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Factors for Parent-Reported ADHD Diagnosis in Hispanic Elementary School-Aged Children

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This is to certify that the doctoral dissertation by

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Walden University
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Abstract

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MA, The University of Texas Pan American, 2001

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Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Clinical Psychology

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Abstract

Attention/deficit hyperactivity disorder (ADHD) affects a sizable number of children ages 4 to 17 and can be impairing into adulthood. Genetics are partly responsible, but research shows that psychosocial disparity and the interaction of select demographic factors significantly influence ADHD prevalence. There is limited research on the primary factors for an ADHD diagnosis in Hispanic elementary school-aged children. The purpose of this quantitative cross-sectional survey research was to determine the impact of disparity and interaction of psychosocial factors on an ADHD diagnosis. The research questions asked whether there was a relationship between the independent variables (mother's marital status, family income, insurance coverage, gender, age, Spanish spoken at home) and the dependent variable (an ADHD diagnosis) and whether the independent variables were predictive of an ADHD diagnosis. The theoretical framework was derived from Vygotsky and Bronfenbrenner who posited that an individual's culture influences development and a child's development is affected by the environment and external forces, respectively. Elementary school parents (N = 105) completed a self-administered survey to assess the independent variables' impact on an ADHD diagnosis. Data were analyzed using descriptive statistics, chi-square analysis, and binary logistic regression. Results showed males (23.8%) more likely than females to be diagnosed with ADHD. Results also found gender (p = .002) and age [$X^2(7) = 15.302$, p = .032] to be significant overall, R^2 = .31. These findings could result in positive social change by fostering awareness, early identification, and treatment of ADHD in Hispanic children and similar communities and may also decrease health care costs.

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Dedication

This project is dedicated to my husband of 47 years who supported me emotionally and financially. Also, to my children, grandchildren, siblings, friends, and 92-year-old mother who were patient and understanding of my absences to special events. They were encouraging, understanding, and supportive.

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Chapter 1: Introduction

Attention-deficit/hyperactivity disorder (ADHD) is one of the most diagnosed neurodevelopmental disorders of early childhood in the United States (American Psychiatric Association [APA], 2010, 2013). It is persistent, continues into adulthood, and is characterized by impairment in academic outcomes, social interactions, and future relational and occupational functioning (Brown, Brown, Briggs, German, & Oyeku, 2016; Strine et al., 2006). Experts deem this chronic disorder to be a serious public health problem that impairs academic outcomes, social interactions, and future relational and occupational functioning (Centers for Disease Control and Prevention [CDC], 2018). Yet, despite much research, the etiology and prevalence of ADHD have not been agreed upon by researchers (Thomas, Sanders, Doust, Beller, & Glasziou, 2015), and there is no biological or psychological test to confirm ADHD (CDC, 2018). ADHD prevalence in the United States is estimated to have increased by 42% between 2003 and 2011 (Collins & Cleary, 2016). The overall prevalence estimate found by Collins & Cleary was 12%.

Researchers have found that ethnicity and other variables influence the diagnosis of ADHD in children (Bloom, Jones, & Freeman, 2013; Pastor, Reuben, Duran, & Hawkins, 2015). The Office of Management and Budget (OMB;1997) revised the use of *Hispanic* to *Hispanic or Latino*. Both Hispanic and Latino include persons identifying themselves as (a) Puerto Rican, (b) Cuban/Cuban American, (c) Dominican (Republic), (d) Mexican American, (e) Central or South American, (f) Other Latin American, or (g) Other Hispanic/Latino (OMB, 1997). The term *Hispanic or Latino* appears in the

National Health Interview Survey (NHIS) questionnaire (CDC, National Center for Health Statistics [NCHS], 2017). Throughout this study, I will use the term *Hispanic*.

In NHIS estimates, Hispanic children have repeatedly been found less likely to be diagnosed with ADHD (Pastor et al., 2015). Researchers have also found that children diagnosed with ADHD were more likely to come from single mother homes, have low family socioeconomic status (SES), have public health insurance, and be male (Pastor et al., 2015); be under the age of 12 (Siegel, Laska, Wanderling, Hernandez, & Levenson, 2016; Visser, Zablotsky, Holbrook, Danielson, & Bitsko, 2015); and have a non-English language spoken at home (specifically Spanish; Lonigan, Lerner, Goodrich, & Allen, 2016). A lack of research in determining the effects of disparity and interaction of ethnic and psychosocial factors on an ADHD diagnosis exists (Collins & Cleary, 2016). Researchers use health disparities and inequalities interchangeably to indicate gaps in health between sections of the population (Meyer, Yoon, & Kaufmann, 2013). In view of the low ADHD prevalence estimates for Hispanics compared to other groups, the mostly Hispanic population in this geographic area, and the disparity of the select variables compared to state and national estimates, this research is needed to address this specific population.

In this quantitative cross-sectional study, I addressed the association of disparity and interaction as determining factors of an ADHD diagnosis by analyzing parent-reported survey data of elementary school aged children (4 to 12 years old) in a mainly Hispanic community (92.2%; U.S. Census Bureau, 2017). I expect that my findings will result in positive social change by increasing awareness and inspiring revisions in

policies (see Bishaw, 2013; Collins & Cleary, 2016; Lee, 2018). Additional positive social changes could include early diagnosis, interventions, and treatment of ADHD symptoms (Berger & Nevo, 2011) and a possible decrease in the yearly cost of this disorder, which is estimated to range, nationally, from $38 to $72 billion annually (CDC, 2013; Doshi et al., 2012).

In this chapter, I define ADHD and identify a gap in knowledge and understanding of the impact of disparity and interaction of being Hispanic, having a single mother, having low family SES, having public health insurance coverage and gender, age, and language spoken at home on an ADHD diagnosis. I provide background information on the study, the problem statement, and the purpose of the study. These sections are followed by the research questions and hypotheses; an overview of the study's theoretical foundation and research method; operational definitions; the assumptions, boundaries, limitations, and significance of the study; and a summary.

Background

ADHD is one of the most diagnosed childhood disorders (CDC, 2018). The current national prevalence of ADHD in the United States is estimated to be 11% (U.S. Census Bureau, 2018) of the population. Recent comparative statistics related to the growth of ADHD show that parent-reported rates for children ages 4 to 17, who have been diagnosed with ADHD in Texas, increased from 7.7% to 10.1% between 2007 and 2011 (CDC, NCHS, 2016).

The NHIS does not provide prevalence statistics for communities below the state level, and it acknowledges that state prevalence estimates are not considered reliable due

to small sample sizes because of limited funding (CDC, NCHS, 2016). This would suggest less generalizability at the community level. However, in examining a California insurance company's medical records (Getahun, Jacobsen, Fassett, Chen, Demissie, and Rhoads, 2013), Visser, Danielson, Bitsko, Perou, and Bumberg (2013) found state prevalence estimates were consistent with the NHIS parent-reported ADHD diagnosis suggesting NHIS findings are valid.

Researchers have found lower diagnoses among Hispanic children. Pastor et al. (2015) estimated that children ages 4 to 17 years of age, who had been diagnosed with ADHD, were less likely to be Hispanic. The rate of ADHD diagnosis was 6.3% for Hispanics and 11.5% and 8.9% for non-Hispanic Whites and non-Hispanic Blacks, respectively (Pastor et al., 2015). In addition, NHIS estimates have consistently found that children diagnosed with ADHD were more likely to come from (a) single mother homes, (b) have low family SES, and (c) be covered by public health insurance (Bloom, Jones, & Freeman, 2013; Pastor et al., 2015). Other researchers have found that (a) gender (Danielson et al., 2018), (b) age (Visser, Danielson, Bitsko, Holbrook, Kogan, & Ghandour, 2014), and (c) being a Spanish speaker (Lonigan et al., 2016) also were factors in ADHD diagnoses among children.

The southern Texas border county, which was the subject of this study, has a population of 92.2% Hispanics compared to 39.4% for the state overall and 18.1% nationwide (U.S. Census Bureau, 2018). Organizations such as the American Academy of Pediatrics (AAP) recognize that race, ethnicity, and socioeconomic status disparities can affect children's health (Cheng & Goodman; 2015). Collins and Cleary (2016) and

Willcutt (2012) recommend additional research to determine etiology to clarify whether ethnicity and/or psychosocial characteristics can result in variations in ADHD prevalence.

Researchers have considered biological and environmental influences as possible factors contributing to ADHD prevalence and etiology. Some of the topics explored have been genetics (Romens, McDonald, Svaren, & Pollak, 2015), epigenetics (Meloni, 2015; Nigg & Craver, 2014), and environmental exposures (Choi, Kwon, Lim, Lim, & Ha 2016). Other researchers have explored traumatic brain injury (Adeyemo et al., 2014; Ornstein et al., 2014), fetal alcohol exposure (Burd, 2016), smoking (Huang et al., 2018; Kim et al., 2017, Skoglund, Chen, D'Onofrio, Lichtenstein, & Larsson, 2014), low birth weight (Nigg & Song, 2018; Pettersson et al., 2015), and language as a predictor of externalizing behaviors (Peterson et al., 2013).

Despite much research, researchers have not agreed upon the etiology of ADHD, and there is no biological or psychological test to confirm an ADHD diagnosis (CDC, 2018). Even though most researchers studying ADHD have shown an association between ADHD and some risk factor as mention above, they have had inconsistent results when repeating studies. Collins and Cleary (2016), Willcutt (2012), and Choi et al. (2016) have all proposed additional research to find which variables are more likely to be associated with ADHD prevalence.

Colby and Ortman (2015) project a 114.8% increase in the Hispanic population by 2060. In 2015, Hispanics numbered 56.6 million in the United States and 10.7 million in Texas (QuickStats, 2015). Hispanics have consistently been found to be less likely to

be diagnosed with ADHD (Coker et al., 2016; Pastor et al., 2015). I used data collected for this study to examine effects of several variables on ADHD prevalence in a mostly Hispanic community. Study findings may be helpful in further clarifying the effect of disparity and interaction and select psychosocial risk factors in ADHD diagnoses. The need for such knowledge is recognized by researchers (Collins & Cleary, 2016) and organizations such as the AAP (Cheng & Goodman, 2015). These areas have been understudied in unique communities such as the one examined in this study.

Problem Statement

Determining the primary factors for an ADHD diagnosis in Hispanic children has been a problem because there is a lack of research involving disparity and interaction (Cheng & Goodman, 2015), coming from a single mother home, having low family SES, having public health insurance and gender, age, and language spoken at home on an ADHD diagnosis (Choi et al., 2016) in a mainly Hispanic community. Genetics have been recognized as partly responsible for ADHD (CDC, 2018), but the NHIS estimates suggest that disparity and interaction of select demographic factors significantly influence ADHD prevalence (CDC, NCHS, 2017). Having ADHD can profoundly affect social interactions, well-being, and academic achievement in childhood (Roy et al., 2016). Roy et al. (2016) suggest that adult persistence and functioning problems may be reduced by early interventions.

The increasing prevalence of ADHD may be due to inconsistent use of diagnostic criteria in diagnosing this disorder (Fulton, Scheffler, & Hinshaw, 2015; Musser, Karalunas, Dieckmann, Peris, & Nigg, 2016) causing over- and/or underdiagnosis. Coker

et al. (2016) found that racial and ethnic minorities were underdiagnosed and undertreated even though findings did not suggest Whites as being over diagnosed. Organizations such as the AAP recognize that race, ethnicity, and sociodemographic disparities experienced during childhood can affect children's health (AAP, 2016; Cheng & Goodman, 2015). Therefore, the aim of this quantitative cross-sectional study was to explore whether the identified independent variables affect the incidence rate of ADHD.

Purpose of the Study

The purpose of this cross-sectional quantitative descriptive research was to determine the effects of disparity and the interaction of select factors (coming from a single mother home, having low family SES, having public health insurance coverage, gender, age, and Spanish spoken at home—the independent variables) on parent-reported ADHD diagnosis (the dependent variable) in a mostly Hispanic community. As Cheng and Goodman (2015) noted, there is inadequate research on the influence of these independent variables and on ADHD diagnoses. I used the results to determine the primary factors affecting an ADHD diagnosis in a Hispanic community. Furthermore, there is a lack of research on disparity and interaction of psychosocial risk factors in Hispanic children diagnosed with ADHD (Choi et al., 2016; Collins & Cleary, 2016). My research design model is shown in Figure l.

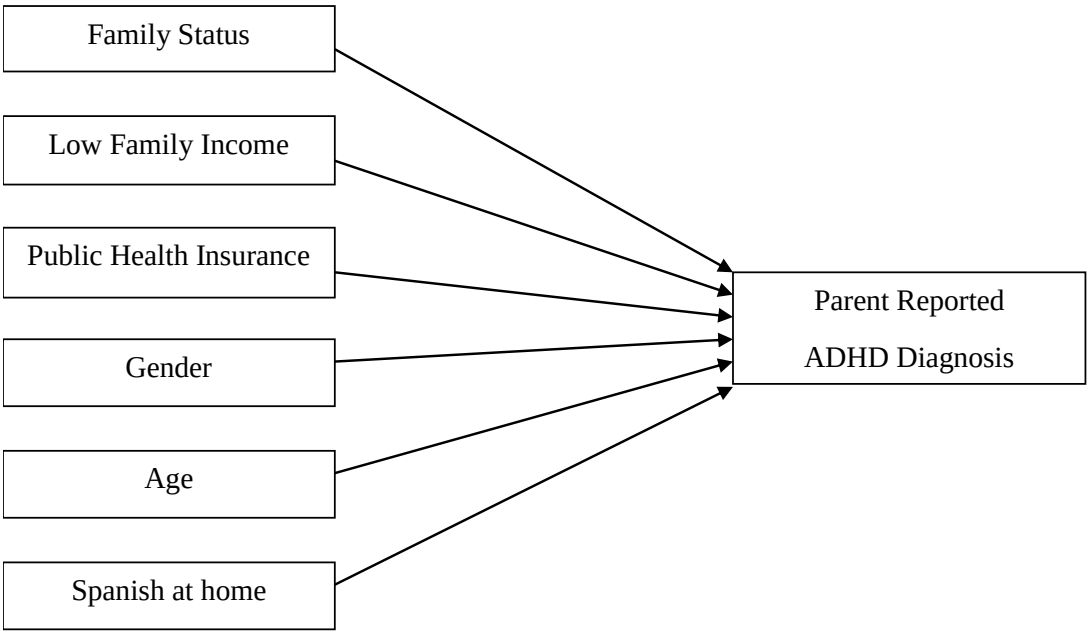

Figure 1. Research design model. Diagram depicting the hypothesized relationship of the independent variables (being Hispanic, having a single mother, having low family SES, being on public health insurance, gender, age, speaking Spanish at home) and the dependent variable (an ADHD parent-reported diagnosis).

Research Questions and Hypotheses

Research Question 1: Are there statistically significant associations between the independent variables of coming from a single mother home, having low family SES, having public health insurance, gender, age, and Spanish spoken at home and an ADHD parent-reported diagnosis?

$H1_0$: There are no statistically significant associations between the select independent variables of coming from a single mother home, having low family SES, having public health insurance, gender, age, and Spanish spoken at home and an ADHD parent-reported diagnosis as measured by analyzing the data.

$H1_1$: There are statistically significant associations between the select independent variables of coming from a single mother home, having low family SES, having public health insurance, gender, age, and Spanish spoken at home and an ADHD parent-reported diagnosis as measured by analysis the data.

Research Question 2: Do the independent variables (coming from a single mother home, having low family SES, having public health insurance, gender, age, and Spanish spoken at home) significantly predict the dependent variable of an ADHD parent-reported diagnosis?

$H2_0$: The independent variables (coming from a single mother home, having low family SES, having public health insurance, gender, age, and Spanish spoken at home) do not significantly predict the dependent variable of ADHD parent-reported diagnosis as measured by analyzing the data.

$H2_1$: The independent variables (coming from a single mother home, having low family SES, having public health insurance, gender, age, and Spanish spoken at home) significantly predict the dependent variable of ADHD parent-reported diagnosis as measured by analyzing the data.

Theoretical Framework

I derived the theoretical framework for this quantitative cross-sectional study from cultural-historical theory (Vygotsky, 1978; Wertsch, 1985; Wertsch & Tulviste, 1992) and ecological systems theory (Bronfenbrenner, 1979, 2005). These developmental theories relate to social factors affecting an individual and, thus, were pertinent to the

study topic. Specifically, this framework offered a useful means of investigating the influence of disparity and interaction of ethnicity and psychosocial risk factors on a diagnosis of ADHD.

Vygotsky's Cultural Historical Theory

For this quantitative cross-sectional investigation, I drew upon Vygotsky's general genetic law of cultural development, which the theorist developed based on the influences of Marx and Blonsky (Vygotsky, 1978). The general genetic law of cultural development is used to explicate the role of ethnicity and psychosocial factors that produce a cultural evolution of sorts (Khinkanina, 2014; Wertsch, 1985). The main supposition of Vygotsky's theory was that human development is affected by cultural and social influences of the society in which the child is raised (Steve & Grubb, 2018, Wertsch, 1985; Vygotsky, 1978).

Researchers have used Vygotsky's cultural-historical framework in different areas of cognitive processes such as phylogenetic, ontogenetic, microgenetic, and cultural historical (Cole & Wertsch, 1996; Marginson & Dang, 2017; Wertsch, 1985). Vygotsky (1978) posited that a child's social and psychological *planes* determine the child's cultural development. This can be further explained as the need for humans to adapt to changing situations in the face of uncertainty (Khinkanina, 2014). Marginson and Dang (2017) described Vygotsky's cultural historical *genetic domain* as encompassing the social activity of humans. This being the social experience of human development where culture affects behavior.

Saengpun and Inprasitha (2012) used Vygotsky's theory to interpret the use of psychological tools through a cultural process to learn mathematics. Their results suggest that the use of psychological tools (e.g. language, drawing diagrams, and instructional materials) were vital in helping students solve addition problems. This theoretical framework may explain the low prevalence rates of Hispanic children in this community diagnosed with ADHD since their parents may use different tools and/or use them differently than other groups (Lawton, Gerdes, Haack, & Schneider, 2014).

Vygotsky's view was that a child's cultural development manifests itself twice (Vygotsky, 1978). At first as inter-psychological thinking (between two people) and then as intra-psychological thinking which was within themselves. Vygotsky posited that this thinking was in line with the culture in which he was raised (1978). Using this logic, Hispanic children in a single mother home, with low family SES, public health insurance affected by uncertainty and forced to adapt would result in ADHD symptomology. This theoretical construct links the low prevalence rates of ADHD to Hispanics.

Steve and Grubb (2018) note that Vygotsky's *More Knowledgeable Other* was no longer fitting the expectation of passing a culture on to the next generation. They suggested communication regarding appropriate behaviors in the United States was ambiguous and unpredictable thus resulting in children with lower self-control. They attribute this behavior to the individualistic culture limiting adult-child interaction due to increased technology use (Steve & Grubb, 2018).

Bronfenbrenner's Ecological Systems Theory

Ecological systems theory of human development is a complex theory consisting of five interrelated levels of proximity to the individual (Bronfenbrenner, 1979). Concentric circles show the order of the five environmental systems starting with the microsystem. This system or level is comprised of family and peers in the system closest to the individual (Bronfenbrenner, 2005). In Bronfenbrenner's theory, a change in the system may potentially change an individual and an individual may potentially change a system, which may cause changes in the other systems (Swick & Williams, 2006).

Ebersohn and Bouwer (2015), interpreted qualitative data using this theory and found that biological parental interaction at the mesosystemic level affected the child. Their study further suggested the change that takes place when the child becomes a member of two different microsystems, the child affects change in them as well (2015). Ebersohn and Bouwer (2015) looked at their research as a means to bring awareness to divorced parents on the unique relationship that was created to provide a better mesosystem for the child.

Gonzalez & Barnett (2014) also researched family structure (ecosystem) drawing from ecological systems perspectives. They conducted a longitudinal study of Mexican-origin mothers with a romantic partner relationship. The goal of the study was to see if maternal distress (e.g. children's problem behavior) was linked to the biological father, romantic partner, and instrumental social support such as money loan, emergency childcare, and shelter (2014). Results of the study showed that Mexican-origin mothers in

a microsystems level romantic relationship for more than two years were more depressed than those in relationships of less than two years.

Changes in the family structure, SES, employment, and/or residency influence the individual over time as they age (Swick & Williams, 2006). Collins and Cleary's (2016) findings that ecological factors impact an ADHD diagnosis is in alignment with this premise. Choi et al. (2016) found environmental and social factors increase the risk of an ADHD diagnosis and Cheng and Goodman (2015) suggested a better understanding of ethics, race and SES as necessary to effectively address disparities. Therefore, coming from a single mother home, having low family SES, having public health insurance, gender, age, and language spoken at home on an ADHD diagnosis can conceivably influence an ADHD diagnosis in Hispanic children. This theory is further clarified in Chapter 2.

Theoretical Synthesis

Cultural history (Vygotsky, 1978) and ecological systems theory (Bronfenbrenner, 1979) work together because they overlap in their views of social interaction affecting development. This framework provides a basis for researching the interaction of disparity and interaction of being Hispanic, and psychosocial risk factors in children diagnosed with ADHD. Data collected through a survey in a mostly Hispanic community (U.S. Census Bureau: QuickFacts, 2016, July 1) was used to determine whether Hispanic children from single-mother homes, with low socioeconomic status, with public health insurance, gender, age, and home language were more likely to be diagnosed with ADHD. This framework was supported by the concept that these select

factors affect development of these children influenced by outside forces (Cheng & Goodman, 2015; Choi et al., 2016; Collins & Cleary, 2016; Martinez, 2015).

These two theories, Vygotsky's cultural-historical theory (1978; Wertsch, 1985) and Bronfenbrenner's ecological theory (1979), were used as mediums of the theoretical framework to narrow the literature gap in environmental and developmental research. The theoretical framework developed from these two theories provides a means to study the individual child in ecological contexts (Neal & Neal, 2013). Synthesis of these two theories drive this quantitative cross-sectional survey study focused on exploring whether coming from a single mother home, low family income, having public health insurance, gender, age, and language spoken at home can conceivably influence an ADHD diagnosis in Hispanic children.

Nature of the Study

This study used a cross-sectional survey study design permits a comparison of naturally occurring groups of individuals (Jackson, 2012). This design was used to assess the significance of primary determining factors in ADHD prevalence. A cross-sectional design allowed an opportunity to explore primary factors, specifically, Hispanic children who come from single mother homes, with low family socioeconomic status, have public health insurance coverage gender, age, and Spanish language spoken at home (independent variables), and an ADHD diagnosis (dependent variable). A numeric description of study results, of this unique population, was possible because of this study design (Creswell, 2014).

Despite many studies, no one factor has been found culpable for ADHD symptomology. Cheng and Goodman (2015) and Collins and Cleary (2016) found race/ethnicity and socioeconomics disparities can affect children's health. Collins and Cleary (2016) further found family status, neighborhood safety factors, and a language other than English in the home were also implicated an ADHD diagnosis. This study adds to the literature gap related to the hypothesized effects of psychosocial factors on an ADHD diagnosis

This geographic area was especially suited for this study because of the disparities of the independent variables selected (U.S Census Bureau, 2018). Census estimates showed the density of the Hispanic population in this Texas county, with 92.2% Hispanics (see Appendix A), was over two time greater than that of the state (39.1%; see Appendix B) and more than five times that of the national estimate 17.8% (2018; see Appendix C). Single mother homes, low family income, public health insurance coverage, and Spanish spoken at home were more prevalent in this county than state and national estimates (U.S. Census Bureau, 2018).

A survey was developed, in English and Spanish (see Appendices D and E). The developed survey uses the NHIS household questionnaire, family questionnaire, and child questionnaire sections (2017) as guides for the questions necessary for evaluating the independent variables and the dependent variable. The NHIS is a multistage probability sample survey (Bloom et al., 2013) conducted by the Census Bureau for the NCHS, under the guidance and supervision of the CDC (2017).

The results of this survey provided data to determine whether the select psychosocial demographic independent variables influence an ADHD diagnosis (the dependent variable). The questions about the health of a randomly selected child in a household were answered by an adult familiar with that child's health (CDC, NCHS, 2017). The reason for selecting an elementary school population age group was because ADHD is expected to be diagnosed by age 12 (APA, 2013). This age limit was seven in the Diagnostic and Statistical Manual-IV-TR (APA, 2000) and increased to age 12 in the DSM-5 (APA, 2013). The survey questions address ethnicity, mother's marital status, the family's income, the child's health insurance coverage, gender, age, and primary language (CDC, NCHS, 2017).

A packet containing instructions, the informed consent, and the survey, in English and Spanish, were sent home with each child attending the target elementary schools as a means of distributing the forms. No implicit or explicit information was gathered to ensure anonymity (Sierles, 2003). Only one caregiver voluntarily filled out the survey at a location of their choice and at their convenience with no repercussions for nonparticipation (Creswell, 2014).

The completed survey was placed in the envelope and sealed by the participant to ensure confidentiality. It was then returned to the school and/or mailed by the respondent. All pertinent and necessary information was included in the informed consent, which provided details of what was included in the survey (e.g., background of the study, approximate time for completion, procedures, assurances of confidentiality, instructions, etc.; Walden University IRB, 2018).

A convenience sample of parents with children in two elementary schools in a Texas/Mexico border county were administered the survey. The surveys were returned to the school office or by mail. Surveys returned to the school were either mailed to the P.O. Box or picked up by the investigator for data imputation and analysis. Raw data were coded and analyzed with IBM SPSS version 25 (2017).

A descriptive statistic, chi-square test of independence, and logistic regression were used as the primary analytic scheme due to the binary properties of the independent and dependent variables (IBM SPSS, 2014). This model allowed the interpretation of the coefficient for the predictor to determine odds and odds ratios (Szumilas, 2015). Chapter 3 highlights more statistical details.

Definitions

The following operational definitions help orient the reader as to how terms were interpreted for this study. I adapted many of the terms used in the study from those in the NHIS (CDC, NCHS, 2017).

ADHD diagnosis: A diagnosis that is determined by asking the parents whether a doctor or health professional has ever told them the child has ADHD or attention deficit disorder (ADD; CDC, NCHS, 2017). The coding for this dependent variable was 1 for *No* to an ADHD diagnosis and 2 for *Yes* to an ADHD diagnosis.

Age: Four to 17 is the age for children considered for an ADHD diagnosis by the NSCH (CDC, ADHD, 2018). This study uses these guidelines but stops at 12 years of age, which is at the top of the age group in elementary schools. The redesigned NSCH, as

of 2016, now identifies children 2–17 for ADHD diagnosis consideration (CDC, ADHD, 2018).

Child: In this study a child was operationalized as being between the ages of four and 12 years of age, which coincides with the age set by NSCH (CDC, ADHD, 2018) and eligibility for the pre-kindergarten programs in Texas (TEA, 2017 - 2018), which are housed in the elementary schools. The children in the elementary schools in the pre-kindergarten 3 program were not included because they were not included in the NHIS for ADHD consideration (CDC, ADHD, 2018).

Family structure: In this study family structure referred to the marital status (single mother or not) of the child's caregiver (see CDC, NCHS, 2017). This independent variable referred to whether the parent was single or not, as per the parent's response on the survey, which was coded 0 for *not single* and 1 for *single*.

Gender: In this study gender was coded as either male or female. This independent variable was coded as 1 for *male* and 2 for *female*.

Health insurance coverage: An independent variable referring to medical coverage available to a child, as reported by the child's parent. The responses were limited to (a) private health insurance (employer or self-bought), (b) Medicaid or other government insurance, and (c) not insured (CDC, NCHS, 2017). Coding was 0 for *private health insurance* and *no insurance* and 1 for *public health insurance.*

Hispanic: Hispanic or Latino Origin and Non-Hispanic or Latino Origin were used to signify ethnicity (U.S. Census Bureau, 2012). This characteristic was in the survey, but since there were no other ethnic groups it was not analyzed.

Parent-reported: Information gathered from parents/caregivers about a child and used to analyze the independent variables being explored for this study and their effect on the dependent variable. Questions used were fashioned after the NHIS, which was also based on parent reporting (CDC, NCHS, 2017).

Socioeconomic status (SES): For the independent variable family income. This survey asks for the household's yearly income total starting at less than $10,000 to over $100,000 (e.g. < $10,000, < $15,000, < $25,000, < $35,000, < $50,000, < $75,000, and over $100,000). A space was provided for the informant in case they were willing to provide a specific dollar amount to determine poverty levels (see Appendix F). This definition was used to obtain data for the *Family Income* independent variable. Due to a small sample size, levels were combined, and the family's income was noted as either > $25,000 and coded 0 or < $25,000 and coded 1).

Spanish language spoken at home: Persons who speak a language other than English at home (CDC, MMWR, 2013); specifically, Spanish for this study. English was the reference language and Spanish and Bilingual were compared to it. The dummy coding was Spanish vs English and Bilingual vs English.

Assumptions

One assumption was that the parent-reported data collected from the target elementary schools in Hidalgo County would produce similar response rates as the NHIS (Pastor et al., 2015), but higher prevalence rates. This was expected due to the disparity of coming from a single mother home, having low socioeconomic status, public health insurance coverage, and a language other than English spoken at home (specifically

Spanish) in this community as compared to Texas and the U.S. (U.S. Census Bureau, 2018). It was further assumed that the study sample adequately represented the counties' population (2017) because the school's population was similar to that of the county with an over representation of Hispanics (Texas Education Agency [TEA], 2017-2018).

As with most survey-based studies, it was assumed that respondents would willingly participate and respond candidly (Grimm & Yarnold, 1995). It was further assumed that a reported ADHD diagnosis of the identified child indicated that the child has access to medical attention and has been diagnosed by a doctor or mental health professional as indicated in the questionnaire. The final assumption was that the survey instrument measured what it was intended to measure with similar validity and reliability as the NHIS since the survey questions were modeled after their survey questions (CDC, NHIS, 2017).

Scope and Delimitations

The focus of this cross-sectional quantitative study was to determine if the primary factors for an ADHD diagnosis involving disparity and interaction (Cheng & Goodman, 2015) of coming from a single mother home, with low socioeconomic status, health insurance coverage, age, gender, and Spanish language spoken at home in a community with 92.2% Hispanics (U.S. Census Bureau, 2018), were indicative of an ADHD diagnosis. This study was limited to the population of two schools in one district in this county. However, the population was a close representation of the local population (TEA, 2017-2018).

These schools' population was 100% and 99.2% Hispanic and 92.8% and 96.3% economically disadvantaged during the 2017-2018 school year (TEA, 2017 - 2018). Elementary school parents (respondents) fit the criteria in that their children were a part of this community attending the target schools who might have, or not, been diagnosed with ADHD. Inclusion for this study was limited to the parents of children between the ages of 4 and 12 enrolled in the target schools.

History, age, and regression, as threats to internal validity, were not a consideration because this was a cross-sectional survey design which was only administered once (Creswell, 2014). Selection issues were not a threat either as all parents/caregivers from the two schools were included. Also, nonthreatening to internal validity due to the design were mortality, diffusion, and treatment effects (Huitt, Hummel, & Kaeck, 1999). Compensation or compensatory rivalry was not a problem to internal validity since no benefits were offered nor demands made (2014) and participants were from elementary schools in the same district. Also, there were no measures of an intervention or pre- or post-test and therefore, there was no threat.

Even though the sample population was one of convenience (Babbie, 2013) and not representative of the US or Texas populations (U.S. Census Bureau, 2018), it was representative of this community and county as evidenced by the similar percentage of Hispanics in the schools (TEA, 2017-2018). All parents were invited to provide information about their child or children attending these schools. Surveys returned provided the data needed to assess whether coming from a single mother home, having

low family SES, having public health insurance, gender, age, and language spoken at home affected an ADHD diagnosis.

External validity could have been a threat if the data analyzed and reported was generalized to other populations not meeting the same criteria or characteristics (Creswell, 2014). Using a community-based population reflective of the county improved generalization to the NHIS Hispanic estimates derived from their data base (Pastor et al., 2015). Due to the nature of the study, the survey was completed by the participants in the privacy of their own home, at their convenience without interference from the researcher.

Limitations

A major limitation was the low response rate yielding a sample size of $N = 105$ and a small viable number of cases of $N = 83$ to use in the logistic regression analysis. Small sample sizes can jeopardize confidence because the confidence interval range is greater than with a larger sample size. Statistical power can also be affected because low statistical power decreases the ability to detect differences. Also, Fisher's Exact Test was used because other chi-squared tests use approximation methods, which are inadequate when working with small sample sizes.

Additionally, methodology changes were needed due to the small sample size. Independent variables with cell values of less than five were either grouped or dummy coded. This is explained in detail in chapter three.

Less detailed survey data (as compared to the NHIS) was collected due to instrument development constraints and to avoid a lengthy, and overly burdening instrument (e.g. NHIS; see Appendices D and E). However, it was appropriate for the

needs of this study. This study's cross-sectional design cannot demonstrate causal association between the sociodemographic variables and study outcomes (Krueger, Jutte, Franzini, Elo, & Hayward, 2015). Lack of control as to who filled out the survey and the truthfulness of the responder may also be a limitation and affect the results of the data (Babbie, 2013).

However, the request that the primary caregiver fill out the survey and an assurance of anonymity may help improve candid and accurate responses. The parents/caregivers' response in the affirmative to the ADHD diagnosis question as to whether they have ever been told their child had ADHD or ADD may cause over or under diagnosis rates (Fulton et al., 2015). Possible confounding variables may be comorbid disorders (2016) and parental education (Visser et al., 2014). However, if this study could be replicated with a larger sample, it might support this study's findings in this unique community.

Significance of the Study

The purpose of this study was to identify the primary factors for an ADHD diagnosis in this Hispanic community. This has been a problem because research evaluating the disparity and interaction of psychosocial risk factors, of Hispanic children, diagnosed with ADHD was sparse in the literature (Cheng & Goodman, 2015, Collins & Cleary, 2016). Results from this study could bring about a change in the way people think of ADHD. A local study might encourage community members to seek help and treatment. To determine primary factors for an ADHD diagnosis consisting of coming from a single mother home, having low family income, having public health insurance,

gender, age, and Spanish as the language spoken at home on an ADHD diagnosis, a framework was developed.

Significance to Theory

Vygotsky's cultural-historical theory (Vygotsky,1978; Wertsch, 1985) and Bronfenbrenner's ecological systems theory of human development (Bronfenbrenner, 1979; 2005) were used for this. Vygotsky's theory acknowledges the importance of culture in behavior and social interaction (Vygotsky, 1979; 1985) and Bronfenbrenner proposed individuals learn from their environment (specifically the micro system) but it was affected by the other systems as well (Bronfenbrenner, 1979, 2005). This framework serves as the foundation of this study in assessing the determining factors contributing to an ADHD diagnosis based on developmental and environmental contributors.

Significance to Practice

Delineating the effects of being Hispanic, coming from a single mother, having low family SES, having public health insurance, gender, age, and Spanish spoken at home have on the prevalence of ADHD, in this population, was important since there were no local statistics about this topic (Parsons, Moriarity, Jonas et al., 2014). Collins and Cleary (2016) recommend future research should be carried out to understand the causes of racial/ethnic disparities observed in their study. The AAP states there is a need for "eradicating health and health care inequalities associated to race, ethnicity, and SES (Cheng & Goodman, 2015). This research helps address these needs since the select variables were more likely found in children diagnosed with ADHD and the estimated

rates of these variables were higher in this Texas county, logic suggests these children have a higher prevalence rate of AHDH diagnosing.

These study results, albeit based on a small sample size, in this unique geographic location may be generalized to other similar communities. A research study of a community with over 90% Hispanics with similar ethnicity and psychosocial factors may encourage other researchers to conduct similar studies. These results may be compared and thereby establish a more robust accumulation of community-based data. This in turn would provide a better ADHD prevalence estimate for small communities not presently addressed by NHIS (Parsons et al., 2014).

Significance to Social Change

Despite an abundance of research on ADHD, little is known about its etiology and prevalence (Choi et al., 2016; Collins & Cleary, 2016). This quantitative cross-sectional study contributes to the knowledge about the association of specific risk factors (coming from a single mother home, having low family SES, having public health insurance, gender, age, and Spanish language spoken at home) and the prevalence of an ADHD diagnosis in a south Texas border county. Disparity and interaction of the select risk factors associated with an ADHD diagnosis in Hispanic elementary school aged children were explored by analyzing the dataset derived from the survey responses.

Drawing attention to these risk factors may help in intervening at an earlier age (Morgan, Hillemeier, Farkas, & Maczug, 2014) or providing best practice treatment as recommended by the APA (Hauk, 2013). This quantitative survey study attests to the need for solutions to a chronic and debilitating disorder in this unique community and by

extension to other similar communities with growing Hispanic populations, especially along the U.S. and Mexico border. Positive social changes may be in the form of improved awareness (CDC, Health Equity, 2013), of prevalence and improved community service delivery (Lonigan et al., 2016), and policy changes (Czajka & Denmead, 2012) produced in response to this study's results.

Lonigan et al., (2016) found children proficient in Spanish were only proficient in primarily Spanish skills while English speakers were more proficient in both English and Spanish Skills. Changes, due to research results, may provide early identification of children with these select risk factors. Also, results could improve interventions and treatment of ADHD symptoms (Berger & Nevo, 2011) due to these environmental issues. Policy making is another form of possible change as it depends on survey results and statistical estimates (U.S. Department Health Human Services, 2016). This may lead to a decrease in the yearly cost of this disorder, which ranged from $38 to $72 billion annually (Doshi et al., 2012).

Summary and Transition

The intent of this cross-sectional quantitative study was to determine primary factors in a Hispanic community involving disparity and interaction (Cheng & Goodman, 2015) of ethnicity and psychosocial risk factors in children diagnosed with ADHD (Choi et al., 2016). The purpose was to explore what effects, if any, coming from a single mother home, having low family SES, having public health insurance, gender, age, and Spanish spoken at home have on an ADHD diagnosis. The participants were the parents/caregivers of children 4 to 12 in two elementary schools in the select county.

A self-administered survey was distributed to the respondents to collect relevant data used to answer the research questions (Sierles, 2003). It was hypothesized that responses to the questions about being Hispanic, family structure (single mother home), family income, insurance coverage (having public health insurance), gender (male or female), age (when diagnosed), and Spanish spoken at home would help predict an ADHD diagnosis among children in a county with over 92% Hispanics (U.S. Census Bureau, 2018). A theoretical framework derived of an interaction of Vygotsky (1979) and Bronfenbrenner's (1979) developmental theories was the basis of the study.

In Chapter 1, a need for research literature related to disparity and interaction of ethnicity and psychosocial factors was shown to exist (Cheng & Goodman, 2015, Collins & Cleary, 2016). It was established that Hispanic children were less likely to be diagnosed with ADHD and that children diagnosed with ADHD were more likely to come from single mother homes, have a low family income, be covered by health insurance, gender, age (Visser et al., 2013) and Spanish spoken at home (Lonigan et al., 2016). Results from a developed survey instrument were used to assess for the select variables to determine their effect on an ADHD.

Chapter 2 consists of the literature review aligned with the theoretical framework used to explain (a) coming from a single mother home, (b) having low family SES, (c) having public health insurance, (d) gender, (e) age, and (f) having Spanish spoken at home related to an ADHD diagnosis. This chapter specifically addressed the association between the above mention independent variables and an ADHD diagnosis as reported by the parents of Hispanic elementary school age children. Also, the generalizability of a

community that is over 90% Hispanic to national and state estimates was discussed. Chapter 3, the methods chapter, consists of the design, how the data was obtained, and how they were analyzed. It also includes a description of the instruments used and the method for analyzing the data collected. Results are presented in chapter 4 and implications are explained in detail in Chapter 5.

Chapter 2: Literature Review

In conducting this study, I sought to determine the primary factors underlying disparity and interaction of psychosocial factors affecting children with an ADHD diagnosis in a mostly Hispanic community. The specific purpose of the study was to explore influences of (a) coming from a single mother home (family status), (b) having low SES (family income), (c) having health insurance (covered or not), (d) gender (male or female), (e) age (when diagnosed), and (f) Spanish spoken at home on an ADHD diagnosis. Data from a self-administered survey were used to determine whether these factors affected ADHD prevalence and to explore generalizability of ADHD between the Hispanic community that was studied and national and state estimates (see Pastor et al., 2015).

ADHD is one of the most diagnosed childhood neurodevelopmental disorders in the United States (APA, 2013; CDC, 2018), whose prevalence has increased steadily over time (Collins & Cleary, 2016). The abundance of research on ADHD has not helped determine etiology or prevalence (Choi et al., 2016), but genetics have been found to play an important role (Polderman et al., 2015). In conducting the literature review, I sought to find information about factors found to be associated or related to ADHD diagnoses in children.

Specifically, I reviewed literature relevant to ethnicity and psychosocial disparities that can affect an ADHD diagnosis (Collins & Cleary, 2016). A summary of the two theories and the resulting framework used for this study--cultural-historical theory (Vygotsky, 1978; Wertsch, 1985; Wertsch & Tulviste, 1992) and ecological

systems theory (Bronfenbrenner, 1979, 2005)--are presented in detail in this chapter. Last, I provide an exhaustive review of current literature illustrating what is known and not known about ethnicity, psychosocial factors, and ADHD prevalence. The chapter begins with an overview of my literature search strategy.

Literature Search Strategy

I obtained the primary sources for this literature review from online library databases, specifically those of EBSCO, and websites of government agencies and organizations such as Healthline and CHADD (Children and Adults with Attention-Deficit/Hyperactivity Disorder). I also searched subject-specific databases focused on education (ERIC and Academic Search Complete), dissertations (American Doctoral Dissertations), and measurement (Mental Measurements Yearbook, Mental Measurements Yearbook with Tests in Print, and PsycTESTS) along with four other psychology databases; they yielded 40,500 hits for the keyword *ADHD* only when I searched on August 4, 2017. By adding MEDLINE with Full Text, the hits rose to almost 56,400.

I reduced these results by removing anything before 2012, which yielded just under 22,900 hits, and selecting only peer-reviewed research articles, which resulted in 17,400 hits. Using English only for the search decreased the number to fewer than 17,000 results limiting the subject to only attention deficit/hyperactivity disorder brought that number down to 825. Adding additional keywords to find articles for *ethnicity*, *risk factors*, and *prevalence* reduced the numbers significantly (e.g. ADHD and poverty got

68 hits). I further limited results to children, birth to 12 years of age. Using only the key words *ADHD* and *poverty* in the identified databases resulted in 13 articles.

I varied ADHD terms (e.g., *attention deficit/hyperactivity disorder*, *attention deficit disorder, ADD*) in my searches to find the literature needed for this study. To find research articles on race/ethnicity, I used the following key words: *ethnic, ethnicity*, *race, racial, Hispanic,* and *Latino*. Other secondary and tertiary terms for family status included *family structure, single-parent or single mother,* and *single parent homes*; for SES, *socioeconomic status*, *SES*, *low SES,* and *poverty*; for health insurance coverage, *health, insurance, public insurance*, and *health coverage*; for gender, *male* and *female*; for age, *age*; and for Spanish language, *Spanish*, *primary language, home language;* and/or combinations of these.

Additional primary sources accessed were online governmental websites such as the (a) Census Bureau, (b) CDC, (c) HHS (d) NCHS, and (e) NHIS. I searched these sites to obtain reports of national and state estimates of ADHD and select psychosocial factors (CDC, NCHS, 2017). The American Factfinder homepage and State and County QuickFacts homepage provided economic, demographic, and socioeconomic estimates at the national, state, and county level for this study.

Searches produced results on select independent factors (coming from a single mother home, having low family SES, having public health insurance coverage, gender, age, and Spanish spoken at home) and ADHD prevalence. The literature that I found included information related to cultural-historical theory (Jovanovic, 2015) and ecological systems theory (Meyer, Wood, & Stanley, 2013), but this search was not

limited to the 2012 and later date range as those for the independent and dependent variables had been. The results I obtained provided corroboration, but also contradiction, for this present study.

I found an abundance of research on the effects of various factors on an ADHD diagnosis. These included studies on genetics (Coghill, 2015; Zayats, Johansson, & Haavik, 2015), ethnicity (Coker et al., 2016), environmental factors (Silva et al., 2013), and psychosocial characteristics (Collins & Cleary, 2016). Additionally, I found a dissertation on ADHD and culture as a possible factor in fewer diagnoses of ADHD due to cultural differences in the mothers of the children evaluated. Martinez (2015) used Bronfenbrenner's ecological theory to show that cultural and environmental issues affect diagnosing ADHD, providing a macrosystem perspective.

Theoretical Foundation

The aim of this study was to determine primary factors for an ADHD diagnosis in elementary school aged children in a mostly Hispanic community. I used cultural-historical theory (Steve & Grubb, 2018; Vygotsky, 1978) and ecological theory (Bronfenbrenner, 1994; Ebersohn & Bouwer, 2015) as the theoretical frameworks for this research. These theories propose that the immediate external environment affects an individual's behavior and personality.

Vygotsky's Cultural Historical Theory

Vygotsky was born in Russia and died by the age of 38 (Wertsch, 1985). He started out as a lawyer; however, he had many interests that covered numerous themes, one of which was human development (Vygotsky, 1978; Wertsch, 1985). For political

reasons during his lifetime, his writings were not allowed to be published (Wertsch, 1985). The few works that did get published after his death were suppressed (Wertsch, 1985). His writings were then allowed to be published in Russian and have been widely published and translated into English (Vygotsky, 1978; Wertsch, 1985).

Vygotsky was influenced by Marxism and by Blonsky, who was Vygotsky's colleague (Vygotsky, 1978). I used Vygotsky's general genetic law of cultural development (Wertsch, 1985) to explicate the role of ethnicity through culture in this quantitative cross-sectional investigation. The main supposition of Vygotsky's theory was that human development is affected by cultural and social influences of the society in which the child is raised (Vygotsky, 1978; Wertsch, 1985). Vygotsky (1978) posited that a child's social and psychological planes determine the child's cultural development.

Despite having died at the age of 38, Vygotsky had many propositions that have been introduced in the United States, including the use of tools (e.g. language) in a cultural context. Saengpun and Inprasitha (2012) used Vygotsky's theory to interpret the use of psychological tools through a cultural process to learn mathematics. Their results suggest that the use of psychological tools (e.g. language, drawing diagrams, instructional materials) are vital in helping students solve addition problems, which is the culture in the United States.

The zone of proximal development was Vygotsky's explanation of how culture affects an individual. He purported this zone was the gap between a child's real developmental level as established by independent problem solving (Wertsch & Tulviste, 1992). The second part was the guidance improves this level, which is provided by an

adult or capable peer, and instills their culture, tools, and views into teaching the child receives (1992).

This concept of what tools a child uses to interpret the world around him would be hard to prove empirically without knowing what the child was actually thinking (Vygotsky, 1978). Evolutionally determinism was modified by an individual's environment and culture created by the society in which he lives (Marginson & Dang, 2017). However, this study, having used the cultural aspect of this community, may shed some light on how culture affects a child's development in this unique area. The risk factors in this community are not unique but are much more prominent than in other parts of the United States (United States Census Bureau, 2018). This study may thus be linked to the cultural aspect of this theory.

Using this theory, Steve and Grubb (2018), hypothesis that technology interferes in parent-child interaction in the United States. They reported England as having less than 1% of children diagnosed with ADHD. These authors (2018) stated children in the United States received unclear and inconsistent signals due to our individualistic culture. Their findings suggest parents are also so caught up in technology that they do not interact with their children (Steve and Grubb, 2018).

Bronfenbrenner's Ecology of Human Development

Bronfenbrenner's father was a neuropathologist in an institution for the *feebleminded* (Bronfenbrenner, 1979). He was raised on the premises of the institution and learned about the injustice of children wrongly placed in institutions for not having the capacity to function normally and not passing the Stanford-Binet IQ test. From this

upbringing, Bronfenbrenner learned that human beings' development and well-being are affected by public policy (1979).

Through his experiences, and influenced by Kurt Lewin, Bronfenbrenner formed the ideas of the ecology of human development. Bronfenbrenner (1994) proposed an increase in rates of adverse psychosocial experiences and explained how the system of relationships directly influences a child's development. Bronfenbrenner's (1979) ecological theory of human development hypothesized that psychosocial factors affect children and they, in turn, affect their environment (Mischo, 2014).

Bronfenbrenner proposed *definitions* of the systems in his ecology of human development theory (1979). The layers represent different systems and their effects on the individual at different levels (1979). His ecological system consisted of the microsystem, mesosystem, exosystem, macrosystem, and chronosystem (see Table 1).

The crucial interplay between the individual and the context in which he exists was the focus of this theory. Mischo (2014) relates the interaction of the different layers to private tutoring. He states decisions were made for this child's life and their effect on his learning. Mischo explains the microsystem (interaction with the tutor) was affected by the mesosystem (parent's decision to contract the tutor) and how the exosystem (the parent's education) and macrosystem (their beliefs and culture) affect their decisions.

Ecological systems theory proposes that an *interaction* may do more than contribute to secondary development as dyadic data suggest; if one of the pairs experiences a process, the other would too (Bronfenbrenner, 1979). This would imply that what the parent goes through could affect the child (e.g. divorce, economic hardship,

and/or the having medical insurance coverage). It has been found that low SES can predispose children to ADHD (Clearfield & Jedd, 2013). Infants from low-SES circumstances have been found to show deficiencies in attention by age 6 months as compared to high-SES infants (2013).

Table 1

Basic Concepts of the Ecology of Human Development

System	Definition
Microsystem	The immediate context of the individual – setting, the activities, roles, and interpersonal experiences
Mesosystem	The interrelations between the microsystems – home, school, church, neighborhood
Ecosystem	Places that do not involve the child but influences them – parents' job, siblings, classroom, activities of the schoolboard
Macrosystem	The culture, society, beliefs, and consistencies in content and the previous three systems
Chronosystem	Transitions in position in the ecological environment throughout the life span–role, setting, or both

Note. Bronfenbrenner (1994) motivated development of this table.

This theoretical framework was used in this cross-sectional quantitative study with the intent of finding out if disparity and interaction of being Hispanic (Lopez, Barrio, Kopelowicz, & Vega, 2012) and psychosocial risk factors affect an ADHD diagnosis. Cultural historical theory (Wertsch, 1985) and ecological systems theory help explain the relationship between a child's environment and variables considered risk factors (Bronfenbrenner, 1979) which may influence ADHD diagnosing. Using these principals, a logistic regression design provided insight into the relationship of the

independent variables and the dependent dichotomous variable (Grimm & Yarnold, 1995) to answer the research questions.

Literature Review

Symptoms of ADHD were first noted in 1865 but were documented more publicly in 1902 by Hoffman (Barkley, 2006). Despite its long existence, medical and mental health professionals still disagree as to the prevalence and/or etiology of ADHD (APA, 2000; 2013; Cheng and Goodman, 2015, Collins & Cleary, 2016). Despite thousands of published research studies (over 460,100 hits using the keywords *ADHD or ADD* in the EBSCOhost databases [2014]), there is not a definitive cause or agreed upon prevalence estimate. Using 2011 data, Visser et al. (2014) estimated the United States prevalence rate at about 11% (over 6 million) of children ages 4 to 12 and Collins and Cleary (2016) found 12% using 2011 archival data of the National Survey of Children's Health.

Cheng and Goodman (2015) recommend more research internationally on race, ethnicity, and SES. Collins and Cleary, (2016) suggest additional studies that address racial/ethnic observed disparity. This cross-sectional quantitative survey study attempts to increase understanding for solutions to a chronic and debilitating disorder in a unique community, and by extension, to other similar communities with large Hispanic populations along the United States and Mexico border.

Nigg (2013) noted the disparity in ADHD diagnosis between African American and White children but did not include data on Hispanic children in his study. Nigg concludes biological or epigenetic studies neglecting the child's developmental context would limit the effect of biological discoveries. Kan et al. (2013) suggests early detection

of attention problems was vital due to long term effects of environmental influences. Therefore, select psychosocial factors that have been implicated in ADHD diagnoses (Pastor et al., 2015) were the focus of this research.

Information was collected from parents/caregivers of elementary school children aged 4 to 12 using a self-administered survey. Logistic regression was used to analyze these data to explore influences of ethnicity, family status, low socioeconomic status, and health insurance coverage on an ADHD diagnosis (Cheng & Goodman, 2015). Additional variables considered were gender, age (Pastor et al., 2015), Spanish spoken at home (Morgan et al., 2014), and parental education (Visser et al., 2014). Results produced outcomes that contributed to positive social change.

Ethnicity/Hispanic

The NHIS is a government survey that, among other characteristics and topics, gathers information about select health measures (e.g. ADHD) and sociodemographic information (e.g. age, sex, race, ethnicity, family structure, family income, poverty status, health insurance coverage, gender, age, and language spoken at home) for children under 18 years of age (Bloom, Jones, & Freedman, 2013). For ethnicity, the OMB, chose to modify the terminology for *Hispanic* for use of Federal Statistics and Administrative reporting (OMB, 1997). The agency rejected keeping *Hispanic* only and chose to modify it to *Hispanic or Latino*. Hispanic and Latino included persons identifying themselves as (a) Puerto Rican, (b) Cuban/Cuban American, (c) Dominican (Republic), (d) Mexican American, (e) Central or South American, (f) Other Latin American, and (g) Other Hispanic/Latino (2017).

However, NHIS reports still use Hispanic or non-Hispanic origin in their reports (Bloom et al., 2013; Pastor et al., 2015); as do some researchers using government data (Collin & Cleary, 2016) instead of *Hispanic or Latino* (OMB, 1997). The Census Bureau, in a technical document, reported changes were made for the 2000 Census collection (U.S. Census Bureau, 2012) in accordance with OMB (1997). Some state and local agencies also use OMB modified terminology for race and ethnicity for collection, tabulation, and presentation of data on race and ethnicity (2002). For this study, since it was closely aligned to the NHIS survey and its reported estimates, Hispanic was used, but Latino was used when appropriate in reporting other researchers' studies.

Using 2011-2013 data, the ADHD prevalence for non-Hispanic White children was 11.5%, 8.9% among non-Hispanic black, and 6.3% for Hispanic children (Pastor et al., 2015), but the cause for the disproportionate results was not clear (Collins & Cleary, 2016). This Texas county, bordering with Mexico, shows disproportionately higher rates of Hispanics (92.2%) compared to 39.4% in the state, and 18.1% nationwide (2018). Disparity of ethnicity led Collins and Cleary (2016) to suggest a need for research to better understand the causes of racial/ethnic disparities observed in their study.

Pastor et al. (2015) estimate children 4 to 17 diagnosed with ADHD were *less likely* to be Hispanic/Latino (6.3% Hispanics; 11.5% and 8.9% for non-Hispanic White and non-Hispanic Black children respectively). These authors used archived 2011-2013 NHIS data to analyze for prevalence of ethnicity, gender, insurance coverage, and income. Pastor et al., (2015) used the SUDDAAN software and differences between percentages were evaluated using two-sided significance test at the 0.05 level.

Race and ethnicity have been found to result in disparity of underdiagnosing and undertreating these minorities who exhibit symptoms (Coker, 2016). Despite the county being made up of 92.2% Hispanics (United States Census Bureau, QuickFacts, 2018) the schools do not reflect that. In this county, for school year 2016-2017, there were 16 of 20 border school districts whose student populations were more than 95% Hispanic and 12 of the 20 border school districts had over 99% Hispanics (TEA, 2017-2018).

Some areas or towns consist of 100% Hispanics (McGreal, 2015). McGreal (2015) states the median household income in this little town was $11,111 even though the county's median income was $37,097 in 2017 (U.S. Census Bureau, 2018). Hispanics in all age groups were found to be less likely to be diagnosed with ADHD. This is where the disparity lies hence the reason for this study.

To address the race and ethnicity disparity issue, Coker et al. (2016) conducted a longitudinal study to assess the gap in ADHD and medication use in *Latino* (Hispanic), African American, and white children. Coker et al.'s study consisted of three waves (5th, 7th, and 10th graders) from 118 schools consisting of over 11,500 students. They used a screening tool and a quality of life questionnaire to determine symptoms and comorbid disorders (2016).

Coker et al., (2016) used a two-stage probability sample and analyzed the data using logistic regression to assess adjusted and unadjusted odds of an ADHD diagnosis. To evaluate disparity, the researchers used multivariate logistic regression. Results showed that the disparity in *Latino* and African American children was more likely

related to being underdiagnosed and undertreated instead of White children being over diagnosed and overtreated (2016).

Racial and ethnic disparities in parent-reported ADHD were found by Collins and Cleary (2016). Their study also consisted of three waves (2003, 2007, 2011) but they used National Survey of Children's Health datasets (2016). The objective of this study was to examine the trends of parent-reported ADHD prevalence. This study contained variables being used for the present study in addition to other confounding variables.

These data were evaluated using descriptive statistics for measures of central tendency for the continuous variable age (Collins & Cleary, 2016). Bivariate analysis (race/ethnicity and sociodemographic covariates), adjusted logistic regression models, and χ^2 (race/ethnicity and ADHD) statistics were used to obtain results (2016). These researchers' results showed an increase in ADHD parent-reported ADHD diagnosis. Especially significant was the 83% increase in Hispanics diagnosed with ADHD (Collins & Cleary, 2016).

Their findings found significant disparity by ethnicity/race, however, their hypothesis that sociodemographic factors affected all differences in race and ethnicity was not supported (Collins & Cleary, 2016). They did find that non-English speakers were also less likely to be diagnosed with ADHD (2016). All races and ethnic groups that spoke a non-English language were between 60% and 92% less likely to have parent-reported ADHD. They do, however, admit limitations to the study such as the sample was small, lack of replication, and indeterminate generalizability (Collins & Cleary, 2016).

A more recent study on parent-reported ADHD, using 2016 National Survey of Children's Health (NSCH) data was conducted by Danielson, et al. (2018). They estimated children (2 to 17) that had ever been diagnosed with ADHD were at a 9.4% rate. Hispanics were estimated at a rate of 6.7% compared to 10.2% for non-Hispanic children.

Family Status

The geographic area of the county in this study has almost twice the number of estimated single mother homes (12.6%) than the national average (6.8%; United States Census Bureau, 2018). Collins and Cleary (2016) found a consistent association of parent-reported ADHD in children with single mothers in all three waves of NSCH surveys (2003, 2007, 2011). The overall percentage change of children diagnosed with ADHD in single mother homes increased by 49.5% between 2003 to 2011 (2016).

Choi et al. (2016) also found single mothers were a factor more likely to affect an ADHD diagnosis. Their study was aimed at examining the incidence rate of ADHD and how ADHD symptom development and affected by blood lead level and marital status. The population used by Choi et al. consisted of lower elementary school children in 10 Korean cities. The ADHD developmental rate in single parent homes was 18.05 times higher than that of two parent homes.

Choi et al. (2016) used a *t*-test (ANOVA) to compare continuous variables. Categorical variables were analyzed with a chi-square test. ADHD relative risk ratios were estimated with logistic regression analysis (Choi et al.). These researchers used SAS version 9.3 to estimate relative ratios instead of odds ratios in their analysis.

Chaotic environments occurring at the microsystem level can cause an adverse impact in different areas such as learning (Wachs, 2010). Divorce and restructuring impact the primary learning environment—the family (Ebersohn & Bouwer, 2015). This study found that children, in fact, were *active participants* and affected their own development (2015).

Low Socioeconomic Status

Larsson, Sariaslan, Langstrom, D'Onofrio, and Lichtenstein (2014), in a Swedish study, found a link between family income in early childhood (first five years) and ADHD even when adjusting for other factors (e.g. nuclear family, sex, birth year). Low SES can predispose children to ADHD (Clearfield & Jedd, 2013). Infants from low-SES circumstances have been found to show deficiencies in attention by six months of age as compared to high-SES infants (Clearfield & Jedd, 2013). Danielson et al. (2018) found that those with <100% (10.6%) and < than 200% (10.0%) of the Federal Poverty Level (MPH@GW, 2019), as compared to those with > 200% (8.7%), were more likely to have had a doctor or other health professional tell them their child had ADHD or ADD.

This study conducted by Larsson et al. (2014) used Cox proportional regression to obtain hazard ratios. Results showed an association between family income, early childhood, and subsequent offspring ADHD (2014). This longitudinal study followed children for up to 13 years. Limitations of this study were in that ADHD cases could not be classified, validity of national registry was not examined, and generalizability was questionable due to welfare state (Larsson et al., 2014). Larsson and associates censored those participants that moved (migrated) or died.

Getahun et al. (2013) examined race/ethnicity, age, sex, and median household income to determine trends in ADHD. The data used were obtained from hospital, outpatient visits, and emergency visits in the Kaiser Permanente health plan medical records for 2001 through 2010 (2013). To estimate annual ADHD rates, analyze for distribution comparison, increases in relative risk, and to test for significant differences in ADHD trend rates, Poisson, χ^2, linear regression, and regression analysis were used using SAS statistical software.

This county's estimates showed households of single female householders with children under 18 years of age (35.6%) and 37.4% fall below the poverty level (U.S. Census Bureau, 2018). It also showed 70.1% of children under 18 years of age in single female households receive SSI, cash, public assistance income, or food stamps (2017). Further, they earn a median income of $17,162 as compared to the county median of $40,925. About 31.9% of this county's population earn less than $25,000 although nationally, the median income for Hispanics was $46,882 (Guzman, 2016). Over 37% of this county's population was covered by public health insurance. TEA (2017-2018) estimates show this district's Hispanic *Economically Disadvantaged* to be 99.1% of its student population. The median household income in the county was $37,097 and the poverty rate for all ages was 29.5% (U.S. Census Bureau, 2018). This county data also shows the average persons per household was 3.57%.

Health Insurance Coverage

Cohen, Zammitti, & Martinez (2017), produced an early release report of 2016 insurance coverage for children 0–17. Findings showed 5.1% of children were uninsured,

43% had public coverage, and 53.8% had private insurance. Decreases in the uninsured dropped to about half (6.9%) for the *near poor* and 6.5% for the *poor* but not for the *not poor* (2016). Private insurance coverage has dropped about 12% while public health insurance has increased by over 20% in 20 years (Cohen et al., 2017).

Pastor et al., (2015) reported on data gathered during 2011–2013. Their estimates showed that children of all ages had a higher prevalence of ADHD if they had public health insurance compared to children with private insurance coverage. Wolraich et al. (2014) found a higher rate of Medicaid recipients contributed to higher prevalence of ADHD. ADHD prevalence studied in a public health system, as opposed to NHIS (Parsons et al., 2014), found White children with insurance were more likely to be diagnosed with ADHD than African American children (64%) and Hispanics (44%) (Siegel et al., 2016).

However, Siegel et al.'s (2016) study, based on the New York State public mental health system (NYS PMHS), did not include mental health providers in private practice or primary health providers who provide mental health in his study. Archived data from 2011 were used and other factors such as age, gender, and insurance type using adjusted odds ratios were compared (2016).

Gender

Boys have consistently been found to have an ADHD diagnosis more often than girls. Duran and Reuben (QuickStats, 2017) reported boys were more likely than girls to receive an ADHD diagnosis. Siegel et al. (2016) reported 73.8% of children aged three to 17 diagnosed with ADHD, in the NYS PMHS, were boys and 26.2% were girls. Pastor et

al., (2015) found boys were diagnosed more than twice as often as girls (13.3 for boys compared to 5.6 for girls). Using NSCH 2016 data, Danielson et al, (2018), also found that boys were more likely (12.9%) than girls (5.6%) to have been diagnosed with ADHD. The DSM 5 (APA, 2013) reported girls have consistently been found to be diagnosed at a rate of 1 to 2 compared to boys.

Age

Age has been used as one of the criteria for diagnosing ADHD. Symptoms observed before seven years of age had been one of the criteria for diagnosing ADHD (APA, 2000) until DSM-5 (APA, 2013) was released. The DSM-5 (2013) says that to meet criteria for an ADHD diagnosis, several symptoms of inattention or hyperactivity-impulsivity need to be present before the age of 12.

Visser et al. (2015) found that seven years of age was the median age at which children were diagnosed with ADHD. About one third (30.7%) of diagnosed children were diagnosed before age 6 (2015). Visser et al. (2015) also found 76.1% of children were diagnosed before age 9.

Danielson et al. (2018) found 2.4% of young children (2-5-year-olds), 9.6% of school aged children (6-11), and 13.6 % of adolescents (12-17 years) were ever found to have been diagnosed with ADHD. This examined the increase/decrease of prevalence by age groups (2-17, 3-17, and 4-17 years of age). Findings were that the 4 to 17 group was more likely to be diagnosed with ADHD (10.5%) than the 3 to 17 group (9.9%) and the 2 to 17 group (9.4%).

Siegel et al. (2016), using the New York State public mental health system (NYS PMHS), found children seven and under were diagnosed at a rate of 17.6%. Children ages eight to 12 were diagnosed with ADHD at a rate of 48.5%. This was about two thirds of the children, up to age 12, that were included in the study. For this study, age was used as a variable to assess if it was a determining factor in an ADHD diagnosis of Hispanic children in this geographic location.

Spanish Spoken at Home

Hispanics whose home language is Spanish have been found less likely to receive *all* eligible health care services (Cheng, Chen, & Cunningham (2007). Lonigan et al. (2016) found the Executive Function (EF) of Spanish-speaking preschoolers was strongly related to behavioral self-regulation skills and behavioral ratings by teachers. Children diagnosed with ADHD (six to eight-year-old) were found to have a higher rate of language problems (Sciberras et al., 2014). Danielson et al. (2018) found that Spanish speakers were less likely (3.8%) than English speakers (10.4%) to be diagnosed with ADHD.

Petersen et al. (2013), found that language ability (language mechanics, expression, vocabulary) influenced externalizing behaviors and inattention/hyperactivity problems (ADHD). One of two longitudinal studies undertaken by Petersen et al. ([2013]; children 7 to 13; N = 585), examined if a relationship existed between inattention/hyperactivity and internalizing problems and language ability. One of their research questions was whether language ability affected behavior problems or behavior affected language ability. Their findings showed that language ability affected behavior.

ADHD Prevalence

Considerable increases and persistent trends in ADHD prevalence (Getahun et al., 2013) without systematic tracking of this diagnosis in geographic areas smaller than states were reason to suspect an underestimation or overestimation of ADHD prevalence in smaller communities. Parent-reported ADHD diagnosis on national surveys has not been validated against clinical standards (Visser et al., 2013). Although it would be difficult to verify the validity of parent-reported ADHD on national studies as they apply to subgroups in different areas of the country, one study was used by the CDC to explain similar results to those of the CDC parent-reported estimates in California (4.7% to 4.9%; Getahun et al., 2013). However, Getahun's study concluded that teacher and parent-reported ADHD elevated the prevalence rates in California.

They limited their study sample to children in the health plan between the ages of five to 11 and in the California geographic area (Getahun et al., 2013). The data were gathered from medical health records of a California based insurance company (CDC, Health Equity, 2013). This would suggest that the parent reported method of gathering information that was used for estimating rates as a viable means of accurately estimating community ADHD prevalence rates and population characteristics (Visser et al., 2013).

Getahun et al. (2013) used insurance medical records from the Kaiser Permanent Southern California health plan for the years 2001 to 2010 to determine ADHD trends. They found a 24% increase in ADHD diagnostic rates showing White children more likely, and Hispanic children less likely, to be diagnosed with ADHD than other groups except Asian/Pacific Islander. Hispanics' ADHD prevalence rate increased 60.4% from

2001 to 2010 (the years included in the study). The participant sample used in this study was physician diagnosed and not parent reported. Siegel et al. (2016), using data from a public health system, found 31% of 133,091 children ages three to 17 years of age had an ADHD diagnosis.

There was concern of over-diagnosing and/or under-diagnosing ADHD due to mental health professionals (e.g. psychiatrists, psychologists, social workers) not using the recommended criteria to make an accurate diagnosis (Bruchmüller, Margraf, & Schneider, 2012; Power, 2013). Others concurred (Collins & Cleary, 2016). An ADHD future research needs-report showed a deficit of literature related to evidence-based assessment of prevalence, of case identification variation, and of geographic areas, settings, and cultures (Gaynes et al., 2012) supporting the need for this study.

Previous Research on ADHD

Nigg, (2013), in reviewing the last 25 years of ADHD research, concluded the population, technology, beliefs, and families (sociocultural context) were changing, but were not being researched. He stated few studies had addressed these issues and those older studies that did, were now considered inadequate and lacked significance (2013). He also pointed out the overlap of ADHD symptomology into other domains such as psychopathology and human development.

Previous research has addressed ADHD etiology with inconclusive results (Thapar, Cooper, Eyre, & Langley, 2013; Thomas et al, 2015). Researchers have found Latino culture, beliefs, acculturation, and parental beliefs influence ADHD etiology (Lawton et al., 2014). Blood lead levels and single parent variables have also been found

to affect an ADHD diagnosis (Choi et al., 2016). Genetics have commonly been accepted as being partially responsible for ADHD symptoms (CDC, ADHD, 2018).

Studies on prevalence have not fared much better (Siegel et al., 2016). The latest national estimates of ADHD prevalence were 9.4% (CDC, Summary Health Statistics, 2017). There were inconsistences in prevalence that have been attributed to misunderstanding cultural differences (Siegel et al., 2016), No Child Left Behind (Fulton et al., 2015), and methodological characteristics of the studies (Polanczyk, Willcutt, Salum, Kieling, & Rohde, 2014). There were also those who thought the difference in prevalence was due to over-or under-diagnosing (Thomas, 2015).

Review of Methodology

Using a post-positivist worldview, a quantitative cross-sectional survey design was chosen to gather data employing closed-ended questions (Creswell, 2014) to assess if disparity and interaction of single mother homes, low family income, public health insurance, gender, age, and Spanish language spoken at home in Hispanic children between 4 to12 years of age affect an ADHD diagnosis. This study was used to examine a theoretical framework derived from Vygotsky's cultural historical theory (1978) and Bronfenbrenner's ecological theory (1979). The research questions and hypotheses drove this investigation.

This type of study was selected because of its ability to provide data to quantify and describe the prevalence of ADHD, prevalence of exposure (independent variables), prevalence odds ratio (determine risk factor for ADHD), and prevalence rate ratio estimates. Cuffe, Moore, and McKeown (2005) found that cross-sectional designs have

often been used for this type of analysis in ADHD studies (as cited in Morgan et al., 2014). Odds ratios were used by the NHIS to provide detailed numerical descriptive health statistics through data gathered with their surveys (Parsons et al., 2014).

Instrument selection. There were several research methods for obtaining raw data for an investigation. The data for this study mandated a quantitative cross-sectional survey design (Creswell, 2014). This design was selected to generalize the results from the sample population to the general population in this county (Sierles, 2003). Raw data gathered was used to quantify and describe the results of the research questions (2003). A researcher developed survey was used to gather data employing closed-ended questions to assess the relationship of select variables and an ADHD diagnosis.

A survey (also called a questionnaire) can be administered in different ways (Rickards, Magee, & Artino (2012) such as by phone, self-administered, on the internet, or in person (Babbie, 2013). This kind of design is used when (a) large numbers of participants are needed, (b) to gather data about constructs and behaviors unique to some individuals, (c) when resources are limited as with the NCHS (2016), and (d) to protect confidentiality because this type of evaluation can be administered anonymously (Sierles, 2003).

Following the wording of the NHIS questionnaire questions to ensure reliability (CDC, 2017), an instrument specific to this study was developed. This quantitative cross-sectional survey was used to assess the influence of disparity and interaction of ethnicity, psychosocial factors, and an ADHD diagnosis. A self-administered parent-report provided answers for the research questions on their children in elementary

school between the ages of four and 12. Parent-reported surveys have been shown to be valid (Visser et al., 2013). Additionally, Doostfatemeh, Ayatollahi, & Jafari, (2015) found that the gender of the informant did not matter, and results showed a moderate to high level of agreement on the PedsQL™ used for their study.

Convenience sampling. Convenience sampling is a nonprobability sampling technique used to sample a subpopulation because it is impractical to study every person in that population due to limited funds, time, and personnel (Etikan, Musa, & Alkassim, 2016). Nonrandom selection of participants was chosen because the target group was the parents of two elementary schools with children 4 to 13 years of age. By electing to use a convenience nonexperimental sampling technique, this subpopulation was selected with a specific purpose in mind (Tongco, 2007). In this type of design, there was also a greater chance that the study would not be fully representative of the population being studied (Trochim, 2006). Although random sampling would have been the preferred sampling technique because it is deemed more precise, it was not practical (Trochim, 2006) in the case of this investigation.

For this study, the nonprobability sampling technique was most applicable because it meets three criteria (Etikan et al., 2016). The first is accessibility as in this unique geographic location with no other racial/ethnic group represented (poorly defined population other than Hispanics ([92.2%]; United States Census Bureau, QuickFacts, 2018). Second, was the purpose for the study, which required the participants be parents of children aged 4 to 12, as are found in elementary schools (*homogeneous sampling*; 2016). Third, was access to the population (Etikan et al., 2016).

Alternative research methods. Even though quantitative, qualitative, and mixed methods were possible choices for an investigation, only quantitative was considered for this study. Choosing a method requires taking many factors into account (Creswell, 2014). Factors that needed to be considered, before a decision was be made, included the worldview, research design, methods, the research problem to be investigated, the researcher's personal experiences, and the target audience (2014).

A qualitative method was based on constructivist grounded theory (Charmaz, 2016). This method consisted of collected inductive data, depended on comparative analysis, data collection and analysis needed to happen simultaneously, and hypotheses were developed to form a theory (2016). Mixed methods are a combination of quantitative and qualitative methods. Neither of these methods was appropriate for this study (Creswell, 2014).

Summary and Conclusions

Determining the primary factors for an ADHD diagnosis in a Hispanic community was the goal of this study because there was scant research involving interaction and disparity (Cheng & Goodman, 2015) of ethnic and psychosocial risk factors in children diagnosed with ADHD (Choi et al., 2016). Specifically addressed were (a) single mother homes, (b) family income, (c) public health insurance, (d) gender, (e) age, and (f) Spanish spoken at home in elementary school aged Hispanic children between 4 and 12 years of age.

Chapter 2 is the result of the literature review, synthesizing the theoretical framework, and pointing out the gap in the literature. ADHD has been a controversial

issue since it was first recognized as a disorder (Barkley, 2006). This quantitative cross-sectional design addresses the hypotheses and the research questions.

ADHD has been a controversial issue since it was first recognized as a disorder (Barkley, 2006). Most researchers accept that nature and nurture are associated with ADHD symptomology (Powledge, 2011). This could help explain the complexity, confusion, and disagreement of diagnosing ADHD. However, others believe there is no connection (Burt, Larsson, Lichtenstein, & Klump, 2012).

One of the major gaps was the disagreement in ADHD prevalence especially in view of the lack of literature addressing disparity and interaction of the above-mentioned variables in determining the possible risk factors (CDC, 2017). Another gap was the lack of research of ADHD prevalence in communities smaller than states. Even though the literature addresses ethnicity, it was not generalizable to this community due to the high Hispanic representation in this area (92.2%; U.S. Census Bureau, 2017).

In chapter 3, I explain the rationale for the methodology of the research. I clearly outline and describe the population, the sample, and procedures and the analysis method chosen is further detailed. Data collection, instrumentation, and constructs are simplified. And finally, I clarify the theory, hypothesis, research questions, and threats to validity. Ethical procedures are enumerated to ensure no participant is hurt.

Chapter 3: Research Method

For decades researchers have sought to determine the primary factors underlying ADHD (CDC, 2018). The purpose of this cross-sectional quantitative descriptive research was to determine the effects of disparity and interaction of coming from a single mother home, having low family SES, having public health insurance coverage, gender, age, and Spanish spoken at home on an ADHD diagnosis in a mostly Hispanic population. Vygotsky's (1978) and Bronfenbrenner's (1979) theories provided the theoretical framework for this study.

Researchers undertake descriptive studies using a survey method to find associations or causal relationships between study variables. I used a survey instrument as the data collection instrument to obtain information from parents/caregivers for this study. The survey consisted of germane questions constructed to obtain answers to the research questions (see Sierles, 2003). There were no identified time or resource constraints with this design choice.

In Chapters 1 and 2, I provided an overview of the study and a review of the literature to corroborate the problem and need for this study. In this chapter I discuss the research methods used to examine the research questions. The research design and rationale, population, sampling procedures, and participants are described. In addition, I describe the data collection process, instrumentation and operational constructs, and statistical power. Last, the data analysis plan; research questions and hypotheses; internal, external, and construct validities; and ethical procedures are communicated.

Research Design and Rationale

I selected a cross-sectional quantitative survey design to help describe trending characteristics (see Jackson, 2012) in parent-reported ADHD diagnoses of children 4 to 12 years of age in a county with over 92% Hispanics (U.S. Census Bureau, 2018). Using this design, I collected data from participants in a one-time administration of the survey (see Jackson, 2012). The developed survey was fashioned after the NHIS survey, which has been conducted continuously since 1957 (CDC, NCHS, 2019).

I used a researcher developed self-administered survey in this study to help in determining the primary factors associated with an ADHD diagnosis in the Hispanic Texas/Mexico border community I studied. This project's proposal and methodology were approved by the Walden's Institutional Review Board on September 12, 2019 (approval number 09-12-18-0130170, expiration date of September 12, 2019).

General Design

The primary factors (independent variables) researched in this study were (a) coming from a single-mother home (Wachs, 2010), (b) having low SES (Russell, 2014), (c) having public health insurance coverage (Getahun et al., 2013), (d) gender (Pastor et al., 2015), (e) age (Visser, 2015), and (f) Spanish as the home language (Lonigan et al., 2016). I investigated these variables relative to their association with an ADHD diagnosis (dependent variable). The hypotheses and research questions related to the theoretical framework were derived from two developmental theories (Bronfenbrenner, 1979; Vygotsky, 1978).

I used the self-administered survey to collect demographic and psychosocial data to provide data germane to the research questions (see Rickards et al., 2012). Reusing questions that have already been validated and are suitable and considered a good strategy (Yan, Lee, Liu, & Hu, 2016). Survey questions for this study were developed using the NHIS questionnaire (CDC, NCHS, 2016) as a guide with minor adjustments (Parsons et al., 2014). The use of established questions may help support or negate current prevalence estimates in NHIS parent-reported diagnosis.

Methodology

Population

The target population were the parents/caregivers of children from two elementary schools in a Texas county, which shares a border with Mexico. The two elementary schools serve prekindergarten-3, known as Pre-K-3 (an early childhood program for three years old) to fifth grade. However, only the parents/caregivers of children ages 4 to 12 were invited to participate because the study was limited to this age range.

I invited the two schools, which had eligible student populations of 505 and 517 for a total of 1,022 students, to participate. The estimated percentages of the schools' population that was Hispanic, at 99.2% and 100%, respectively (TEA, 2017-2018), were higher than that of the county (92.2%; U.S. Census Bureau, 2018). However, the percentage of Hispanic students in the county's school population was about the same (99.2%; TEA, 2017-2018). Access to participants was sanctioned by the school district

and the principal of each of the two schools. I chose this population because it was representative of the sampling frame of this community (see Babbie, 2013).

Sampling and Sampling Procedures

As in most research, sampling an entire population of interest was not feasible due to cost, time, and resources (see Babbie, 2013). Therefore, I collected data from a sample of the desired population. A nonprobability sampling of convenience (based on availability) consisted of the parents of two elementary schools in the study county. I limited the inclusion criteria only to the respondents of children, between the ages of 4 to 12, attending the elementary schools that served as the survey sites. Targeting the proper population helped ensure validity (see Doostfatemeh, Ayatollahi, & Jafari, (2015).

The sampling frame consisted of the elementary schools in the school district located in a south Texas county with a population of 860,661 as of July 2017 (CDC, 2018). This school district consisted of 32,3667 students, of which 32,360 were Hispanic (TEA, 2017-2018).The high prevalence of Hispanics and disparity of the select psychosocial factors, offered a unique opportunity to study this geographic area.

I recruited the parents by having school personnel give a packet to each eligible child at the school to give to their parents. The packet included the informed consent, the survey (see Appendices D and E), and a stamped envelope for each child enrolled in the participating schools within the ages of 4 to 12. These documents were provided in English and Spanish to ensure that language was not a barrier in responding to the questionnaire (U.S. Department of Health and Human Services, 2016). Participation was voluntary and confidential.

Statistical Power and Sample Size

Conducting an a priori statistical power analysis to determine an adequate sample size was essential to achieve the desired power for alpha (see Cohen, 1992). I selected a binary logistic regression model for this study because of the dichotomous dependent variable, ADHD diagnosis (Peng, Lee, & Ingersoll, 2002). I used the peer-validated free G*Power 3 analysis program, which allows for the manipulation of power, effect size, alpha-levels, and other statistical factors (Faul, Erdfelder, Buchner, & Lang, 2009), to determine the sample size.

For a binary logistic regression model with seven independent variables and one dichotomous dependent variable (*Yes* = 1; *No* = 0), a sample size of 215 would be adequate, according to Faul et al. (2009). To attain this *N*, I used a significance level of $\alpha = .05$, a power Beta of $1-\beta = .80$, and a medium effect size (ES) of .30 (see Hsieh, 1989). ES is the degree to which the null hypothesis (H_0) is false or is present in the population (Cohen, 1988).

A low response rate of 105 returned surveys out of 1,022 surveys sent (10.37%) was achieved, despite two approved reminders sent by the schools at my request (see Appendix G). However, per Vittinghoff and McCulloch's (2006) guidelines, the actual 83 cases used for the binary logistic regression analysis met required sample size. The findings showed that there was no compromise of relative bias or confidence intervals (Vittinghoff & McCulloch, 2006).

Procedures for Recruitment, Participation, and Data Collection

Recruitment

I chose these participants as a convenience because of the naturally formed group—elementary schools (Creswell, 2014). Participants targeted for this quantitative cross-sectional study were the parents of elementary school children in a border county with over 90% Hispanics (United .States Census Bureau, 2018). As with the NHIS data collection (CDC, NCHS, 2016), a parent/caregiver was the best choice for gathering information about elementary school aged children. The information requested was used to answer the research questions on ethnicity, family status, socioeconomic status, insurance coverage, gender, age, and Spanish as the home language (see Appendices D and E). related to the research questions on for this study.

A request to participate in the study was made of the research partner district superintendent. The IRB Sample Letter of Cooperation was not used (Walden University Internal Review Board [IRB], 2018). The district had its own in-house external researcher application, which was signed by all parties involved and approved by IRB (Walden University, 2018). Approval from the Principals permitted the survey (see Appendices D and E) to be disseminated (Walden University IRB, 2018).

The Informed Consent and Survey, sent to the parents, were provided in English and Spanish to ensure ease of participation and increase response rates of Spanish speaking respondents. The Informed Consent was translated and back translated by a psychologist assistant educated in Mexico who has resided in this area for over 15 years (board certified psychologist, personal communication, January 2, 2018). The *Spanish*

Survey questions were adapted from the NHIS Spanish questionnaire available online (CDC, NCHS, 2017).

Participation

Criteria for participation was only that the participant be the parent/caregiver of a child in attendance at the target schools and that the child be between 4 and 12 years old. The exclusion included incomplete surveys or surveys of children under four years of age, over 12 years of age, or surveys of children not enrolled in the target schools. The eligible student populations were 505 (School staff, personal communication, September 13, 2018) and 517 (School staff, personal communication, September 17, 2018), for a total of 1,022. The parent/caregiver were sent a packet with a request to participate.

A presentation was given to the faculty of one of the two schools to share the (a) procedure, (b) dissemination, and (c) collection protocol. This was held with the principal's approval and at his convenience (Principal, personal communication, May 7, 2018). The classroom teachers were the disseminators of the surveys sent home with every child enrolled in their classroom on the first Monday in October.

Included in the packets were the English and Spanish informed consent forms and surveys (see Appendices D and E), and stamped envelopes for the return of the completed survey. Consent forms included a statement reiterating that non-participation was optional, confidential, and anonymous. Not returning the survey would be considered their refusal to participate in the study and no debriefing was necessary. Additional information stating the return of a completed survey was interpreted as consent to participate in the study. Completed surveys were returned in the provided self-addressed

stamped envelope (indicating consent to participate) by mail to a P. O. Box and some were returned to the school's office some of which were then mailed by the office staff.

Data Collection

Notifications in both English and Spanish were sent home with students to inform parents the survey was (a) voluntary, (b) anonymous, (c) devoid of identifying information, and that (d) responses would only be used for research (Sierles, 2003). The participants received an Informed Consent within the packet assuring that nonparticipation would not be prejudicial to them or their children (National Institute of Health, 2008). They would have the opportunity to change their mind about participating at any time prior to returning the survey.

Although the original intention was to have the surveys returned to the school by the students, IRB requested a change to avoid confidentiality issues (Walden IRB, personal communication, August 17, 2018). A post office box was rented, envelopes were bought and self-addressed, and stamps were bought and placed on the envelopes. The change to return surveys by mail was communicated in the Informed Consent form.

I acquired the raw data for this study through the survey. This was a onetime administration so there was no need for follow up interviews. Also, due to the anonymous nature of the survey and participants, it would not have been possible to reach out to the participants for further communication. Since there were no treatment manipulations, there was no debriefing.

Instrumentation and Operationalization of Constructs.

Instrumentation and the quantitative cross-sectional survey instrument developed for this study was based on the NHIS questionnaire administered yearly to the noninstitutionalized United States population (CDC, NCHS, 2017). The NHIS instrument has been in existence since 1957 and has been modified every ten years (Parsons et al., 2014). The modification of the last version that just expired was begun in 1998, directed by Ezzati-Rice, and used from 2006 to 2015 (Parsons et al., 2014). This survey has been used to collect health information through face-to-face interviews of United States households conducted by Census Bureau trained interviewers for over 60 years (Parsons et al., 2014).

It is recommended that when developing an instrument of measure, an instrument with *proven* reliability should be used as a model for the questions developed (Sierles, 2003). All the questions needed and used for this study were from the NHIS questionnaires (CDC, NCHS, 2017). Although revisions, adjustments, and modifications have been made to the NHIS survey, they were intended only to keep up with the changing demographics (2017). The goal of the decennial revisions of this instrument have been to improve reliability and they attempt to do this throughout the life of the instrument (Parsons et al., 2014).

The NHIS questionnaires and results were made available to the public through online sites (Parsons et al., 2014). The CDC has a website for public-use data files and documentation with downloadable public use files (CDC, 2016). This survey description includes information stating that it was not necessary to request permission to use their

public domain, but a citation would be appreciated (2016). They also give permission to use their collected data to researchers for data analysis. Use was made of this permission by using questionnaire questions to develop the survey for this study (see Appendices D and E).

Reliability

Reliability is arriving at the same findings when the same procedure is applied repeatedly (Babbie, 2013). The CDC and NHIS staff, making minor adjustments between revisions, strive for reliability by adjusting to population changes (CDC, NCHS, 2016). Reliability errors stemming from the interviewer or the setting (methods errors) should be decreased (Jackson, 2012) with this instrument. All interviewers were trained by the CDC before they administer the questionnaire, it was administered face-to-face, and in a familiar setting such as the participant's home (Suchman & Jordan, 1990).

Suchman and Jordan (1990) conducted a study addressing concerns that the interview was an interactional event complicated by a neutral measurement instrument, which they felt could not be administered conversationally because it was scripted (CDC, NCHS, 2016). Suchman and Jordan expressed concern that what was intended to make the NHIS survey more valid was making it less reliable. However, they attributed the success of the instrument to both the planned questions and reading the questions without variation to avoid interviewer bias (1990).

For this cross-sectional study, even though the respondents were not addressed, and the survey was not administered in a face-to-face interview, better reliability was expected to be obtained from this study because there was no interviewer bias (Suchman

& Jordan, 1990). The survey questions were the same as those of the NHIS questionnaire and were in English and Spanish to accommodate those parents who do not read English (CDC, NCHS, 2017). Since this study had only one researcher, there was no issue of inter-rater reliability or other differences between researchers which might jeopardize reliability (Phelan & Wren, 2006). However, reliability does not guarantee accuracy (Babbie, 2013).

Validity

A review of the literature did not produce any information on the validity of the NHIS instrument. However, expertly developed government questionnaires were considered to be valid (Sullivan, 2011). These instruments have been in use since 1957 and continuously used for data collection (Parson et al., 2014). They were developed with the intent of sampling the United States noninstitutionalized population to provide health statistics on diseases and trends (Pastor et al., 2015).

The adjustments made during the use of the recently retired 2006 to 2015 NHIS instrument were an effort to get a representative sample as demographic changes (Parsons et al., 2014). However, the core questions stayed the same so that trends and data could be compared over time. Also, concessions had to be made and a compromise was reached between ideal allocations for the various domains. This instrument has proven its validity through the accumulation of relevant data across time (since 1957) and settings (Rickards et al., 2012).

The quantitative cross-sectional survey for this research was developed and fashioned from NHIS questions used to survey these same characteristics (CDC, NCHS,

2017). This study's intent was to measure the logical relationship between the risk factors and an ADHD diagnosis (Babbie, 2013). To assess the construct validity of the instrument being used to gather data for this study, the theoretical framework expectation was met.

Validity was also obtained using the survey developed from a well-established source, NHIS survey questions (CDC, NCHS, 2017). The NHIS is a multistage probability sample survey (Bloom et al., 2013). The literature review shows researchers use NHIS data for evaluation or analysis of constructs related to ethnicity, family status, poverty, health insurance, gender, age, Spanish spoken at home, and a parent-reported ADHD diagnosis for statistical estimations (Collins & Cleary, 2016; Pastor et al., 2015). The questions asked, through the developed survey, were expected to yield the expected responses to address the research questions.

Operationalization of Constructs (Predictor Variables)

Demographic information was included as it has been found to influence an ADHD parent-reported diagnosis. The predictor variables in this study were asked of parents of elementary school aged Hispanic children (between the ages of four 4 and 12). Descriptives were run on all predictor variables to calculate frequencies and percentages for nominal (marital status, insurance, gender, language), ordinal variables (income), and continuous variable (age). Results were used to describe the surveyed population (Jackson, 2012). The above-mentioned survey was used to obtain the responses for the following constructs.

Ethnicity: Hispanic/Latino. Ethnicity had been one of the original variables I had considered for the study, however, due to the high incidence of Hispanics in each of the schools (100%and 99.2 %; TEA, 2017-2018), I opted to not use it as one of the variables. The term Hispanic was used instead of Latino, but still includes persons identifying themselves as (a) Puerto Rican, (b) Cuban/Cuban American, (c) Dominican (Republic), d) Mexican American, (e) Central or South American, (f) Other Latin American, and (g) Other Hispanic/Latino (OMB, 1997). In this study, the only choices for the Hispanic question were *Hispanic Origin* or *Non-Hispanic Origin* (see Appendices D and E).

Marital status. The mother's marital status question was: Marital status: single, married, widowed, divorced, separated, never married, living with a partner, and prefer not to answer (see Appendices D and E; CDC, NCHS, 2017 [qfamily]). As a nominal variable, I ran a basic analysis using frequency distribution to determine the observed number of values. By running a basic analysis, frequency distribution showed cell count to be below 5 cases in 50% of the cells (IBM Corp., 2017).

Family income. For the purpose of this study, I considered the family income to be low if it was less than $25,000 (see Appendices D and E). My reasoning was that this county had an average persons per household of 3.7 (U.S. Census Bureau, 2018) and the federal poverty guidelines for a family of four was $25,750 for 2019 (see Appendix F). This was below the Texas and national median incomes of $56,565 and $57,617 respectively (Guzman, 2017). The median income for this county was $40,925 (U.S. Census Bureau, 2018; see Appendix A). The survey question asks for the household's

yearly total from less than $10,000 to over $1000,000 in increments of between $5,000 to $25,000 (e.g. < $10,000, < $15,000, < $25,000, < $35,000, < $50,000, < $75,000, and over $100,000) (2017, qfamily).

Health insurance. There were four possible choices to indicate the kind of insurance under which the child was covered. The four choices were Private Insurance, No Insurance, Medicaid, and Other Government or State Program Insurances (CDC, NCHS, NHIS, Questionnaire, 2017 [qfamily]). A frequency distribution analysis showed 2 of the 4 levels had less than 10 values in 50% of the cells (IBM Corp., 2017). This resulted in grouping the levels to having either Medicaid coded as 1 or not having Medicaid (other) coded as 0. A higher rate of Medicaid was found to contribute to higher prevalence of ADHD (Wolraich et al., 2014).

Gender. The gender question only had two choices *(Male or Female;* see Appendices D and E). These were coded males 1 and females 2. This variable was used to establish gender prevalence and was also analyzed using descriptive statistics (IBM Corp., 2017). Using NSCH 2016 data, Danielson et al, (2018) found that boys were more likely (12.9%) than girls (5.6%) to have been diagnosed with ADHD. The present study found 38% of males to be diagnosed with ADHD as compared to 11.1% for females.

Age. Having symptoms before the age of seven had been one of the criteria for diagnosing ADHD (APA, 2000) until DSM-5 (APA, 2013) was released. Seven years of age was the median age at which children were diagnosed with ADHD (Visser et al., 2015). Age in this study was used to control for elementary school aged children and to find the median age. The median age in this study was 7.5 years.

Spanish spoken at home. Due to the high prevalence of Hispanics in this community, only Spanish was considered in this study for language spoken at home (CDC, NCHS, 2017 [qfamily]). The choices on the survey were English, Spanish, or Bilingual (see Appendices D and E). To make the comparison between the three, English was used as the reference language and Spanish and Bilingual were compared to it and each other. The dummy coding was Spanish vs English and Bilingual and then Bilingual vs English and Spanish where zero and one were interchanged for the level that was not being compared to the reference language (English; Kent State University, 2019).

Data Analyses Plan

The software used to analyze this data was the IBM SPSS version 25 (2017). Using a researcher modified survey, data was collected for this study. It was used to analyze data collected to answer the two research questions, with the null and alternative hypothesis, for this study. To cover the ethical part of this, the return of the survey implied consent, therefore the consent forms were not required (Walden IRB, 2017). The surveys were inspected to confirm eligibility with a reply to an ADHD diagnosis *Yes* or *No,* as it was the main inclusion determinant.

Data Cleaning

Once surveys were collected, they were reviewed for missing data and invalid cases. The surveys were inspected to confirm eligibility with age as the main inclusion determinant. Data cleaning and data editing were part of the data analysis plan.

To clean the data with the SPSS program, value problems such as 1) missing data, 2) blank coded (0), 3) typing errors on data entry, 4) column shift (entering data into the

wrong column, 5) decimal point errors, 6) inconsistent coding were addressed using summary and graphical techniques by running descriptive and statistical graphs (Holcomb & Spalsbury, 2005). This was used for improving the quality of the data by screening for outliers and to ensure finding and correcting errors in data entry, misspellings, missing data, invalid data, and inconsistencies (Rahm & Do, n.d.). Errors like this were more likely to happen in larger systems with multiple data entry sites and repeated data depiction (Holcomb & Spalsbury, 2005; Rahm & Do, n.d.).

Since the survey return rate was small, missing data was noticed upon inspection and during data entry (Holcomb & Spalsbury, 2005). Two areas were edited to minimize their impact on the study results (Broeck, Cunningham, Eeckels, & Herbst, 2005). This was accomplished by evaluating questions with omissions in the ADHD (Yes/No) question and the age question.

Data Editing

Before coding began, the surveys were inspected and found to have a need to edit the data. The question from the survey read, "HAS A DOCTOR or health professional ever told you that *this* child had Attention Deficit Hyperactivity Disorder (ADHD) or Attention Deficit Disorder (ADD)?", and had three possible responses of Yes, No, and Don't Know. There were five addition sub-questions (e.g. who referred, age symptoms were noticed, age of referral, other diagnosis, and are medications for ADHD being taken). Holcomb & Spalsbury (2005) suggest that referring back to the data can give you a clue as to the correct coding.

If the above stated question was answered:

1. *No*, but the participant filled out all the information on the subsequent questions – it was coded as *Yes* (3 cases)
2. *I don't know,* and filled out some information – coded *Yes* (4 cases)
3. *I don't know*, and the subsequent questions were left blank – coded *No* (3 cases)

If age was left blank, but the grade level was given, age was calculated using similar data from other surveys that had completed age and grade level (Holcomb & Spalsbury, 2005). There were 2 changes made to age. No other missing data was filled in.

Analysis Plan

To test the first hypothesis that there were no statistically significant associations between the independent variables and dependent variable (a parent-reported ADHD diagnosis), descriptive statistics using frequencies distributions, histograms, and cross tabulations for chi square tests of independence, and point biserial analysis were conducted (Peng & So, 2002). Frequency distribution tables were used to compare a summary of the values in each variable to determine the if the cell values were viable and to answer research question 1. The Chi-square test was used to analyze categorical (nominal/ordinal) and continuous (scale) independent and dependent variables (Wuensch, 2014). However, due to expected cell count being < 5, Fisher's exact test was performed in place of the Pearson's product moment correlation. For the categorical variable age, point biserial correlation was used.

Binary logistic regression was used to test the second hypothesis that the predictor variables significantly predict the outcome variable (Szumilas, 2015). Simply explained,

it represents the proportion or odds that the child was diagnosed with ADHD due to the effect of any of the independent variables (Norman & Streiner, 2010). To assess the accuracy of the odds ratio, a confidence interval of 95% was used for this study (Siegel et al., 2016). A small confidence interval indicates a greater odds ratio accuracy (Szumilas, 2015).

Research Questions

This predictive quantitative cross-sectional survey was used to obtain answers to questions needed to address the research questions (see Appendices D and E). The following research questions and hypotheses were based on the theoretical framework consisting of Vygotsky's cultural historical theory (1978) and Bronfenbrenner's ecological systems theory (1979) developed through a literature review of disparity of ethnicity, psychosocial factors, and ADHD diagnoses in a Texas/Mexico border county.

Question 1. Are there statistically significant associations between the independent variables of coming from a single mother home, having low family SES, having public health insurance, gender, age, and Spanish as a primary language and an ADHD parent-reported diagnosis?

$H1_0$: There are no statistically significant associations between the select independent variables of coming from a single mother home, having low family SES, having public health insurance, gender, age, and Spanish as a primary language and an ADHD parent-reported diagnosis as measured by an analysis of the survey data.

$H1_1$*:* There are statistically significant associations between the select independent variables of coming from a single mother home, having low family SES, having public health insurance, gender, age, and Spanish as a primary language and an ADHD parent-reported diagnosis as measured by an analysis of the survey data.

Question 2. Do the independent variables (coming from a single mother home, having low family SES, having public health insurance, gender, age, and Spanish as a primary language) significantly predict the dependent variable of an ADHD parent-reported diagnosis?

$H2_0$: The independent variables (coming from a single mother home, having low family SES, having public health insurance, gender, age, and Spanish as a primary language) do not significantly predict the dependent variable of an ADHD parent-reported diagnosis as measured by an analysis of the survey data.

$H2_1$: The independent variables (coming from a single mother home, having low family SES, having public health insurance, gender, age, and Spanish as a primary language) significantly predict the dependent variable of an ADHD parent-reported diagnosis as measured by an analysis of the survey data.

Threats to Validity

External Validity

The aim of a study was to achieve generalizability to other populations, geographical locations, and across studies (Onwuegbuzie, 2000). Controlling for threats to external validity was essential to be able to improve generalizability (Michael, n.d.). Many research studies were conducted to find cause-and-effect such as in finding a relationship or association between independent variables and at least one dependent variable (Huitt et al., 1999).

Even though subjects were not randomly selected as is recommended to ensure every member has an equal chance of being selected, all participants in the approved locations had an equal opportunity to participate because all received packets (Jackson, 2012). Huitt et al. (1999) list pretesting and setting as the second and third threats to external validity that were again not applicable to this study. Multiple treatments and interventions were not part of this study and were therefore nonthreatening to external validity (The Ultimate IBM, 2017).

This study's generalizability was limited due to a small sample size. Creswell (2014) warns against drawing incorrect conclusions such as generalizing to different populations or to past or future populations causing external validity threats. The study results clearly state where and who the population surveyed was and is not compared to other populations but used to bring attention to the disparity of this geographic area within this county (U.S. Census Bureau, 2018).

Internal Validity

Internal validity can compromise generalizability (Ferguson, 2004). Internal validity in a descriptive study refers to the precision of the study. Kukull and Ganguli, (2012) suggested internal validity was dependent on the choice of study design, thorough data collection, and correct statistical analysis. Campbell and Stanly (1966, as cited in Huitt et al., 1999) provided eight types of recognized internal threats to validity, but due to the selected research design and methodology, these threats do not affect this study.

Construct Validity

A construct is a mental abstraction that accommodates those things that are not easily observed (The Ultimate IBM, 2017). However, ideas, people, events, and objects can be constructs. Construct validity is considered more important because it is a measure of theoretical constructs (Jackson, 2012). Hong and Lim (2008) established construct validity in their study using convergent and divergent approaches. The constructs in this study were quantifiable and observable therefore not subject to criteria for validation.

Ethical Procedures

In keeping with the Walden University IRB; 2017), this study was on a voluntary basis with assurances of anonymity. It was conducted without using invasive or dangerous treatments (U.S. Department of Health and Human Services, 2016). There were no known adverse effects possible from responding to this survey that asks questions about ethnicity, marital status, economic status, insurance coverage, gender, age, and primary home language and an ADHD diagnosis.

The school district that agreed to allow my investigation had their own in-house application for researchers. This was used in place of the Walden *Letter of Cooperation*, which was required by Walden University IRB (2018). The superintendent granted permission to contact all 26 elementary school principals to facilitate access to participants. Two principals volunteered to participate in the study (Principals, personal communication, May 7, 2018 and May 10, 2018 respectively).

The campus principals were contacted by email to request their signature on the in-house research application which took the place of the *Letter of Cooperation* (same as the superintendent's form letter with necessary changes) required by Walden University IRB (2018). No classroom *Letter of Cooperation* was needed since the teachers would only be sending the packets home the one time. All necessary documentation was signed to ensure ethical standards were not jeopardized.

All forms going out to the parents were translated to Spanish to ensure maximum participation. The packets sent contained the informed consent, the survey, and a stamped, self-addressed envelope in which to return the completed survey. To protect confidentiality and avoid students from hand-carrying the survey back to school, I implemented this form of survey return, as requested by the Walden University IRB (personal communication, August 17, 2018).

To ensure confidentiality, once collected, returned forms have been kept in a securely locked file cabinet at home where only the researcher has access (NIH Office of Extramural Research Participants (2008). The electronic data analysis and related documents are password protected on a personal home computer where no one else has

access (Walden University IRB, 2018). I implemented this study at two schools with parents reporting and no personal participant information gathered in the survey.

Refusal or withdrawal of participation was not applicable because this was an anonymous survey completed at the discretion and convenience of the participant with no identifying information. Once the study was completed, the data has been securely stored electronically (scanned and encrypted), and hard copies are under lock and key with no one else having access. After five years, the data will be destroyed. Compliance with the Ethical Principles of Psychologists and Code of Conduct were strictly carried out (American Psychological Association, 2016; U.S. Department of Health and Human Services, 2016).

Summary

The purpose of this study was to explore the effects of family status, family income, insurance coverage, gender, age, and Spanish spoken at home (independent variables) on an ADHD diagnosis (dependent variable) in this mostly Hispanic community (Cheng & Goodman, 2015). The problem was the lack of research addressing disparity and interaction of ethnicity (Coker et al., 2016) and the primary risk factors affecting an ADHD diagnosis (Choi et al., 2016). Coker et al., (2016) found racial and ethnic minorities were underdiagnosed and undertreated. However, ADHD prevalence increases may be due to inconsistent use of diagnostic criteria in diagnosing this disorder (Fulton et al., 2015; Musser et al., 2016).

A quantitative cross-sectional survey design methodology was used to establish the association of disparity and interaction with the primary factors associated with an

ADHD diagnosis. A developed survey derived from NHIS questions (CDC, NCHS, 2017) was utilized for this study to be able to reach a larger number of participants (Creswell, 2014). A theoretical framework derived from Vygotsky's cultural historical theory (1978) and Bronfenbrenner's bioecological theory (1979) was the driving force for this investigation.

Chapter 3 consists of the research design and rationale, methodology, and threats to validity. The research design and rationale section encompass the study variables and research design. The methodology section includes the population, sampling and recruitment procedures, instruments used, operationalization of variables, and the data analysis plan. Threats to validity delineates study ethical procedures. Chapter 4 reports on data collection and results. Chapter 5 consists of limitations of the study, recommendations for further research, implications for social change, and conclusions derived from the data analysis.

Chapter 4: Results

The purpose of this cross-sectional quantitative descriptive research was to determine the primary factors for a parent-reported ADHD diagnosis. I sought to answer two research questions using the collected data. Research Question 1 concerned whether there were statistically significant associations between the independent variables (marital status for the mother, low family income, public insurance, gender, age, and Spanish spoken at home) and the dependent variable (an ADHD parent-reported diagnosis). The null hypothesis for Research Question 1 was there are no statistically significant associations between the independent variables and the dependent variable. Research Question 2 centered on whether the independent variables significantly predict the dependent variable. The null hypothesis for Research Question 2 was that the independent variables did not significantly predict the dependent variable of an ADHD parent reported.

I conducted this investigation to answer the research questions and test the hypotheses. For this study, a binary logistic regression analysis was performed because of the dichotomous outcome of ADHD (have it or not have it). The aim of Chapter 4 is to present the study results. Included in Chapter 4 are an explanation of the data collection and analysis procedures, including information on the selection of tests for analyzing the data; a description of the sample population; and finally, a presentation of key findings from the study.

Data Collection

I used a researcher-developed survey instrument in English and Spanish to collect data from participants (see Appendices D and E). A large manila envelope containing this survey, the informed consent form (in English and Spanish), and a stamped envelope were enclosed in a packet and sent home with the children in each of the two schools. The informed consent served as recruitment for the study and a means of assuring anonymity, confidentiality, and the voluntary nature of study participation. The envelope was for parents to mail the survey to me.

I planned a time frame of 14 days for data collection. However, a slow returned rate of surveys warranted that the time frame be extended to 7 weeks. At one school, the week after the packets were sent home with the students, personnel made an intercom announcement asking that students remind their parents about the survey (the assistant principal, personal communication, October 8, 2018).

However, the administrator of the other school forgot to send the packets on the agreed-upon date which had been October 1, 2019 (The principal's secretary, personal communication, September 9, 2018). They were sent out about two weeks late on Friday, October 12, 2018. The 500 additional packets sent out at this time did not improve the response rate. Surveys were very slow in being returned.

Participants either mailed the surveys to me or returned them to the schools. Of those returned to the schools, some were mailed by to me by the school and some were picked up. A change made by me, with approval, that was not included in Chapter 3, was to send reminders home with the students. A second change was that the data collection

time was extended to 7 weeks resulting in an increase in the response rate to a total of 105 surveys (10.4%).

Baseline Descriptives and Demographic Characteristics

The population of interest was all parents/caregivers of elementary school-aged children 4 to 12 years of age within the district in question (*N* = 16,908; TEA, 2017-2018). I used a nonprobability convenience purposive sampling approach because the desired respondents could best be reached by going through the elementary schools. This approach was taken because parents/caregivers would be the most knowledgeable about the questions being asked (Jackson, 2012).

Two campus administrators out of 26 approved the request to have the surveys sent through their sites. The total number of children who received a packet for the study was 1,022 (Principal, personal communication, May 7, 2018; Principal, personal communication, September 13, 2018). However, each parent/caregiver might have received more than one recruitment invitation (packet) if they had more than one eligible child within the age group.

Summary statistics. I used frequencies and descriptive statistics to examine the association between variables. There were six independent variables and one dichotomous dependent variable (ADHD diagnosis). When frequencies were run, the assumption of independent observation and adequate cell size, which requires that all expected frequencies have values > 5 (McHugh, 2013), was assessed but not met. To accommodate the small sample size, I chose Fisher's Exact Test to assess the relationship

between two categorical variables because it is the appropriate test when sample size for at least one of the categories is small (McDonald, 2014).

Representative sample. Parents from the two elementary schools were the population from which the sample for the study was obtained. Each child in the schools (N = 1,055) received a packet to take to their parents of which 105 were collected. The select population sample was representative of the district and county from which it was taken (TEA, 2017-2018). Both participating elementary schools had a high Hispanic population, which was similar to that of the district's student population. Both participating campuses were estimated to have economically disadvantaged students comparable to district estimates (TEA, 2017-2018; see Table 2).

Table 2

Community Demographics by Campus

Demographics	Campus 1 (*n*)	Campus 2 (*n*)	District (*n*)	Texas (*n*)
Student population	555	594	32,667	5,385,012
Invited to participate	512	505	1,022	N/A
Ethnicity/Hispanic	100% (555)	99.2% (589)	99.1% (32,360)	52.4% (2,821,189)
Disadvantaged	92.8% (515)	96.3% (572)	90.8% (29,679)	58.8% (3,164,349)
English language learners	66.5% (369)	69.4% (412)	42.8% (13,988)	18.9% (1,014,830)

Note. Estimates were taken from TEA (2017-2018).

These schools had a higher percentage rate of English language learners than the district or the state (see Table 2). Bilingual education counts at the campuses were not provided by TEA, but 45.4% of the students in the district received this service, and the two campuses had a similar rate (44.8%) compared to 18.9% at the state level (TEA, 2017-2018). Table 2 shows the community demographics.

Results

The variables in this study were nominal (marital status, insurance, gender, Spanish spoken at home), ordinal (income), and continuous (age). Variables with more than two levels were dummy coded to make all variables dichotomous to maximize results attained from the small sample size (Ahlgren & Walberg, 2017). The software used for analyzing data for this study was SPSS version 25 (IBM Corp., 2017).

To test for a relationship between a continuous variable and a dichotomous nominal variable, the point-biserial correlation coefficient was appropriate (KSU, 2019). A correlation expresses the strength of association or co-occurrence (SPSS Tutorials, 2018). This test allowed us to make predictions (not determine causation) about the independent variables and the dependent variable ADHD (IBM Corp., Tutorials, 2017).

Descriptive Statistics

To help answer research question 1, the data was run to obtain frequencies and percentages for each dichotomous variable. Tests of statistical significance were conducted to obtain percentage values, central tendency, and dispersion for the continuous variable age, but results were limited because of the small data set ($N = 100$). Analyses of frequencies and descriptive statistic helped describe the sample population.

Frequencies and percentages. A frequency analysis of the dependent and independent variables was conducted to produce occurrences and frequency distributions (percentages) from the data collected through the survey. Frequencies and percentages of valid counts were obtained (see Table 3). The most notable observation was the 27-missing data, in total, from the independent variables: marital status, ($n = 3$, 2.9%);

income, (*n* = 7, 6.7%); and insurance, (*n* = 6, 5.7%). Additionally, gender, (*n* =1, 1%), continuous variable age, (*n* = 5, 4.8%), and Spanish spoken at home, (*n* = 3, 2.9%) had missing data. Table 3 presents this and other information.

Additional findings were the low observed values of less than 5 cases in several cells using the frequency count column. Marital status had low observed values of (never married (*n* = 2, 2%), separated (*n* = 3, 2.9%), divorced (*n* = 3, 2.9%) and missing values, (*n* = 3, 2.9%). The choice of Prefer not to answer was coded as *other* indicating no single. Family income had 4 levels with 5 or less values representing 50% of the levels of less than $35,000 (*n* = 4, 4.1%); less than $75,000 (*n* = 3, 3.1%); less than $100,000 (*n* = 3, 3.1%); more than $100,000 (*n* = 1, 1.0%) Table 3 has the complete results.

For insurance, four possible answers were presented in the survey (see Appendices D and E). Three of the choices had 10 or less values (Private Insurance [4, 4.0%]; No Insurance [8, 8.1%]; Other Gov't Insurance [10, 10.1%]) and there were 6 missing cases (5.7%). Gender was missing only one case, *n* = 1.0. Age had eight levels of ages from 4 to 11 with *n* = 5 (4.8%) missing. Language met the assumption of having more than 5 values per level and had 3 (3.8) missing cases, with *English* having the lowest count (*n* = 11, 10.5%) and 3 missing cases (2.9%). These results prompted dummy coding (Graham, Taylor, & Cumsille, 2001). Table 3 shows results for frequencies, small cell values, and missing data.

Table 3

Frequencies for Small Cell Values and Missing Data for Nominal Variables

Characteristic	*n*	%
ADHD		
No	80	76.2
Yes	25	23.8
Marital Status		
Single	22	21.6
Married	55	53.9
Never Married	2	2.0
Living with a Partner	16	15.7
Separated	3	2.9
Divorced	3	2.9
Prefer not to Answer	1	1.0
Missing Data	3	2.9
Income		
Less than $10,000	37	39.8
Less than $15,000	17	17.3
Less than $25,000	19	19.4
Less than $35,000	4	4.1
Less than $50,000	12	12.2
Less than $75,000	3	3.1
Less than $100,000	3	3.1
More than $100,000	1	1.0
Missing Data	7	6.7
Insurance		
Private Insurance	4	4.0
Medicaid	77	77.8
No Insurance	8	8.1
Other Gov’t Insurance	10	10.1
Missing Data	6	5.7

Table 3 (Continued) Gender		
Male	50	48.1
Female	54	51.9
Missing	1	1.0
Age in Years		
4 years old	7	7.0
5 years old	14	14.0
6 years old	16	16.0
7 years old	13	13.0
8 years old	16	16.0
9 years old	14	14.0
10 years old	15	15.0
11 years old	5	5.0
Missing Data	5	4.8
Home Language		
English	11	10.8
Spanish	43	43.1
Bilingual	47	46.1
Missing Data	3	2.9

Dummy coding was created for the nominal and ordinal variables that had missing data and low value counts (Ahlgren & Walberg, 2017). Marital status was recoded using zero for *other* indicating married and living with a partner; *single* was used for the other cells (single, widowed, divorced, separated, or never married) and coded with a one. The income variable was recoded with zero (0) for more than $25,000 and one (1) for less than $25,000. The low cell counts and high incidence of Medicaid as a response (78, 74.30%), indicated this variable should be recoded as Medicaid 1 and all other insurance choices as 0 for the Other level.

The language variable was dummy coded where English was the constant or reference and Spanish was coded one (1) and English and Bilingual were coded zero (0).

Then Bilingual was coded one (1) and English and Spanish were coded zero. By recoding one variable with three levels, two new variables with 2 levels and different names were produced and analyzed separately (KSU, 2019).

Frequency tables were rerun with the recoded variables to make the data results more meaningful to the population characteristics. The resultant analysis show the disparity of the data for each level of the recoded variables: marital status recoded showed Other (indicating not being single), *n* = 72 (70.6%) and single, *n* = 30 (29.4%); family income recoded, more than $25,000, *n* = 23 (23.5%) and less than $25,000, *n* = 75 (76.5%); insurance recoded, 22.2% (*n* = 22) reported their child did not have Medicaid and 77.8% (*n* = 77) reported the child had Medicaid; for language, 56.9% (*n* = 58) were not Spanish Speakers and 43.1% (*n* = 44) spoke Spanish, while 53.9% (*n* = 55) were not Bilingual, 46.1% (*n* = 47) were Bilingual.

For the ADHD diagnosis, results were 76.2% (*n* = 80) that participants had not been told their child was diagnosed with ADHD and 23.8% (*n* = 25) had been told their child had ADHD. For Gender, the sample was close to evenly distributed with males representing 48.1% (*n* = 50) and females (51.9%, *n* = 54). Age stayed the same since it was not changed (see Table 3).

Descriptive statistics showed age was grouped close to the center of the normal curve (*M* = 7.44, *SD* = 2.01). Twelve years of age was not represented (*n* = 0). Skewness (-.005, SE_M = .241) and kurtosis (-1.096, SE_M = .478) are within normal.

Tests of Significance

To test the null hypothesis (H_0) of the first research question shown below, SPSS version 25 was used (IBM Corp., 2017). The H_0 stated that there were no statistically significant associations between the select independent variables and an ADHD parent-reported diagnosis as measured by analysis of the survey data. To assess the effect of the binary independent variables on the dichotomous dependent variable, a series of chi-square tests of independence were performed. For the continuous variable, point-biserial correlations analyze was performed.

Research question 1.

Are there statistically significant associations between the independent variables of coming from a single mother home, having low family SES, having public health insurance, gender, age, and Spanish language spoken at home and an ADHD parent-reported diagnosis?

- The null hypothesis (H_o): There are no statistically significant associations between the select independent variables and an ADHD parent-reported diagnosis as measured by analyzing the survey data.
- The alternate hypothesis (H_1): There are statistically significant associations between the select independent variables and an ADHD parent-reported diagnosis as measured by analyzing the survey data.

Chi-square test of independence results. Fisher's exact test was chosen because of the small sample size (Kim, 2017). To assess the strength of that relationship, a Phi coefficient was run, which was used, instead of Cramer's V, due to the small sample size.

Assumptions for Fisher's exact test are that: (1) observations are independent, (2) the data are ordinal or nominal (3) all expected frequencies are > 5, and (4) a dichotomous level of measure is assumed (McDonald, 2014).

The results for marital status and ADHD were found to be statistically significant, $p = .010$. The Yes, to an ADHD diagnosis in the Other group was $n = 12$ (16.7%) while the level for being single was $n = 13$ (43.3%). The Phi coefficient statistic, $\varphi = .28$, $p = .006$, indicated a weak relationship between marital status and an ADHD diagnosis. This showed that being a single mother affected whether a child was diagnosed with ADHD.

Also, statistically significant was an ADHD diagnosis and gender where males were found to be more likely to be diagnosed with ADHD ($n = 19$, 76.0%) than females ($n = 6$, 24%). Fisher's exact test results found significance, $p = .002$. The Phi correlation coefficient was $\varphi = -.31$, $p = .002$ indicating a moderate strength of association between gender and ADHD diagnosis. Thus, it is concluded that a statistically significant association exists between gender and ADHD at a moderate relationship strength. The null hypothesis was rejected.

However, the other nominal independent variable revealed a nonsignificant association between an ADHD diagnosis and income (< \$25,000 - > \$25,000) $\chi^2(1, N = 98)$, $p = .262$, $\varphi = .14$, $p = .262$; an ADHD diagnosis and insurance (Other or Medicaid), $\chi^2(1, N = 99)$, $\varphi = .20$, $p = .055$, an ADHD diagnosis and Spanish $\chi^2(1, N = 102)$, $p = .812$, $\varphi = -.044$, $p = .812$, and an ADHD diagnosis and Bilingual $\chi^2(1, N = 102)$, $p = 1.000$. $\varphi = .019$, $p = 1.000$. This indicates results could have occurred by chance or

normal sampling error. I thereby conclude that the null hypothesis cannot be rejected for these variables. The results of the chi-square tests are shown in Table 4.

Table 4

Chi-Square Test of Independence Split by ADHD

	ADHD				
Variable	No %	Yes	χ^2	*Df*	p^*
Marital status					
Single	17[56.7]	13[43.3]			
Other	60[83.3]	12[16.7]	.28	1	.010
Income					
Less than $25,000	55[73.0]	20[26.7]			
More than $25,000	20[87.0]	3[13.0]		1	.262
Insurance					
Medicaid	54[70.1]	23[29.9]			
Other	20[90.9]	2[9.1]			.055
Gender					
Female	48[88.9]	6[11.1]			
Male	31[62.0]	19[38.0]	-.31	1	.002
Age					
Totals	77[77.0]	23[23.0]	.39	1	.021
Home language					
Spanish vs English	44[75.9]	14[24.1]		1	.812
Bilingual vs English[a]	43[78.2]	12[21.8]		1	1.000

Note. [a]Bilingual indicates English and Spanish spoken at home vs English.
$^*p$ - values are from Fisher's Exact Test.

Point-biserial correlation. A point-biserial correlation is a special case of the Pearson correlation (SPSS Tutorials, 2018). This correlation analysis was conducted for ADHD diagnosis (a dichotomous variable) and age (a continuous independent variable). There was a significant negative relationship between the predictive variable for ADHD diagnosis and age, r_{pb} = -.23, p = .023. Results indicate younger children were more likely

to be diagnosed with ADHD. The strength of the relationship is weak as per conventionally accepted r = .1–small, .3=medium size, and .5–large (Oliver & Bell, 2013. However, the difference between the observed and the expected values was sufficiently different that I concluded that it was not just a random distribution, and a relationship does exist, so, I rejected the null hypothesis.

Inferential Statistics

Binary logistic regression was used to find the probability estimates to address the second research question. Statistical significance was noted at the generally accepted level 95% confidence interval, $\alpha = .05$ (McHugh, 2013). A total of $n = 83$ was used to assess the predictability of the dependent variables on the independent variable.

Research question 2.

Do the independent variables (coming from a single mother home, having low family SES, having public health insurance, gender, age, and Spanish spoken at home, significantly predict the dependent variable of an ADHD parent-reported diagnosis?

- $H2_0$: The independent variables (coming from a single mother home, having low family SES, having public health insurance, gender, age, and Spanish spoken at home do not significantly predict the dependent variable of an ADHD parent-reported diagnosis as measured by analyzing the survey data.
- $H2_1$: The independent variables (coming from a single mother home, having low family SES, having public health insurance, gender, age, and Spanish spoken at home significantly predict the dependent variable of

ADHD parent-reported diagnosis as measured by analyzing the survey data.

Binary logistic regression. To address research question 2, a binary logistic regression is appropriate because this study has a dichotomous dependent variable (Laerd, Binomial, 2018). Assumptions for logistic regression are: (1) the dependent variable should be measured as dichotomous, (2) one or more independent variables are present (continuous or categorical), (3) the dependent variable is mutually exclusive, and (4) there is no multicollinearity among the predictors (Laerd, Binomial, 2018). Binary logistic regression, using the independent variables, estimates the probability of an ADHD diagnosis occurring

An examination of the 83 viable cases was performed to ascertain the effects of the predictor variables (marital status, family income, insurance coverage, gender, age, Spanish spoken at home) on the likelihood that participants had an ADHD parent-reported diagnosis. The overall logistic regression model was statistically significant, $\chi^2(7) = 19.10$, $p = .008$, and correctly classified 77.1% of cases.

The Hosmer-Lemeshow goodness-of-fit was not statistically significant $\chi^2(8, N = 105) = 8.80$, $p = .360$, indicating the model was correctly specified. The model explained 31.2% ($r_n = .312$; Nagelkerke R^2) of the variance in the dependent variables compared to the null model (Walter & Smith, 2016). By using results from both Cox & Snell R^2 (r_{cs} , = .21) and Nagelkerke R^2 ($r_n = .312$), we could say the explained variation in the dependent variable, based on our model, ranges between 21% and 31% (Laerd Statistics, Binomial, 2018).

The regression coefficients for this model are summarized in Table 5. Controlling for all other variables, the predictor variables in the logistic regression analysis found gender, B = -1.51, OR = .22, 95% CI [.06, .77], p = .02 and age B = -.342, OR = 0.71, [.52, .97], p = .03 were significantly predictive of an ADHD parent reported diagnosis. This would suggest that if you are male, for every 1.51-unit increase, the odds of an ADHD diagnosis increase by 22%. For age, for every year of decrease, the odds of being in the Yes category for being diagnosed with ADHD decreased by 71%. The results of this binary logistic regression model are shown in Table 5.

Table 5

Logistic Regression With Factors Predicting an ADHD Diagnosis

	B	*SE*	*Wald* χ^2	*df*	*p*	*OR*	*95% CI*	
							LL	UL
Marital Status recode	.56	.65	.75	1	.39	1.75	.49	6.25
Income recode	1.26	1.23	.05	1	.31	3.52	.32	39.19
Insurance recode	2.05	1.19	2.97	1	.09	7.73	.75	79.31
Sex	-1.51	.63	5.66	1	.02	.22	.06	.77
Age	-.34	.16	4.78	1	.03	.71	.52	.97
Spanish	.67	1.06	.40	1	.53	1.96	.24	15.71
Bilingual	.22	1.00	.05	1	.83	1.24	.18	8.83
Constant	.08	1.98	.00	1	.97	1.00		

Note. OR = odds ratio. CI = Confidence Interval; LL = Lower Limit; UL = Upper Limit.

Effect size. A search for outlies and missing data was performed. Outliers in this study were not of significance as the variation was expected due to the disparity in this community (e.g. family income and age). Additionally, no action was taken to handle the

problem of missing data (Graham et al., 2001). Included in the study were 105 surveys, which may be considered a small sample for the seven independent variables in the study.

However, when applying the rule of thumb derived from two simulation studies conducted by Peduzzi, Concato, Kemper, Holford, and Feinstein (1996) and Peduzzi, Concato, Feinstein and Holford (1995), determined that 10 events per predictor variable (EPV) would not compromise regression coefficients biases, confidence intervals coverage, or loss of power. Vittinghoff and McCulloch (2006) stated (uncited source) that the rule of thumb for logistic and Cox model is 10 EPV supporting the previous findings. Therefore, by applying this logic to my study sample size, I could conservatively say my study met the required 70 EPV.

Summary

This study's sample population was one of convenience (Etikan et al., 2016). The purpose of this study was to gather parent reported information about their elementary school aged children aged 4 to 12. The selection was all the parents from two volunteer schools within a local district. Surveys were sent to 1,022 parents for voluntary self-administration. Although a small usable sample was obtained (N = 105), the sample was representative of the larger population in the district.

My first research question queried the association of the selected variables (coming from a single mother home, having low family SES, having public health insurance, gender, age, and Spanish language spoken at home) in relation to the variable of interest-an ADHD diagnosis. Frequencies and percentages were used to describe the sample population, chi-square test of independence was used to assess for an association

between the variables, and Phi-Coefficients was used to test the strength of the relationship. Fisher's exact test is used in place of chi-square to test the association or relationship between two dichotomous categorical variables when one of the four cells of a 2 X 2 contingency table have less than 5 observations and/or when the sample size is small (Mehta & Patel, 2010).

The results of the chi-square analysis showed a statistically significant relationship in marital status (p = .010) and gender (p = .002). Additionally, point-biserial correlation revealed that age was statistically significant p = .021, in relation to an ADHD diagnosis. Results showed there was no association in the other variables and the independent variable. Of interest were: the 23.8% (n = 25, N =105) of Yes responses to the Yes/No ADHD question; the 77% (n 75, N = 98) of families with income below $25,000; 78% ($n$ = 77, N = 99) of children on Medicaid; and the 11% (n = 11, N = 102) of English only households.

My second research question was whether the predictor variables were significantly predictive of the dependent variable. A binary logistic regression model was appropriate to analyze the data and answer the research question due to the nature of the variables (Ahlgren & Walberg, 2017; Wuensch, 2014). The overall model indicated statistical significance, $\chi^2(7) = 19.10$, p = .008, but the results showed that only gender and age were statistically significant in predicting an ADHD parent-reported diagnosis.

Chapter 5 spotlights: (1) the rational for this investigation, (2) offers interpretations of the analysis, (3) expands on the answers to the research questions, (4) and draws conclusions on the findings. Additionally, limitations of the study are

disclosed and recommendations for future studies are shared. Implications and contributions of the study are available to the stakeholders for sharing, with the intention of contributing to social change.

Chapter 5: Discussion, Conclusions, and Recommendations

ADHD is one of the most diagnosed childhood disorders in the United States (CDC, 2018). A review of the literature showed that determining primary factors for an ADHD diagnosis was a problem because findings were inconsistent (Collins & Cleary, 2016). Therefore, the purpose of this quantitative survey investigation was to determine the effects of disparity and interaction of the select independent variables (marital status, having low family SES, public health insurance coverage, gender, age, and Spanish spoken at home) and the dependent variable (an ADHD diagnosis). I used a theoretical framework based on Vygotsky's (1978) and Bronfenbrenner's (1979) developmental theories. The broader aim of this investigation was to expand the current knowledge and literature on ADHD diagnosis factors in predominantly Hispanic communities and to advance social change.

I assessed whether there was an association between the selected predictor variables and an ADHD parent-reported diagnosis and if these same independent variables were predictive of an ADHD diagnosis. This study recruited from two schools with Hispanics comprising 100% and 99.2% of the schools' populations, respectively. The gender split was almost 50% with males numbering 50 and females, 54.

I chose variables previously shown to be predictive of an ADHD diagnosis (Collins & Cleary, 2016; Danielson et al., 2018; Pastor et al., 2015) for this study to assess how closely they were supportive of previous studies using a sample from the study population. The specific focus of the study was on elementary school Hispanic

children ages 4 to 12 years old. In this chapter, I review the findings of this investigation in relation to the research questions.

Data analysis were performed on information derived from 105 researcher-developed surveys. Results showed ADHD prevalence to be 23.8% with males being more likely to be diagnosed than females. Age and gender findings showed statistical significance and predictiveness. Marital status was found to be statistically significant with the Fisher's Exact Test but not analyzed with binary logistic regression. The remainder of the independent variables were not found to be significant.

Interpretation of Findings

I examined parent-reported ADHD within a predominantly Hispanic community focusing on select psychosocial and demographic factors. Comparison of findings was to confirm, refute, and extend knowledge in the search for primary factors associated with, or predictive of, a parent-reported ADHD diagnosis in a mostly Hispanic community. One finding that was confirmed was the rate of diagnosis between males and females where males are more often diagnosed. One refuted finding was the ADHD prevalence rate in this community, which was higher (23.8%) than that of the estimated national average of 4 to 17-year-olds (> 10.5%) and of Hispanic children in general (> 6.7%; Danielson et al., 2018). Findings also extended knowledge for a unique geographical area where the population consists of over 92% Hispanics (U.S. Census Bureau, 2018), which was absent in the literature reviewed.

Findings

Analyses included descriptive statistics as well as chi-square tests of independence-Fisher's exact test (Kim, 2017; Mehta & Patel, 2010), point-biserial correlation analysis (Demirtas & Hedeker, 2016), and binary logistic regression (Laerd Statistics, 2018). However, results were mixed with some findings supporting the null hypotheses that (a) there was no statistical significance between the independent variables and a parent-reported ADHD diagnosis and (b) that the independent variables were not predictive of the dependent variable, while some findings did not support the null hypotheses. The findings were not all consistent with expectations or the literature review (Cheng & Goodman, 2015; Choi et al., 2016; Collins & Cleary, 2016; Danielson et al., 2018; Schwarz, 2016). Danielson et al. (2018) derived findings from a newer survey, which was recently implemented by the NSCH (2018), thereby limiting comparisons with their study.

Descriptive statistics. I used descriptive analysis to describe and explore the data and the population of the study. One of the findings was that some of the expected frequency counts were below 5 because of the small sample size (see Table 3). It was for this reason that marital status, family income, insurance coverage, and Spanish spoken at home were dummy coded (Ahlgren & Walberg, 2017). Data for this study consisted of 50 males and 54 females whose parents responded to the survey.

Key findings in this study were the rate of parent-reported ADHD, which showed a 23.8% prevalence rate, $n = 25$. Gender and age were found to be statistically significant and predictive of an ADHD parent-reported diagnosis. The mother's marital status, at the

single level, was found to be statistically significant (p = .010) but not predictive (p = .386); insurance was found to be marginally significant (p = .055) in association and predictiveness (p = .085) of an ADHD diagnosis. Not contributing significantly to the model were family income and Spanish spoken at home.

Results showed support for the first hypothesis regarding whether an association between the predictor variables and the dependent variable was present. The theoretical framework using Vygotsky's (1978) and Bronfenbrenner's (1979) developmental theories was also supported, with culture and environment found to affect behavior as shown by the disparity of the results. However, not all associations were statistically significant, which may be due to the small dataset (McHugh, 2013).

ADHD prevalence. Frequency results showed that ADHD prevalence for the sample was inconsistent with previous studies for Hispanics (23.8%) due to the high incidence rate and the lack of diversity in this community; non-Hispanics were not available for comparison. But, even so, this rate is higher than previous researchers have reported with Hispanic White compared to non-Hispanic White children (4% to 10%, respectively; Bloom, Cohen, & Freeman, 2009). Although this study showed a high prevalence rate of ADHD diagnosis in Hispanic children, a most recent study still showed Hispanics less likely to be diagnosed than non-Hispanic children ([6.7% and 10.2, respectively]; Danielson et al., 2018).

Marital status. Previous studies have shown that children who come from a single mother home are more likely to be diagnosed with ADHD than those from two-parent homes (13.2% versus 7.5%; CDC, ADHD, 2018). Of note were this study's results of

ADHD-diagnosed children (43.3%) who came from single homes compared to two-parent homes (16.7%), which was expected and consistent with findings from previous studies (e.g., Collins & Cleary, 2016, where the contrast was 16% compared to 9%). This finding suggests that children from single parent homes were about three times more likely to be diagnosed with ADHD (see CDC, ADHD, 2018). These results are in keeping with the previous literature, and although not significant in this study, can contribute to advance the knowledge for this variable.

Family income. Family income of < $25,000 was chosen because, in the United States, a single mother with children under 18 years of age (57%) is estimated to have a median income of $17,162, receive public assistance (70.1%), and live below the poverty level (64.6%; U.S. Census Bureau, 2018). Previous studies have shown that low income can predispose children to ADHD (Clearfield & Jedd, 2013; Larsson et al., 2014). In the present study, I found that 26.7% of children with ADHD lived in a home where the family income was less than $25,000 compared to those with more than $25,000 (13.0%). Although not significant, this study confirms previous findings (Danielson et al., 2018).

Health insurance. Nyarko et al. (2017) reported that Medicaid increases occurred for 2009 to 2012 from 11.3% to 13.3%, then decreased to 12.5% and have held steady through 2015. Children with public health insurance coverage were found to be more likely to be diagnosed with ADHD in previous research (Danielson et al., 2018). These researchers found that children with public insurance (12.5%) were more likely to be diagnosed with ADHD than children with only private insurance (7.6%).

However, they also found that children with both public and private insurance had a greater chance of an ADHD diagnosis (16.0%). This study supports previous research findings that children with public health insurance coverage are more likely to be diagnosed with ADHD. Although the percentage of Medicaid recipients was high in my study (77.8%), it may be due to the disparity of single families living below the poverty level and the overall poverty level in the study community (U.S. Census Bureau, 2018).

Other researchers' findings showed that Medicaid (11.8%) did not result in a greater likelihood of ADHD diagnosing as compared to Other (13.9%). Other meaning the child had private, Medicaid, or no insured (CDC, Table C 3a,). This could be the result of the use of a different survey and a change in the survey (CDC, ADHD, 2018). Alternately, another study found white non-Hispanic children (41.2%) less likely to be diagnosed compared to Hispanic children (34.7%) stating NHIS findings might be attributed to more white families seeking private care and not state provided health care (Siegel et al., 2016). However, a 20% increase in public health insurance over the past 20 year was reported (Cohen et al., 2017), and could account for the increased numbers of ADHD diagnosis. There are discrepancies between the reports, but this study supports the majority, which agree that having public health insurance results in being more likely to be diagnosed with ADHD and expands on the knowledge of this unique local population.

Gender. As for gender, the findings have shown that males (17.4%) are more likely than females (7.5%) to be diagnosed with ADHD (CDC, QuickStats, 2017). Danielson et al. (2018) found males (12.9%) to be more likely than females (5.6%) to have an ADHD diagnosis. This study also concurs with the findings of males (38.0%)

being more likely to be diagnosed, although at a rate more than three times that of females (11.1%). Findings for this study were significant for gender (p =.002.

Age. Age had been used as part of the diagnostic criteria because it was expected that the ADHD symptoms should have been observed before the age of 7 but has now changed to 12 years of age (APA, 2013). Visser et al. (2015) found that seven years of age was the median age for an ADHD diagnosis and that 76.1% of children with an ADHD diagnosis were diagnosed before the age of seven. Siegel's study (2016), found 48.5% of children were diagnosed between the ages of 8 to 12 years of age. This study confirms a close approximation to the median age (7.5), the percentage of children diagnosed before the age of 9 (80%), and a close approximation to the 48.5% (50%) of ADHD diagnosed children between the ages of 8 to 12 years. Point biserial correlation showed age to be statistically significant, $r_{pb} = -0.23$, $p = .023$ with a weak correlation.

Spanish spoken at home. Language was found to affect behavioral self-regulation skills and those diagnosed with ADHD were found to have a higher rate of language problems (Lonigan et al., 2016). Danielson et al., (2018) found Spanish language speakers to be less likely (3.8%) to be diagnosed with ADHD compared to non-Spanish speakers (10.4%). This study's results did not support those findings. Speaking Spanish was not associated with an ADHD diagnosis (20.5%) and neither was non-Spanish speaking (24.1%). Speaking both English and Spanish (bilingual) at home did not show any difference in the association of these variables (23.4% for bilingual, 21.8% for not bilingual).

Chi square test of independence. A chi square test of independence was conducted on the variables of interest to perform an independency test under the null and alternate hypothesis using Pearson's chi-square (Kim, 2017). Using the data as imputed, findings were questionable because of the small sample size. Therefore, the following recoding was implemented:

1. Marital status was recoded to reflect married (*married, living with a partner, and prefer not to answer),* as zeros and single (*single, never married, separated, divorced*) and coded as ones (findings before recoding were statistically significant, X^2 (6) = 15.910, p = .004, φ = .014, indicating the null hypothesis of no relationship can be rejected). Sixty-four percent of cells (9) had expected cell counts of < .05.
2. Income was divided into more than $25,000 (*less than $35,000; less than $50,000; less than $75,000; less than $100,000; and more than $100,000*), coded as zero and less than $25,000 (*less than $10,000; less than $15,000; and less than $25,000*) coded as one (findings before recoding were not significant X^2 (7) = 7.209, p = .293, φ = .420. Fifty percent of cells (11) had expected cell count < .05.
3. Insurance was separated by those that did not have Medicaid (*private, no insurance or another government insurance*) coded as zero and those that did have Medicaid coded as one (findings before recoding were not significant, X^2 (3) = 5.600, p = .132, φ = .127). Sixty-eight percent of cells (4) had expected cell counts < .05.

4. Spanish spoken at home was dummy coded where English was the reference and Spanish and Bilingual were each compared to the other two levels. Two new variables were produced of the variable with three levels. In each of these cases, English was coded one as was one of the other variables were coded zero (0), while the third level of Spanish or Bilingual was coded one (findings before recoding were not statistically significant, X^2 (2) = 2), p = .839, φ = .892). Sixteen percent of cells (1) had expected cell counts of < .05.

Because of the high percentage of expected cell counts that were less than 5, our data needed special consideration as to which test to use. The variables of interest were nominal by nominal and the sample size was small, Fisher's exact test, a nonparametric alternative to the chi square test, was chosen to test for an association between two categorical variables (Kim, 2017). Even though none of the cell counts in each of the 2 X 2 contingency tables was below 5 after the regrouping of categories, the small population sample would dictate the use of Fisher's exact test used especially for small-sized samples to ensure accurate results (Kim, 2017).

Results showed support for the first hypothesis that stated there was no association between the predictor variables and the dependent variable. The theoretical framework using Vygotsky's (1978) and Bronfenbrenner's (1979) developmental theories was supported, where culture and environment affect behavior as shown by the disparity of the results. Not all associations were statistically significant, which could be attributed to the small dataset (McHugh, 2013).

Marital status. Results from the Fisher's exact test, using the recoded variables, showed marital status was statistically significant, $p = .010$. Forty three percent of children from single mother homes were observed to be diagnosed with ADHD whereas 16.7% of children from the Other group were diagnosed with ADHD. Using Phi statistics, the strength of the relationship was $\varphi = .28$ indicating a weak to moderate association. The hypothesis was supported in that marital status is significantly related to an ADHD diagnosis, so, I rejected the null hypothesis.

Family income. Fisher's exact test was performed to assess the association between two levels of family income and an ADHD diagnosis. The analysis was performed on 98 participants. The results did not find a significant association between family income and an ADHD diagnosis ($p = .142$). However, it did show that children from families with income over $25,000 were less likely (13.0%) to be diagnosed with ADHD than those from homes with family income less than $25,000 (26.7%). The strength of the association, as indexed by Phi coefficient, was weak, $\varphi = .262$. These results show the disparity between those with income more than $25,000 and those with less than $25,000 and are supportive of the literature (Collins & Cleary, 2016), but the lack of a relationship leads me to accept the null hypothesis.

Insurance coverage. In order to test the hypothesis that insurance coverage, specifically Medicaid, was associated to an ADHD diagnosis, Fisher's exact test was used. Findings showed insurance coverage was marginally significant ($p = .055$), but Phi statistic indicated a weak association (.055). About 30% percent of children diagnosed with ADHD had Medicaid coverage whereas 9% with Other insurance coverage were

diagnosed with ADHD. Again, the null hypothesis stating that there was no association between the predictive variable and an ADHD diagnosis is accepted.

Gender. To investigate the association of gender and an ADHD diagnosis, Fisher's exact test was performed. Findings showed males were more likely to be diagnosed (38.0%) with ADHD than females (11.1%). Results were statistically significant (p = .002) but with little or no association to the ADHD diagnosis, φ = .002. The null was rejected, and the alternate hypothesis was accepted.

Spanish spoken at home. In order to test the hypothesis that there was no association with Spanish spoken at home and an ADHD diagnosis (Yes/No), a Phi exact test was performed. The relationship was found not to be significant for Spanish, p = .812 when compared to English and Phi statistics showed a strong relationship, φ = .812. It was also not significant for Bilingual children, p = 1.000, speaking both Spanish and English at home when compared to English alone.

Point-biserial correlation. Point-biserial correlation is a specific test for a dichotomous variable and a continuous variable testing for an association (SPSS Tutorials, 2018). For this study, age was analyzed using point-biserial correlation to see if a correlation was found. Findings from this assessment showed a negative, statistically significant correlation, r_{pb} = -.23, p = .023, indicating a that a younger child is more likely to be diagnosed with ADHD. Results suggested the null hypothesis be rejected and the alternate hypothesis be accepted.

Binary logistic regression. The null hypothesis was derived from the second research question that marital status, family income, insurance coverage, gender, age, and

Spanish spoken at home were predictive of an ADHD diagnosis (Laerd Statistics, Binomial, 2018). To answer this question and test the null hypothesis, binary logistic regression was used to analyze the data and estimate the probability of an ADHD diagnosis. Although the total number of surveys was $N = 105$, for this model, 83 selected cases were included in the analysis (79%) and 22 were considered missing cases (21.0%).

Even with the small sample size, the logistic regression model was overall statistically significant, $\chi^2(7) = 19.10$, $p = .008$ indicating a good fit. This was supported by the Hosmer-Lemeshow test $\chi^2(8, N = 105) = 8.80$, $p = .360$. However, results showed that only two variables (gender and age) of the seven were associated and predictive of an ADHD diagnosis. These two variables had a significant effect on the odds of observing the Yes category of an ADHD diagnosis and contributing to the model.

The regression coefficient for gender/male was significant, $B = -1.51$, $OR = .22$, 95% CI [.06, .77], $p = .02$ as was age, ($B = .56$, $OR = 1.75$, CI [.49, 6.25]). These predictive variables confirmed the statistical significance of the chi-square test of independence. However, marital status, which was considered significant in its association to ADHD using the Fisher's exact test (Mehta & Patel, 2013), did not prove predictive of an ADHD diagnosis. These results support previous findings that age, and gender contributed to the model (Collins & Cleary, 2016, Danielson et al., 2018). Results corroborated the theoretical framework that development is influenced by both culture and the environment.

Limitations of the Study

Results obtained were supportive of finding in other studies found with a few exceptions. Despite these positive results, the obvious limitations of this study need to be addressed. The most time-consuming limitation was getting to the data collection phase.

Before getting to the data collection stage, there were time constraints having to do with the vetting process (e.g. fingerprinting and background check), required approvals (e.g. from the principals, district, university IRB), the school calendar, testing, end of school, beginning of school, activities held by the school, and one school forgot to disseminate the surveys despite several communications during that two-week time period. The poor response rates necessitated having to extend the survey collection time for over seven weeks. The complete process took about six months.

Another limitation was the small participant pool (N = 105) and the use of a nonprobability sampling techniques (Etikan et al., 2016). The lack of diversity in the population and the small sample surveyed (98% and 91.8%; TEA, 2017-2018), did not impede the many supporting similarities that were found to previous research. Whereas the physical and economical improbability of taking the study elsewhere, prevented this from being an option to compare or generalize findings (Babbie, 2013). The results were mostly confirming of other research findings (Collins & Cleary, 2016, Donaldson et al., 2018) and can expand on the knowledge of this special community. Despite these supportive findings and the corroboration of the framework, this study cannot be generalized to other geographic areas.

Although findings were confirmed to be similar to previous studies and some assumptions could be reached from the results, generalizability to the population at large is not appropriate (Jackson, 2012). However, findings would be of interest to the stakeholders (parents at the elementary schools and administrators) that contributed to the study and could help acknowledge the need for change and support for this mental health disorder. Administering and collecting a larger sample through the use of the surveys would enhance the current knowledge.

Another limitation might have been the detailed survey that may have been too confusing or challenging for some parents. Even though the survey questions were from the NHIS questionnaire (CDC, NCHS, NHIS, Survey, 2016) and minimally revised (in English and Spanish) to make it accessible and as uncomplicated, concise, and complete as possible (Yan, 2016), this might have been too complicated as evidenced by the poor response rate.

Recommendations

ADHD is considered one of the most common neurodevelopmental childhood disorders and has continued to increase in prevalence (Collins & Cleary, 2016). It is also pervasive into adulthood (Zhu, Liu, Li, Wang, & Winterstein, 2017). Regrettably, despite all the research, there is still no definitive test to diagnose or treat ADHD with 100% certainty (CDC, ADHD, 2018). Therefore, continued efforts to define and alleviate the daily impairments caused by ADHD continue and would benefit all. Additionally, the knowledge gained from exploring ADHD symptomology and etiology of primary risk factor to determine how to diagnose and treat this disorder would be helpful to the most

recent victims of this disorder (Cheng & Goodman, 2015), 2 - 5-year-olds, that are now being diagnosed and even medicated (Danielson et al., 2018; Hauk, 2013).

The problem with trickling down the diagnosis to preschool children could be that this disorder mimics other problems like anxiety, depression, sleep problems, and some learning disabilities (CDC, ADHD, 2018). However, there is a lack of research and conclusive findings to make the determination (Cheng & Goodman, 2015). Hispanics have usually been found to be less likely to be diagnosed with ADHD, but the numbers are rising (Collins & Cleary, 2016).

Besides being the fastest growing minority, it could be a result of Hispanics being younger; 61% under the age of 35 (Lopez, Krogstad, & Flores, 2018). Some of the growth due to birthrates of 72.1 births per 1,000 Hispanic women ages 15 to 44 in 2014 (Stepler & Lopez, 2016). Hispanics accounted for half of the population growth from 2000 to 2016 (Flores, 2017). In 1980 the Hispanic population was 6.5% and by 2015, it had grown to 17.6% (Flores, 2017). The numbers continue to rise at an average rate of about 2.8% (Stepler & Lopez, 2016).

Another reason, as per the United States Office of Minority Health (2019), could be that Hispanics are less likely to seek or receive help, but more likely to be in need of it. This should be sufficient cause for steps to be taken to rectify existing deficits and to prevent additional disparities now being experienced (U.S. Census Bureau, 2018). Unfortunately, the majority of the disparities in this community cannot be solved by the current study, but it is a steppingstone in the right direction to prepare children in this community for a better future.

Additional studies, with a larger sample representative of this community should be undertaken (Etikan et al., 2016). Independent studies should be performed to find primary factors that may be predictive of an ADHD diagnosis (Collins & Cleary, 2016). Many of the current studies take their datasets from the nation databases (Collins & Cleary, 2016; Danielson et al., 2018), meta-analysis from previous research (Polanczyk. 2014), or large medical or insurance archived data (Cohen et al., 2017; Nyarko et al., 2017; Siegel et al., 2016). That type of research usually does not include a proportional sample of Hispanics and would not be a good generalization for an area such as this with its distinct Hispanic population. Aside from independent studies, it would be in the best interest of the community, parents, children, and the school districts, who have the best access to parents, to be involved in the process of studying the ADHD population to help decrease the disparities of mental health in this community.

Previous researchers on Hispanics and ADHD have proposed continued exploration of these topics because they, too, have found disparity among this very fast-growing Hispanic population (Cheng & Goodman; 2015; Collins & Cleary, 2016; Willcutt, 2012). ADHD and ethnicity are surveyed yearly by the NHIS, but results are not reported for communities smaller than the state. Researchers still have not reached any conclusions on the prevalence or causes of ADHD, and there is still no definitive test to diagnose it nor has a gold standard for the treatment of ADHD been defined, although there are guidelines set by the American Academy of Pediatrics (Hauk, 2013). Medication usage has increased, and children being prescribed are getting younger (Danielson et al., 2016).

Despite the abundance of literature about ADHD, the inability to accurately generalize those findings to this area, because of the uniqueness of its population and this geographic location (U.S. Census Bureau, 2018), make it necessary to produce some local research. The almost 92% Hispanic population and distinctive culture in this area would contribute to the expansion of knowledge of Hispanics in general but especially for this community. Surveying parents about ADHD and related factors locally and in other similar communities, could lead to taking steps to better recognize the symptoms of this disorder helping decrease misdiagnosis (CDC, ADHD, 2018).

Some minor improvements to the survey in the form of more spacing to improve the likelihood of getting the survey completed (see Appendices D and E). Reaching a greater number of potential participants could improve the response rate. This could be accomplished by having the survey filled out when a child is registered, or sending a previous notice, or perhaps advertising the study on the school marquee might improve response rates. Additionally, a more hands on approach in the dispersion of the packets and an incentive to return them might help get the surveys completed.

Also, because of the Hispanic population growth in other parts of the United States, research in this area might be generalizable to those areas in the future. Confidence, provided by continued investigations of this disorder, ensure findings help identify ADHD and not mistakenly misdiagnose one of the disorders mentioned above that mimic ADHD symptomology. The recommendation is to continue to strive for the most current knowledge of the disorder involving all stakeholders with a vested interest

and provide access to the most current, relevant, and statistically significant findings on this disorder.

To help improve the usefulness of any future research executed in this community, some improvements need to be made to the current methodology and survey. It would be helpful to have a good contact, someone interested in the outcome, communication, and with the administration where the study is to be administered. Improvement of access to the participants and perhaps the administration

Implications

This study's descriptive and predictive results confirmed and contradicted some previously published research studies (Jackson,2012). The elusiveness of etiology and best practices treatment for ADHD (Hauk, 2013), beseechs further investigations to get answers (CDC, ADHD, 2018). Knowledge gathered in the form of investigations and experiments to fill gaps in the literature and to answer questions (Rickards, 2012) will magnify positive social change and make a positive difference on those that are touched by this disorder.

Some changes could be in the form of awareness (Morgan et al., 2014). The study's findings and its subsequent presentation will bring awareness to parents, teachers, and administrators within the schools surveyed and other communities by making these findings available or by presenting at small groups or conferences. It will also inform the children who are affected by ADHD. Bringing awareness will help that school community to be informed, plan for interventions, provide services to its population, and maybe make policy changes if necessary (Lee, 2018).

One policy change that could come from the school might be that of allowing students to attend recommended weekly therapy sessions for counseling when the child is diagnosed with ADHD (CDC, ADHD, 2018). Not being allowed to take a child to recommended therapies seems to be a problem encountered by parent who try to pick up their child for a scheduled counseling session (Office manager, personal communication, February 12, 2019). This would result in a more successful treatment approach with better communication between all parties involved in treating children diagnosed with this disorder instead of relying solely on medication.

A special ADHD day would not only bring awareness and improve communication but would get more people involved that could help with planning strategies and intervention planning. Another change could be in the form of a grant to have outside therapists come in to evaluate students suspected of having ADHD or other behavioral issues (TEA, 2019). Identification and treatment are forms of interventions (Lopez, 2016; Nyarko, 2016). If put in place, results from these interventions would continue to produce positive social change.

The similarities of the sample to the district population could make this a study that could be of use to the district from where the sample was obtained. Disseminating the results and providing administrators, teachers, parents, and students notes or pamphlets with information would create an informed community. This could be done once or twice a year and they could dedicate one day to the special treatment of ADHD information dissemination producing positive social change.

All these positive social changes that could come about might be small, but could also help the families, communities, and federal government expenses decrease the yearly cost of this disorder estimated to range, nationally, from $38 to $72 billion annually (CDC, Health Equity, 2013). This cost includes parent's missing work (or getting fired) because they had to take care of issues at school. It might also decrease the need for medication, which would save money and improve economic status for the family the school (the child would not be absent) and the community (Doshi, 2012). Helping make these changes would improve the impact of the environment and culture on everyone involved. It would have to be a community effort (even if it is just the school community).

Conclusion

ADHD is a chronic impairing disorder usually diagnosed in childhood but can persist into adulthood. Sever impairment may occur in social, relational, emotional, academic, and professional settings (ADHD Institute, 2017). Despite voluminous amounts of research, there are no more than guidelines for the identification, diagnosis, and treatment of ADHD (Hauk, 2013). Hispanics have consistently been found to be less likely to be diagnosed with ADHD (Pastor et al., 2015). The high prevalence rate of Hispanics and other disparities (United States Census Bureau, 2018) makes this a perfect geographic location for working with Hispanics, which is the fastest growing minority (Colby & Ortman, 2015).

The survey was disseminated at two elementary schools where the population sample was very similar to the district population in demographics and psychosocial

factors (United States Census Bureau, QuickFacts, 2018; TEA, 2017-2018). The finding that gender and age were statistically significant was expected, but the high prevalence rates were only hypothesized. What was most interesting was the severity of the disparity of single mothers (29%), income of less than $25,000 (77%), Medicaid coverage (78%), and Spanish as the language spoken at home (57%). These findings are all more prevalent in this community (United States Census Bureau, 2018).

This investigation provided the opportunity to observe and acknowledge the dire situation of this community. It allowed the opportunity to compare and contrast this study to others from the literature review. These findings helped to see how this area compared to other studies and geographic areas, even if generalization was not possible.

Additionally, it provided the opportunity to find differences when compared to other studies, especially those that were very similar in variables being studied (Collins & Cleary, 2016; Danielson, 2018). It was found that this study was sometimes supportive of previous research confirming their findings (Collins and Cleary, 2016; Danielson et al., 2018), while others were not (Siegel et al., 2016). A meta-analysis of 134 studies by Polanczyk et al., 2014) found differences observed in ADHD prevalence rates could be because of methodology and characteristics of the studies.

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Appendix A: Select County ACS Characteristics

	A County in, Texas			
Subject	Estimate	Margin of Error	Percent	Percent Margin of Error
Total population	839,539	****	839,539	(x)
White	746,211	+/-4,495	88.9%	+/-0.5
Hispanic	770,794	****	91.8%	****
Spanish at home	631,638	+/-3,045	83.2%	+/-0.4
Median household income	$40,925	+/-$898	(x)	(x)
Per capita income	$15,883	+/-$288	(x)	(x)
Persons per household	3.57	+/-0.02	(x)	(x)
Families < $25,000	60,875	(x)	31.9%	(x)
Persons in poverty with kids <18	(x)	(x)	57.0%	+/-2.0
Public insurance	310,379	+/-4,533	37.3%	+/-0.5
Single female/ kids < 18 years	29,413	+/-1,115	21.8%	+/-0.6

Note. Adapted from "2013-2017 American Community Survey 5-year Estimate," by U.S. Census Bureau, n.d. (https://www.census.gov/programs-surveys/acs/). In the public domain.

Appendix B: Select Texas ACS Characteristics

Subject	Texas			
	Estimate	Margin of Error	Percent	Percent Margin of Error
Total population	27,419,612	****	27,419,612	(x)
White	20,459,525	+/-21,474	74.6%	+/-0.1
Hispanic	10,673,909	+/-191	38.9%	+/-0.1
Spanish at home	7,498,255	+/-21,869	29.5%	+/-0.1
Median household income	67,344	+/-280	(x)	(x)
Per capita income	28,985	+/-95	(x)	(x)
Persons per household	2.84	+/-0.01	(x)	(x)
Families < $25,000	1,022,506	(x)	15.6%	(x)
Persons in poverty with kids <18	(x)	(x)	39.9%	+/-0.4
Public insurance	7,710,086	+/-22,504	37.3%	+/-0.5
Single female/ kids < 18 years	758,736	+/-6,914	8.0%	+/-0.1

Note. Adapted from "2013-2017 American Community Survey 5-Year Estimate," by U.S. Census Bureau, n.d. (https://www.census.gov/programs-surveys/acs/). In the public domain.

Appendix C: Select National ACS Characteristics

Subject	United States			
	Estimate	Margin of Error	Percent	Percent Margin of Error
Total population	321,004,407	****	321,004,407	(x)
White	234,370,202	+/-57,873	73.0%	+/-0.1
Hispanic	56,510,571	+/-1,543	17.6%	+/-0.1
Spanish at home	39,769,281	+/-111,096	13.2%	+/-0.1
Median household Income	70,850	+/-215	(x)	(x)
Per capita income	31,177	+/-87	(x)	(x)
Persons per household	2.63	+/-0.01	(x)	(x)
Families < $25,000	11,031,520	(x)	14.1%	(x)
Persons in poverty with kids <18	(x)	(x)	38.7%	+/-0.1
Public insurance	106,925,261	+/-251,038	33.8%	+/-0.1
Single female/ kids < 18 years	8,090,431	+/-25,377	6.8%	+/-0.1

Note. Adapted from "2013-2017 American Community Survey 5-Year Estimate," by U.S. Census Bureau, n.d. (https://www.census.gov/programs-surveys/acs/). In the public domain.

Appendix D: Child and Family Information (in English)

CHILD AND FAMILY INFORMATION

CHILD'S: _____Male _____Female

Age_____ Grade Level _____

RACE: _____American Indian or Alaskan Native _____Asian or Pacific Islander
_____White _____Black (African American) Other _____

ETHNICITY: _____ Hispanic Origin _____ Non-Hispanic Origin

LANGUAGE SPOKEN AT HOME: _____ English _____ Spanish
_____ Bilingual (both English and Spanish)

HAS A DOCTOR or health professional ever told you that *this* child had Attention Deficit Hyperactivity Disorder (ADHD) or Attention Deficit Disorder (ADD)?

_____ Yes _____ No _____ Don't Know

If Yes, who referred your child?

____ Pediatrician ____ Family Doctor _____ Psychologist
_____ Teacher Other _____

At what age did you first notice ***this*** child's symptoms?

____ 4 – 6 years ____ 7 – 9 years ____ 10 – 12 years

At what age was ***this*** child referred? ____years Grade _____

Does ***this*** child have other diagnosis?

_____ Disruptive Behavior Disorder _____ Oppositional Defiant Disorder (ODD)
_____ Conduct Disorder (CD) _____ Pervasive Developmental Disorder (PDD)
_____ Autistic Disorder _____ Depression/Mood disorder
_____ Anxiety Other _____

Does ***this*** child take prescription medications for ADHD? ____Y ____N

INSURANCE COVERAGE: What kind of health insurance coverage does ***this*** child have?

_____ Private Health insurance _____ Medicaid
_____ No Insurance _____ Other Government or state program

What is your relationship to ***this*** child?

_____ Parent (biological, adoptive, or step)
_____ Grandparent (Maternal, Paternal) _____ Other relative
_____ Legal guardian _____ Foster Parent
_____ No Relationship

Do you have legal custody of ***this*** child? _____ Yes _____ No

What is your spouse's (husband; wife; significant other) relationship to ***this*** child?

_____ Parent (biological, adoptive, or step)
_____ Grandparent (Maternal, Paternal) _____ Other relative
_____ Legal guardian _____ Foster Parent
_____ No Relationship

FATHER: How old was the father when ***this*** child was born. _____ Years

Education:

_____Middle School or Less _____Some high school _____GED
_____High School Graduate _____Some College
_____Associate Degree _____Bachelor's Degree ____Master's Degree
_____Doctorate Other_____

RACE: _____American Indian or Alaskan Native _____Asian or Pacific Islander
_____White _____Black (African American) Other _____

ETHNICITY: _____Hispanic Origin _____Non-Hispanic Origin

LANGUAGE SPOKEN AT HOME: _____ English _____ Spanish
_____ Bilingual (Both English and Spanish)

MARITAL status: _____ Single _____ Married _____ Widowed
_____ Divorced _____ Separated _____ Never Married
_____ Living with a Partner _____ Prefer not to Answer

How many children live with you? _____biological _____stepchildren
_____grandchildren

EMPLOYMENT STATUS: _____Employed _____Unemployed
_____Self Employed

MOTHER: How old was the mother when ***this*** child was born. _____ years

Education:

_____Middle School or Less _____Some high school _____GED
_____High School Graduate _____Some College
_____Associate Degree _____Bachelor's Degree ____Master's Degree
_____Doctorate Other_____

RACE: _____American Indian or Alaskan Native _____Asian or Pacific Islander
_____White _____Black (African American) Other _____

ETHNICITY: _____Hispanic Origin _____Non-Hispanic Origin

LANGUAGE SPOKEN AT HOME: _____ English _____ Spanish
_____ Bilingual (Both English and Spanish)

MARITAL status: _____ Single _____ Married _____ Widowed
_____ Divorced _____ Separated _____ Never Married
_____ Living with a Partner _____ Prefer not to Answer

How many children live with you? _____biological _____stepchildren
_____grandchildren

EMPLOYMENT STATUS: _____Employed _____Unemployed
_____Self Employed

FAMILY'S Estimated Combined Annual Income (all sources): _____

_____ Less than $10,000 _____ $10,001 to $15,000
_____ $15,001 $25,000 _____ $25,001 $35,000
_____ $35,001 $50,000 _____ $50,001 $75,000
_____ $75,001 $100,000 _____ More than $100,000

What other children live in the home? If you need more lines, please us the back of this page.

Gender	Age	Relationship to the child	Diagnosed with ADHD

What other adults live in the home? If you need more lines, please us the back of this page.

Gender	Age	Relationship to the child	Diagnosed with ADHD

Appendix E: Child and Family Information (in Spanish)

INFORMACION DEL NINO Y LA FAMILIA

EL NINO/A Masculino _____ Femenina _____
Edad _____ Nivel Escolar _____

RAZA: ____ India (americana) o Nativo de Alaska
____ asiática o Isleño del Pacifico _____ Blanca
_____ Negra/Africano Americano Otra _____

ETNICIDAD _____ De Origen Hispano _____ De Origen No-Hispano

IDIOMA QUE SE HABLA EN EL HOGAR: _____ Ingles _____ español
_____Bilingüe (inglés e español)

¿LE HA DICHO ALGUNA VEZ UN MEDICO u otro profesional de la salud que *este* niño/a tiene un Trastorno Hiperactivo de falta de atención (ADHD) o Trastorno por falta de atención (ADD)?

_____ Si _____ No _____ No Se

¿Si respondió Si, quién refirió a ***este/a*** niño/a?

_____Pediatra _____Doctor Familiar ____Psicólogo/a
_____Maestro/a Otro_____

¿A qué edad se dio cuenta se los síntomas por primera vez?
_____ 4 – 6 Años _____ 7 – 9 Años _____ 10 – 12 Años

¿A qué edad fue referido ***este*** niño/a? _____Años Grado _____

Ha sido diagnosticado ***este/a*** niño/a con otras diagnosis

_____Trastorno de Comportamiento Destructivo

_____Trastorno Desafiante Oposicional (ODD)

_____Trastorno de Comportamiento (CD);

_____Trastorno Generalizado del Desarrollo (PDD)

_____Trastorno del espectro autista (ASD_

_____Depresión/Trastorno del Estado de Animo

_____Ansiedad Otro_____¿

Toma medicamento ***este/a*** niño/a para ADHD? _____ Si _____ No

CUBERTURA DE SEGUROS: ¿Qué tipo de seguro de salud tiene ***este/a*** niño/a?

_____ Seguro Privado _____ Medicaid
_____ No tiene seguro _____ Otro tipo de seguro del gobierno

¿Cuál es su parentesco con ***este/a*** niño/a?

_____ Padre o Madre (Biológico(a), adoptivo(a), padrastro o madrastra)
_____ Abuelo(a) Maternal o Paternal _____ Otro Pariente
_____ Guardián Legal _____ Guardián Temporal (Foster)
_____ Sin parentesco alguno

¿Tiene usted custodia legal de ***este/a*** niño/a? _____ Si _____ No

¿Cuál es el parentesco de su pareja (esposo/a, compañero/a) con ***este/a*** niño?

_____ Padre o Madre (Biológico(a), adoptivo(a), padrastro o madrastra)
_____ Abuelo(a) Maternal o Paternal _____ Otro Pariente
_____ Guardián Legal _____ Guardián Temporal (Foster)
_____ Sin parentesco alguno

PADRE: Edad del padre cuando nació ***este/a*** niño/a. _____ Años

Educación:

_____ Secundaria o menos _____Menos de Preparatoria (High School)
_____Equivalente a Graduado de la preparatoria _____Graduado de la preparatoria
_____Universidad sin graduar _____Certificado _____Licenciatura
_____Maestría _____Doctorado Otro_____

RAZA: ____ India (americana) o Nativo de Alaska _____ asiática o Isleño del Pacifico
_____ Blanca _____ Negra/Africano Americano Otra _____

ETNICIDAD: _____ De Origen Hispano _____ De Origen No-Hispano

IDIOMA QUE SE HABLA EN EL HOGAR: _____ Ingles _____ español
_____Bilingüe (inglés e español)

ESTADO MATRIMONIAL: _____Soltero/a _____ Casado _____ Viudo
_____ Divorciado _____ Separado _____ Nunca Casado
_____ Vive en unión libre _____ Prefiero no contestar

¿Cuántos niños/as viven con usted? _____biológicos _____ hijastro/a
_____nietos

ESTADO de EMPLEO: _____ Empleado _____ Desempleado
_____Trabaja por cuenta propia

MADRE: Edad de la madre cuando nació ***este*** niño/a _____Años

Educación:

_____Secundaria o menos _____Menos de Preparatoria (High School)
_____Equivalente a Graduado de la preparatoria _____Graduado de la preparatoria
_____Universidad sin graduar _____Certificado _____Licenciatura
_____Maestría _____Doctorado Otro_____

RAZA: _____ India (americana) o Nativo de Alaska _____ asiática o Isleño del Pacifico
_____Blanca ____ Negra/Africano Americano Otra _____

ETNICIDAD: _____ De Origen Hispano _____ De Origen No-Hispano

IDIOMA QUE SE HABLA EN EL HOGAR: _____ Ingles _____ español
_____Bilingüe (inglés e español)

ESTADO MATRIMONIAL: _____Soltero/a _____ Casado _____ Viudo
_____ Divorciado _____ Separado _____ Nunca Casado
_____ Vive en unión libre _____ Prefiero no contestar

¿Cuántos niños/as viven con usted? _____biológicos _____ hijastro/a
_____nietos _____ Otros

ESTADO de EMPLEO: _____ Empleado _____ Desempleado
_____Trabaja por cuenta propia

Ingreso Anual de la familia (de todos los medios): _____

_____ Menos de	$10,000	_____ $10,001	$15,000
_____ $15,001	$25,000	_____ $25,001	$35,000
_____ $35,001	$50,000	_____ $50,001	$75,000
_____ $75,001	$100,000	_____ Mas de	$100,000

¿Qué otros niños/as viven en el hogar? Si necesita más líneas, por favor use el reverso de esta hoja.

Genero M o F	**Edad**	**Relación a usted**	**Diagnosticado con ADHD Use: Si, No, o No Se**

¿Qué otros adultos viven en el hogar? Si necesita más líneas, por favor use el reverso de esta hoja.

Genero	**Edad**	**Relación a usted**	**Diagnosticado con ADHD Use: Si, No, o No Se**

¡SU INFORMACION ES CONFIDENCIAL! GRACIAS POR PARTICIPAR.

Appendix F: 2019 Poverty Guidelines

The U.S. Department of Health and Human Services' 2019 poverty guidelines are presented in the following table.

Persons in family/household	Poverty guideline
1	$12,490
2	$16,910
3	$21,330
4	$25,750
5	$30,170
6	$34,590
7	$39.010
8	$43.430

Note. For families/households with more than 8 persons, add $4,420 for each additional person.

Appendix G: Reminder About Survey Completion

FRIENDLY REMINDER - ADHD SURVEY.

If after reading the Consent Form you agree to participate,

please fill out the 10-minute survey and return in the stamped envelope.

It was sent in a big manila envelope.

RECORDATORIO AMIGABLE – ENCUESTA de ADHD

Si después de leer el Formulario de Consentimiento, decide participar,

por favor llene la encuesta de 10 minutos y regrésela en el sobre sellado.

Se le mando en un sobre manila grande.