic and Statistical Manual of Mental Disorders - Fourth Edition (DSM-IV) and as a special education disability category may have also contributed to this observed rise in autism.

Clinical Definitions of Autism

Two of the most widely used definitions for autism come from the DSM-IV and the International Classification of Diseases - 10 (ICD-10), which are predominately medical models that view autism as a disease with certain common characteristics. American doctors and psychiatrists have typically used the DSM-IV while the ICD-10 has been adopted by the World Health Organization as a guideline throughout the world. These systems have recently begun to converge on their definitions, which has aided identification and research (Volkmar, 1998). Both systems place autism under the classification of Pervasive Developmental Disorder (PDD).

DSM-IV Definition (1994)

A. A total of six (or more) items from (1), (2), and (3), with at least two from (1), and one each from (2) and (3):

1. Qualitative impairment in social interaction, as manifested by at least two of the following:

4571. marked impairment in the use of multiple nonverbal behaviors such as eye-to-eye gaze, facial expression, body postures, and gestures to regulate social interaction
4572. failure to develop peer relationships appropriate to developmental level
4573. a lack of spontaneous seeking to share

4573. a lack of spontaneous seeking to share enjoyment, interests, or achievements with other people (e.g., by a lack of showing, bringing, or pointing out objects of interest)

2. Qualitative impairments in communication as manifested by at least one of the following:

1. delay in, or total lack of, the development of spoken language (not accompanied by an attempt to compensate through alternative modes of communication such as gesture or mime)
2. in individuals with adequate speech, marked impairment in the ability to initiate or sustain a conversation with others
3. stereotyped and repetitive use of language or idiosyncratic language
4. lack of varied, spontaneous make-believe play or social imitative play appropriate to developmental level

3. Restricted repetitive and stereotyped patterns of behavior, interests, and activities, as manifested by at least one of the following:

1. encompassing preoccupation with one or more stereotyped and restricted patterns of interest that is abnormal either in intensity or focus
2. apparently inflexible adherence to specific, nonfunctional routines or rituals
3. stereotyped and repetitive motor mannerisms (e.g., hand or finger flapping or twisting, or complex whole-body movements)
4. persistent preoccupation with parts of objects

B. Delays or abnormal functioning in at least one of the following areas, with onset prior to age 3 years: (1) social interaction, (2) language as used in social communication, or (3) symbolic or imaginative play.

C. The disturbance is not better accounted for by Rett's Disorder or Childhood Disintegrative Disorder.

ICD-10 Definition (1990)

Childhood autism: A type of pervasive developmental disorder that is defined by: (a) the presence of abnormal or impaired development that is manifest before the age of three years, and (b) the characteristic type of abnormal functioning in all the three areas of psychopathology: reciprocal social interaction, communication, and restricted, stereotyped, repetitive behaviour. In addition to these specific diagnostic features, a range of other nonspecific problems are common, such as phobias, sleeping and eating disturbances, temper tantrums, and (self-directed) aggression.

Atypical autism: A type of pervasive developmental disorder that differs from childhood autism either in age of onset or in failing to fulfil all three sets of diagnostic criteria. This subcategory should be used when there is abnormal and impaired development that is present only after age three years, and a lack of sufficient demonstrable abnormalities in one or two of the three areas of psychopathology required for the diagnosis of autism (namely, reciprocal social interactions, communication, and restricted, stereotyped, repetitive behaviour) in spite of characteristic abnormalities in the other area(s). Atypical autism arises most often in profoundly retarded individuals and in individuals with a severe specific developmental disorder of receptive language.

There is currently no medical test that can diagnose autism (ASA, 2005), and common practice is to use a list of agreed upon characteristics as criteria to determine the presence of autism. Both the DSM-IV and ICD-10 use the individual's behaviors as a means of codifying autism, which is useful to medical and clinical professionals for consistent diagnosis.

Autism Society of America Definition

The Autism Society of America (ASA) is a nationally recognized organization that has become a major source of support for individuals and families affected by autism. This organization advocates for those suffering from autism, and it also promotes and funds research into the causes and treatment of the disorder. The ASA defines autism as:

"Autism is a complex developmental disability that typically appears during the first three years of life. The result of a neurological disorder that affects the functioning of the brain, autism impacts the normal development of the brain in the areas of social interaction and communication skills. Children and adults with autism typically have difficulties in verbal and non-verbal communication, social interactions, and leisure or play activities." (ASA, 2005).

This definition is similar to the ICD-10 in language and style, but it also contains the features listed within the DSM-IV criteria. The major difference in the ASA definition is that it was written with nonprofessionals such as parents and as such, it aims to avoid technical or confusing language.

Educational Autism

Autism within educational environments takes on a different meaning than in clinical settings because the

goal of school professionals is the education of the child with autism. As such, IDEA and state definitions differ slightly from the clinical ones. They focus more on the academic impact the disorder has on a child, but educational criteria still incorporate the DSM-IV and ICD-10 characteristic as a means of identifying a child.

Tennessee has outlined its eligibility standards in the state special education manual (2003). This is the guide by which appropriate school personnel within the state of Tennessee must go by to reach the educational diagnosis of autism in accordance with IDEA. According to the special education manual, autism is defined as:

"A developmental disability, which significantly affects verbal and nonverbal communication and social interaction, generally evident before age three (3), that adversely affects a child's educational performance. Other characteristics often associated with Autism are engagement in repetitive activities and stereotyped movements, resistance to environmental change or change in daily routines, and unusual responses to sensory experience. The term does not apply if a child's educational performance is adversely affected primarily because the child has an Emotional Disturbance, as defined in this section.

After age three (3), a child could be diagnosed as having Autism if the child manifests the above characteristics.

The term of Autism also includes students who have been diagnosed with an Autism Spectrum Disorder such as Autism, Pervasive Developmental Disorder - Not Otherwise Specified (PDD-NOS) or Asperger's Syndrome when the child's educational performance is adversely affected. Additionally, it may also include a diagnosis of a Pervasive Developmental Disorder such as Rett's or Childhood Disintegrative Disorder. Autism may exist concurrently with other areas of disability."

This definition provided by the state is drawn largely from the areas listed in DSM-IV as affected by autism. One critical difference in this definition is that it includes Asperger's Syndrome, Pervasive Developmental Disorder, Rhett's Syndrome, Childhood Disintegrative Disorder, and Pervasive Developmental Disorder- Not Otherwise Specified as falling under the label of autism. Under DSM-IV and ICD-10 all of these disorders are separate, and by combining all these of these under one label, educational diagnoses of autism will vary greatly. For example, verbal communication differs greatly in amount and quality between these separate conditions, but all would be labeled as autistic in the schools.

Tennessee Eligibility Standards

Tennessee, like other states, has set specific eligibility criteria to meet the definition for autism and qualify for special education under that label. It is very similar to the process to determine a diagnosis in a clinical setting, and interviews and observations provide much of the information that satisfies the standards. There are a number of standards that must be met under Tennessee state law.

2. "Absence, disorder, or delay in verbal and/or nonverbal communication".
3. One or more of the following:
 - Insistence on sameness as evidenced by restricted play patterns, repetitive body movements, persistent or unusual preoccupations, and/or resistance to change.
 - and/or
 - Unusual or inconsistent responses to sensory stimuli.

A last standard included in the special education manual is that the characteristics listed in the eligibility standards must be "present and cause an adverse effect on educational performance in the classroom or learning environment" (Tennessee, 2003). It is important to note that if such symptoms were present but did not have an educational impact, the child would not meet eligibility standards and could not be educationally diagnosed as autistic.

Current Issues in Autism

The differences between the clinical and educational diagnoses of autism are important. A clinical diagnosis may apply to many settings including the school environment, but an educational label of autism will only allow for placement within the school setting itself. It is important to consider that the purpose of IDEA qualification is to provide special services that are above

and beyond what they would otherwise receive in school to a child in need.

Since autism is often based on observation and interview, any information that can be obtained from standardized instruments may be helpful in determining an appropriate autism diagnosis. Two instruments that can be used to this end are the Childhood Autism Rating Scale (CARS) and the Gilliam Autism Rating Scale (GARS), and manuals provided with both instruments support the use of these scales as instruments to aid in the diagnosis of autism. Research with the CARS does support its effectiveness as a screening instrument (Eaves & Milner, 1993). Eaves and Milner's study found that the CARS had approximately 98% "hit" rate of diagnosis with those already identified as having autism. However, recent studies of the GARS have suggested that it may consistently underestimate autism in children who are measured by it (South, Williams, McMahon, Thomas, Filipek, Shernoff, Corsello, Lainhart, Landa, & Ozonoff, 2002). Taken together, these studies indicate that professionals using standardized instruments should be aware of their uses and limitations, and appropriate diagnosis of autism should be based on all available data.

Another current issue in autism research revolves

around early detection of the disorder. The definitions of autism discussed previously include the approximate age of three as a guideline for first diagnosis of autism, but researchers have begun to look at the validity of earlier identification. Stone, Lee, Ashford, Brissie, Hepburn, Coonrod, and Weiss (1999) found autism diagnosis for children under three who were evaluated by independent clinicians were stable and reliable. Work by Moore and Goodson (2003) found similar results very recently although their sample of only twenty children was a drawback to the study.

Chapter III

Methodology

Selection of Participants

For this study, participants are independent school districts rather than individuals, and specific school districts were chosen based on their inclusion in a publicly available database of the Tennessee special education censuses. Only those districts within Tennessee were of interest to this study, therefore school districts in other states were excluded despite geographically close proximity to this study.

Due to a change in the way the state reports census data in order to protect the confidentiality of students, districts with between 1 and 10 students with autism were not reported between 2002 and 2004. This was more common in some of the smaller districts, but in order to examine data over the longest span possible, those districts where no numbers are reported were excluded from the study in those years.

Data Obtained

The information of interest to this study related directly to the number of students who are currently

identified as autistic, and children identified as autistic were listed under the special education census for each district. Therefore, the information needed for this study was taken from the special education database holding census information for Tennessee.

There was no identifying information gathered such as name, race, or sex. The database was public domain and was designed to protect the identities and confidentiality of the students. The only information the researcher saw was the total number of students in a district, in special education, and diagnosed as autistic. The source of the information itself protected students, districts, and the researchers from risk.

Chapter IV

Results

procedure for Analysis

Procedure for this study required downloading the data from the state's website to a computer hard drive in order to transfer that information to a statistics program. Analysis of the data used the commercially available software package Excel to derive statistical results for all four research hypotheses. Descriptive statistics such as the total number of regular education students, special education students, and students with autism were gathered to derive the percents used for comparison.

Percents of students who fell under the label of autism were found using Excel to mathematically determine those percents, and they were compared to hypothesized percents taken from national data pulled from the Office of Special Education Programs (OSEP) Annual Reports for 2002, 2001, and 2000. A Chi-Square Test for Goodness of Fit on Excel compared the obtained values for Tennessee and predicted values from the United States to determine the results of that research question.

For the fourth research hypothesis the percent of increase in autism over time was calculated on Excel and a handheld solar calculator using basic mathematical operations. For the 2002-2003 and 2003-2004 school years, full data was censored for some districts and does not include the numbers of students diagnosed with autism from approximately 92 districts each with between one and nine cases of Autism. Each of these districts was assigned one case of autism, which was the minimum number possible, making at least 92 additional cases for those years. These projects are the lowest possible estimate and should be interpreted as such.

Results of Hypothesis 1

Table 1.1
Autism vs. Special Education Population

YEAR	PEARSON R COEFFICIENT	REGRESSION EQUATION	SIGNIFICANT AT .05
2003-2004	$R^2 = 0.7677$	$y = 0.0024x + 2.8947$	Y
2002-2003	$R^2 = 0.8236$	$y = 0.0022x + 0.8142$	Y
2001-2002	$R^2 = 0.8561$	$y = 0.0019x - 2.1089$	Y
2000-2001	$R^2 = 0.8421$	$y = 0.0014x - 1.0739$	Y
1999-2000	$R^2 = 0.9214$	$y = 0.0014x - 2.4159$	Y
1998-1999	$R^2 = 0.8991$	$y = 0.0014x - 3.0032$	Y

Data for the first research question pertaining to the relationship between autism and special education populations were analyzed and a Pearson R Correlation was determined for the years of 1998-1999, 1999-2000, 2000-

2001, 2001-2002, 2002-2003, and 2003-2004. All were significant at the .05 level for their respective degrees of freedom. Based on this information, this study rejects

YEAR	PEARSON R Coefficient	REGRESSION EQUATION	SIGNIFICANT AT .05
2003-2004	$R^2 = 0.7866$	$y = 0.0171x - 2.5793$	Y
2002-2003	$R^2 = 0.8174$	$y = 0.0148x - 4.219$	Y
2001-2002	$R^2 = 0.8291$	$y = 0.0116x - 3.9972$	Y
2000-2001	$R^2 = 0.8043$	$y = 0.0097x - 3.3623$	Y
1999-2000	$R^2 = 0.8381$	$y = 0.0091x - 4.0056$	Y
1998-1999	$R^2 = 0.7975$	$y = 0.0084x - 4.0768$	Y

the null hypothesis.

Results of Hypothesis 2

Table 2.1
Autism vs. Total Population Enrollment

Data for the second research question pertaining to the relationship between autism and total school population were analyzed and a Pearson R Correlation was determined for the years of 1998-1999, 1999-2000, 2000-2001, 2001-2002, 2002-2003, and 2003-2004. All were significant at the .05 level for their respective degrees of freedom. Based on this information, this study rejects the null hypothesis.

Results of Hypothesis 3

A Chi Square Goodness-of-Fit analysis was conducted to

determine the answer to hypothesis three for the data provided between 1998 and 2004.

Table 3.1
Observed vs. Predicted Autism Diagnosis

Year	Chi-Square Value	Degrees of Freedom	Significant .05?
2003-2004	13.2727	50	N
2002-2003	5.3736	48	N
2001-2002	7.8505	138	N
2000-2001	5.8851	137	N
1999-2000	6.1735	137	N
1998-1999	6.5723	137	N

Given that it was predicted there would be no significant differences noted in Tennessee, which was the case, this study failed to reject the null hypothesis.

Results of Hypothesis 4

Table 4.1
Increase in Autism 1998-2002

YEAR	NUMBER OF STUDENTS w/ AUTISM	NET CHANGE	PERCENT OF INCREASE FROM PREVIOUS YEAR
1998-1999	965	N/A	N/A
1999-2000	1,081	+116	10.91%
2000-2001	1,236	+155	12.54%
2001-2002	1,499	+263	17.54%

Table 4.2
Observed Increase in Autism 2002-2004

YEAR	NUMBER OF STUDENTS w/ AUTISM	NET CHANGE	PERCENT OF INCREASE FROM PREVIOUS YEAR
2002-2003	1,495	N/A	N/A
2003-2004	1,882	+387	25.88%

Table 4.3
Minimal Projected Autism Increase 2002-2004

YEAR	MINIMAL PROJECTED NUMBER OF STUDENTS w/ AUTISM	MINIMAL PROJECTED NET CHANGE	MINIMAL PROJECTED PERCENT OF INCREASE FROM PREVIOUS YEAR
2002-2003	1,585	N/A	N/A
2003-2004	1,968	+383	24.16%

Table 4.4
Increases in Autism 1998-2004

YEARS	OBSERVED TOTAL OF STUDENTS WITH AUTISM	OBSERVED NET CHANGE	OBSERVED PERCENT OF CHANGE
1998-1999	963	N/A	N/A
2003-2004	1,882	+919	95.43%
YEARS	MINIMAL PROJECTED TOTAL OF STUDENTS WITH AUTISM	MINIMAL PROJECTED NET CHANGE	MINIMAL PROJECTED PERCENT OF CHANGE
1998-1999	963	N/A	N/A
2003-2004	1,968	+1,005	104.36%

Descriptive statistics were used on the data tables from 1998-1999, 1999-2000, 2000-2001, and 2001-2002. These were the only years for which complete data was reported without censoring for confidentiality. For the years of 2002-2003 and 2003-2004, both the reported rates and projected rates based on the lowest possible number of occurrences were calculated. Based on this information, it is concluded that a definite trend toward increased numbers of students with autism exists and appears to be increasing

more with each school year. This supports the hypothesis
of this research question.

General Discussion

There are several findings from this study that may be interesting to note. First, there is a strong positive correlation between the number of cases of autism in a district and the total number of enrolled students. This is a logical finding since it might be expected that districts with more students would also see more instances of disabilities. Interestingly, most of the correlation coefficients are in the .80s, and this means that only about 80% of the instance rate of autism can be explained by district size. This leaves a considerable percentage of autism incident rate unexplained in this study. It is possible that factors such as local hospitals and universities, quality of evaluation staff, and clustering effects of families of children with autism may influence the incidence of autism in larger or smaller districts.

Discussion of Hypothesis 1 & 2

There is a relatively strong positive correlation between the number of students with autism and the size of the special education population in a given district. These coefficient values mostly fall in the high .70s and low .80s. This is interesting because it suggests that

autism incidence rates are slightly more influenced by the total population rather than the special education population of the district. Furthermore, special education populations actually decreased between 1998 and 2002 although the rates of autism increased considerably. One possible explanation for this is that special education includes disabilities that are not as well defined as autism such as the category of Specific Learning Disability (SLD). Criteria for SLD has changed several times in recent years at both state and federal level, and this has possibility led to fluctuations in special education that have not impacted the more medically defined, but less prevalent, category of autism.

Discussion of Hypothesis 3

Given the concern for misidentification and over- or under-representation of students in special education based on race, disability, or other demographic, it is important to determine if such irregularities are occurring. The results of this study show that there is not a significant difference between the percent of students labeled with autism in a given Tennessee district and that which would be expected based on national norms. Although there are districts where concentrations of students with autism exceed the national norm, there are also districts where

there are fewer students than would be predicted for their population size. It appears the state as a whole diagnoses students with autism at nearly the same rate as the nation overall.

Discussion of Hypothesis 4

One trend that is very apparent is the dramatic increase in the diagnosis of autism in the schools. In 1998, Tennessee districts reported 963 instances of autism, but by 2002 that number had risen to 1,499, which is a 55 percent increase over the original number in four years. From the fall of 2002 to the spring of 2004, full numbers of the instances of autism in Tennessee are protected, but based solely on the information provided, between 1998 and 2004 there was a 95% increase in school reported autism. As reported above, the actual increase of autism between 1998 and 2004 is actually higher with at least a 104% jump, and that is likely to be a low estimate as well. It is clear that over time, rates of reported autism are increasing despite enrollment and special education staying relatively stable.

Lastly, when the trend of increased autism diagnosis of the fourth research question is considered along with the results of question three, it appears that Tennessee is increasing its diagnosing of autism, but the rate at which

this is occurring is similar to that of the country.

Limitations of Study

One major limitation of this study is the data collected. Tennessee blocked out certain data for the most recently available years of 2002-2003 and 2003-2004. This prevented better analysis of data from those years, and the information gained from them is more limited.

Additionally, other data such as the total US enrollment were rounded to the nearest thousand before reported.

Although this is not believed to have significantly altered the results of this study, it is important to note that more precise data would be preferable and improve the conclusions of this study.

Another limitation of this study is the unknown variables that factored into the reporting of results to the state of Tennessee. Professionals such as school psychologists must use clinical judgment to diagnose autism, and this will influence classification data.

Furthermore, some students with autism may actually be served under different IDEA labels such as Speech/Language Impaired, or some labeled autistic may be misidentified. Although the state provides guidelines and criteria for diagnosis, theoretical perspective, experience, and natural

bias will affect the data, and this cannot be accounted for or eliminated from the data.

Lastly, although there appears to be evidence of a positive relationship between autism/total enrollment and autism/special education population, this study cannot identify the cause of this relationship. It may be that districts with larger total and/or special education populations also have larger numbers of students with autism. It is also possible that larger populations of autism attract larger populations of students in regular and/or special education such as children of parents who come to an area to serve those with autism. It may also be that an unidentified third variable is influencing the populations and given the result that was observed. It is impossible within the conceptual design of this study to determine the causal factors, but future research may look in this direction.

Recommendations

Based on the results of this study, the following recommendations are made:

- 1). Professionals and nonprofessionals involved with autism in the schools should be aware of the current literature and statistics pertaining to autism. Awareness

of the disorder appears to have brought increased diagnosis to autism, but those who must deal with it through schools, special facilities, or home would benefit from more information.

2). Professionals in the school setting should be aware of autism, its features, its prevalence, and at least a basic understanding of its interventions. It is a well-recognized disorder that requires the involvement of many school employees, and staff should be prepared to serve students with autism.

3). Assessment staff such as school psychologists should be thoroughly familiar with the disorder including its diagnostic criteria, course, treatment means, and other relevant information. Furthermore, such personnel should be familiar with state standards for the diagnosis of autism, which may differ slightly from clinical or federal standards.

4). With the reauthorization of IDEA in December of 2004, at least some diagnostic criteria are being reviewed and updated. When the Autism label is reviewed, it would be beneficial if practices and procedures in the assessment of

autism are thoroughly surveyed and reviewed. An appropriate team should consider if there are ways to improve the standard for diagnosis and increase the accurate identification of students with autism.

5). There is a need for further research in this area and for the other disability categories as well. There are many research questions that could be asked based just on the database used for this study. Future research should consider additional hypotheses that could be tested and further build or validate the results of this research.

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icd.htm](http://www3.who.int/icd/vollhtm2003/fr-icd.htm)

APPENDICES

Figure 1.1

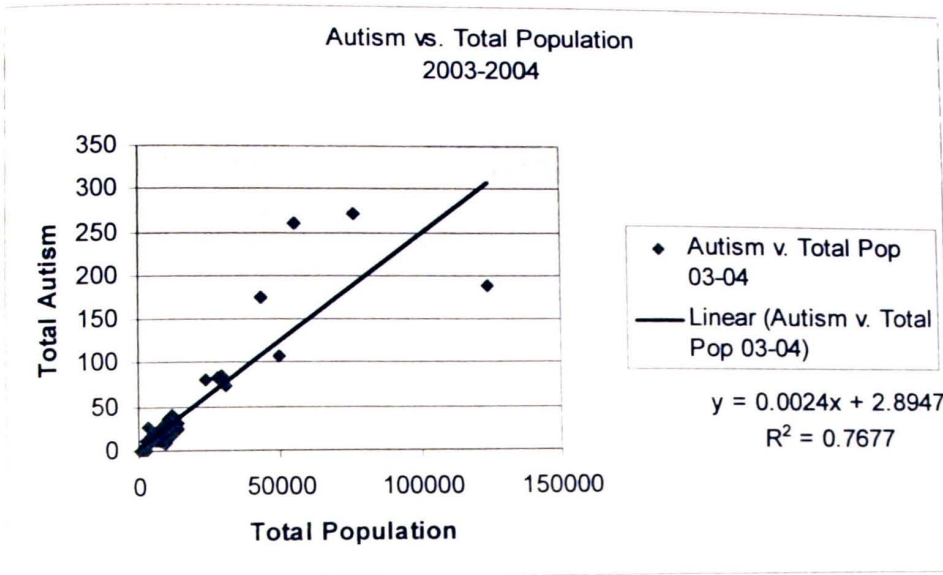
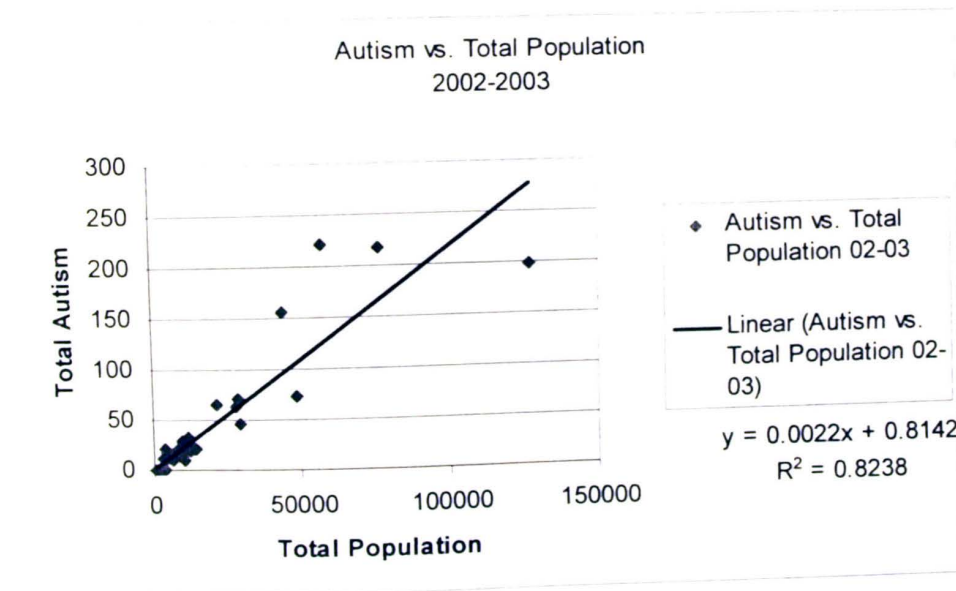


Figure 1.2



Appendix A.2

Figure 1.3

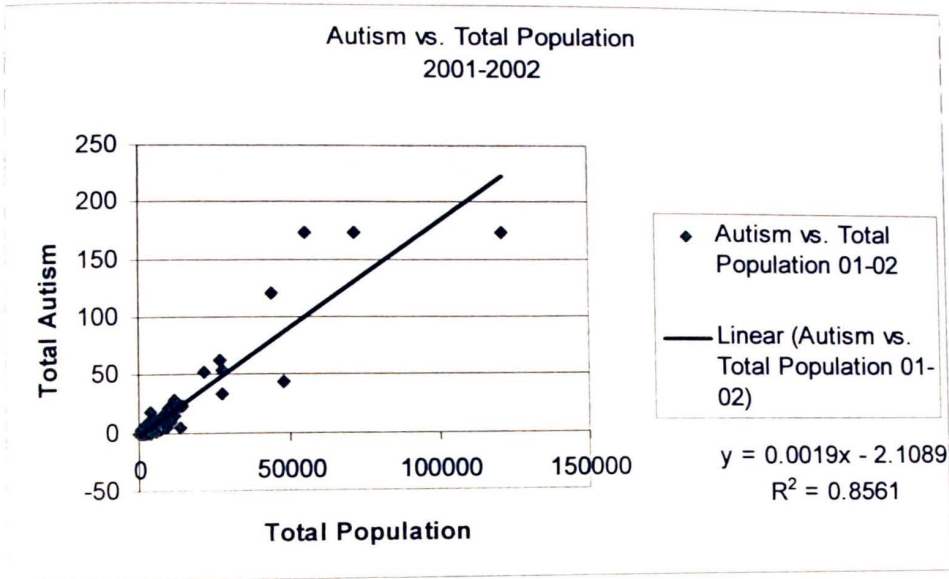
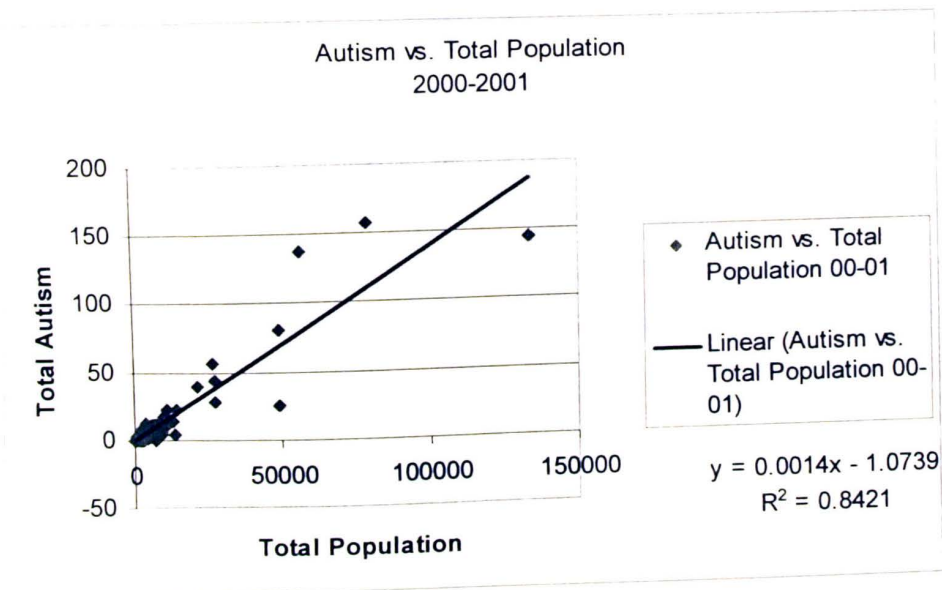


Figure 1.4



Appendix A.3

Figure 1.5

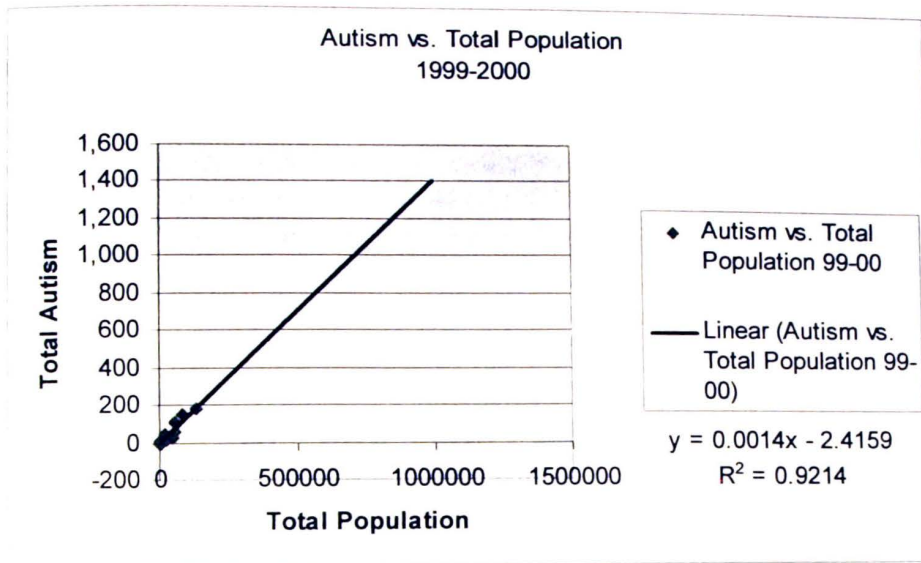
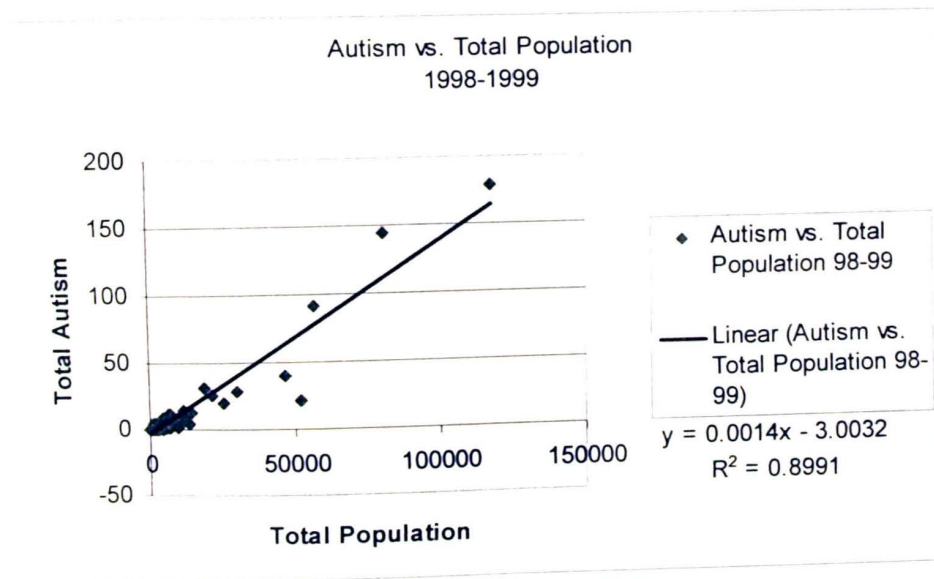


Figure 1.6



Appendix B.1

Figure 2.1

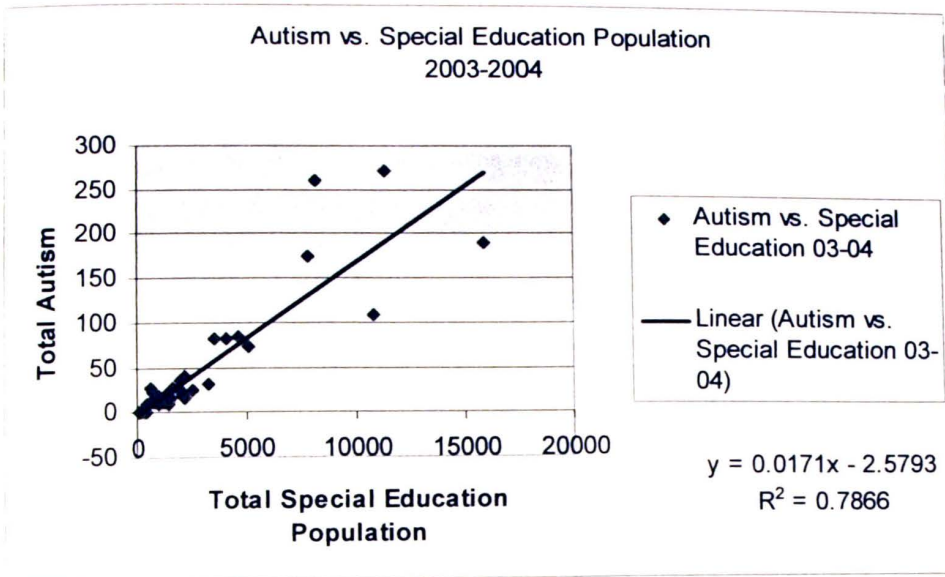
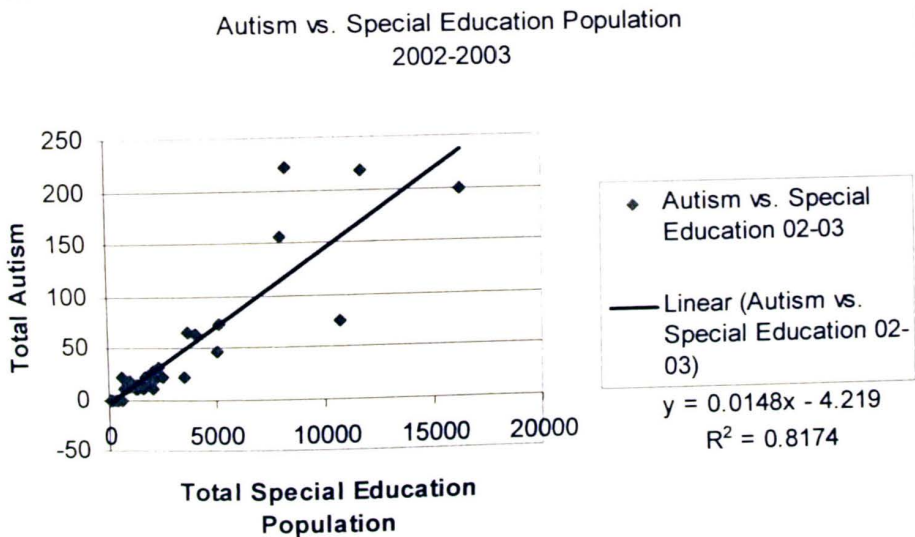


Figure 2.2



Appendix B.2

Figure 2.3

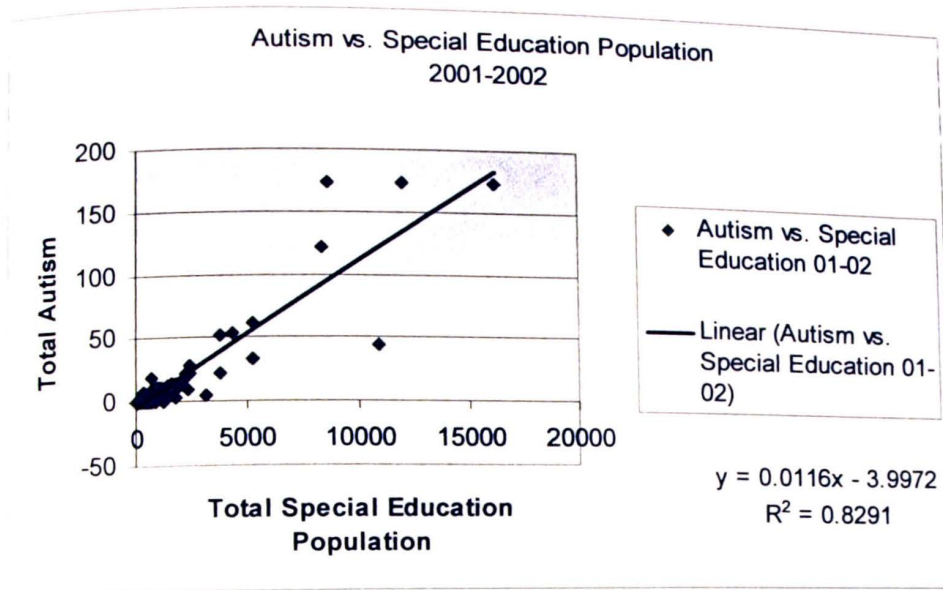


Figure 2.4

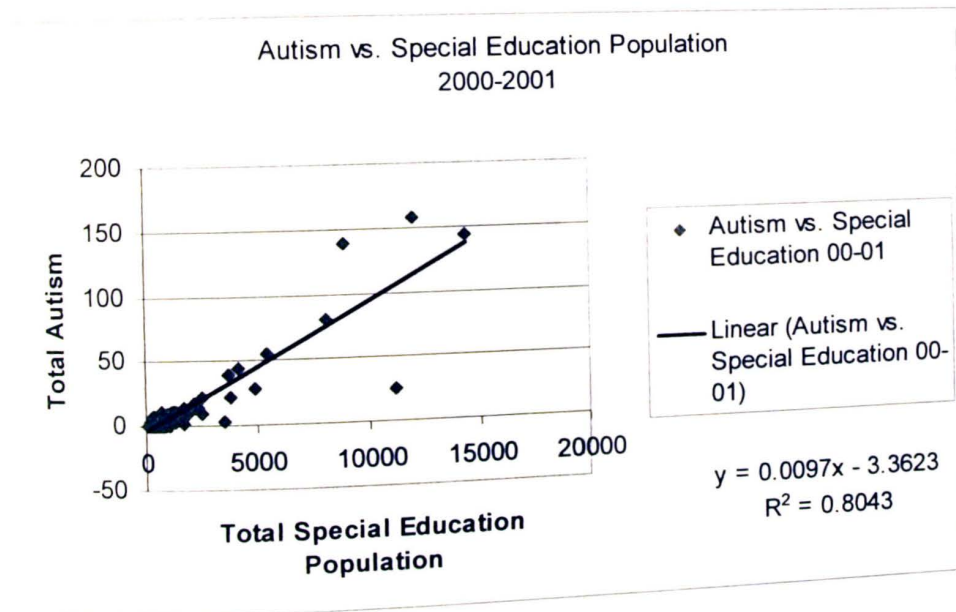


Figure 2.5

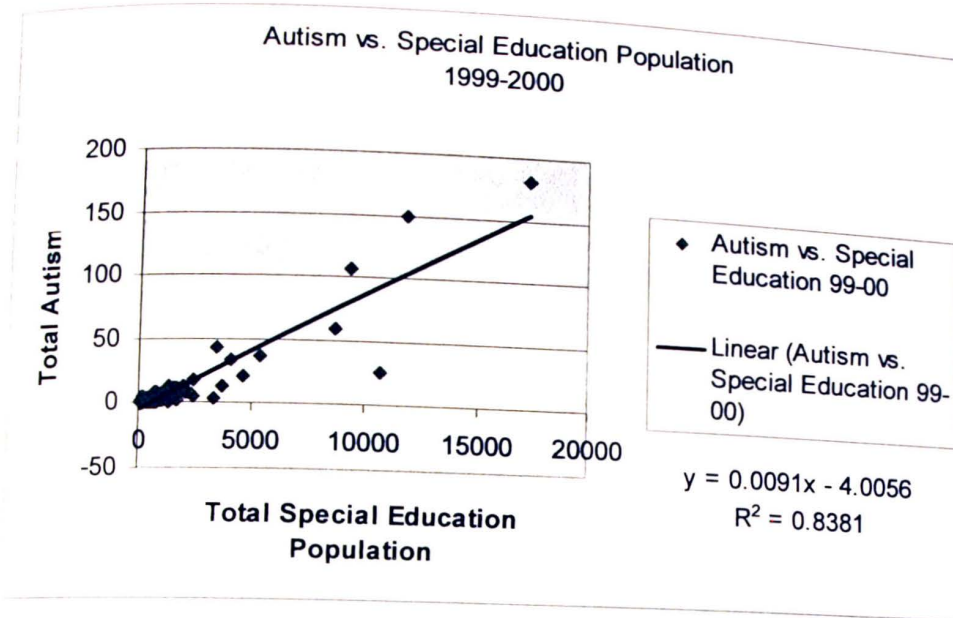
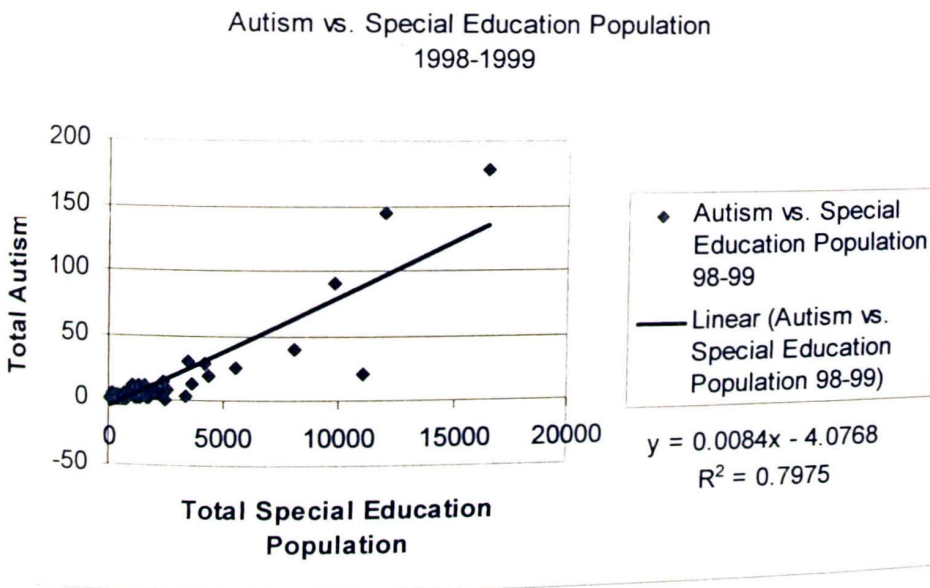


Figure 2.6



Appendix C

April 15, 2005

Mr. Larry D. Burns
1411 Hwy 46
Indian Mound, TN 37079

RE: Your application regarding study number 05-039: A study of Autism Incidence Rates in Tennessee Counties (APSU School of Education).

Dear Mr. Burns:

Thank you for your recent updated submission. We appreciate your cooperation with the human research review process. I have reviewed your request for expedited approval of the new study listed above. This type of study qualifies for expedited review under FDA and NIH (Office for Protection from Research Risks) regulations.

Congratulations! This is to confirm that I have approved your application through one calendar year. This approval is subject to APSU Policies and Procedures governing human subject research. The full IRB will still review this protocol and reserves the right to withdraw expedited approval if unresolved issues are raised during their review.

You are granted permission to conduct your study as described in your application effective immediately. The study is subject to continuing review on or before April 15, 2006, unless closed before that date. Enclosed please find the forms to report when your study has been completed and the form to request an annual review of a continuing study. Please submit the appropriate form prior to April 15, 2006.

Please note that any changes to the study as approved must be promptly reported and approved. Some changes may be approved by expedited review; others require full board review. Please contact me at (221-7415; fax 221-7641; email pinderca@apsu.edu) if you have any questions or require further information.

Again, thank you for your cooperation with the APSU IRB and the human research review process. Best wishes for a successful study!

Sincerely,

Charles A. Pinder, Ph.D.
Chair, Austin Peay Institutional Review Board
Cc: Lowrance