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Teachers' Perceptions of Autism Spectrum Disorder: An Analysis of the Relationship Among Teachers' Knowledge, Exposure, and Attitudes

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Philadelphia College of Osteopathic Medicine

Department of Psychology

TEACHERS' PERCEPTIONS OF AUTISM SPECTRUM DISORDER:
AN ANALYSIS OF THE RELATIONSHIP AMONG TEACHERS' KNOWLEDGE,
EXPOSURE, AND ATTITUDES

Nicole Jones

Submitted in Partial Fulfillment of the Requirements for the Degree of

Doctor of Psychology

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**PHILADELPHIA COLLEGE OF OSTEOPATHIC MEDICINE
DEPARTMENT OF PSYCHOLOGY**

Dissertation Approval

This is to certify that the thesis presented to us by Nicole L. Jones EdS, NCSP
on the 26 day of May, 2015, in partial fulfillment of the
requirements for the degree of Doctor of Psychology, has been examined and is
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Abstract

This study explored teachers' knowledge of the causes, characteristics, assessment, and treatments of autism spectrum disorder. This study also examined teachers' experiences and perceptions of the causality of the disorder. Research questions included whether special-education teachers possessed more accurate knowledge of the disorder and if experience (professional and/or personal) with autism led to more internal causes of autism spectrum disorder. One hundred seventy-two educators who self-identified as a general educator, special educator, paraprofessional, or academic specialist completed a 24-question survey pertaining to the topic. Results showed that, although special educators scored significantly higher on their knowledge questions as compared to the other three roles, general scores were low in terms of the participants' knowledge about the disorder. In terms of causality, no relationship was found between experience, training level, and perception of causality of autism spectrum disorder. School psychologists and other related service providers should consider collaborating to create a professional development and training for staff in their schools to address the lack of knowledge and help aid in the understanding of characteristics and interventions.

Keywords: autism spectrum disorder, teachers, education

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Chapter 1

Introduction

Autism spectrum disorder (ASD) has become a controversial topic as a result of confused media coverage and a lack of complete understanding of the disorder. Owing to the vast ability to increase knowledge of ASD through different media sources, many Americans rely on television programs, newspaper and magazine stories, and the Internet to gain knowledge on different topics. Even teachers' qualifications and certification programs have been examined in terms of how little information about the topic is given in actual training (Scheuermann, Webber, Boutot, & Goodwin, 2003). Unfortunately, what is addressed in terms of ASD is not always accurate, and Americans are basing their knowledge of ASD on what they hear (Holton, Wberling, Clarke, & Smith, 2012). The educators who have direct contact with children affected with the disorder may have been trained in ASD, may have gained some of their knowledge through media coverage, or may have gone a step further and researched topics of interest or necessity. Limited research has been conducted in the area of teachers' general knowledge of ASDs, which usually includes characteristics, causes, assessment, and treatment.

The basic characteristics of autism should, but may not, be understood by all educators within the schools. The American Psychiatric Association (APA) has recently updated the characteristics of ASD in the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; DSM 5; 2013) to include (a) social interaction and communication and (b) restricted, repetitive patterns of behaviors, interests, or activities. Within the school, school psychologists have been trained in the new information, but the training may or

may not have reached classroom teachers. If a teacher is working with a child or children with autism, he or she may not have the knowledge that is needed to intervene with such children. The level of knowledge that the teachers have must be determined in order to assist them in understanding and assisting their students.

Levels of knowledge should also be assessed in terms of the perceptions of cause. The specific etiology of autism is unknown, but research has indicated that it is a combination of both genetic and environmental causes. However, some individuals tend to believe that the environment, including vaccinations and religion, has the greatest influence (Gerber & Offit, 2008; Goin-Kochel & Myers, 2005; Landrigan, Lambertini, & Birnbaum, 2012; Nataf et al., 2006). A survey completed in the United States alone reported that most parents believed vaccines to be the number-one cause of autism, followed by genetics (Harrington et al., 2006). Conversely, many parents across the world (North America, Europe, Asia, and Australia) reported that they believed the most common cause of autism is genetics, followed by vaccines (Goin-Kochel & Myers, 2005). People outside of the United States, specifically in Puerto Rico and India, believe in supernatural causes or even “punishment” resulting from sins of the mother (Ravindran & Myers, 2011). The research tends to show that the vaccine belief is prominent in the United States and is less accepted elsewhere. One should note that all participants in the studies are, in fact, parents of a child with autism.

The research that has been completed in terms of the knowledge of autism lacks much in terms of demographic background and beliefs. It usually focuses on parents or different ethnicities, as noted prior (Goin-Kochel & Myers, 2005; Harrington, et al.,

2006; Mercer et al., 2006; Ravindran & Myers, 2011; Russell & Norwich, 2012; Samadi & McConkey, 2013; Shyu et al., 2010; Sipes, Furniss, Matson, & Hattier, 2011; Voelkel, LeCroy, Williams, & Holschuh, 2013). However, many people other than parents come into contact with autism. Children aged 5 to 18 years spend about 40 hours a week in school, approximately 25% of their weekly time or 36% of their “awake” time (Hofferth & Sandberg, 2000). The children have constant contact during this time with their teachers, peers, aides, and school administration. The media and other coverage may gear information toward parents, but information should also be shared with the educators of their children. No research within the United States has been found in which researchers have determined teachers’ perceptions of the causes of ASD. Studies have investigated teachers’ levels of knowledge, levels of stress, and levels of training (Hendricks, 2011; Scheuermann et al., 2003).

Studies have not been completed in terms of educators’ knowledge and perceptions of autism in the United States. Some studies have been completed in terms of understanding the amount of education that educators receive (Hart & Malian, 2013). Countries other than the United States (i.e., Greece and Iran) have studied the topic (Syriopoulou-Delli, Cassimos, Tripsianis, & Polychronopoulou, 2012; Zarafshan, Mohammad, Ahmadi, & Arsalani, 2013), but no research has been conducted in the United States based on teachers’ direct knowledge and understanding of autism. More information is needed in terms of American teachers’ perceptions about autism.

Statement of the Problem

Although many studies in the research have looked at parents' perceptions and knowledge of ASD, no studies in the United States have investigated the perceptions of teachers and other educators. Teachers spend much time with children and are required to have the training and information necessary to help children progress. Busby, Ingram, Bowron, Oliver, and Lyons (2012) interviewed 31 teachers currently enrolled in training classes to determine their needs when working with children on the spectrum. The teachers reported five concerns: their level of training; their lack of collaboration with the school team; their training on dealing with "disruptive" behavior; their extensive individual education plan (IEP) procedures; and the lack of knowledge held by the general-education teachers. A way to decrease these concerns, and thus to increase performance, would be a needs assessment to determine teachers' knowledge about the disorder and, therefore, the type of training needed.

ASD certainly has been increasing in prevalence, and educators will continue to see an increased number of students with ASD in the classroom. As of 2011, approximately 5.7 million American children were eligible for special-education services, with 7% of those children having a diagnosis of ASD (Institute of Disability, 2013). The autism diagnosis, itself, has increased from 1 in 150 children (2000) to 1 in 68 children (Centers for Disease Control [CDC], 2010). Is all of the research that has been proposed and supported throughout the autism community available for educators to help increase their knowledge and expertise in working with children on the spectrum?

Current Study

The focus of this study includes teachers who may or may not have experience with autism. The purpose of the present study is to examine differences in awareness of, exposures to, and perceptions of causality of autism. It examines the levels and sources of awareness of the characteristics, assessment, causes, and treatments of autism. It also investigates the level of exposure the sample population has to autism, as well as their general perceptions of the causes of the disorder.

The study was quantitative in nature and included a researcher-created survey for the participants to complete. No names or identifying information was collected. After the data were collected, statistical tests were run to compare groups' knowledge, experience, and perceptions.

The present study sought to answer the following questions:

- (1) Do teachers have accurate, factual information related to autism?

The hypothesis that was tested included that staff within special-education classrooms have more accurate, factual information based on their training and experience compared to staff within general-education classrooms.

However, it was also hypothesized that educators required more education about the characteristics, causes, assessment, and treatment of autism.

- (2) Does exposure to autism affect causal attribution?

The hypothesis that was tested included that teachers who personally know someone with autism or have worked with someone with autism attributed more internal than environmental causes of autism as a result of

coming in close contact with those affected, understanding them, and taking an interest in learning more about ASD.

Chapter 2

Literature Review

What Is Autism Spectrum Disorder?

Clinical Definition

Researchers have suggested that the characteristics of autism spectrum disorder (ASD) have long existed but were not necessarily always known as that expression. The term *autism* did not enter the world of clinical diagnoses until 1980 in the third edition of the American Psychiatric Association (APA)'s *Diagnostic and Statistical Manual of Mental Disorders (DSM-III; 1980)*. The concept of *infantile autism*, which could be applied to children under the age of 30 months, was introduced at this time and included a lack of response toward people, deficits in language development, and bizarre environmental responses. Another additional disorder, *childhood onset pervasive developmental disorder*, could have been applied to children older than the age of 30 months with clear social impairment and at least three more symptoms, including anxiety, inappropriate affect, resistance to change, odd motor movement, abnormalities of speech, hyper/hyposensitivity to sensory stimuli, and self-mutilation.

The triad of characteristics known as autism today did not emerge until 1987, in the revision of the *DSM-III*. *Autistic disorder* included difficulties in (a) reciprocal social interaction, (b) verbal and nonverbal communication and imaginative activity, and (c) restricted repertoire of activities and interests (APA, 1987). The term *pervasive developmental disorder, not otherwise specified (PDD-NOS)* was used when a child had

poor social interaction and communication, but did not meet criteria for an autistic disorder.

The *DSM-IV* and *DSM-IV-TR* added much more information about autism and the spectrum of disorders similar to it (APA, 1994; APA, 2000). They presented the continued use of the triad of difficulties: (a) social interaction, (b) communication, and (c) restricted, repetitive, and stereotyped patterns of behaviors, interests, and activities. An additional diagnosis, called Asperger's Disorder, was among a new category in which children had impairments in social interaction and restricted, repetitive, and stereotyped patterns of behaviors, interests, and activities but did not have difficulties in communication and language. Both of these disorders were filtered under the general term of *Pervasive Developmental Disorders* (APA, 1994; APA, 2000). PDD-NOS was still used as a diagnosis when a child did not meet the full criteria of autism.

Although autistic disorder was known as a triad of difficulties, some researchers found support for just a dyad. Shuster, Perry, Bebko, and Toplak (2014) performed a meta-analysis in which they compared 36 factor analysis studies. A majority of the studies used individuals who had a variety of diagnoses, including autism, Asperger's disorder, and PDD-NOS. All studies used one of three scales to determine the characteristics: the Autism Diagnostic Interview-Revised (ADI-R), Autism Diagnostic Observation Schedule (ADOS), or the Social Communication Questionnaire (SCQ). Three different factor analyses were used among the studies: principal component analysis, exploratory factor analysis, or confirmatory factor analysis. Eight studies tested the triad of *DSM-IV* characteristics, and only two found support for the model. The other

six found a high level of overlap between the first and second characteristics (social interaction and communication).

Now that the two criteria were paired as one, a question developed as to where certain behaviors should lie. When the triad was collapsed into a dyad of social/communication and restricted and repetitive behaviors and interests (RRBI), two groups emerged. The main overlap between the two groups was stereotyped speech and to which difficulty it related. The first group had stereotyped speech included in the social/communication piece, and only one of five studies found support for this model. However, when the stereotyped speech was included in the RRBI piece, three of four studies found support (Shuster et al., 2014).

The results of this meta-analysis showed a number of implications for the diagnosis of autism. First, social interaction and communication were highly collinear and had a large overlap, thus emerging as one factor versus two as shown in the *DSM-III-R* (1987), *DSM-IV* (1994), and *DSM-IV-TR* (2000). Next, the RRBI factor could be viewed as separate from the other two and found more support when the stereotyped speech was included. Further analysis of RRBI showed that a sensorimotor factor and a resistance to change factor were also involved. Both of these characteristics had previously been categorized under *childhood onset pervasive developmental disorder* in the *DSM-III* (1980).

This information was utilized when the *DSM-5* was published in 2013. This version collapsed the first two previously stated difficulties into one: social communication and social interaction. The second characteristic remained the same

(restricted, repetitive patterns of behaviors, interests, or activities). Another change introduced in the *DSM-5* was the collapse of all autism-related disorders from previous versions (i.e., early infantile autism, childhood autism, Kanner's autism, high-functioning autism, atypical autism, Asperger's disorder, pervasive developmental disorder, and childhood disintegrative disorder) into one broad-based *autism spectrum disorder* and could be found under the further umbrella term of *neurodevelopmental disorders*. Asperger's disorder and PDD-NOS no longer stood alone. To differentiate the level of autism, three specifiers were added: (a) requiring very substantial support, (b) requiring substantial support, and (c) requiring support.

When a child has a clinical diagnosis of autism, he or she is able to receive a number of services in the home based on the severity. The child's school team must also perform an evaluation to determine the child's needs for school services. The two concepts overlap but are still very different.

Educational Definition

Every child is given the opportunity to have a free and appropriate education through federal laws. In 1975, the Education for All Handicapped Children Act (EHA; also known as Public Law 94-142) was written into law to provide special education services and to define the following children as "handicapped" and, thus, recipients of following services: "mentally retarded, hard of hearing, deaf, speech impaired, visually handicapped, seriously emotionally disturbed, crippled, or other health impaired children" (Congress of the U.S., p. 2). The term *autism* was not included, but the lack of

this was not a surprise being that the *DSM* did not include autism as a mental disorder until 1980. In 1990, the EHA was amended and renamed the Individuals with Disabilities Education Act (IDEA). The amendment was completed for multiple reasons, but one of the main goals was to add traumatic brain injury and autism to the list of disabilities eligible for services. However, the amendment noted that autism previously was classified as “other health impaired” (Library of Congress, 1991). According to Dahle (2003), the IDEA defines autism as follows:

A developmental disability significantly affecting verbal and nonverbal communication and social interaction, generally evident before age 3, which adversely affects a child’s educational performance. Other characteristics often associated with autism are engagement in repetitive activities and stereotyped movements, resistance to environmental change or change in daily routines, and unusual responses to sensory experiences (p. 240).

Comparison of Both Definitions

The assessment of both types of autism is independent of each other (see the next section). For now, Table 1 provides a comparison of the characteristics noted in the *DSM-5* and IDEA. The reader will see how each area is covered by both sources.

Table 1

Comparison of Clinical and Educational Definitions of Autism

Characteristics	CLINICAL: <i>DSM-5</i>	EDUCATIONAL: IDEA
Social interaction	“Deficits in developing, maintaining, and understanding relationships; Deficits in social-emotional reciprocity”	“Significantly affects social interaction”
Social communication	“Deficits in nonverbal communicative behaviors used for social interaction; Deficits in social-emotional reciprocity”	“Significantly affects verbal and nonverbal communication”
RRBI: General	“Stereotyped or repetitive motor movements; Highly restricted, fixated interests that are abnormal in intensity or focus”	“Engagement in repetitive activities and stereotyped movements”
RRBI: Resistance to change	“Insistence on sameness, inflexible adherence to routines, or ritualized patterns of behavior”	“Resistance to environmental change or change in daily routines”
RRBI: Sensory responses	“Hyper or hypo reactivity to sensory input or unusual interest in sensory aspects of the environment”	“Unusual responses to sensory experiences”

Note. *DSM-5* = *Diagnostic and Statistical Manual of Mental Disorders, 5th edition*; IDEA = Individuals with Disabilities Education Act; RRBI = restricted and repetitive behaviors and interests

Current Prevalence Rates

The prevalence of autism has increased over the past decade. When the *DSM-5* was published, the APA reported that the frequencies have approached 1% of the population (APA, 2013). More recently, the Centers for Disease Control and Prevention (CDC, 2014) reported that one in 68 children has been identified as having a spectrum disorder, which is about 14.7 per 1,000. To put this statistic into perspective, when the CDC began collecting data in 2000, one in 150 children had been diagnosed, which is about 6.7 per 1,000. Throughout the years, autism has continued to be a disorder that affects male individuals more frequently than female individuals. A recent report stated that male individuals are five times more likely than female individuals to have the diagnosis (CDC, 2014).

All groups of people are affected, regardless of culture. Studies performed within 2010 until 2014 showed rates of 26.4 (per 1,000) in South Korea, 11.3 in the United States, 6.9 in Denmark, 5.1 in Australia, 2.9 in Taiwan, and 0.1 in Oman (CDC, 2014). Samadi, Mahmoodizadeh, and McConkey (2011) reported a rate of 0.6 in Iran. In 2006, Baird et al. (as cited in Sipes et al., 2011) reported a rate of 11.6 in the United Kingdom.

Despite the difference in rates across the world, medical tests have shown a new light on possible causes of autism, which is not culture specific. The severity of the characteristics may be affected by culture, but the same factors are appearing as common causes across the world.

Causes and Risk Factors

People have different opinions regarding the causes of autism and the characteristics that appear at different times. Researchers have noted that there are two different types of autism depending on when the characteristics first begin (Goin-Kochel & Myers, 2005). The first type was coined *congenital* and means that the child had the signs from birth as a result of a neurological impairment. The second type, called *regressive*, began making an appearance in the 1950s. In this type, the child appeared to typically develop, but started showing concerns and regression in behaviors after a couple of years. Harper and Williams in 1975 (as cited in Goin-Kochel et al., 2005) and DeLong in 1999 (as cited in Goin-Kochel et al., 2005) reported that the children who developed the regressive type seemed to have had a vulnerability to developing these characteristics based on the environmental factors involved but lacked the neurological impairment. The regression seemed to be most common between the ages of 30 to 38 months.

Heredity and Genetics

One possible cause of autism seems to be genetics. Genes are passed down from person to person and does not rely on environmental factors in order to become apparent. Landrigan et al. (2012) reported both heredity and environmental factors as possible causes. Some studies have identified chromosomes that are related to autism, while others have identified certain gene mutations. These authors reported that not one single factor, but a combination of many factors, accounts for autism occurring genetically. Very recently, Napoli, Wong, Hertz-Picciotto, and Giulivi (2014) performed a study in which they found associated mitochondrial deficiencies in children with autism. Cells of those

children in comparison to cells of children without the deficiencies were slower to respond to infections and slower to repair any damage that viruses created. Consequently, the child's brain neurons were not being restored as quickly as they should have been. The lack of restoration has a direct effect on the severity of the child's characteristics. Certain risk factors may affect the chances of a child having symptoms of autism, aside from prenatal exposure to the items described in the next section. The APA (2013) reported that studies have shown a 37 to 90% chance of a relative having the disorder.

Environmental Toxins.

If autism were purely genetic or hereditary, twin studies would show a 100% chance of siblings having the disorder. They do not. Therefore, something else outside of the body has an impact. In terms of environmental factors, a number of toxins have been identified as having a negative effect on a child's brain during development (Landrigan et al., 2012). Some of these toxins include first-trimester medications like thalidomide, misoprostol, and valproic acid. Thalidomide is an immunomodulator used for skin disease; misoprostol prevents gastric ulcers; and valproic acid is an anticonvulsant, mood stabilizer, and antimigraine agent (Schull, 2006). Numerous studies have found that autism also has been linked to maternal exposure to the organophosphate insecticides chlorpyrifos and phthalates (used in plastic). Some other toxins that have been tied to detrimental brain development include lead, methylmercury, polychlorinated biphenyls, pesticides, endocrine disruptors, automotive exhaust, polycyclic aromatic hydrocarbons, flame retardants, and perfluorinated compounds (Landrigan et al., 2012). Nataf et al. (2006) reported higher-than-average levels of urinary porphyrin (a byproduct of

environmental toxicity) in children with autism as compared to children with allergies, attention deficit hyperactivity disorder (ADHD), cerebral palsy, epilepsy, hyperactivity, mental retardation, and psychomotor retardation, and children in the control group.

Vaccinations.

Vaccines are a “hot topic” when discussing causes of autism. Gerber and Offit (2009) performed a meta-analysis in which they researched articles that compared (a) children with autism who received the measles-mumps-rubella (MMR) vaccines versus controls and (b) children with and without autism who received vaccines with and without mercury. Thirteen studies performed across the United Kingdom, United States, Canada, Finland, and Denmark showed no association between MMR and autism. To further investigate vaccines and specifically look at the mercury intake, which is not included in MMR, seven studies were performed across the same countries and also found no association. Uno, Uchiyama, Kurosawa, Aleksic, and Ozaki (2012) also found no relation between MMR and autism in children in Asia. Gallagher and Goodman (2010) tested the same idea with the hepatitis B vaccine, but found that boys who received the vaccine within the first month of life were three times more likely than boys who did not receive the vaccine within the first month of life to get diagnosed with autism later in life. More research should be completed in this area to test for further results.

Autism seems to be caused by a number of factors, including genetics and environmental toxins. Much research is still being performed to look for specific causes of the disorder. Because autism seems to be affected by many factors, a specific cause

may never be found. However, knowing some of the causes can still assist obstetricians in helping their pregnant patients provide a healthy womb for their child.

Assessment

The assessment of autism can take place in both private settings and the public school system by a number of individuals. Evaluations can be completed by psychiatrists (who use *DSM-5* criteria), private-setting psychologists (who use *DSM-5* criteria), school teams (which use IDEA criteria), pediatricians, and neurologists. The school team usually consists of the child's teacher, school psychologist, speech and language therapist, occupational therapist, and physical therapist, depending on the need of the child. Those who use *DSM-5* criteria can make a *diagnosis* of autism, whereas those who use IDEA criteria report whether or not the child is *eligible* for special education under the educational disability of autism. Children are not diagnosed by IDEA (Aspy & Grossman, 2007).

Although the terminology of the result may be different, the assessment is typically the same. Information from a variety of areas is assessed to determine a profile of strengths and needs. An evaluation should include a developmental history and interview obtained from the parent/guardian; observations of the child; and formal assessments in social skills, communication, sensory needs, social-emotional skills, cognitive abilities, and adaptive behavior (Aspy & Grossman, 2007).

The evaluator should choose instruments for the actual evaluation based on the child's overall level of functioning. A number of cognitive assessments can be used for early development (e.g., Bayley Scales of Infant Toddler Development, Wechsler

Preschool and Primary Scales of Intelligence [WPPSI-IV], Stanford Binet Intelligence Scales for Children [SB5]), early and middle childhood (e.g., Wechsler Intelligence Scales for Children [WISC-V], Woodcock Johnson Tests of Cognitive Abilities, Third Edition [WJ-III], Kaufman Assessment Battery for Children [KABC-II]), and adolescence/adulthood (Wechsler Adult Intelligence Scale [WAIS-IV], Kaufman Adolescent and Adult Intelligence Test). A number of neuropsychological assessments also can be used (e.g., Developmental Neuropsychological Assessment [NEPSY-II], Delis Kaplan Executive Function System [DKEFS]). Speech assessments should investigate the use of receptive language, expressive language, and pragmatic/social language and can include the following: Clinical Evaluation of Language Fundamentals, Comprehensive Assessment of Spoken Language, and Peabody Picture Vocabulary Test (Saulnier & Ventola, 2012).

Behavioral observations are important while assessing for a spectrum disorder because cognitive and speech assessments do not cover all aspects of the characteristics of autism. Atypical behaviors can be assessed using the Behavior Assessment Scale for Children, Child Behavior Checklist, or Conners. The school team may also conduct a functional behavioral assessment to determine the triggers and frequency of behaviors. Adaptive behaviors can be assessed through the Vineland Adaptive Behavior Scales, Adaptive Behavior Assessment System, and Scales of Independent Behavior. Rating scales used specifically for autism spectrum disorders include the Social Communication Questionnaire (SRQ), Childhood Autism Rating Scale Second Edition (CARS-II),

Gilliam Autism Rating Scale (GARS), Autism Behavior Checklist, and Autism Spectrum Rating Scales (Saulnier & Ventola, 2012).

Once an assessment is completed and the child's learning profile, adaptive skills, behavior, and autism characteristics have been determined, the parents may choose to go a step further. However, before the next step is taken, the child must receive a comprehensive evaluation that includes all of the information just mentioned, as doing so will not only give a clear picture of the child, but also allow for practitioners to pinpoint the exact areas that need to be improved.

Treatment

A number of different treatments could assist children with autism. However, one should keep in mind that not all of the following are available to all children based on their financial resources, community resources, and level of severity.

Early Intervention

Infants and toddlers who have a diagnosis of autism can be eligible for early intervention services from birth until three years old depending on the state in which the child is receiving services. The eligible child can partake in different services, such as speech and language therapy, occupational therapy, and physical therapy. Although much information points to early intervention as the best approach, Camarata (2014) completed a meta-analysis and found no such data to support this conclusion. He reported that early intervention is believed to be a great service offered to children, but he is skeptical of the studies that have been put forth to support that belief. He outlined the numerous flaws in the design methods across studies. Koegel, Koegel, Ashbaugh, and Bradshaw (2014)

rebutted Camarata's article, however. They reported that before the most recent comprehensive intervention programs became available, outcomes were bleak for children with autism. Early intervention programs offer a variety of sources that allow the child to grow in many areas. The authors found numerous studies that supported a number of interventions, including parent education and interventions to increase social skills, communication, and academics. Many articles also stress that intervention at its earliest point in time is the most beneficial.

Diet

Gluten and casein are both proteins broken down by the body, but different people have different reactions to them. Pennesi and Klein (2012) performed a study in the United States in which they surveyed 387 parents of children with autism on their opinions of the gluten-free/casein-free (GFCF) diet. In this particular study, the outcomes were positive for children whose diets were free of both gluten and casein. These children had a decrease in problematic behaviors compared to other children with the same diagnosis whose diets were free of either gluten or casein. Within the GFCF group, those children who went off the diet more than twice did not see as many behavioral improvements as did the children who went off the diet two or fewer times. The greatest number of behavioral improvements was found in children who remained on the diet for 6 months or more. Other improvements were found for children who had previous gastrointestinal difficulties and allergies.

The relationship between diet and autism continues to be well known and has been considered by countries other than the United States, as well. Winburn et al. (2014)

performed a similar study in the United Kingdom with 258 parents, but they also included 244 healthcare professionals. Most parents reported that they were using multiple interventions with their child, including diet restriction (not necessarily the GFCF diet). Many parents reported using dietary supplements and a diet, like the GFCF, together. As in the United States study, this study also showed improvements across many areas when the GFCF diet was in place for their child. Doctors and parents both reported needing more information about the GFCF diet, but they felt positively about it.

Medication

Although not typically on the top of the list for most parents, medication is still a treatment option for children. Leskovec, Rowles, and Findling (2008) reported that about one third of children with autism take a psychotropic medication. However, the medication is rarely used for a primary characteristic of autism. Parents generally look into medication when ADHD symptoms, irritability, aggression, obsessions/compulsions, and social dysfunction are evident. Methylphenidate and atomoxetine (used with hyperactivity) were found to be less effective for children with autism, but positive results were found for tricyclic antidepressants, venlafaxine, clonidine, guanfacine, donepezil, and galantamine. Parents are cautioned against antipsychotics (although they decrease aggressive behaviors) because of their side effects. Antidepressants, such as selective serotonin reuptake inhibitors can be used for children's repetitive behaviors, such as their obsessions and compulsions.

Applied Behavior Analysis

Treatments not involving food restrictions or medications seem to be considered first by parents. Foxx (2008) summarized the uses of applied behavior analysis (ABA) with children with autism. He reported that ABA has been effective for numerous reasons, including all people with autism receive ABA in some form, ABA for children with autism has been used for more than 30 years old, and the National Institute of Mental Health has been supporting research on ABA for 40 years. Foxx cautioned against combining different ABA models to form a program because the person choosing the components may not choose the best models and the models often do not correlate with each other. ABA includes many factors, such as intensive work, one-on-one or small group instruction, focus on spontaneous skills, reinforcement, teaching children in trials, and providing assessments for teachers and other professionals.

What Occurs When a Person Has Experience with ASD?

When people are exposed to something, they gain knowledge. However, exposure can come in many forms. In 2007, Collins and Evans (as cited in Milton, 2014) wrote a book in which they defined the meaning of an expert on a topic. They reported that expertise in any area could be directly related to the amount of knowledge obtained. However, they suggested that there are two different types of knowledge: “ubiquitous” and “specialist.” Ubiquitous is the type of knowledge one gains from simply reading about or being familiar with a topic. People use their skills and abilities to gain this type of knowledge through readings, classes, trainings, books, and journals. This knowledge is available to anybody who is interested. Specialist, on the other hand, requires people to

immerse themselves in the topic in which they are interested. This level of expert would relate to people who work with autism directly (e.g., parents, teachers, therapists). Specialist experts can then contribute to this body of knowledge themselves but are limited because they must have a community in which to be involved. This type of knowledge is not available to just anybody. Through this study, the researcher feels as if, when relating this information about autism, those who work specifically with the community will have the most knowledge about its characteristics, causes, assessment, and treatment.

Some researchers have studied the aspect of knowledge related to exposure, but the research is sparse. Voelkel et al. (2013) reported that almost 90% of their Hispanic sample stated that they knew something about autism, but only 57% personally knew someone affected. Participants who were less acculturated knew fewer people with the diagnosis compared to the participants who were highly acculturated. Ling, Mak, and Cheng (2010) performed a study in which they surveyed 123 workers in Hong Kong schools to determine the staff's knowledge, training, experience, and emotions related to autism. The level of special-education training and the duration of time spent with children with autism were not found to be significantly related to the person's knowledge. When investigating the staff's special-education background, the authors found that the participants who had the training believed that autism was less controllable, had more sympathy for the students, preferred to help the child, had less anger, and punished the child less compared to the participants who did not have special-education training. Participants who felt more anger were significantly less likely to help the child.

These two brief articles seem to suggest that when people have more information about a topic available to them, they become more familiar with that topic. People who know someone with autism may or may not have that information available for them to learn.

What is Teachers' Understanding of Autism Spectrum Disorder?

Knowledge

In terms of knowledge provided by training, a survey was completed for special education teachers who served children with autism within the state of Virginia (Hendricks, 2011). Self-reported knowledge of individualization, behavior, communication, sensory motor skills, social skills, and overall combined total of all factors were measured within the low-to-intermediate range. The highest area was knowledge of symptoms, while the lowest was knowledge of intervention strategies. Bin Lian et al. (2008) administered a survey to 503 teachers in Singapore to determine their level of knowledge. They found that the more time teachers spent obtaining their degree, the higher their score became. The authors described the scores for autism as “disappointing, demonstrating significant educational deficits in our frontline educators” (p. 191).

Scheuermann et al. (2003) took this idea a step further and investigated the problems that surround teachers' training in regards to autism. They made the point that the requirements for obtaining special-education licensure are different from state to

state. Also, because of the lack of special-education teachers, other teachers without the proper training are being hired to fill their places.

If training is not superb and teachers are being hired into spots that are not related to their specialty, knowledge of the disorder is going to plateau. However, as noted, teachers could gain knowledge through working directly with children who have been diagnosed with the disorder.

Experience

Hendricks's (2011) survey results show that special-education teachers who serve students with autism in Virginia come to the classroom with many areas of specialty and experience with students whose severity of autism varied widely. Most teachers taught their students in a self-contained classroom, but others remained in the general-education setting. Bin et al. (2008) found that only 82% of their sample had received formal training in autism.

Chapter 3

Methodology

The purpose of this study was to examine teachers' awareness of, exposure to, and perceptions of causality in relation to autism spectrum disorder (ASD). A correlational, quantitative study using a survey and between-subject design was utilized. The main focus was to determine the level of awareness, professional or personal experience with ASD, and perceptions of causality that staff members currently had in order to create professional development opportunities.

Participants

Survey respondents included 223 voluntary classroom staff members from across the United States who identified themselves as a general-education teacher, special-education teacher, academic specialist, or another classroom staff member. More than half of the surveys were electronically completed ($n = 177$; 79%), which was the only format available. The investigator sorted through the 46 partially completed responses and included the participants who were (a) missing *fewer than* three answers *and* (b) identified themselves with a specific role. Of these 46, four complete-survey respondents were added to the total. Of these 46, 63% ($n = 29$) skipped the last two pages of the questionnaire, while 26% ($n = 11$) skipped only one of the pages. One participant skipped only one question, but identified him or herself as an administrator and, therefore, was not eligible for the study based on profession.

Of the participants, 153 (85%) identified themselves as one of the four roles, whereas 28 (15%) identified themselves as "other." The investigator explored the "other"

titles given by those participants and excluded nine of them, which included administration, social worker, and related service provider. Therefore, the final sample number was 172, which is 77% of the population who opened the survey.

The survey was shared with educators in Maryland, New Jersey, Ohio, Pennsylvania, and Virginia. Neither place of employment nor residence was a question on the survey; therefore, whether or not other states were utilized is unclear.

Procedures

A letter of introduction was sent to the students in the school psychology program at Philadelphia College of Osteopathic Medicine. They were asked to provide the letter to their building principals (Appendix A). The letter included the purpose of the study, which was to explore teachers' knowledge and perceptions of autism. The letter also stated that no identifying information would be collected. The principals were asked to contact the investigator if they were interested in having their school staff participate in the study. Three principals contacted the investigator and informed her that they would need to gain consent from higher administration, which could take up to 6 months' time. No other principals contacted the investigator. A teacher introduction letter was also drafted to send to the teachers who were participating (Appendix B).

Next, the investigator created a virtual event via social media and invited all of the educators she knew outside of her place of employment, which included 44 teachers and school psychologists. The purpose of the study, duration of the study, anonymity, and survey link were provided in the event, and the school psychologists were sent the letter of introduction for their principals. The survey was opened on March 18, 2015. This

event, which was opened from March 18 to April 6, gained 33 responses. Six noneducators then shared the survey with friends in education, garnering more than 100 more responses. Participants contacted the psychologist to pass along the link to educators outside of the social media community. The survey was closed on April 15, 2015.

Measures

An online survey was created on Survey Monkey. It consisted of 24 questions that required the majority of staff no more than 30 minutes to respond. A small validity study ($n = 3$) was completed prior to the administration of the survey, and participants were asked for feedback on the questions. All three participants reported that the questions were logically ordered, easy to understand, and easy to answer. No drawbacks were noted. The confidentiality notice of Survey Monkey is located in Appendix C.

The title of the survey was “Teachers' Perceptions of Autism Spectrum Disorder: An Analysis of the Relationship Among Teachers' Knowledge, Exposure, and Attitudes” and included three parts: SECTION A – Demographics; SECTION B – Factual Information; and SECTION C – Exposure and Attitudes.

Section A included nine questions. It consisted of demographic data regarding highest level of education, age, primary role in the school, time spent in that self-identified role, experience as a classroom teacher, original training topics as they pertained to autism, continued professional development as it pertained to autism, whether the participants had obtained information about autism on their own, and from where this information had been collected.

Section B included nine questions. It consisted of the teachers' factual knowledge of the prevalence, symptoms, causes, types, assessments, and treatments of autism.

Section C included six questions related to the teachers' exposure and attitudes toward autism. Two questions asked about the teachers' exposure to autism at work and in their personal lives. The next two questions asked about the teachers' attitudes toward the cause of autism and if the symptoms were controllable. Finally, the last two questions required the teachers to rate (a) the interventions that they felt were most important to least important and (b) the beliefs that they felt were most similar to least similar to their own. The survey can be found in Appendix D.

Chapter 4

Results

Data were analyzed to determine educators' levels of training, experience with autism, factual knowledge of autism, and causal attributes. Survey respondents included 223 educators, but 82 results were eliminated because they were incomplete. Nine more were eliminated because the respondent indicated an incorrect role for this study. This study consisted of 172 educators who self-identified as a special educator, general educator, paraprofessional, or academic specialist. Nineteen of these educators reported "other" as their role in the school and listed their specific title. Thirteen of these responses were coded as General Education, one was coded as Special Education, five were coded as Academic Specialist, and 0 were coded as Paraprofessional/Aide. The total sample size broken down by role can be found in Table 1.

Based on other coded responses, each respondent was given a total score for three areas:

- *Total training* score, which took into consideration the following questions:
 - (6) When you went through your original training to become a teacher or educator, were you provided with a class on autism?;
 - (7) Through continued professional development, have you received specific trainings on the diagnosis and nature of autism?; and
 - (8) Have you read or studied about autism with the hopes of gaining more understanding outside of work and trainings?

- Items were coded as 0 if the answer was *no* and 1 if the answer was *yes*.
The scores ranged from 0 (*no training*) to 3 (*all three types of training*).
- *Total knowledge* score, which took into consideration the following questions:
 - (10) Which of the following is true about the current rate of autism in the past 10 years?;
 - (11) Which of the following is also true about the current rate of autism?;
 - (12) Which of the following characteristics are included in the definition of autism according to the *DSM-5*?;
 - (13) Which of the following have been linked to causing autism?;
 - (14) The literature supports two types of autism categorized by its onset. True or False?;
 - (15) What is the most commonly used cognitive assessment for children with autism?;
 - (16) Which of the following screening tools do pediatricians commonly use?;
 - (17) Which of the following have been supported by research to have a positive effect for children with autism?; and
 - (18) ABA has been proved to be a helpful intervention tool for children with autism. What does the acronym represent?
 - Items were coded as 0 if the answer was incorrect and 1 if the answer was correct. The scores could range from 0 to 33.
- *Total exposure* score, which took into consideration the following questions:

- (19) Have you worked with or taught at least one person who has been diagnosed with autism? and
- (20) Do you personally know someone with autism outside of the school?
- Scores ranged from 0 (*no exposure in either work or home*) to 2 (*exposure in BOTH work and home*).

Demographic Characteristics

Table 2 provides a summary of the demographic characteristics of the survey participants.

Table 2

Characteristics of the Respondents

Demographic	Frequency	Percent
Degrees ($n = 172$)		
No degree	5	2.9
College	53	30.8
Above college	114	66.3
Age ($n = 172$)		
18-28 years	37	21.5
29-39 years	63	36.6
40-50 years	50	29.1
51-61 years	18	10.5
62-72 years	4	2.3
Primary role ($n = 172$)		
General education teacher	101	58.7
Special education teacher	46	26.7
Academic specialist	13	7.6
Paraprofessional/Aide	12	7.0
Time spent in role ($n = 171$)		
Under a year	8	4.7
1-5 years	44	25.7
6-10 years	44	25.7
11-15 years	32	18.7
16+ years	43	25.2
Teacher status ($n = 157$) ^a		
Current teacher	115	73.2
Past teacher	29	18.5
Never a teacher	13	8.3

^a 15 educators skipped this question.

Training Experiences of the Respondents

Table 3 provides a summary of the training information gathered from respondents. In terms of original training in education, 98 respondents (57.0%) reported some kind of class or course in autism, while 74 respondents (43.0%) reported no training. Through continued professional development for their current job, 95 respondents (55.6%) received a specific training on autism, while 76 respondents (44.4%) did not. Of the respondents, 153 (89.0%) took it upon themselves to gain more information on autism to better educate themselves, while 19 respondents (11.0%) did not. Most respondents who reported they had gained information on their own time used research articles or journals (81.7%), while others read newspaper or magazine articles (67.5%), watched educational television shows (49.1%), took a class independent from work (38.5%), watched a news program on television (30.2%), and/or obtained a certificate in an area related to autism (12.4%). Fifteen respondents (8.9%) did not reply because they did not report gaining knowledge on their own.

Table 3

Training Experiences of the Respondents

Experience	Frequency	Percent
Original training ($n = 172$)		
Received class in autism	98	57.0
Did not receive class in autism	53	43.0
Continued professional development ($n = 172$)		
Received autism training	95	55.6
Did not receive autism training	76	44.4
Personal development ($n = 172$)		
Researched autism on own	153	89.0
Did not research autism on own	19	11.0
Source of information ($n = 169$)		
Obtained a certificate in autism	21	12.4
Took class outside of work	65	38.5
Read journals or research	138	81.7
Watched educational TV	83	49.1
Watched news program on TV	51	30.2
N/A (said no to Question 8)	15	8.9

Factual Information of the Respondents About Autism

Table 4 provides a summary of the responses to the questions aimed toward the factual knowledge of autism, which has been included in the research.

Current Rates

In terms of current rates, 99 respondents (57.6%) reported that they believed the rate of autism has increased by 25% in the past 10 years, while 60 respondents (34.9%) believed that the rate has increased by 50% and 13 respondents (7.6%) believed that it has stayed the same. For the rate in relationship to gender, almost the entire sample believed that autism affects boys more than girls. Of the respondents, 112 (65.1%) believed that boys are affected 5 times more than girls, while 54 respondents (31.4%) believed that boys are affected twice as often as girls. Four respondents (2.3%) believed that the rates between boys and girls are the same.

Characteristics/Symptoms

In terms of the characteristics, 156 respondents (91.2%) reported delays and deficits in social language and a preference for routine and sameness. Of the respondents, 144 (84.2%) reported a poor understanding of social situations, while 132 respondents (77.2%) reported repetition of motor movements or speech. The remaining beliefs included 78 respondents (45.6%) reporting a significantly higher personal skill, 48 respondents (28.1%) reporting negative behaviors, and 13 respondents (7.6%) reporting a lower-than-average intelligence.

Causes

In terms of the causes, gene mutations (49.7%) were found to be the most common belief, followed by vaccines (48.9%), chromosomes (48.3%), medications given to mother during pregnancy (39.6%), pesticides (24.8%), food dyes (24.2%), lead and premature birth (both 19.5%), gluten (17.5%), methylmercury (15.4%), antibiotics (14.1%), allergies (9.4%), parenting styles (4.7%), and surgeries (2.0%). Eighty respondents (46.5%) believed that there are two types of autism based on the onset of symptoms, whereas 92 respondents (53.5%) did not.

Assessment

The respondents rated the Differential Abilities Scale, Second Edition (DAS-II) as the most commonly used cognitive assessment tool (25.6%), followed by the Kaufman Assessment Battery for Children, Second Edition (KABC-II; 23.1%), the Woodcock Johnson Tests of Cognitive Abilities, Third Edition (WJ-III; 21.3%), the Wechsler Scales (WPPSI-IV and WISC-V; 19.4%), and the Stanford Binet Intelligence Scales for Children, Fifth Edition (SB5; 10.6%). In terms of the instrument pediatricians use the most, 52 respondents reported that they use the Childhood Autism Rating Scale, Second Edition (CARS-II; 31.7%), followed by the Autism Behavior Checklist (23.3%), and the Checklist for Autism in Toddlers/Modified Checklist or the Social Responsiveness Scale (both 22.6%).

Treatments

In terms of treatments, 160 respondents (93.6%) believed that some kind of therapy (e.g., behavioral, speech) helped the symptoms, followed by early intervention

before the age of 3 years (91.2%), special education (50.3%), changing diets (43.7%), medication (13.5%), and day care (5.3%). Most of the respondents (87.2%) knew that ABA stood for applied behavior analysis, while 12.8% did not.

Table 4

Factual Information of the Respondents

Factual information	Frequency	Percent
Current rate ($n = 172$)		
Decreased by 10%	0	0
Decreased by 25%	0	0
Stayed the same	13	7.6
Increased by 25%	99	57.6
Increased by 50%	60	34.9
Current rate: Gender ($n = 172$)		
Boys 5x more likely than girls	112	65.1
Boys 2x more likely than girls	54	31.4
Boys and girls are equal	4	2.3
Girls 2x more likely than boys	1	0.6
Girls 5x more likely than boys	1	0.6
Characteristics ($n = 171$)		
Significant personal skill	78	45.6
Delays/deficits in social language	156	91.2
Low intelligence	13	7.6
Negative behavior	48	28.1
Poor understanding of social interaction	144	84.2
Preference for routine	156	91.2
Repetition	132	77.2

Causes ($n = 149$)

Allergies	14	9.4
Antibiotics	21	14.1
Chromosomes	72	48.3
Food dyes	36	24.2
Gene mutations	74	49.7
Gluten	26	17.5
Lead	29	19.5
Medications given to mother	59	39.6
Methylmercury	23	15.4
Parenting styles	7	4.7
Pesticides	37	24.8
Premature birth	29	19.5
Surgeries	3	2.0
Vaccines	73	48.9

There are two types of autism ($n = 172$)

True	80	46.5
False	92	53.5

Common cognitive test ($n = 160$)

DAS-II	41	25.6
KABC-II	37	23.1
SB5	17	10.6
Wechsler Scales	31	19.4
WJ-III	34	21.3

Common pediatrician test ($n = 164$)

Autism Behavior Checklist	38	23.2
CHAT or M-CHAT	37	22.6
CARS-II	52	31.7
SRS	37	22.6

Treatment ($n = 171$)		
Changing diets	73	43.7
Day care	9	5.3
Early intervention	156	91.2
Medication	23	13.5
Therapy	160	93.6
Special education	86	50.3
ABA acronym ($n = 164$)		
Correct	143	87.2
Incorrect	21	12.8

Note. DAS-II = Differential Ability Scales Second Edition. KABC-II = Kaufman Assessment Battery for Children Second Edition. SB5 = Stanford Binet Intelligence Tests for Children Fifth Edition. WJ-III = Woodcock Johnson Tests of Cognitive Abilities Third Edition. CHAT = Checklist for Autism in Toddlers. MCHAT = Modified Checklist for Autism in Toddlers. SRS = Social Responsiveness Scale. ABA = Applied behavior analysis.

Experience

Table 5 provides a summary of the responses to the questions aimed at whether the respondents knew someone with autism through work or in their personal lives.

Work

Of the respondents, 165 (95.9%) had worked with a student diagnosed with autism, while 4.1% had not.

Personal

Of the respondents, 130 (76.0%) knew someone personally with autism, while 41 respondents (24.0%) did not. Of the 130 respondents who knew someone, 87 (50.1%) reported that they had a friend whose child or family member had autism, while 30

respondents (17.5%) reported that someone in their direct family had autism and 9 respondents (5.3%) reported that their child had autism. Ten respondents (5.9%) reported that a friend had autism, 11 respondents (6.4%) reported that a neighbor had autism, and 32 respondents (18.7%) reported that they knew someone with autism who was not explained by one of the previously named relationships.

Table 5

Experience with Autism of the Respondents

Experience	Frequency	Percent
Work experience ($n = 172$)		
Worked with child with autism	165	95.9
Did not work with child with autism	7	4.1
Personal experience ($n = 171$)		
Did not know someone personally	41	24.0
Child had autism	9	5.3
Family member had autism	30	17.5
Friend had autism	10	5.9
Friend's child or family had autism	87	50.9
Neighbor had autism	11	6.4
Another person had autism	32	18.7

Causal Attributions of Autism

Table 6 provides a summary of the responses to the questions aimed toward the causal attributions that the respondents felt best described their perception of autism.

Most of the sample (104 respondents; 61.2%) reported that genetics is the main cause of autism. Forty-four respondents (25.9%) believed that solely genetics cause autism, while 60 respondents (35.3%) believed that genetics accounts for 75% of the diagnosis and 25% is attributed to the environment. Forty-eight respondents (28.4%) believed that genetics and environment cause autism equally. Seventeen respondents (10.0%) believed that the environment accounts for 75% of the diagnosis and 25% is attributed to genetics, while one person (0.6%) believed that autism is 100% attributed to the environment.

In terms of controllability of symptoms, most respondents (116; 68.2%) believed that children with autism can control at least *some* of their symptoms, while eight respondents (4.7%) believed that the children can control *most* of their symptoms, and one respondent (0.6%) believed that the children can control *all* of their symptoms. Thirty-three respondents (19.4%) believed that the children cannot control *any* of their symptoms. Twelve respondents (7.1%) did not know which way to respond to the question.

Table 6

Causal Attributions of Autism of the Respondents

Causal attribution	Frequency	Percent
Environment versus genetics ($n = 171$)		
100% caused by genetics	44	25.9
75% caused by genetics; 25% caused by environment	60	35.3
50% caused by genetics; 50% caused by environment	48	28.2
25% caused by genetics; 75% caused by environment	17	10.0
100% caused by environment	1	0.6
Controllability of symptoms ($n = 170$)		
Child can control ALL symptoms	1	0.6
Child can control MOST symptoms	8	4.7
Child can control SOME symptoms	116	68.2
No control over symptoms	33	19.4
Don't know	12	7.1

Table 7 provides a summary of the interventions the respondents felt are most important when working with a child with autism. The respondents were asked to rate the importance of interventions from 1 *most important* to 9 *least important*. Respondents felt as if sensory activities ($M = 2.95$) and therapy ($M = 2.96$) were most important, followed by praise/reinforcement ($M = 3.22$) and small-group lessons ($M = 3.71$). The least important interventions included not getting vaccinations ($M = 7.74$), followed by

ignoring the behavior ($M = 6.78$), time outs ($M = 6.64$), medication ($M = 5.96$), and changing diets ($M = 5.05$). Although the mean ($M = 7.74$) demonstrates that not getting vaccinations is the least important intervention, the standard deviation ($SD = 2.21$) shows that it had the most variability when rated by respondents.

Table 7

Mean and Standard Deviation for Important Interventions When Working with Autism According to Respondents (n = 168)

Intervention	Mean	Standard Deviation
Sensory activities	2.95	1.74
Therapy (speech, behavioral, etc.)	2.96	2.17
Praise and reinforcement	3.22	1.78
Small group lessons	3.71	1.66
Diet	5.05	2.00
Medication	5.96	1.76
Time outs	6.64	1.68
Ignoring the behavior	6.78	2.07
Not getting vaccinations	7.74	2.21

Table 8 provides a summary of the beliefs the respondents felt are most similar to their own when working with a child with autism. The respondents were asked to rate the beliefs from 1 *most similar to their own* to 6 *least similar*. The beliefs the respondents thought were most similar to their own included, “I think I could help lessen the triggers to these behaviors” ($M = 2.01$), “I think the environment could be changed to lessen the behaviors” ($M = 2.23$), and “I think the child needs increased counseling and help from

experts” ($M = 2.87$). The beliefs the respondents thought were least similar to their own included, “I think the child intentionally creates problems” ($M = 5.37$), “I think the child is fully responsible for his or her own behaviors” ($M = 4.93$), and “I think the child is set off by the smallest things” ($M = 3.59$). There was not much variance among the respondents, but the item with the highest variance was “I think the environment could be changed to lessen the behaviors” ($SD = 1.32$).

Table 8

Mean and Standard Deviation for Beliefs When Working with Autism According to Respondents ($n = 167$)

Beliefs	Mean	Standard Deviation
I think I could help lessen the triggers to these behaviors	2.01	1.08
I think the environment could be changed to lessen the behaviors	2.23	1.32
I think the child needs increased counseling and help from experts	2.87	1.22
I think the child is set off by the smallest things	3.59	1.09
I think the child is fully responsible for his or her own behavior	4.93	1.03
I think the child intentionally creates problems	5.37	1.07

Research Question 1

Do teachers have accurate, factual information related to autism based on training and experience with autism?

The data presented for all three areas (knowledge, training, and exposure) were a mixture of continuous (knowledge, where score mattered) and categorical (where numbers stood for a specific category). Once scores were obtained for the knowledge variable, scores were then categorized into groups: low knowledge, medium-low knowledge, medium-high knowledge, and high knowledge. The category cutoffs were set within the standard deviations. Table 9 shows how the groups were created.

Table 9

Group Breakdown of Knowledge Scores (n = 172)

Group	Cut off	Scores	Frequency
(1) Low knowledge	2+ S.D. below the mean	15 – 18 points	18
(2) Medium-low knowledge	1 S.D. below the mean	19 – 21 points	70
(3) Medium-high knowledge	1 S.D. above the mean	22 – 24 points	66
(4) High knowledge	2+ S.D. above the mean	25 - 28 points	18

A chi-square test was conducted to determine if training was related to knowledge and if experience was related to knowledge. The data for the chi square tests are outlined in Tables 10 and 11.

Table 10

Frequency Distribution and Relative Frequencies of Level of Training in Relation to the Amount of Knowledge

Training	Low knowledge		Medium-low knowledge		Medium-high knowledge		High knowledge	
	<i>N</i>	(%)	<i>N</i>	(%)	<i>N</i>	(%)	<i>N</i>	(%)
No training	0	0.0	3	4.3	3	4.5	0	0.0
Self, school, or work	6	33.3	17	24.3	14	21.2	3	16.7
(2) Self, school, or work	7	38.9	31	44.3	25	37.9	9	50.0
All three trainings	5	27.8	19	27.1	24	36.4	6	33.3
TOTAL	18	100.0	70	100.0	66	100.0	18	100.0

There was not a significant association between the level of training and the level of knowledge, $\chi^2 (9) = 4.56, p = .871$.

Table 11

Frequency Distribution and Relative Frequencies of Level of Exposure in Relation to the Amount of Knowledge

Exposure	Low knowledge		Medium-low knowledge		Medium-high knowledge		High knowledge	
	<i>N</i>	(%)	<i>N</i>	(%)	<i>N</i>	(%)	<i>N</i>	(%)
No exposure	1	5.6	1	1.4	1	1.5	0	0.0
Exposure at home <u>or</u> work	3	16.7	20	28.6	15	22.7	5	27.8
Exposure at home <u>&</u> work	14	77.8	49	70.0	50	75.8	13	72.2
TOTAL	18	100.0	70	100.0	66	100.0	18	100.0

There was not a significant association between the level of training and the level of knowledge, $\chi^2(6) = 3.13, p = .792$.

Hypothesis #1

Staff within special-education classrooms will have more accurate, factual information based on their training and experience.

To observe the difference in total knowledge scores alone without considering training and experience, the researcher ran an independent *t* test between special educators and all other roles. The mean total score on the knowledge test of special educators was compared to the mean total score on the knowledge test of the other three roles combined. Levene's Test was nonsignificant, which assumes equal variances. The data are outlined in Table 12.

Table 12

Summary of Independent TTest for Special Educators (n = 172)

Role	<i>n</i>	Mean	<i>SD</i>	<i>t</i>	<i>df</i>	<i>p</i>	Decision
Spec. Ed.	48	22.13	2.294	2.127	170	.035	Accept
Others	124	21.26	2.436				

On average, special-education teachers had more accurate knowledge about autism ($M = 22.13, SE = 0.331$) than those in all other roles ($M = 21.26, SE = 0.219$). This difference, .867, BCa 95% CI [0.062, 1.671] was significant, $t(170) = 2.127, p = .035$. This statistic represented a medium-sized effect, $d = 0.36$.

When broken down even further, independent *t*tests were run for special-education teachers versus all others in terms of characteristics, causes, and treatments.

The data are summarized in Table 13.

Table 13

Summary of Independent TTest for Special Educators Among Areas (n = 172)

Role	<i>n</i>	Mean	<i>SD</i>	<i>t</i>	<i>df</i>	<i>p</i>	Decision
Characteristics							
Spec ed	48	5.75	1.158	1.108	170	.270	Reject
Others	124	5.56	.974				
Causes							
Spec ed	48	8.50	1.399	.065	170	.948	Reject
Others	124	8.48	1.484				
Treatment							
Spec ed	48	4.90	.831	1.659	170	.099	Reject
Others	124	4.64	.085				

On average, special educators did not have more accurate knowledge about autism in regard to characteristics ($M = 5.75$, $SE = 1.158$), causes ($M = 8.50$, $SE = 1.399$), or treatments ($M = 4.90$, $SE = .831$) than those in all other roles ($M = 5.56$, $SE = .974$; $M = 8.48$, $SE = 1.484$; $M = 4.64$, $SE = .949$). The differences, .194, .016, and .259, BCa 95% CIs [-.151, .538; -.474, .506; -.049, .567] were not significant, $t(170) = 1.108$, .065, 1.659, $p = .270$, .948, .099.

The overall score for the special educators showed a significant concern, but when broken down into the three major categories of characteristics, causes, and treatments, there was no difference. The difference was within the other questions that focused on assessment and prevalence rates.

Hypothesis #2

Educators require more education about the characteristics, causes, assessment, and treatment of autism.

To determine the factual knowledge held by the respondents, descriptive statistics were analyzed for the results of the knowledge questions. The total correct score for the knowledge questions was added up and determined to range from 0 (*all questions were answered incorrectly*) to 33 (*all questions were answered correctly*). The results are summarized in Table 14.

Table 14

Summary of Descriptive Statistics for the Knowledge Total Score (n = 172)

Statistic	Result
Mean	21.5
Standard deviation	2.4
Median	21
Mode	21
Range	13
Minimum	15
Maximum	28

Score	Frequency
15	1
16	3
17	7
18	7
19	14
20	22
21	34
22	25
23	28
25	9
26	6
27	1
28	2

Participants' scores ranged from 45.5% (15/33 questions) to 84.8% (28/33 questions). The mean score was 63.6%, showing that the need is great for more education on autism. The score, which marks three standard deviations above the mean (28), is still 5 points away from a "perfect" score (33).

Research Question 2

Does exposure to autism affect causal attribution?

Hypothesis

Educators who personally know someone or have worked with someone with autism will attribute more internal causes of autism.

Causal attribution was broken down into (a) the nature of the disability and (b) the controllability of symptoms. The nature of the disability took into consideration Question 21: Which of the following do you feel best describes the nature of autism? The controllability of symptoms took into consideration Question 22: Do you believe a child can control their symptoms of autism? Chi-square tests were run to determine if the level of exposure (exposure at home vs. exposure at work) was related to how the respondent attributed the cause (genetic, environment, or both). Chi-square test were also run to determine if the level of exposure was related to whether or not the respondent believed children with autism can control their own symptoms. The data are summarized in Tables 15 and 16.

Table 15.

Frequency Distribution and Relative Frequencies of Level of Exposure in Relation to the Attributable Cause.

Exposure	Attribute to mostly environment		Attribute to both environment and genetics equally		Attribute to mostly genetics	
	<i>N</i>	(%)	<i>N</i>	(%)	<i>N</i>	(%)
No exposure	0	0.0	0	0.0	3	1.7
Exposure at home <u>or</u> work	5	27.8	8	16.7	30	28.3
Exposure at home <u>&</u> work	13	72.2	40	83.3	73	68.9
TOTAL	18	100.0	48	100.0	106	100.0

There was not a significant association between the level of exposure and the factors respondents attributed to being the cause of the disability, $\chi^2 (4) = 4.67, p = .323$.

Table 16

Frequency Distribution and Relative Frequencies of Level of Exposure in Relation to the Controllability of Symptoms.

Exposure	None to little control of symptoms		Much control of symptoms		Don't know	
	<i>N</i>	(%)	<i>N</i>	(%)	<i>N</i>	(%)
No exposure	3	2.0	0	0.0	0	0.0
Exposure at home <u>or</u> work	38	25.2	2	22.2	3	25.0
Exposure at home <u>&</u> work	110	72.8	7	77.8	9	75.0
TOTAL	151	100.0	9	100.0	12	100.0

There was not a significant association between the level of exposure and the factors respondents attributed to being the cause of the disability, $\chi^2(4) = .480, p = .975$.

Other Tests

Through analysis of the data, the investigator found that nine respondents were also parents of a child with autism. Independent *t* tests were run to determine if the parents had more accurate general knowledge than those in other roles and then knowledge was broken down into characteristics, causes, and treatments. Data are summarized in Tables 17 and 18.

Table 17

Summary of Independent T Test for Staff Who Are Also Parents of a Child with Autism (n = 172)

Role	<i>n</i>	Mean	<i>SD</i>	<i>t</i>	<i>df</i>	<i>p</i>	Decision
Parent	9	22.33	3.240	1.061	170	.290	Reject
Others	163	21.45	2.373				

On average, parents did not have more accurate knowledge about autism ($M = 22.33, SE = 3.240$) than those in all other roles ($M = 21.45, SE = 2.373$). This difference, .879, BCa 95% CI [-.757, 2.516] was not significant, $t(170) = 1.061, p = .290$; however, this statistic represented a medium-sized effect, $d = 0.37$.

Table 18

Summary of Independent T Test for Parents Among Areas (n = 172)

Role	<i>n</i>	Mean	<i>SD</i>	<i>t</i>	<i>df</i>	<i>p</i>	Decision
Characteristics							
Parents	9	6.11	.782	1.506	170	.134	Reject
Others	163	5.58	1.035				
Causes							
Parents	9	8.33	1.732	-.327	170	.744	Reject
Others	163	8.50	1.446				
Treatment							
Parents	9	4.67	.866	-.142	170	.877	Reject
Others	163	4.71	.928				

On average, parents did not have more accurate knowledge about autism in characteristics ($M = 6.11$, $SE = .782$), causes ($M = 8.33$, $SE = 1.732$), or treatments ($M = 4.67$, $SE = .866$) than those in all other roles ($M = 5.58$, $SE = .1.035$; $M = 8.50$, $SE = 1.446$; $M = 4.71$, $SE = .928$). The differences, .528, -.164, -.045, BCa 95% CIs [-.164, 1.221; -1.151, .824; -.670, .580] were not significant, $t(170) = 1.506$, $-.327$, $-.142$, $p = .134$, $.744$, $.877$.

Chapter 5

Discussion

Autism spectrum disorder (ASD) is a growing concern in the United States, and its prevalence has almost doubled in the last 10 years. Many studies have been completed that investigate parents' thoughts and perceptions of the disorder, while the research on educators' knowledge and perceptions has been sparse (Busby et al., 2012; Syriopoulou-Delli et al., 2012; Zarafshan et al., 2013). The purpose of this survey was to explore the knowledge and causal attributes of ASD as reported by educators. This study also examined whether the educators' training (both formal and informal) and experience (both personal and professional) influenced their knowledge, as well as what they see as the causal attributes of the disorder.

Most of the teachers who responded to the survey had professional and educational development beyond a college degree, which is very promising for the field of education. Teachers are pursuing their own education to help further their students' experience in schools. To further support this optimism about the field of education, most teachers reported that they were less than 40 years old, and thus will be able to stay within the field for a longer time with their students. There was a wide variety of how long teachers have been working in their current education role and could also help us understand the vast experience and knowledge that are gained throughout this career.

Although many of the teachers reported advanced degrees, only slightly more than half of the teachers had attended a class in autism throughout their training and/or received autism training as part of their professional development. With the increase in

the prevalence of ASDs, this statistic is surprising. One in 68 children have been diagnosed with autism, which could equate to one child in every two classes. This statistic shows that teachers may not have the training required to understand a child's disorder, including his or her triggers and ways to handle situations that result. On the positive side, 89% of the participants reported that they have independently researched autism in order to understand the disorder. This shows that, despite not having the formal training, they see a need to better understand the disorder. Most of these educators have gained their knowledge from journals or research, this is peer reviewed and data supported. However, 30% of the sample reported that they watch news programs on television to help them gain knowledge, which is of concern. Society has seen the inconsistencies and false information given on television, specifically Jenny McCarthy saying that her son's autism was caused by vaccines, which was not proved, and that he was later "cured" of the diagnosis.

Educators were asked to answer questions regarding their ideas about the rates, characteristics, causes, assessment, and treatment of ASDs. None of the participants reported that the prevalence of an autism diagnosis has decreased, which shows that the participants know it is a growing concern. Most participants (57.6%) reported that autism has increased by only 25%, when in fact it has increased by 50% (CDC, 2014). Although participants knew the increase in diagnosis is of growing concern, they underestimated the increase. However, 96.5% of the participants correctly identified that boys are more affected than girls (CDC, 2014).

The four defining characteristics of autism according to the *DSM-5* (2014) include (a) delays and deficits in social language, (b) poor understanding of social cues, (c) preference for routine and sameness, and (d) repetition of motor movements or speech (77.2%). Only nine participants, or 5% of the sample, reported just those four characteristics. The rest of the sample endorsed at least one incorrect characteristic.

The most frequently incorrect characteristic chosen was a significant personal skill performed at a level higher than that of their peers. These skills are commonly referred to as “savant” skills (Bennett & Heaton, 2012). In a 2009 study by Howlin et al. (as cited in Bennett & Heaton, 2012), 28.5% of their sample, which consisted of children on the spectrum, have a savant skill. Therefore, this skill is not a main characteristic of the disorder. However, movies like *Rain Man* show a character who has autism *in addition to* savant syndrome, which could commonly be misunderstood as a characteristic. The authors noted, however, that children with ASD and with savant skills are both very detail oriented, which could account for some of the misconception.

The pattern of errors in identifying the characteristics of autism, which include endorsing incorrect symptoms as part of the disorder, shows that educators continue to need more education on the characteristics that constitutes the diagnosis. Because many teachers may see the “savant” skill, negative behavior, or low intelligence as a symptom of the disorder, they may not address it as a concern. These three characteristics usually have different causes, which must be addressed and treated separately.

Researchers and physicians have not found one true cause of autism and agree that it is caused by a combination of factors (Landrigan et al., 2012). Because the cause is

not associated with school and is not important to the treatment of the symptoms while in school, the review of the results will not be in depth. However, one statistic will be addressed: approximately half of the educators surveyed continued to believe that vaccines are a cause of autism. In 1998, Dr. Andrew Wakefield, a British medical doctor, reported in his study that autism results from vaccinations, specifically the MMR vaccine. In 2011, however, his study was deemed a “fraud” with manipulated data and was retracted from the literature (Cohen & Falco, 2011). However, Wakefield’s study had been available to the public for 13 years before Cohen and Falco’s (2011) study, which is more than enough time for parents, educators, and common folk to adopt it as their own belief. After all, Wakfield was a medical doctor with “data” to support his decision. In 2008, Jenny McCarthy, American actress, came to the spotlight regarding her son’s autism, stating that she believed vaccines helped cause the diagnosis (McCarthy & Carrey, 2008). With celebrities agreeing with Wakefield’s findings, Americans now had more leaders with false information. To this date, no true link has been found between vaccines and the cause of autism (Gallagher & Goodman, 2010; Gerber & Offit, 2008; Uno et al., 2012). Most recently, Jain et al. (2015) published an article in the *Journal of the American Medical Association* that is the latest to debunk the vaccine connection to autism. The authors used a sample of approximately 95,000 children and found no link between MMR vaccination and autism.

As stated, most researchers and physicians have agreed that autism is caused by a number of characteristics, both genetic (chromosomes, gene mutations) and environmental (lead, methylmercury, pesticides, and medications; Landrigan et al.,

2012). Approximately three quarters (73.5%) of the sample reported that the cause is a mixture of the two, while 25.9% of the sample believe autism is only genetic and 0.6% believed it is only environmental. Because of the continued research in this area, physicians are still not sure of the percentage of environment versus hereditary, but they are sure that autism is caused by a combination of both. Most of the sample agreed. If educators believe in a combination of the causes, they believe that they and the child can do something to help alleviate the symptoms. This finding is helpful to know when planning interventions. If educators believe that children with autism control all of their symptoms, teachers may feel “useless,” as if nothing they matters because the child is making the conscious choice to behave poorly. As a result, teachers may be more likely to use punitive measures. On the other hand, if educators believe that children control none of their symptoms, the teachers may feel “useless,” as if anything they do will not matter because the child cannot be helped. They may be more likely to ignore the child and not intervene in any way.

Goin-Kochel and Myers (2005) reported that there are two types of autism: congenital and regressive. Most of the sample (53.5%) did not agree. Although not highly affecting the primary classroom, early-childhood-center and Head Start teachers and educators may come into contact with students with the regressive type before it has been diagnosed, so they should be aware of the symptoms and onset. In terms of actual assessments, only 19.4% knew that Wechsler scales are used for the cognitive measure (three other tests were chosen with higher percentages) and 22.6% knew that pediatricians generally use the CHAT or M-CHAT (two other tests were chosen with

higher percentages). Many educators may not be familiar with any of these assessments because they typically do not administer them. General-education teachers, specialists, and aides may not even be at the meeting where results of these specific assessments are discussed. This lack of knowledge regarding assessments shows that more educators (specifically those who are working directly with the child) should be a part of the results session so that they are aware of the strengths of, needs of, and recommendations for the child.

As with causes, educators were asked to choose which interventions they heard had positive effects from a list of six. The percentage of participants endorsing each is followed in parentheses. The interventions that have been supported in the literature include early intervention (91.2%), therapy (93.6%), and special education (50.3%; Foxx, 2008; Koegel et al., 2014). Only two participants listed these specific three interventions without any of the others on the list, again showing discrepancy. The other interventions on the list included diet changes, medication, and day care. Interestingly, approximately 91% of educators identified early intervention as positive. This finding shows that they were aware that the symptoms/characteristics of autism begin early and can be lessened or treated if found early enough. This area is vital for educators to understand and research, since they are the front runners for implementation. About half of the participants (43.7%) indicated that changing diets is a positive treatment. One should note that diet change *can* be, as long as it eliminates both casein *and* gluten and it is occurring long term (Pennesi & Klein, 2012). However, these characteristics of the diet were not

included in the question. An interesting follow-up study would be to include specific components of diet changes and types of therapy to determine if all aspects are correct.

To build on the last area, educators were asked to rank order which interventions they felt were most important when working with a child with autism. The most common intervention was sensory activities, followed by therapy, praise and reinforcement, and small-group lessons. All of these interventions show that the teachers feel as if they have an effect in the child's symptoms. Teachers can teach the child to control and work through his or her symptoms. On the other hand, the least common interventions included not getting vaccinations, ignoring the behavior, time-outs, medications, and diet. All of these interventions are either punitive in nature or out of the teachers' control, showing again that the teachers feel as if they have some control. If the educators feel as if they have more control over the child's symptoms, his or her education, assessment, treatment plan, and interventions will be much more meaningful. The teachers will consider themselves a vital part of the process, especially the treatment and interventions.

Finally, the educators were asked to rank order their beliefs about autism. Most of the teachers believed, as was stated in the previous areas, that they felt as if they could help lessen the triggers, they could help change the environment to lessen the behaviors, and they could recommend the child's needs for counseling and help from an expert. Again, these findings are consistent with the fact that teachers feel they or others have the ability to positively control symptoms. The least common beliefs included thinking the child intentionally causes problems, thinking the child is fully responsible for his or her behavior, and thinking the child is set off by the smallest triggers.

The results showed that if a person has no training and no experience with autism, his or her scores will not differ significantly from those of a person who has had all three types of training and knows someone at work and at home. Owing to the controversial nature of autism and its lack of understanding among even physicians and researchers, this statistic is not surprising. The disorder known as autism spectrum has been recognized for more than 30 years. In those 30 years, the disorder has become much more prevalent, but still little is known about its causes. Since causes and prevalence are not related to the classroom, characteristics and treatment seem to be more pertinent than both of these to educators. Although the new *DSM-5* was just recently published in mid-2014, teachers and other educators are not required to attend training on the *DSM-5*, as are physicians and psychologists. Therefore, many teachers will not know about the characteristics of autism unless they either attend training by choice or research characteristics themselves. However, the level of training does not seem to affect the knowledge a person has, thus showing that the trainings are not sufficient. Either presenters are not giving correct information or the trainings are not being held frequently enough.

Special-education teachers, based on their role within the classroom and the population they work with on a daily basis, had more knowledge. Knowing that special-education teachers are gaining the knowledge they need to help these children more is encouraging, but the lack of specific knowledge still shows that they are not at the optimal level of their autism knowledge.

Special-education teachers scored higher on overall knowledge as compared to educators in other roles, which included rates, characteristics, causes, assessment, and treatment. When specific characteristics, causes, and treatments were compared among the special-education teachers, they were not higher than those in the other roles. Their increased knowledge came in the form of knowing the rates and assessments, probably because they are involved more closely in these areas within the classroom.

There are many reasons for the lack of accurate knowledge among educators. First could be the lack of accurate trainings provided to educators in the classroom. Second could be the lack of understanding among researchers and physicians that trickles down to the general population. Third could be that the source of the teachers' knowledge is biased (e.g., television shows and newspaper articles). None of these concerns are going to go away overnight and must be focused on for amendment.

The data run through statistical tests, revealed that exposure was related neither to the nature of the disorder nor to the controllability of symptoms. The *p* values were very high, showing absolutely no significance. This statistic means that a person's exposure to a child with autism (whether at home or at work) does not help him or her form a hypothesis about the cause of the disorder. People may use the knowledge they gain from biased sources to weigh their decision. By working with a child, a person may not be able to tell if this disorder is controllable or not.

The data revealed that nine participants were not only an educator of someone with autism, but also a parent of a child with autism. When the scores of these nine participants were compared to those of the nonparents in the group, there was no

significant difference. This finding means that parents of a child with autism did not score significantly higher or lower than nonparents. This idea also continues to support the lack of understanding about autism that has been discussed throughout this paper.

Limitations of the Study

One of the limitations of this research study is the small sample size. Fewer than 200 educators responded, which is only a small fraction of the educators throughout the United States. In addition, all educators were chosen from the east coast within a confined area. Therefore, the ability to generalize is limited. Respondent bias is a possibility that may have prompted some of the participants to answer questions certain ways to please the investigator.

In terms of the survey, two areas could have been broken up and elaborated upon separately for more information. The first was the question about positive treatments and included a response labeled, “therapy.” There are many different types of therapy, and the response did not break these down. The second broad range of questions concerned the exposure to autism. An indicator of how close the respondent was to the child with autism should have been included. Also, the respondents were asked if they had worked with or taught at least one student with autism. Teachers who had been in the field 15+ years may have taught a child with autism in their first year, with no experience since. Finally, if respondents indicated that they had a neighbor with autism, they may have had little to no contact with that child on a daily basis.

Implications for Practice

As noted, school psychologists are specifically trained in the areas of autism, and they should consider creating trainings for and other types of communication to help teachers further their knowledge of the disorder. School psychologist can pass out pamphlets, brochures, and fact sheets; they can hold meetings and trainings for staff and parents. All of these means of communication can disperse knowledge quickly and efficiently. The school psychologist may even plan a monthly workshop to which staff and parents are invited to work with each other, while gaining important information about how to help their children.

The school psychologist is a vital member of the IEP team and should consult frequently with both general and special educators to determine their need for knowledge and assistance. Observations of the students, observations of the lessons, feedback for the teachers, and consultation sessions are just some ways that the school psychologist can become more involved. Weekly special-education meetings may be planned to work directly with the students' case managers so that the psychologists can help plan goals and help with services.

Educators should take advantage of having the school psychologist in the building and consult with him or her when needed. If educators feel unprepared, unknowledgeable, or overwhelmed, remembering that the school psychologist is there to support them is the key factor. School psychologists may even know about autism trainings in the area or online and can help pass this information along to staff.

Although the teachers in the investigator's district were not included as part of the respondents, they could benefit from professional development regarding autism. The research, in addition to this study, reports that teachers do not have clear, accurate knowledge of ASD and should be provided training and consultation in the different areas. Perhaps by working together with other psychologists and related service providers, training or professional development can be created to focus on the different areas assessed by each member of the team. The professional development could then be addressed to staff of each school, specifically those involved with autism programs. If autism knowledge is discrepant in the research and the lack of knowledge showed in the study results, a needs assessment should be completed to determine if the investigator's district has the same needs.

Conclusion

Autism continues to be a growing concern, as its prevalence has increased greatly over the years. Children with autism spend much of their day gaining from their teachers and other educators the education and skills needed to succeed in life. Results from this survey show little accurate knowledge among educators about the prevalence, characteristics, causes, assessment, and treatments of autism. In addition, the level of training and exposure of the teacher does not affect the overall knowledge. Special-education teachers have more accurate knowledge than other educators, but it is still not at an optimal level. The educators' exposure to children with autism, whether in home or in school, does not seem to influence their perceptions of the cause of the disorder or their beliefs regarding whether children with autism can control their own symptoms.

However, teachers overwhelmingly believe that autism is a disorder caused by both genetics and environment, and their beliefs and thoughts regarding treatment positively coincide with this belief.

Future research for educators should emphasize the importance of understanding interventions and knowing which interventions are appropriate and beneficial for the child. Research may also wish to consider the knowledge of parents and pediatricians or psychiatrists. Parents work with the child daily on all different skills outside (and even inside) of school. They are a vital part of their child's school team. Pediatricians and psychiatrists usually make a diagnosis. Staff on the school team who are trained specifically in ASD (i.e., school psychologists, speech-language therapists, occupational therapists, and physical therapists) should consider preparing professional development presentations and other forms of communication for their school teams to help increase their accurate knowledge of autism.

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APPENDIX A:

Principal Letter for Study

Dear principals,

We are conducting a survey to obtain information of autism spectrum disorder. The primary investigator is Nicole Jones, a school psychologist, who is a doctoral candidate in the field of school psychology at Philadelphia College of Osteopathic Medicine. She is under the direct supervision of Dr. Jessica Kendorski. We would greatly appreciate your participation in this process.

We are asking for your staff to complete the following survey, which should take no longer than 15 minutes. The survey was created using Survey Monkey and responses will only be available to the investigators. If you and your staff choose to go forth with this survey, know that they can feel free to stop their participation at any time by closing out of the survey. You can also feel free to stop your participation, by informing the psychologist. Your response is *very important* to us. All information will be held confidential. Staff's name or any identifying information will not be collected as part of this survey. The responses will be password-protected and under the care of the primary investigator only.

Thank you in advance for your time and effort.

If you agree to participate and/or would like some additional information, please inform Nicole Jones (primary investigator) at nicole5.jones@pgcps.org.

APPENDIX B:

Staff Letter for Study

Dear staff,

We are conducting a survey to obtain information of autism spectrum disorder. The primary investigator is Nicole Jones, a PGCPs school psychologist, who is a doctoral candidate in the field of school psychology at Philadelphia College of Osteopathic Medicine. She is under the direct supervision of Dr. Jessica Kendorski. We would greatly appreciate your participation in this process.

We are asking for you to complete the following survey, which should take no longer than 15 minutes. The survey was created using Survey Monkey and responses will only be available to the investigators. If you choose to go forth with this survey, know that you can feel free to stop your participation at any time by closing out of the survey. You can also feel free to stop your participation, by informing the psychologist. Your response is *very important* to us. All information will be held confidential. Your name or any identifying information will not be collected as part of this survey. The responses will be password-protected and under the care of the primary investigator only.

The link for the survey is as follows:

<https://www.surveymonkey.com/s/njdissertation>

Thank you in advance for your time and effort.

If you agree to participate and/or would like some additional information, please contact Nicole Jones (primary investigator) at nicolejo@pcom.edu.

APPENDIX C:

Survey Monkey Confidentiality Notice

By clicking "I Agree" or any other button indicating your acceptance of this privacy policy, you expressly consent to the following:

- You consent to the collection, use, disclosure and processing of your personal data in the manner described in this privacy policy, including our procedures relating to **cookies, IP addresses and log files**.
- Our servers are based in the United States, so your personal data will be primarily processed by us in the United States. You consent to the transfer and processing of your personal data in the United States by SurveyMonkey Inc. and in the data locations identified in Section 5 by our various affiliates and service providers.
- You consent and agree that we may transfer your data to data processors located in countries, including the United States, which do not have data protection laws that provide the same level of protection that exists in countries in the European Economic Area. Your consent is voluntary, and you may revoke your consent by opting out at any time. Please note that if you opt-out, we may no longer be able to provide you our services.
- You consent to us sharing your personal data with relevant persons working for service providers who assist us to provide our services.

“We collect and store the survey responses that you submit. The survey creator is responsible for this data and manages it. A survey may ask you to provide personal information or data. If you have any questions about a survey you are taking, please contact the survey creator directly as SurveyMonkey is not responsible for the content of that survey. The survey creator is usually the same person that invited you to take the survey and sometimes they have their own privacy policy. **Are your survey responses anonymous?** You will need to ask the survey creator this as it depends on how they have chosen to configure their survey. We provide instructions on how a survey creator can ensure they collect responses anonymously. However, even if a survey creator has followed those steps, specific questions in the survey may still ask you for your personal information or data that could be used to identify you.

APPENDIX D:

Survey

Dear participant,

We are conducting a survey to obtain information of autism spectrum disorder. The primary investigator (Nicole Jones) is a doctoral candidate in the field of school psychology at Philadelphia College of Osteopathic Medicine and is under the direct supervision of Dr. Jessica Kendorski. We would greatly appreciate your completing the following survey, which should take no longer than 15 minutes.

The survey was conducted using Survey Monkey and responses will only be available to the investigator. If you choose to go forth with this survey, please answer every question as best as you can and know that you can feel free to stop your participation at any time by closing out of the survey. Your response is *very important* to us. All information will be held confidential. Your name or any identifying information will not be collected as part of this survey. The responses will be password-protected and under the care of the primary investigator only.

Thank you in advance for your time and effort.

(Page 1) Demographics

1. What is your highest level of education completed?
Choose ONE response that best fits your answer.
 - a. Some high school or less
 - b. High school diploma or GED
 - c. Technical or trade school
 - d. Some college
 - e. College degree
 - f. Postgraduate degree
 - g. I choose not to answer

2. Please indicate your age.
 - a. 18-28 years
 - b. 29-39 years
 - c. 40-50 years
 - d. 51-61 years

- e. 62-72 years
 - f. 73-83 years
 - g. I choose not to answer
3. How would you describe your primary role in the school?
- a. General education teacher
 - b. Special education teacher
 - c. Academic specialist (reading, math, etc.)
 - d. Paraprofessional or aide
4. How long have you been in this role?
- a. Under a year
 - b. 1 to 5 years
 - c. 6 to 10 years
 - d. 11 to 15 years
 - e. 16+ years
5. If you are NOT currently a classroom teacher, please indicate if you have been in the past.
- a. N/A to me because I am a teacher
 - b. Yes, I was a teacher for less than 5 years
 - c. Yes, I was a teacher for 6 to 10 years
 - d. Yes, I was a teacher for 11+ years
 - e. No, I was never a teacher
6. When you went through your original training to become a teacher or educator, were you provided with a class on autism?
- a. N/A to me because I am not, nor was I, a teacher
 - b. Yes, I had at least one class devoted to autism
 - c. Yes, I had some lectures related to autism, but not a whole class
 - d. No, I have not had training in autism
7. Through continued professional development, have you received specific trainings on the diagnosis and nature of autism?
- a. Yes
 - b. No
8. Have you read or studied about autism with the hopes of gaining more understanding outside of work and trainings?
- a. Yes
 - b. No

9. If yes to 14, where did you gain your knowledge?
Choose AS MANY as you see fit.
- Obtained a certificate in an area related to autism
 - Took a class or classes outside of work
 - Read journal articles or research
 - Read newspaper or magazine articles
 - Watched educational television shows regarding autism
 - Watched news programs on television

(Page 2) Factual Information

10. Which of the following is true about the current rate of autism in the past 10 years?
- It has *decreased* by about 10%.
 - It has *decreased* by about 25%.
 - It has *stayed the same*
 - It has *increased* by about 25%.
 - It has *increased* by about 50%.
11. Which of the following is also true about the current rate of autism?
- Boys are 5x more likely to be affected
 - Boys are 2x more likely to be affected
 - The rates of boys and girls are equal
 - Girls are 2x more likely to be affected
 - Girls are 5x more likely to be affected
12. Which of the following characteristics are included in the definition of autism according to the Diagnostic and Statistical Manual of Mental Health Disorders, Fifth Edition (DSM-5)?
Choose AS MANY as you see fit.
- A personal skill that is significantly above others the same age, such as memorization or counting
 - Delays or deficits in social language, such as starting or having a conversation
 - Lower than average intelligence
 - Negative behavior toward others, including biting
 - Poor understanding of facial expressions and other body language
 - Preference for routine and sameness, which includes a strong attachment to certain objects
 - Repetitive use of motor movements or speech
13. Which of the following have been linked to causing autism?

- Choose AS MANY as you see fit.
- a. Allergies
 - b. Antibiotics
 - c. Chromosomes
 - d. Food dyes
 - e. Gene mutations
 - f. Gluten
 - g. Lead
 - h. Medications given to mother during pregnancy
 - i. Methylmercury
 - j. Parenting styles
 - k. Pesticides
 - l. Premature birth
 - m. Surgeries
 - n. Vaccines
14. The literature supports two types of autism categorized by its onset: congenital (birth) and regressive (around 2-3 years old). True or false?
- a. True
 - b. False
 - c. I don't know
15. What is the most commonly used cognitive assessment for children with autism?
- a. Stanford Binet Intelligence Scales, Fifth Edition (SB5)
 - b. Wechsler Scales (WPPSI-IV; WISC-V)
 - c. Differential Abilities Scales, Second Edition (DAS-II)
 - d. Woodcock Johnson Tests of Cognitive Abilities, Third Edition (WJ-III)
 - e. Kaufman Assessment Battery for Children, Second Edition (KABC-II)
16. Which of the following screening tools do pediatricians commonly use?
- a. Checklist for Autism in Toddlers (CHAT) or Modified Checklist (M-CHAT)
 - b. Social Responsiveness Scale (SRS)
 - c. Autism Behavior Checklist
 - d. Childhood Autism Rating Scale, Second Edition (CARS-II)
17. Which of the following have been supported by research to have a positive affect for children with autism?
- Choose AS MANY as you see fit.
- a. Changing diets
 - b. Day care
 - c. Intervention at a young age (under 3 years old)
 - d. Medication
 - e. Some type of therapy (behavioral, speech, etc.)
 - f. Special education

18. ABA has been proven to be a helpful intervention tool for children with autism. What does the acronym represent?
- Automatic Behavioral Assessment
 - Assessment of Behavior Application
 - Applied Behavioral Analysis
 - Application of Behavioral Attributes
 - Attributing Behaviors to Assessment

(Page 3) Exposure and Attitudes

19. Have you worked with or taught at least one person who has been diagnosed with autism?
- Yes
 - No
20. Do you personally know someone with autism outside of the school? (Check all that apply)
- No, I do not know someone personally with autism
 - Yes, my child has autism
 - Yes, someone in my family has autism
 - Yes, a friend has autism
 - Yes, a friend's child or family member has autism
 - Yes, a neighbor has autism
21. Which of the following do you feel best describes the nature of autism?
Choose ONE response that best fits your answer.
- I believe that it is 100% due to genetic factors
 - I believe that it is 75% due to genetics and 25% due to the environment
 - I believe that it is 50% due to genetics and 50% due to the environment
 - I believe that it is 25% due to genetics and 75% due to the environment
 - I believe that it is 100% due to the environmental factors
22. Do you believe a child can control their symptoms of autism?
Choose ONE response that best fits your answer.
- Yes, I believe children can control all of their symptoms
 - Yes, I believe children can control most of their symptoms
 - Yes, I believe children can control some of their symptoms
 - No, I do not think they can control any of their symptoms
 - I do not know
23. Please rate the following interventions or strategies from MOST important to LEAST important when working with children who have a spectrum diagnosis:
- Diet

- b. Ignoring
- c. Medication
- d. Not getting vaccinations
- e. Praise and reinforcement
- f. Sensory activities
- g. Small group
- h. Therapy
- i. Time outs

24. Please rate the following beliefs from MOST similar to your own to LEAST similar to your own when working with children who have a spectrum diagnosis:
- a. I think I could help lessen the triggers to these behaviors.
 - b. I think the child intentionally creates problems.
 - c. I think the child is fully responsible for his or her own behavior.
 - d. I think the child is set off by the smallest things.
 - e. I think the child needs increased counseling and help from experts.
 - f. I think the environment could be changed to lessen the behaviors.