

2010

School Psychologists' Knowledge of Tourette Syndrome Characteristics and Awareness of Appropriate Interventions

Jesse Usher Glassman

Philadelphia College of Osteopathic Medicine, jglass70@verizon.net

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Philadelphia College of Osteopathic Medicine

Department of Psychology

SCHOOL PSYCHOLOGISTS' KNOWLEDGE OF TOURETTE SYNDROME
CHARACTERISTICS AND AWARENESS OF APPROPRIATE INTERVENTIONS

By Jesse Usher Glassman

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Submitted in Partial Fulfillment of the Requirement for the Degree of

Doctor of Psychology

July, 2010

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

Dissertation Approval

This is to certify that the thesis presented to us by Jesse Glassman on the 13th day of February, 2009, in partial fulfillment of the requirements for the degree of Doctor of Psychology, has been examined and is acceptable in both scholarship and literary quality.

Committee Members' Signatures:

Carrie Yurica, Psy.D., Chairperson

Terri Erbacher, Ph.D.

Ellen Platt, D.O.

Robert A. DiTomasso, Ph.D., ABPP, Chair, Department of Psychology

Acknowledgments

My study could not have been successfully completed without the support and guidance of several respected individuals. I first want to thank my dissertation committee members, Dr. Carrie Yurica, Dr. Terri Erbacker, and Dr. Ellen Platt for their extensive assistance in seeing that I was able to carry out my research successfully. Additionally, I would like to thank Dr. Rosemary Mennuti and Dr. George McCloskey for the extraordinary supervision they provided throughout my experience at PCOM. I could not imagine attending a better institution to receive my Doctorate degree. I also want to give special thanks to my internship supervisor, Dr. Vahid Najafi, who was not only an influential teacher but who has also become a great friend. He has always stressed the importance of trusting my instincts and to have confidence in my clinical abilities. Additionally, I want to thank all of the members of my cohort who helped to make my Doctorate process unique.

Although, they have passed on, I would like to thank my wonderful parents, Mervin and Muriel Glassman, who raised me to believe in myself and who always instilled in me the value of education. They consistently provided me with unconditional love and support which helped me to realize my potential. Along with my parents, my family members and friends have also played a vital role in my Doctorate process. They provided me with optimism and helped me to never lose sight of my ultimate goal. Their enthusiasm gave me strength to demonstrate the persistency I needed in order to achieve success. I will forever appreciate and value the supports provided to me by all of the above mentioned individuals during my education process.

Abstract

Tourette Syndrome (TS) is a neurodevelopmental disorder consisting of multiple involuntary motor tics and one or more vocal tics. The duration of the disorder is at least one year and not more than three consecutive tic-free months (APA, 2000). The tics associated with TS are frequently more severe than other tic disorders on the spectrum. There are varying degrees of severity of TS disorder, requiring maximum to no treatment. Children and adolescents diagnosed and who are showing signs of TS are referred for school evaluations in order to identify various learning difficulties and /or emotional issues which are often associated with TS. More specifically, school psychologists must be knowledgeable of evaluation procedures that are conducted in order to recognize these deficits correctly. There are no formal evaluations presently required by the state of New Jersey and New York to assess school psychologists' knowledge of TS. Additionally, New Jersey and New York do not mandate practicing school psychologists to study and become experts on this specific subject. Adequate knowledge of TS is vital for school psychologists in order to effectively implement appropriate interventions that meet the needs of TS students. The overall purpose of the study is to determine practicing school psychologists' knowledge of the characteristics and diagnostic criteria of TS, of its associated disorders, and of its effective interventions. The study will set out to establish if these professionals are using appropriate assessments when determining intellectual, educational and emotional functioning and are making correct referrals when obtaining a TS diagnosis.

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Chapter 1

Introduction

Tourette Syndrome (TS), a neurodevelopmental disorder, is also called Tourette disorder or Gilles de la Tourette Syndrome. The core symptomatology of TS consists of multiple involuntary motor tics and one or more vocal tics by the age of 18; its duration is at least one year, with not more than three consecutive tic-free months (APA, 2000). TS is a spectrum disorder with varying degrees of severity; cases range from mild to severe with a majority of individuals having mild characteristics and requiring minimal to no treatment. The tics associated with TS are more severe than other tic disorders on the spectrum. Transient tic disorder, for example, consists of multiple motor tics, vocal tics or both, occurring within a limited time frame of four weeks to twelve months. Chronic tics, which can be motor or vocal, but not both, exist for at least one year. Blinking and other facial movements initially are the most commonly occurring tics (Cohen & Leckman, 1999).

Tourette Syndrome was initially discovered and described in 1885 by Gillis de la Tourette (Cohen & Leckman, 1999). However, during the first half of the 20th century, there was only a limited amount of research conducted to learn more about the maladaptive traits of the disorder. In the early 1970's, almost a full century after its initial discovery, the awareness of TS and the characteristics associated with the disorder still were not well recognized. In 1973, fewer than 200 individuals in the United States were diagnosed with TS (Brunn, 1984). This figure, however, is attributed to a lack of diagnosis of individuals who may have possessed the traits of TS but who were never identified. Researchers and medical professionals at the time simply did not have an

awareness of how the deficits within the brain chemistry affected the maladaptive neurological behavior of TS (Shapiro, Shapiro, Bruun, & Sweet, 1978). In the middle of the 20th century, researchers discovered the inability of patients to control their tics and associated disorders and the tendency of the tics to increase with stress. Professionals also indicated and labeled TS in the Middle of the 20th century a psychiatric disorder (Mahler and Ringell, 1943).

It was actually the discovery of antipsychotic medications which motivated researchers to develop a greater interest in TS. These medications proved effective in decreasing the severity of the uncontrollable tics. The effectiveness of the new medications led to a better understanding of the brain chemistry and the neurological factors which cause motor and vocal tics. Neurologists then began to look at TS as a biological disorder and more research grew out of these discoveries (Walter & Carter, 1997). The frequency of identifying and diagnosing TS was once considered rare among mental health professionals. However, an increased understanding of TS has assisted professionals in identifying the disorder and has raised the estimation of diagnoses to 1.2 million people in the United States (Shapiro, Shapiro, Young & Feinberg, 1988). Based on a 2000 US census report, it is estimated that 530, 000 school-aged children have been diagnosed with TS (Scahill, Williams, Schwab-Stone, Applegate, & Leckman, 2006).

The average age of onset for motor tics is around the age of seven; its onset, however, may range from the ages of two to fifteen. Vocal tics typically begin around the age eleven. Tics can change and worsen during pre-adolescence and early adolescence. A small percentage of individuals show a decrease in early-adolescence. A small percentage of individuals display a decrease in severity of tics when they enter puberty

(Jankovich, 1992). The degree of vocal and motor tics ranges in complexity and in severity. Some tics are more obvious and overt and are difficult to inhibit and control. Motor tic movements are involuntary and occur in different muscle areas of the body. Vocal tics can be demonstrated by sniffing, clearing the throat, grunting or repeating words or phrases. Simple tics are spontaneous, but complex tics occur in bouts and intervals (Leckman, Peterson, Anderson, Arnsten, Pauls, & Cohen, 1997).

Some individuals with TS are afflicted with coprolalia. This is a type of vocal tic in which an individual spontaneously utters objectionable words or phrases. Coprolalia has been reported in 5 to 30% of individuals diagnosed with TS (Teive, Germiniani, Della Coletta, & Werneck, 2001). If present, it typically commences at age fourteen or fifteen (Robertson, Banerjee, Eapen, & Fox-Hiley, 2002).

Tic movements can change as a child matures (Jagger, Prusoff, Cohen, Kidd, Corbonari, & John, 1982). Tics can also wax and wane and be controlled for a certain period of time, depending on their severity. Urges typically precede the tics which become too strong to inhibit. The compulsion to tic can be suppressed only for a period of time before succumbing to it in one form or another (Comings, Himes, Comings, 1990).

There is extensive research analyzing the significant behavioral disorders and learning disabilities frequently associated with TS. Attention Deficit Hyperactivity Disorder (ADHD) with or without inattentiveness and hyperactivity, Obsessive-Compulsive Disorder (OCD), and various learning disabilities are linked to TS (Comings, 1990; Cohen, Brunn, & Leckman, 1988). OCD and ADHD have been identified in almost 50% of children diagnosed with TS. Furthermore, these disorders are more prevalent in

children with TS than in those who do not have the disorder. Children with TS may also develop various types of depression/mood disorders, anxiety/phobias, neurological and behavioral disorders. One example is Oppositional Defiant Disorder which may be connected to TS (Shapiro, Young, & Feinberg, 1988).

The causes of TS can stem either from genetic or from biological factors (Bornstein, Stefl & Hammond, 1990). Although no specific gene has been identified, studies show that the majority of cases are inherited (Robertson, 2000). When this occurs, there is a chemical reaction within the brain in which an excessive amount of dopamine is produced. The abundance of this neurotransmitter causes involuntary motor and vocal tics in the individual. Some biological events that cause TS include various pregnancy factors such as low birth weight and problematic pregnancies. High fever in childhood is another factor which can produce TS symptomatology (Bornstein, Stefl, & Hammond, 1990).

There are no specific concrete medical assessments to identify TS and the severity of tics directly. Medical professionals including physicians, neurologists and psychiatrists utilize the Diagnostic Statistical Manual-Fourth Edition-Text Revision (DSM-IV-TR) developed by the American Psychiatric Association (APA) to diagnosis TS. When evaluating individuals, physicians directly observe patients and administer interviews/rating scales to identify symptoms of the disorder. These methods are beneficial in determining TS symptomatology, tic severity, and maladaptive traits (Leckman, King, Scahill, Findley, Ort, & Cohen, 1999).

The age of onset can vary and a diagnostic lag is often present in individuals with TS because identification and diagnosis of the disorder are not always accurate. The

delay in diagnosis ranges from 4 to 5 years and can be attributed to medical professionals' lack of knowledge and to a child's suppression of tics. Some individuals, especially those with mild symptoms, create effective ways of controlling their tics. Consequently, the suppression of tics can make the disorder even more difficult to diagnose (Comings & Comings, 1985).

Accurate diagnosis of TS is essential in order to develop appropriate intervention and management plans. Specific strategies to assist children with TS are selected, based on the severity, frequency, number and intensity of the symptoms associated with the disorder. Evaluations should include a child's strengths and weaknesses and an accurate assessment of functioning level within the home and community settings (Leckman, et al., 1999).

Purpose of Study

The overall goal of the study is to determine practicing school psychologists' knowledge of the diagnostic criteria of TS, its associated disorders and effective interventions. The study will also set out to establish whether or not these professionals are using appropriate cognitive and academic assessment batteries in order to determine educational and intellectual ability. The study will also identify whether or not participants are utilizing evaluation tools in order to identify social and emotional functioning.

The results of the study will be shared with all of the school psychologists who respond to the survey. A review of the results may help each of these professionals to determine their own personal levels of knowledge about the characteristics and

interventions of TS. It may also motivate them to seek opportunities to further their comprehension of the disorder.

Significance of Study

Currently, there are no formal assessments required by the states of New Jersey and New York to measure practicing school psychologists' knowledge of TS. Although continuing education courses and seminars devoted to the topic of TS are available, school psychologists are not required to study this specific subject. It is important for school psychologists to have adequate knowledge of the characteristics of TS and the appropriate interventions which should be implemented in order to meet the needs of identified students. However, it is not mandated that school psychologists acquire additional knowledge of this disorder.

As mental health professionals within the educational environment, school psychologists have an obligation to identify children with TS. School psychologists are responsible for consulting with school personnel, conducting psychological and educational evaluations for referred students, and developing intervention plans. They also need to be aware of the appropriate professionals to consult, such as Neurologists and/or Psychiatrists in order to obtain an accurate TS diagnosis. Students diagnosed with TS who have been referred for evaluation may experience various learning difficulties and /or emotional issues. Therefore, it is also essential for the entire school community to have an understanding of TS in order to assist these students. School psychologists can educate their colleagues by providing not only information but also effective strategies.

School psychologists, who play a vital role in the educational development of children with TS, are responsible for evaluating these children as well as for providing

resources and strategies for instructional staff. Their expertise and the services they impart directly impact the levels of success that these children will achieve. Therefore, it is essential that these school psychologists have a thorough understanding of the syndrome, its associated disorders, and effective intervention strategies.

School psychologists need to be well aware of TS's associated co-morbid disorders, including obsessive-compulsive disorder (OCD), attention deficit hyperactivity disorder (ADHD), depression, anxiety, and various learning disabilities. These associated disorders are often stressors for children with TS that hinder students' social development and academic achievements. A thorough understanding of proper interventions for children who experience these associated disorders is essential in order to help students to increase their academic performance as well as to develop their social and emotional functioning.

It is essential for school psychologists to understand that evaluations of children with TS should encompass all areas of the students' lives in order to ensure the implementation of effective intervention plans within the school environment. Emotional functioning, as well as social and family settings, should be analyzed in order to have a thorough evaluation. After this assessment is complete, school psychologists can select the most appropriate interventions to address the students' needs. More research must be conducted in order to determine whether or not school psychologists practicing in New York and New Jersey have adequate knowledge of TS in order to meet the needs of their students. If their levels of knowledge prove to be inadequate, steps will have to be taken to enhance their understanding of the disorder. This will ensure that all students diagnosed with TS within both states receive the support with which they require.

Chapter 2

Review of Literature

Overview

Tourette Syndrome (TS) is a neurological disorder which presents itself during childhood and generally progresses into adulthood. Chronic motor and vocal/phonic tics are typical indicators of this neurological condition. Depending upon the case, the degree of the tics can range from mild to very severe. Many individuals endure serious tics as a child but find that they drastically decrease in severity, frequency and intensity as they enter adolescence and adulthood. However, it is important to mention that these tics can also intensify for some children with TS as they approach adulthood (Bronaheim, 1991; Walter & Carter, 1997).

There has been an increased amount of research on Tourette Syndrome conducted by the medical community since the early 1970's. The research has focused on the diagnosis, treatment, interventions and the symptomatology associated with TS. This has given rise to an increased awareness of how the symptoms of TS can have a negative impact on an individual's daily functioning. Specifically, it has been found that students with TS experience problems in schools socially, emotionally, and academically. Because of these difficulties, school psychologists are often involved in such cases. However, there are deficits within the literature regarding the amount of knowledge about TS that school psychologists possess (Walter & Carter, 1997).

This section provides an overview of the literature describing TS and its negative effects on children, adolescents and adults; it also examines the role that school psychologists have in assessing students and in implementing strategies to assist these

children. This section also defines and describes the frequency of associated disorders such as Attention Deficit Hyperactivity Disorder (ADHD), Obsessive-Compulsive Disorder (OCD), depression, aggression, and learning disabilities. Societal and prevalence differences of various cultures and gender are also included. In addition, the importance of evaluating and determining interventions and educational placements of children with TS, while adhering always to ethical guidelines, are discussed within this portion of the chapter.

Description of Tourette Syndrome

Gilles de la Tourette was the physician who first became aware of the motor and vocal/phonic tics among several of his patients. He discovered that these abnormal movements were beginning in childhood or adolescence. Many of these individuals were also experiencing coprolalia, or uncontrollable swearing, and echolalia, or the repetition of one's sounds or phrases (Walter & Carter, 1997). TS, mentioned initially in a medical publication in 1925, presented the case of a French noblewoman named Marquise de Dampier. Her case sparked interest because she was suffering from the classic signs of the disorder (Walter & Carter, 1997). Although it was evident that the awareness of TS was increasing slightly, only fifty cases were described in the literature between 1885 and 1965 (Shapiro, Shapiro, Brunn, & Sweet, 1978). In the 1960's, the medical community witnessed the discovery of a new medication called Haloperidol, an antipsychotic drug that has been found to reduce the severity of tics (Walter & Carter, 1997). The discovery of this successful new drug generated interest in conducting further research of TS in the 1970's and 1980's. Currently, haloperidol is still being used to treat patients who possess mild or severe motor and/or vocal tics. However, continuing research has seen the

discovery of new medications which have been equally successful in lessening the degree of tics. The discovery that medications influence brain chemistry indicates that TS is a neurological disorder (Walter & Carter, 1997).

Definition

TS is described as a spectrum disorder because individuals experience a range of severity of symptoms. The tics can also vary by type and duration (Shapiro et al., 1978). According to Packer (1997), some patients demonstrate only motor tics or only vocal tics. Individuals with these tic disorders are considered to be on the TS spectrum. However, they do not meet the full criteria of TS because they do not exhibit both motor and vocal/phonic tics. Medical professionals and researchers consider TS to be the most serious of all the various tic disorders.

There is overlap between the different TS disorders, which sometimes makes it cumbersome for clinicians to distinguish one from the other. In order to help present clarity, it was suggested by Packer (1997) that TS be subdivided into component parts. The parts are as follows: a) 'pure TS' in which the individual experiences motor and vocal tics, (b) 'full blown TS' in which the patient suffers from coprolalia as well as echolalia and palilalia, and (c) 'TS-plus' in which the individual experiences co-morbid disorders in addition to the tics. As previously stated, some of the most common co-morbid disorders are Attention Deficit Hyperactivity Disorder (ADHD) or Obsessive Compulsive Disorder (OCD) (Carroll & Robertson, 2000; Packer, 1995).

Diagnostic classification has also been developed by the Tourette Syndrome Association (TSA), the American Psychiatric Association (APA) and the World Health Organization (WHO). The classification criteria established by the APA is included in the

Diagnostic Statistical Manual-Fourth Edition-Text Revision (DSM-IV-TR). Because there is no medical or genetic test to identify TS formally, this manual is a viable source of reference for medical professionals. The criteria presented in the DSM-IV-TR assists psychiatrists, psychologists, neurologists, medical doctors, and other medical professionals in making accurate diagnoses which are essential for appropriate treatment (Carroll & Robertson, 2000; Packer, 1995).

According to the DSM-IV-TR, in order for an individual to be diagnosed with TS, there must be the existence of multiple motor and at least one vocal/phonic tic, the occurrence of tics must be almost every day for a period of at least one year, the onset of the tics by age 18 and the stipulation that the tics are not the result of a general medical condition or substance abuse (APA, 2000). The WHO outlines the requirements of mental and medical conditions in the International Classification of Diseases (WHO, 1992). The ICD-10 has the same requirements for TS as does the DSM-IV-TR with the sole difference that the ICD-10 does not have an age limit for the onset of symptoms (Carroll & Robertson, 2000).

The Tourette Syndrome Association (TSA) developed their own criteria in 1993, based on the idea that the DSM-IV-TR did not accurately distinguish the various tic disorders. TSA initiated an organization called the Tourette Syndrome Classification Group (TSCSG) to create new definitions of TS and the other tic disorders (TSCSG, 1993). Although similar to the DSM-IV-TR, the definitions for tic disorders presented by TSCSG can be distinguished in four ways. The first is that the age of onset requirement is extended from 18 years of age to 21 years of age. The second is the requirement that the tics must change in location, in frequency, in number, in type, and in severity during their

duration. The third criterion is that there may be a chronic single motor tic without the presence of any vocal/phonic tics, and the fourth is that the diagnosis may be classified as “definite,” “probable,” or “by history” if the tics are witnessed by a reliable source (TSCSG, 1993).

The criteria presented by DSM-IV-TR, CDI-10 and TSCSG appear to have clear and simple requirements for identifying TS. However, every child and adolescent with TS is unique and has his or her own severity of duration and intensity of tics, therefore making it arduous to distinguish and diagnose (Bronheim, 1991; Jagger et al., Prusoff, Cohen, Kidd, Carbonari, & John, 1982). The uncontrollable motor and vocal movements can also vary in degree from one individual to another. Consequently, the clinical picture which will be presented in the following section may not be characteristic of every individual, but has been observed in the majority of people who are suffering from TS.

Motor and vocal/phonic tics can be categorized as simple or complex. Simple tics such as eye blinking and facial twitches are typically meaningless movements which are abrupt in nature. Complex tics such as jumping, arm flapping, gyrating/bending are more involved and have purpose when compared with the simple isolated motor movements (Bagaheri, Kerbeshian, & Burd, 1999; Comings, 1990; Cohen & Leckman, 1999). The simple vocal/phonic tics presented by an individual are also sudden and have no meaning behind the noises; this is in contrast to the complex vocal sounds which are observed as having more purpose. Simple tics consist of throat clearing and grunting, where as complex vocalizations can be described as verbalizations such as talking to oneself (Jankovic, 1992; Packer, 1995).

Although they are rare traits of children and adolescents, coprophenomena, echophenomena, and palilalia are complex vocal/motor tics which can lead to serious frustration for individuals with TS. Coprophenomena refers to coprolalia and copraxia. Coprolalia is the uncontrollable utterances of obscenities and non-obscene vocalizations, which are considered inappropriate by society's standards (Shapiro, Shapiro, Young, & Feinberg, 1988). Only 5% to 30% of the overall TS population experiences coprolalia and it is found infrequently in individuals who show only mild signs of TS (Carroll & Robertson, 2000). An important distinction of coprolalia is that an individual must exhibit these vocalizations in an environment where such behavior is inappropriate. These obscenities are impulsive and evoked by an intense urge that cannot be controlled by the person vocalizing these sounds (Comings & Comings, 1985; Parker 1995). It is important to note that if coprolalia were to be part of a person's repertoire of tic sounds, it will most frequently emerge before the age of 15 (Robertson, 2000). Similar to coprolalia, copropraxia does not often appear in individuals with TS, affecting less than 30% of patients. Copropraxia is the usage of inappropriate and obscene gestures such as "giving the finger" without provocation (Packer, 1995).

Both echopraxia and echolalia, which are relatively rare characteristics of TS, are types of echophenomen. Echopraxia is exhibited when an individual with TS imitates another person's movements and echolalia is the repetition of another person's vocalizations (Carroll & Robertson, 2000). Echopraxia has been noted only by Kano, Ohta, & Nagal, (1998a); Lees, Robertson, Trimble, & Murray, (1984); Micheli et al. (1995) as occurring in up to 21% of patients, compared with echolalia which has been witnessed in 15 to 46% of individuals with TS (Cardoso, Veado, & de Oliveria, 1996;

Jankovic & Rohaidy, 1987; Kano, Ohta, Nagal, Pauls, & Leckman, 2001; Lees et al. 1984; Micheli et al.; 1995; Staley, Wand & Shady, 1997). When a person with TS repeats his or her own words, sounds, or phrases, this individual is experiencing palilalia (Carroll & Robertson, 2000). It has been found in only 9 to 19% of patients with TS (Cardosa et al. 1996; Kano et al. 2001; Micheli et al. 1995). Although echophenomena and palilalia are not typically viewed as socially inappropriate as is coprophenomena, they can also present many school related problems for children and adolescents. These issues include feelings of ridicule and embarrassment which can lead to beliefs that they are inadequate in relation to their peers (Carroll & Robertson, 2000).

Urges and suppression are essential characteristics for understanding TS and its effects on the people with this neurological disorder. Individuals with TS, especially those with mild traits may have the ability to control their tics for varying periods of time. Depending on the degree of severity, the suppression of these tics can last for seconds, minutes, or even hours (Bronheim, 1991; Comings, 1990). Being able to suppress urges can be very empowering for persons with TS because they feel they have some control over their movements and sounds. However, because it requires tremendous mental and physical energy to suppress these intense urges, the discomfort will eventually cause the involuntary movement to surface and be released (Comings & Comings, 1987b; Shapiro et al., 1978; TSCSG, 1993). Frequently, motor and vocal tics are preceded by a feeling of inner tension throughout the entire body or within specific regions of the body (Jankovic, 1992). The urge to tic increases the pressure and the need to release the building up of the tension. Relief is achieved only when the individual performs the tic or multiple tics (Leckman et al., 1997).

Many children and adolescents will work hard to suppress tics within the school environment. Consequently, they exhibit a rapid burst of severe movements or vocalizations when they return home. After the tics are released, the child will feel a great sense of relief. However, it is not long after the emergence of these movements or vocalizations that the inner tension and discomfort will again begin to increase (TSCSG, 1993). The cycle of the building up of tension and the eventual releasing of the tics can be very mentally and physically strenuous for the individual with TS (Leckman et al., 1997). The intense increase of the urges sometimes produces more discomfort than the tics themselves (Cohen & Leckman, 1994).

Many people believe that tics can consistently be controlled by the individual with TS. Consequently, this has led people to believe that individuals are purposely engaging in such behaviors in order to seek attention (Bronheim, 1991). This belief could be especially troubling for children and adolescents with TS when attending school. If the nature and the symptoms of TS are not fully understood, these individuals will be more likely to have a negative school experience. Teachers and administrators may view the children's actions as intentionally disruptive and these children may find themselves unjustly ridiculed by their peers (Bronheim, 1991).

The waxing and waning of TS symptoms is a pertinent characteristic of the disorder because it is related to the severity and intensity of the tics which change over time (Comings, 1990). Waxing and waning describes the spontaneity of the symptoms and how they can be in remission either for short or for long periods and then reappear unexpectedly with mild to severe intensity. The waxing and waning of the tics associated with the disorder can be observed for weeks, months or years for the duration of the

syndrome (Bruun 1984; Lecman et al., 1997). The severity of the tics can be influenced by the child's level of emotional stress within the context of day-to-day events. Children will frequently experience an increased number of tics if they are distressed, anxious, or fatigued. Feelings of boredom or excitement can also be linked to the increase of involuntary movements (Bagheri et al.1999; Bornstein et al.1990; Jagger et al. 1982; Jankovic, 1992; Min & Lee, 1986; Staley et al., 1997).

There are several factors that can influence a child's tendency to exhibit his or her symptoms of TS. For instance, children with TS are especially susceptible to ticking in social gatherings. These situations may induce feelings of anxiety because they are afraid they will not be able to control their tics around other individuals. The more anxious they become, the more difficult it will be for them to suppress their tics (Bornstein et al.1990; Micheli et al., 1995; Packer, 1995; Silva, Muñoz, Barickman, & Friedhoff, 1995). Specific environmental settings, such as those in which silence is expected, can also exacerbate a child's TS symptoms. For example, being in a library or church or needing to complete a task within a time limit may bring about the urge to make involuntary movements or vocalizations (Jankovic, 1992; Packer, 1995). The stress of transition, such as returning to school after a vacation, can also be difficult for children and may increase their tendency to tic (Bornstein et al, 1990; Micheli et al., 1995; Packer, 1995; Silva, Muñoz, Barickman, & Friedhoff, 1995).

Comorbidity and Associated Disorders

As discussed earlier, children and adolescents may experience other disorders in conjunction with TS. Attention Deficit Hyperactivity Disorder (ADHD) and Obsessive Compulsive Disorder (OCD) are significant conditions that may be associated with TS

(Leckman & Cohen, 1988). In many situations these co-morbid disorders may have a greater negative impact on the child or adolescent than the involuntary movements and verbalizations themselves. Some other co-morbid conditions include mood disorders, depression and various learning disabilities (Leckman & Cohen, 1988).

One study completed by Kurlan, Como, Miller, Palumbo, Deeley, Anderson, Eapen, & McDerrumott (2002) indicates that ADHD and OCD are more prevalent in students with TS than in those who do not have the syndrome. The same sample of students demonstrates that children with TS are more likely to have anxiety disorders, mood disorders and disruptive behavior issues than those without TS (Bagheri, Kerbeshian, & Burd, 1999; Stephens & Sandor, 1999).

Attention Deficit Hyperactivity Disorder (ADHD)

Individuals diagnosed with ADHD experience hyperactivity, impulsivity and difficulty sustaining attention. Children who have problems focusing often suffer within the school environment because they must exert a great deal of energy to control their impulsivity before they can attempt to focus on the lesson. Many children with TS exhibit traits of ADHD from one to three years prior to the occurrence of an initial tic (Bornstein et al., 1990; Cardoso et al., 1996; Comings & Comings, 1984; Freeman, Fast, Kerbeshian, Robertson, & Sandor, 2000; Jagger et al., 1982). It is estimated that 50 to 60% of individuals with TS will be diagnosed with ADHD at some point in their development (Spencer, Biederman, Harding, O'Donnel, Wilens, Faraone, Coffey, & Geller, 1998; Yeates & Bornstein, 1994). The research indicates that individuals who have severe symptoms of TS have a 70 to 80% chance of developing ADHD (Packer,

1995). In contrast, only an estimated 30% of individuals who experience mild tics will be diagnosed with the co-morbid disorder (Packer, 1995).

There has not been an extensive amount of research to determine the actual impact of ADHD on the level of functioning of children with TS. It is evident in the literature that the traits of ADHD can cause distress for school-aged children (Dykens, Leckman, Riddle, Hardin, Schwartz, & Cohen, 1990). Some research concludes that the coexistence of TS and ADHD results in deficits in children's social and emotional functioning (Carter, O' Donnell, Schultz, Scahill, Leckman, & Pauls, 2000). In addition, it may lead to disruptive behavior within the classroom, to difficulty in establishing friendships, and to inferior social and adaptive skills. Depression, conduct disorder, and anxiety have also been linked frequently to the coexistence of TS and ADHD (Nolan, Sverd, Gadow, Sprafkin, & Ezor, 1996; Pierre, Nolan, Gadow, Sverd, Sprafkin, 1999).

The connection of ADHD and TS continues to be debated. Some researchers believe the co-morbid relationship is biological, yet others argue that there is no genetic component (Comings & Comings, 1984; Knell & Comings, 1993). Other researchers have suggested that the traits of ADHD in children with TS are different from those in individuals who are diagnosed with only ADHD. These same researchers have implied that inattentiveness and impulsivity are individual components of TS (Robertson, 2000). It is important for researchers, medical professionals and educators to become knowledgeable about the traits of both TS and of ADHD. It is essential, however, that children with both TS and ADHD, as well as those diagnosed only with TS, are provided with intervention plans within the school and home settings to help them to grow

emotionally, socially, academically, and cognitively (Spencer, Biederman,, Harding, O'Donnell, Wilkens, Farone, Coffey, & Geller, 1998).

Obsessive-Compulsive Disorder (OCD)

Obsessive-compulsive disorder is characterized by undesirable, distressing, ritualistic, and obsessive thoughts and compulsive behavior. Individuals with OCD may experience a serious compulsion to self check, to count, to hoard, to repeat, to touch objects, and to establish symmetry within their environment. Compulsions may include a fear of contamination which usually creates a need to wash excessively (Cohen & Leckman, 1994). Inappropriate sexual behavior is also commonly demonstrated by patients with OCD. An individual's sexual compulsions may include an urge to engage in exhibitionism or to touch themselves or others in a sexual manner (Carroll & Robertson, 2000; Comings, Himes, & Comings, 1990). Compulsions serve as coping mechanisms to relieve anxiety experienced by the individual. Obsessive thoughts may be inappropriate and interfere with functional and rational thinking. The disturbing obsessions and compulsions can be very debilitating, hindering an individual's social, emotional, cognitive and academic functioning (Cohen & Leckman, 1994).

It has been noted by the literature that up to 40% of children with TS engage in self-injurious behavior. This is most often associated with the presence of obsessive compulsive symptomatology (Packer, 1995; Robertson, 2000). Some of these behaviors consist of head banging, hitting oneself, scratching body parts and pulling one's hair (Carroll & Robertson, 2000; Robertson, Banerjee, Eapen, & Fox-Hiley, 2000).

It can be difficult to distinguish whether or not a behavior is a tic or is a compulsion among individuals who are diagnosed with both TS and OCD. In addition,

obsessive and compulsive behaviors have a tendency to become more severe as tics intensify (Comings, Himes, & Comings, 1990). Regardless of whether or not symptoms stem specifically from TS or from OCD, the research indicates that there is a significant correlation between OCD and TS. For proper diagnosis and treatment, it is essential for medical professionals, school personnel, and family members to understand the effects of emotional and social distress of both disorders (Comings, Himes, & Comings, 1990).

There is a 2.5% frequency rate of OCD among adults and a 1 to 2.3% rate among children. Research indicates that approximately 11 to 80% of individuals diagnosed with TS will also exhibit characteristics of OCD (Carroll & Robertson, 2000). Tics, both motor and vocal, begin to emerge in early childhood but the co-morbidity of OCD and TS is not known until pre-adolescence when the presence of a majority of the traits associated with OCD begin to appear (Bornstein et al., 1990; Cohen & Leckman, 1994; Packer, 1995). An estimated 35 to 50% of patients who have TS will meet the diagnostic criteria for OCD (APA, 2000).

Children with TS who exhibit features of OCD and ADHD have been found to have more neurological deficits than those who were diagnosed only with TS. Neurological and genetic factors have been accepted as causes of TS and OCD. However, research has not been as conclusive regarding the genetic deficits influencing the co-morbidity of TS and ADHD (Walkup, LaBuda, Singer, Brown, Riddle, & Hurko, 1996).

Depression and Mood Disorders

The causes of depression and mood disorders among the TS population are not empirically conclusive. Some of the research concludes that these two disorders could

have a genetic link to TS. Other research indicates that the connection stems from environmental factors, independent of genetics. Regardless of etiology, medical professionals, educators, and parents should be aware that the depression and mood disorders are prevalent in individuals with TS. The incidence of depression is influenced by the stigmatization encountered by individuals who have TS. The embarrassment that these individuals often experience can lead to an emotionally debilitating state of depression. The research indicates that 25% of all patients diagnosed with TS experience depression (Packer, 1995). Among children and adolescents, it is estimated that 30 % of those with TS suffer from depression (Rosenberg, Brown, & Singer, 1995; Spencer, Beiderman, Harding, Wilens, & Faraone, 1995). Medication can be a useful vehicle for treating TS. However, depression can also be a side effect of some medications (Packer, 1995).

Aggressive Behavior and Oppositional Defiant and Conduct Disorder

Oppositional Defiant Disorder (ODD) and Conduct Disorder (CD) are two behavioral disorders that some individuals with TS experience (Budman, Bruun, Park, Lesser, & Olson, 2000). Aggression and rage are significant components both of ODD and of CD. It is estimated that 35% of children with TS engage in aggressive conduct. Frustration stemming from the feeling that they are different from their peers may cause them to direct fits of rage toward themselves and/or others. Examples of aggressive maladaptive behaviors that they may engage in include lying, stealing, starting fires, hurting animals, fighting with peers, shouting, feeling hateful, and engaging in substance abuse (Comings & Comings, 1987a). These outbursts tend not to be goal-directed or stimulated by external antecedents. As with tics, they can periodically produce inner

tension, which is followed by a release of pressure (Budman, Bruun, Park, Lesser, & Olson, 2000). The bouts of disruptive behaviors can have a negative impact on developing relationships, academic functioning and emotional development (Stephens & Sandor, 1999). In addition, frequent expressions of rage and aggression may lead to hospitalization for psychiatric treatment. The literature indicates that rage and attacks from children and adolescents are more prevalent in patients who have also been diagnosed with ADHD, OCD, or ODD (Budman et al.2000).

Anxiety and Phobias

Anxiety is also frequently associated with TS because of the victimization and scrutiny that affected children experience. Tics and unpredictable behavior cause individuals with TS to have self-image difficulties. The uncontrollable tics frequently produce awkwardness in social situations. The anxiety is manifested in a child's avoidant behavior from peers, in school refusal, in fears of being overwhelmed, and in daytime fears of being attacked (Comings, Himes, & Comings, 1990; Wolf, 1988). Noticeable tics may evoke social ridicule from peers. This ridicule often leads to embarrassment, which can cause emotional pain and trauma. Parents of children with TS frequently shield them from social events so they will not encounter these awkward situations and feel victimized. However, this strategy can be detrimental because they may miss opportunities to develop socialization skills; the lack of these skills could lead them to feel isolated from their peers (Comings, Himes, & Comings, 1990; Wolff, 1988).

The literature emphasizes the fact that anxiety disorders are more prevalent among patients who are also diagnosed with TS than among individuals who are not (Carroll & Robertson, 2000). According to Robertson (2000), anxiety was prevalent in 30

to 44% of individuals diagnosed with TS. In the same study, individuals identified as having TS were also found to have a high prevalence of simple phobias and panic attacks. A large number of children with TS who experience traits of anxiety have Generalized Anxiety Disorder, which has excessive worry as the primary feature (Carroll and Robertson, 2000). The worry is generalized and extends to a variety of situations. Other related anxiety disorders include panic disorder, agoraphobia, separation anxiety disorder and overanxious disorder. Anxiety among individuals with TS is dependent on the level of tic severity (Coffey, Biederman, Smoller, Geller, Sarin, Schwartz, & Kim, 2000).

Cognitive and Academic Deficits

Children and adolescents with TS also possess various neurological, behavioral, and cognitive characteristics which can be measured by neuropsychological tests (Como, 2001). Research has concentrated on how individuals with TS suffer from neurological dysfunction. These deficits have been linked to specific brain regions. Several studies have analyzed visual-motor skills and executive functioning because of their association with the Basal Ganglia as well as Prefrontal Cortex. Executive functioning refers to the functioning of various cognitive skills that an individual possesses. These abilities include goal-directed behavior, language skills, planning and organization, working memory, sustained attention, vigilance, inhibition, and mental tracking (Como, 2001; Cummings, Singer, Krieger, Miller, & Mahone, 2002). It has been concluded that the overall level of executive functioning of individuals with TS is not hindered. However, some of the specific areas of intellectual capacities which have been reported to be most often affected are visual-spatial and visual-perceptual ability, visual-motor integration and fine-motor skills, and sustained attention (Bornstein, et al., 1990; Bornstein, King, &

Carroll, 1983; Cummings et al., 2002; Incagnoli & Kane, 1981; Randolph, Hyde, Gold, Goldberg, & Weinberger, 1993).

Academic demands can be overwhelming for a child with TS, especially if this particular child is experiencing limited cognitive functioning. Deficits with intellectual abilities will also have a negative impact on a child's level of executive functioning. This will make learning experiences arduous and consequently produce further distress (Como, 2001). Pressure situations can give rise to the frequency and severity of tics as well as to inappropriate and disruptive behavior. The unpredictability of individuals' uncontrolled, involuntary tic behaviors can also hinder their learning capacities. As many as 50 to 60% of children with TS demonstrate significant learning disabilities; this is true, especially in the areas of mathematics, language production, and comprehension (Comings, 1990).

Evaluation and Assessment of Children and Adolescents with TS

The diagnosis and management of treatment plans for TS were initially performed solely by physicians. Currently, psychologists are also identifying TS and developing treatment plans. If a child is experiencing tics, it is essential that a comprehensive evaluation be completed in order to determine if they meet all of the criteria for a TS diagnosis. A complete assessment will help to ensure that appropriate interventions are implemented, thereby enhancing the child's treatment. Early detection is also important in order for children and parents to gain an awareness of TS. Insight into the disorder will help them to cope more effectively with the symptomatology (Bornstein, Stefl, & Hammond 1990).

Although it is understood by mental health professionals that a timely diagnosis is best practice, characteristics of TS in children are sometimes not recognized until they are in pre-adolescence or adolescence. The delay between the onset of tics and the official diagnosis is called a diagnostic lag (Bornstein, Stefl, & Hammond, 1990). In studies conducted by Bornstein, Stefl, & Hammond (1990), it was identified that the diagnostic lag tends to be shorter among older patients than among younger ones. A diagnostic lag may occur because of a clinician's lack of experience and familiarity with TS and its associated characteristics. For instance, some clinicians may not realize that coprolalia does not have to be present in order to make a TS diagnosis. Consequently, they may not identify children as having TS if motor and vocal tics are the only traits the children are demonstrating (Comings & Comings, 1985; Jagger et al., 1982). In addition, motor and vocal tics may not be very obvious and are therefore, hard to detect. Involuntary vocal tics, such as coughing, sniffing, or throat clearing could be mistaken for a child's having a chest cold or allergies (Golden, 1977). Uncontrollable motor movements have also been treated as signs of inattentiveness, hyperactivity or other minimal brain dysfunctions. In some cases, TS's associated disorders are diagnosed, but not the TS itself. Many individuals also have the capacity to suppress their tics very effectively, thereby making it difficult for clinicians to observe the involuntary movements and vocalizations in order to make an appropriate diagnosis (Comings, 1990; Wand, Shady, Broder, Furer, & Statley, 1992).

The Yale University Child Study Center, which has clinics for children who have tic disorders and OCD, developed a specific protocol for diagnosing TS. The Yale Center believes that an evaluation must initially consist of recognizing a child's strengths.

Hobbies and other positive aspects of a child's life can be utilized to help the child feel more empowered and demonstrate resiliency. These skills will assist the child in coping with his or her disorder from childhood into adulthood. The second step of the evaluation process is to research and analyze the child's past developmental history and current presentation. Family medical history as well as the child's neuropsychological and physical health should be examined in the assessment process (Leckman, et al., 1999).

As part of the evaluation process, it is essential to gain an understanding of how TS negatively impacts daily functioning. The severity and the onset of the tics must be investigated along with associated disorders such as ADHD, OCD, anxiety disorders, depression, and aggressive behavior (Leckman, et al, 1999). Leckman, et al. (1999) recommends the plotting of tics and associated disorders on an age timeline. This evaluation practice can be effective for the purpose of observing any changes in behavior and in involuntary movements/vocalizations as the child matures and encounters different life circumstances. Clinicians must also analyze how the child is adapting to his or her home and school environments in order to gain insight into the child's emotional and relationship status with his/her siblings, parents, peers, and teachers. The results of an evaluation are utilized to determine what kind of intervention plan should be developed. A thorough assessment can also identify and prioritize a child's most severe symptoms to be targeted in treatment (Leckman, et al, 1999).

Clinical rating scales are useful in investigating primary symptoms of the disorder. The diagnostic rating scale assists in providing a comprehensive assessment and systematic data collection over time (Scahill et al.1993). Although these rating scales can be very beneficial, the observation of tics can be problematic because of their changes of

severity. Uncontrollable movements and vocalizations also vary, depending on an individual's level of exacerbation and ability to suppress the tics (Goetz & Kompoloti, 2001).

There are three different methods which can be utilized to diagnose TS in children and adolescents. These include self-report, direct observations, and clinical ratings and interviews. Each of these methods has advantages and disadvantages and varying levels of effectiveness. Many evaluators prefer the self-report method because of the ease in which it can be scored (Goetz & Kompoloti, 2001). The self-report can also be very cost-effective (Scahill et al., 2006). It also does not require a great amount of time to administer. The design of the self-report is a questionnaire to be completed by the individual or parent to measure current history and symptoms. The questionnaire includes several checklists such as the Tourette Syndrome Symptom List (TSSL), The Tourette Syndrome Self-Report (TSSR), and the Motor Tic, Obsessions, Vocal Tic Evaluation Survey (MOVES), which provide the children and parents with an opportunity to rate the severity of the symptoms. (Cohen, Leckman, & Shaywitz, 1984; Gafney, Seig, & Hellings, 1994). The Tourette Syndrome Questionnaire (TSQ; Jagger et al., 1982) and the Ohio Tourette Survey Questionnaire (Bornstein et al., 1990) are two additional surveys that have been utilized to gather pertinent information (Goetz & Kompoloti, 2001).

As with many self-report measures, relying on assessing individuals can also be problematic. One shortcoming is that children or parents may complete the survey incorrectly. Patients and parents may also underestimate or overestimate the symptoms. Inaccurate information could also stem from non-compliance and parent observer bias, leading consequently, to TS being misdiagnosed. It has been suggested that clinicians

should explain how to complete the rating scale in order to ensure that information is reported accurately (Goetz & Kompoliti, 2001). Self-report surveys can also be limiting because they do not always account for associated characteristics such as inattentiveness and impulsivity (Goetz & Kompoliti, 2001; Leckman et al., 1999; Scahill et al., 2006).

Direct observation is a more objective method of analyzing tics. Because the severity of the tics can be overtly seen or heard, direct observation is an effective way to gather information (Leckman, et al., 1999). However, a limitation can arise because of the frequent waxing and waning and variability of tics over time. The capacity for patients' to suppress their tics in different environmental settings can be another limiting factor. In addition, the individual may suppress tics if he or she is being observed by the new person. Consequently, longer or multiple observations would need to be conducted in order to investigate the frequent changes in involuntary movements and sounds (Leckman et al. 1999; Scahill et al, 2006).

Both *in vivo* and videotaped observations can be used when identifying tics. *In vivo* observations involve the clinician's observing the child in his/her natural setting such as in a school (Scahill et al., 2006). These settings are effective places for the examiner to record the frequency and severity of tics that the child exhibits. The evaluator can also record how the child is interacting with his/her peers. It is important to note, however, that a limitation of the *in vivo* method is that tics may present themselves differently or not at all in various settings (Scahill et al., 2006).

Videotaping can be a very effective technique when investigating the frequency of tics and type of behavior demonstrated by potential TS patients. It gives the examiner the opportunity to observe the child within his or her natural setting without him/her

knowing they are being observed. Videotaping also provides the clinician the advantage of recording tics from several different body regions at the same time (Goetz & Kompoliti, 2001). There has been a positive correlation between videotaped observations of tics and diagnostic rated instruments such as the self-report surveys (Scahill et al. 2006). There is high level of inter-rater reliability in using this method, which can be attributed to the effective measuring of changes of tics over time and the severity of pharmacological treatments (Scahill et al., 2006). There are instruments which have been developed in order to videotape children successfully within their natural environments. The Rush-based Tic Rating Scale indicated by Goetz, Tanner, Wilson & Shannon (1987) is one such instrument that was created to validate psychometric protocols when using the videotaping technique. This particular method lasts only 10 minutes and requires that the child be relaxed and comfortable with the examiner in the room. It is also necessary for the observer to be relaxed with being alone with the child in the room. These two conditions are set up twice for 2.5 minutes each time. The cameras are set up to monitor and record tics exhibited throughout the whole body (Goetz et al., 1987). A possible disadvantage of direct observation and videotaping is the amount of time required when examiners are analyzing the data (Leckman et al., 1999).

It is essential that clinician ratings and interviews include gathering pertinent information both from the child and from the parent. Obtaining past and current history is important in order to record accurately, the frequency of tics and behavior within various settings (Goetz & Kompoliti, 2001). The Yale Global Tic Severity Scale (YGTSS, Leckman et al., 1989), Tourette Syndrome Severity Scale (TSSS, Shapiro & Shapiro, 1984), Tourette Syndrome Global Scale (TSGS, Harcherick Leckman, Detlor & Cohen,

1984), and Hopkins Motor and Vocal Tic Scale (Walkup, Rosenberg, Brown, & Singer, 1992) are rating instruments that are frequently used when observing children. The YGTSS is particularly beneficial and considered one of the best measures used because it combines clinical rankings with self-report data (Scahill et al., 2006). Clinician rating scales are very effective because they frequently gather accurate information. However, they also have a tendency to be time consuming. More effort is also required of the clinician in comparison with other observation methods. They also do not account for tic suppression (Scahill et al, 2006).

In order to conduct thorough observations and assessments, it is essential for clinicians to use multidisciplinary evaluations. The multidisciplinary approach often uses a variety of methods for gathering information from different settings. It has been recommended that parents consult the current literature regarding TS when deciding on a methodology to assess and treat their child. However, choosing an intervention can be very subjective and dependent both on the patient's individual needs and on desires of the family (Leckman, et al., 1999).

School Difficulties, Interventions and Treatment

It is important for school psychologists to have an awareness of a child's strengths and weaknesses after a clinical evaluation has been completed. This can be beneficial in creating and implementing an individualized school treatment plan. A treatment plan should be flexible, with room for adaptation over time to meet the child's developmental changes (King et al., 1999). Treatment of TS can be broken up into a basic and an individualized approach. The basic type consists of intervention services provided by the school system, including psycho-educational and clinical support. Typical individualized

plans include the use of pharmacology, the development of behavioral interventions and social skills, psychotherapy, and parent training (Bagheri, Kerbeshian, & Burd, 1999). The literature throughout this section describes the role of school psychologists and of schools, including a variety of beneficial interventions that can be implemented in the treatment of children and adolescents diagnosed with TS and associated disorders and learning disabilities.

School Interventions and Role of the School Psychologist

Students with TS have been known to have at least average cognitive ability. However, they often do not realize their academic potential because they are hindered by emotional and social difficulties. In order for school psychologists to become fully aware of a student's intellectual potential, they must conduct a comprehensive psycho-educational evaluation that assesses the child's levels of social, emotional, cognitive, and academic functioning (Bagheri, Kerbeshian, & Burd, 1999).

Among children with TS, 33-68%, receive their education within general classroom settings (Comings, Himes, & Comings, 1990). A majority of children diagnosed with TS are expected by school personnel, parents and medical professionals to function and perform well academically without any type of struggle (Packer, 1995). However, there are many children with TS who suffer academically due to a variety of factors. These include tic severity, social challenges, co-morbid disorders, learning disabilities, side effects from drugs, and neurological impairments. Therefore, the expectation for them to be functional and successful in school without assistance may be unrealistic. This can produce stress and increase tics and other maladaptive behaviors associated with TS. These children need special accommodations within their school

environments in order to meet their potential and to be successful in school. There are various services and academic accommodations that can be utilized within a school system. Section 504 of the American Disabilities Act (ADA) ensures that children with disabilities receive accommodations in order to be educated properly. The Individualized Disabilities Education Act (IDEA) also guarantees accommodations for students with disabilities. The IDEA, unlike Section 504 of the ADA is required, in order to identify a student's unique education needs by implementing an individualized education plan (Bagheri et al., 1999).

The educators of children with TS play a vital role in their successes in school. In order for them to help the students to meet their maximum potential, school psychologists, administrators, teachers, and peers must be knowledgeable about the unique traits of TS and interventions that work best for children with the disorder (Bagheri et al., 1999). Increased knowledge of TS is recommended to encourage acceptance and to decrease teasing, bullying and labeling (Packer, 1997). Sensitivity within a child's school and home settings is also recommended to help them to manage and to camouflage their tics effectively in socially acceptable ways. Children who have supportive environments can also learn to accept and adapt their tics and to develop a strong sense of self-esteem (Packer, 1997). Successful collaboration between school psychologists, school personnel and caregivers will benefit children with TS and contribute to their academic achievements (Scahill, Ort, & Hardin, 1993). The literature throughout this section will discuss different types of beneficial interventions that can be implemented to help students with TS and the associated co-morbid disorders as well learning disabilities.

Pharmacotherapy

Drug therapy is an intervention that has been used with a large number of children diagnosed with TS. It is also the intervention that has been researched most extensively. In this research, medication has proven to be beneficial over the previous 40 years, for ameliorating tics (Sandor, 2003). When tics are decreased using drug therapy, children with TS experience fewer distractions and less need to attempt to suppress tics. This often leads to improved attentiveness and academic success (Bagheri et al., 1999). In addition, drug therapy may improve social and emotional functioning, which can lead to enhanced self-esteem and peer acceptance (Peterson & Cohen, 1998).

It is important for parents and medical professionals to be aware that medication cannot eradicate all involuntary tic movements. Parents must also not be led by clinicians to believe that drug therapy is an intervention which will cure TS. Instead, they must be aware that psychopharmacology's purpose is simply to lessen the severity of tics (Peterson & Cohen, 1998).

Typical and atypical neuroleptics, which are dopamine antagonists, are frequently prescribed to individuals with TS (Carpenter, Leckman, Scahill, & McDougle, 1999). Neuroleptics were originally developed to treat various psychoses. They were also among the first classes of antipsychotic drugs used to treat TS patients (Scahill, 1996). Neuroleptics act as tranquilizers and have been found to decrease the severity of tics and maladaptive behaviors for approximately 70 to 80% of individuals (Cohen, Bruun, & Leckman, 1998; Shapiro, Shapiro, Young, & Feinberg, 1988). Haloperidol is one antipsychotic medication that studies have shown to be effective in reducing the severity of tics. Its positive effects were initially discovered in the 1960's and the Food and Drug

Administration approved its use for adults in 1969 and for children and adolescents in 1978 (Carter et al., 2000). Since then, other antipsychotic medications have been developed and used with a large number of children, adolescents and adults. Pimozide (Orap) and Fluphenazine (Prolixin) are two examples of neuroleptic drugs prescribed by medical professionals to relieve children of the severity of their tics (Sandor, 2003; Scahill, 1996).

Cyclic antidepressants are another class of drugs; these are used to treat anxiety and depression in children and adolescents with TS. Research tends to support the usage of antidepressants because they can help to alleviate separation anxiety, school refusal and symptoms of obsessive-compulsive disorder (Flament, Rapoport, Berg, Sceery, Kilts, Mellstrom, & Linnolia, 1985; Gittelman-Klein & Klein, 1971). Celexa, Lexapro, Luvox, Paxil, and Zoloft are a class of antidepressants known as selective serotonin reuptake inhibitors that are often prescribed to patients with TS who also experience depression.

Stimulant medications, another class of drugs, are also successful in treating comorbid ADHD behaviors. Ritalin, Adderall, and Concerta are some commonly prescribed stimulants. Research indicates that these medications help to assist students to sustain their attention and to decrease inappropriate behavior in the classroom (Abikoff & Gittelman, 1985; Bradely, 1937; Gadow, Nolan, Sverd, Sparafkin, & Paolicelli, 1990). Improved concentration can lead to improved quality of schoolwork and to better grades. Stimulant medication can also suppress the variety of socially unacceptable aggressive, disruptive and oppositional behaviors that are often associated with TS (Bradely, 1937; Gadow, et al., 1990; Hinshaw, Henker, Whalen, Erhardt, & Dunnington, 1989).

Drug therapy as treatment for children with TS is a controversial topic. Parents are sometimes concerned about negative side effects of the medications. Some commonly prescribed stimulants can cause a loss of appetite, altered sleeping habits, abdominal pain, and headaches. Side effects of antipsychotic medications may include cognitive blunting, fatigue, sedation and weight gain (Scahill, 1996). However, it is important to note that drug therapy is monitored and deemed to be safe before it is implemented as treatment. It is also currently the only type of intervention that stimulates the brain chemistry to create positive change (Fazen, Lovejoy, & Crone, 1986).

Behavioral Interventions

Behavioral modification techniques can also be utilized to decrease and relieve the severity of tics in individuals with TS. The objective of behavior modification is to eliminate involuntary tics. However, when one tic is eradicated some other involuntary movement tends to occur in its place. Therefore, it is more appropriate for the professional who is implementing behavior modification to focus on symptom substitution. Tics that may result in self-injury, however, are an exception. They should be eliminated for the safety of the patient (Cohen, Bruun & Leckman, 1998).

There are five major behavioral intervention techniques which have been widely used since the 1970s. These are: massed negative practice, contingency management, self monitoring, self modeling, and habit reversal. Research indicates that all five are effective in reducing the severity of tics and in improving coping skills to deal with tics. Massed negative practice is an intervention plan which teaches children to expose all of their tics as fast as possible within a short period of time. The concept behind the modification is that releasing the tics will provide relief for a longer period of time

(Fredrick, 1971). The goal of the contingency management plan is to provide positive and negative reinforcement for the suppression of tics (Miller, 1970). The self-modeling plan is frequently used with individuals who have TS. This treatment plan exposes the child to only the edited video clips of himself or herself when he or she is not ticking. The goal is to increase the children's confidence so that they can control their involuntary movements (Clark, Bray, Kehle, & Truscott, 2001). Self-monitoring is a useful modification in which children keep a journal to record the frequency of their tics and the feelings that they experience during the various incidences (Varni, Boyd, & Cataldo, 1978). The habit reversal technique is another form of behavioral treatment that has increased in use. Habit reversal describes the act of looking in a mirror while tics are occurring. The goal is for the child to become aware of any precursors which may influence the tics. The rationale behind habit reversal is that reduction of tics is possible if the person can develop a competing physical response which interrupts the original tic. Habit reversal teaches the individual to be aware by helping him or her gain insight into warning signs and urges when he or she feels a tic emerging (Himle, Woods, Piacentini, Walkup, 2007). Family and friends are also solicited to help a child become aware of the different situations in which he or she experiences tics and they are asked to praise the child when he or she is successful in suppressing tics (Azrin, & Nunn, 1973; Azrin & Peterson, 1990).

Because of their effectiveness, behavioral modification techniques are widely used by school psychologists and clinicians to treat children and adolescents with TS. As discussed throughout the literature, co-morbid disorders are frequently associated with TS. Research indicates that exposure therapy and response prevention are beneficial for

patients diagnosed with OCD (King et al., 1999). These techniques have proven to be useful with individuals who have ADHD (DuPaul & Hoff, 1998). However, there has been limited research conducted to determine the success of behavioral strategies, which include contingency management plans and antecedent-based interventions with individuals who have OCD or ADHD along with TS (King et al., 1999).

Psychotherapy

Negative intra-and interpersonal consequences of the tics associated with TS can be disabling (Mateševac, 1991). Psychotherapy is not necessarily given to decrease tics, but rather to assist the individual in handling the social and emotional issues associated with TS. The goal of psychotherapy is to improve coping skills, to improve family and peer relationships, to increase self-esteem and to decrease depression. Therapy is used as an outlet to relieve anxiety, which can be emotionally crippling for children and adolescents. Academic responsibilities and the social stigmas that students with TS experience can be overwhelming without having psychotherapy as a positive resource (Cohen, Friedhoff, Leckman, & Chase, 1992; King et al, 1999; Peterson & Cohen, 1998).

There is limited research supporting the positive effects of psychotherapy with the treatment of TS and its associated co-morbid disorders. However, it is evident that children and adolescents with TS who have high levels of self-esteem and very good social skills have an easier time adjusting to teasing, bullying and criticism from peers (Peterson & Cohen, 1998). Therapy helps individuals understand the characteristics, adjustment problems and disorders which are associated with TS. Strong insight can bolster confidence, problem solving skills and acceptance of abilities and limitations. It can also help individuals to set goals to improve themselves (Carroll & Robertson, 2000).

The suppression of uncontrollable movements and sounds makes concentrating an arduous task within the classroom. Therefore, psychotherapy in the early elementary years focuses on teaching children with TS how to learn coping skill strategies and sustain attention. It stresses the importance of learning social skills in order to interact successfully with peers, teachers, and family members. As children with TS move into pre-adolescence, they are challenged by other obstacles (King et al., 1999). At this stage, students with TS begin to encounter others and are increasingly more aware of embarrassing situations and the negative consequences that their tics have on peer and teacher relationships. Developing self-esteem is vital for a child's persistence through the awkward moments and negative reactions. Increasing self-efficacy can be achieved by creating and following intervention plans within therapy sessions (King et al., 1999). The goal of psychotherapy in adolescence is to help individuals gain a heightened awareness of how to control symptoms and actions and to make appropriate decisions to increase their levels of functioning. The adolescents are also encouraged to gain self-acceptance and create insights into their strengths and weaknesses (King et al., 1999).

Alternative Treatments

There are other types of treatment approaches which are used less frequently than those previously mentioned; however, these can also be beneficial in helping children and adolescents with TS. Some of these methods include self-hypnosis, relaxation therapy and mental imagery (Bergin, Waranach, Brown, Carson, & Singer, 1998). Studies have found that both self-hypnosis and mental imagery are effective in lessening tic severity. In contrast, studies conducted on relaxation therapy have not found this to be as beneficial in the treatment of TS symptomatology (Kohen & Botts, 1987).

Alternative drugs such as botulinum toxin, marijuana, and melatonin have also been used to treat the symptoms of TS. Botulinum toxin has been found to help adolescents reduce premonitory sensations and coprolalia (Scott, Jankovic, & Donovan, 1996). Melatonin appears to be effective for helping children to sleep better. Marijuana has been shown to lessen the degree of uncontrollable motor and vocal tics, although it has not been empirically researched (Sandyk & Awerbuch, 1988). Nutritional supplements are also frequently taken by children and adolescents with TS. It has been reported that 87.8% of TS patients have taken at least one nutritional supplement in order to help control their tics (Mantel, Meyers, Tran, Rogers, & Jacobson, 2004). However, the effects of nutritional supplements have not been researched so the claimed benefits have not been clinically substantiated. In addition, some individuals have reported improvement in their symptoms by following a healthy diet, such as one with reduced sugar intake and increased herbal supplements (Erenberg, 1999; Scahill, Williams, Scwab-Stone, Applegate, & Leckman, 2006).

Parent and Family Support and Interventions

Clinicians must understand that parents and families need support as well as the children and adolescents who have been diagnosed with TS. Many parents have difficulty in dealing with the fact that their child is suffering from the symptoms associated with TS. Initially, family members may experience anger, sadness, depression, guilt or denial (Packer, 1997). Some parents may also inaccurately attribute their child's diagnosis to "bad parenting". Many parents and family members may not fully understand the involuntary and inappropriate tics. Therefore, they need to be educated about all of the characteristics and interventions. The greater the knowledge that they obtain, the more

successful they will be at advocating for their child (Leckman, et al., 1999; Scahill et al., 1993).

Clinicians may refer parents to support groups, parent training sessions, family therapy, and advocacy groups. Local support groups give parents, families and children opportunities to meet other individuals who are either experiencing the symptoms of TS or who know someone who is suffering from TS. Some local support groups also have summer camps for children and adolescents that enable them to meet and interact with others who are also experiencing difficulty with the disorder. Visiting chat rooms on the Internet and writing to a pen pal are other effective ways to help a child feel less isolated (Packer, 1997).

The Tourette Syndrome Association (TSA) is a non-profit organization that acts as an advocacy group for people who have been diagnosed with TS and for their families (TSA, 2001). They are committed to finding a cure for TS and they work with parents and families to cope with the symptomatology of TS. TSA also provides an outlet for parents and families to express their concerns.

As stated previously, there are many different methods used to treat children and adolescents with TS. However, each child has unique needs and there is not one technique that works for every child. Flexibility and the combination of multiple methods are most effective in treating individuals diagnosed with TS (King et al., 1999).

Multicultural, Gender and Ethical Considerations

Multicultural and Diversity Considerations

It is important to gather literature which emphasizes the prevalence of TS among various cultural backgrounds. Research indicates that TS was once diagnosed primarily in

individuals of Jewish Eastern European descent. Recent studies have been completed throughout the regions of North, South, and Latin America, Australia, Europe, Asia and the Middle East (Cardoso Veado, & de Oliveira, 1996; Robertson, Verrill, Mercer, Jamea, & Pauls, 1994). The results of these studies indicate that the percentage of individuals with TS in the United States is comparable with the percentage in New Zealand, Sweden, Taiwan, and Israel. The symptoms of TS, such as age of onset, increase of motor tics, co-morbidity and responses to medication are also consistent across these aforementioned cultures (Cardoso et al., 1996; Kano, Ohta, & Nagal, 1998a; Lees, Robertson, Trimble, & Murray, 1984; Mathews, Amighetti, Lowe, Wetering, Freimer, & Reus, 2001; Micheli, Gatto, Gershanik, Steinschnaider, Pardal, & Massaro, 1995; Min & Lee, 1986; Robertson, et al., 1994; Staley, Wand, & Shady, 1997).

Relative to the TS trait of coprolalia and other uncontrollable vocalizations, Japan has a slightly smaller percentage of people suffering from this characteristic compared with Western countries (Kano et al., 2001). In Japan and Korea, there is a lower frequency of diagnosis of TS (Kano et al., 2001; Min & Lee, 1986). The literature attributes this to the stigmatization that mental illness has in these two nations. Psychiatric illness is also seen as a weakness in Costa Rica where prejudice toward patients diagnosed with TS was discovered (Mathews et al., 2001). Overall, research has shown some consistency in the identification of TS among various diverse cultures. Consequently, it could be argued that the cause of the disorder is genetically based (Robertson et al., 1994).

Gender Differences

A study conducted by Peterson, Leckman, and Cohen (1995) indicates a prevalence of TS in males versus females, ranging from 2:1 to 10:1; male to female. However, these statistics may be misleading. The wide range of prevalence that has been reported may be linked to discrepancies in the manner in which data was collected and analyzed. For instance, questionnaires were utilized to gather some data. However, participants tend to underreport symptoms on questionnaires. Formal interviews were also utilized. The data collected through this method may be tainted, however, because interviewers may have difficulty discerning between mild and severe symptoms, thereby indicating a higher prevalence of TS than perhaps truly exists. Another factor is that the samples in the study were pulled from both clinical and community settings. The sample population for the interviews consisted of individuals in clinics, whereas the sample population for the questionnaires consisted of members of the general community.

Other research confirms that TS is more frequently diagnosed in males than in females, although the range of prevalence varies. A study conducted by Pauls and Leckman (1986) indicates that males are 3 to 5 times more likely than females to be identified as having TS. Additional research shows that males are reported to be diagnosed with TS 3 to 4 times more often than females (Zinner, 2000).

There are also reported gender differences among children who have been identified with OCD. Comings and Comings (1985), for example, have concluded that more females with TS possess co-morbid OCD than males. Within another study, however, the findings indicated that males with TS were more likely than females to be

diagnosed with OCD (Bornstein et al., 1990; Leonard, Lenane, Swedo, Rettew, Gershon, & Rappoport, (1992).

Ethical Standards

It is important for school psychologists to understand ethical behavior and to take this seriously, when working with children and adolescents with TS. The National Association of School Psychologists (NASP) and American Psychological Association (APA) have established ethical guidelines that all school psychologists must follow in order to evaluate and diagnose properly, children with special needs, including students with TS (Corey & Corey, & Callanan, 1998). Professional practice emphasizes the need for school psychologists to conduct assessments appropriately when working to gain insight into a child's level of functioning. It is also vital for the results of evaluations to be interpreted properly in order to determine accurately the child's strengths and weaknesses. Decisions regarding placement and implementation of intervention plans are made, based on the results of these evaluations (Vanderwood & Powers, 2002).

When conducting an evaluation for a child with TS, it is important for a school psychologist to understand the difference between testing and an assessment. When a school psychologist administers a test, it is for the purpose of finding information for the student's assessment. Assessment is a broader term used to describe the gathering of many types of information when evaluating a student. Reviews of records, medical and school history, observations, interviews and test results are all valuable and essential tools used for evaluations (Vanderwood & Powers, 2002).

Therefore, information gathered from the literature indicates that research is limited surrounding the discovery of school psychologists' knowledge of TS, its co-

morbid disorders, and proper school interventions and assessment tools which should be utilized for the development of appropriate behavioral and education plans. It is evident that more research is needed to measure school psychologists' knowledge of TS and to determine further whether or not they are properly equipped to service school-aged children who may present with the disorder. It is this researcher's hypothesis that school psychologists do not possess adequate knowledge of the assessment of TS, of its associated disorders, and of effective intervention strategies. A study will be designed to determine the levels of school psychologists' knowledge of TS throughout the states of New Jersey and New York. If knowledge is found to be lacking, the results of this study can be utilized by school psychologists, administrators, educators, universities, parents, and medical professionals to improve the level of sensitivity and to enhance the quality of intervention for children and adolescents with TS.

Chapter 3

Methods

Overview

This section provides an overview of the study which was conducted. The objective of the study is to investigate school psychologists' levels of knowledge of Tourette Syndrome and their level of education and training in regard to treating children and adolescents with Tourette Syndrome. It also analyzed school psychologists' familiarity with assessment tools and strategies for providing effective intervention plans for students diagnosed with TS.

Participants

A total sample of 525 school psychologists in New Jersey and New York were asked to complete paper surveys for this study. Surveys were mailed to 505 school psychologists throughout the different regions of New Jersey and New York; these psychologists were asked to complete the surveys and to return them. A total of 120 (23.8%) of the mailed surveys were returned, with 4 of them unusable. All of these respondents whose surveys could not be used were from New Jersey and did not meet the inclusion criteria for the study. They were either retired, working in private practice or not working in a school system. Therefore, there were 116 of the participants who completed the surveys; these were used in this study, a response rate of 23.0% on the mailing. There were an additional 20 surveys distributed to school psychologists attending various workshops within the state of New Jersey and New York. These individuals were not members of the New Jersey and New York School Psychology Association Directory. There were 18 (90%) completed from these workshops, 12 from

New York and 6 from New Jersey. Overall, there were a total of 134 of the surveys used in order to complete the study. There were 78 New York School Psychologists (58.2% of the respondents) and 56 New Jersey School Psychologists (41.8% of the respondents) who answered the questionnaires.

Respondents included school psychologists who were employed by both public and private educational systems and who serviced students at the preschool, elementary, middle, secondary, and high school levels. The participants were geographically selected from the New Jersey Association of School Psychologist Directory (NJASP) and the New York Association of School Psychologist Directory (NYASP). Both state directories were chosen in order to ensure that the participants were appropriately trained, certified, and were currently practicing in a school setting. The school psychologists were not randomly selected out of the population of certified school psychologists. Therefore, these participants were a narrowly defined, non-random, convenient sample. Because the subjects were only from New Jersey and New York, the results can only be generalized to these two states. There were participants who attended psychological workshops that were also non-random because they were specifically selected. These seminars specifically focused on anxiety disorders among children and adolescents.

Purpose of Study

The overall goal of the study was to determine practicing school psychologists' knowledge of the diagnostic criteria of TS, of its associated characteristics and disorders, and effective interventions. The study also established the various types of evaluation methods these professionals are utilizing to assess the cognitive, academic and social functioning of these students. Finally, the study also attempted to determine the extent to

which practicing school psychologists are trained and are implementing the best possible interventions, as defined by the Tourette Syndrome Awareness Scale (TSAS).

Instrumentation

The materials utilized within this study were the cover letter and survey. The cover letter (Appendix A), which identified the researcher and explained the nature of the study, indicated the approximate amount of time that would be required to complete the survey; it also requested the school psychologists to participate by completing the enclosed survey. The purpose of the research was explained, including how the participants' identities and their results would remain confidential. The cover letter explained that participation in the study was voluntary and respondents could withdraw at any time during the process. In addition, the cover letter included a confidentiality statement that explained that the data would be published in a doctoral dissertation and shared with the participants, but that no personal identifiers would be revealed. Additionally, the phone number and email of the researcher and of the committee chair as well as the Philadelphia College of Osteopathic Medicine address were included.

The Tourette Syndrome Awareness Survey (Appendix B) was the instrument utilized for the study. This was broken into three sections. Section A included questions regarding the participants' backgrounds and demographics. This included questions to determine each school psychologist's gender, race, level of education and professional training, years of experience, the city or town of employment, size of the school or district, grade level of the students, the socioeconomic status of the community and the type of school setting. Three questions required the school psychologists to rate their understanding of social deficits, executive functioning, and academic weaknesses which

are frequently associated with students with TS. If knowledge of TS is indicated, the participants were asked to answer two additional questions. The first section also asked the school psychologists to specify sources from which they have learned about the disorder.

Section B asked respondents to indicate the number of students with TS with whom they have worked during their tenures. This section also asked the participants to specify the capacity in which they have worked with identified students (i.e. consultation, evaluation, case management). The second portion of the questionnaire consisted of fifteen items which asked participants if they had any experience working with students who had been diagnosed with TS. If the respondents answered yes, then they continued to respond to a series of more detailed items. These questions focused on diagnostic criteria such as the age when the student was initially diagnosed with TS, whether or not it was identified by a neurologist or psychiatrist and whether or not there was a co-morbid disorder or other associated characteristics and weaknesses. Respondents were also asked if these individuals were referred for special education services; they were also asked to describe the educational program the students may be receiving and whether or not they required counseling or an aide within the classroom. Additionally, respondents were asked to rate the level of these children's social skills and academic functioning, whether or not they had discipline problems, and if they were receiving social skills instruction.

Section C was the last section of the survey and consisted of seven questions which concentrated on school psychologists' knowledge of characteristics and diagnostic criteria and awareness of effective interventions of TS. These items also focused on the school personnel who most frequently intervened in TS cases and what intervention

techniques school psychologists felt comfortable in implementing. Additionally, items concentrated on assessment batteries and questionnaires used by school psychologists when determining cognitive, academic, and emotional functioning.

For the purpose of testing the hypotheses of the study, scores based on questions 5 and 6 within the final section were developed. Questions 5 and 6 were designed to determine the school psychologists' knowledge of characteristics, diagnostic criteria and associated characteristics of TS. Question 5 consisted of true or false items which focused on the respondents' understanding of the TS diagnostic criteria. The diagnostic characteristics are essential requirements of the Diagnostic Statistical Manual-Fourth Edition-Text Revision (DSM-IV-TR) in order to identify TS appropriately. Question 6 consisted of eight items which concentrated on subjects' knowledge of co-occurring characteristics of TS rather than on the primary diagnostic criteria of TS. In addition to co-morbid disorders, participants were requested to indicate whether or not specific statements were consistent or inconsistent of the literature on TS.

This is the method used to calculate the Knowledge of Characteristics score. Question 5 was scored by giving the participants two points for responding correctly and zero points for an incorrect answer. For Question 6, the subjects were given only one point for the correct and zero points for the incorrect answer. Question 5 was given more points for the correct response in comparison with Question 6 because of the relative importance of the two questions. The former emphasized knowledge of the primary diagnostic criteria of TS. Therefore, the scores were weighted more heavily for the respondents' knowledge of TS characteristics. The latter investigated the participants'

awareness of associated characteristics of the disorder and information from the literature.

The investigation of one of the hypotheses of the study involved school psychologists' self-rating of their knowledge of specific deficits associated with TS. Questions 11, 12, and 13 of Section A of the survey were developed and focused on respondents' self-rating of their knowledge of social deficits, executive functioning, and academic ability among students. The participants were requested to indicate if they felt they had little or no knowledge, whether or not they were somewhat knowledgeable, very knowledgeable or an expert in their understanding of cognitive, academic and executive functioning in children with TS. Four points were given to participants who felt they were experts, three points to those who believed they were very knowledgeable, two points if they felt somewhat knowledgeable and one point for having little or no knowledge. All of the points were added in order to determine school psychologists' scores on their self-rating of knowledge of social deficits, executive functioning and academic ability. These Self-Rating of Knowledge scores were correlated with the respondents' actual results on the Knowledge of TS Characteristics Scale.

Specific questions testing the study's hypothesis on school psychologists' knowledge of effective interventions were also developed in the last section of the survey. Questions 3, 4 and 7 of the last section of the survey focused on the participants' knowledge of effective interventions of TS. The results from these three questions were measured and interpreted on the Knowledge of Interventions Scale.

Question 3 requested information about the necessity for school psychologists to consult a psychiatrist and/or neurologist when a student was suspected of having TS in

order to be diagnosed appropriately. Psychiatrists and neurologists play a vital role in the intervention process by utilizing their expertise in identifying and treating children and adolescents with TS and co-morbid disorders. Therefore, Question 3 asked subjects if students suspected of having TS were referred to a psychiatrist or neurologist for consultation or for treatment. If the participants answered yes, they were given two points and zero for a no response.

Question 4 of the survey asked school psychologists to indicate whether or not they administered cognitive, academic assessments as well as behavioral questionnaires when a student with TS is referred for an evaluation. The importance of giving these tests lies in the fact that school psychologists need to determine a child or adolescent's level of intellectual, academic and emotional functioning. It also assists with developing effective intervention strategies within their educational setting. More specifically, Question 4 requested the participants to circle the specific methods they utilize when analyzing a student's level of functioning in all three of these listed areas. Two points were assigned if the participants responded to at least one assessment battery in all three areas. One point was given to any of the methods chosen but not in all three groups. Zero points were given if respondents did not indicate that they used any testing procedures for the domains listed.

Question 7 consisted of 6 items labeled 7A through 7E. These questions focused on school psychologists' understanding of classroom modifications for students identified with TS. The respondents were asked to indicate if specific modifications were *almost always*, *were often*, *were sometimes*, or *were never appropriate* when teaching these children within the educational setting. The scoring ranged from zero to two points; two

points were assigned for the best answer; one point was given for an acceptable response, and zero points for an inadvisable answer. Participants were given two points for answering *sometimes or often*, one point for *always*, and zero points for *never* on items 7A and 7B. The respondents needed to answer *always* for two points, one point for *sometimes or often*, and zero points for *never* on item 7C. Subjects were assigned two points for *never* and zero for all other responses on item 7D. Item 7E required participants to answer *always* for two points, one point for *sometimes or often*, and zero points were earned for responding *never* to the question.

All of the points were added from Questions 5 and 6 in order to determine the Knowledge of Characteristics score. The points were also all generated from questions 3, 4, and 7 and computed for the Knowledge of Interventions score. These two sets of scores from these scales were then used for the purpose of answering the study's hypotheses. Additionally, the results of the Knowledge of Characteristics and Knowledge of Interventions Scale were used for exploratory measures.

It is important to note that Questions 1 and 2 of the final section were used only to obtain descriptive data and were not utilized to determine the participants' actual knowledge of TS characteristics and effective interventions. Therefore, they were not developed for the purposes of the predictions of the hypotheses. Question 1 asked the school psychologists to indicate the school personnel within their districts who assumed the primary role in cases of TS i.e., how a school district determines the role and responsibility is important for informational purposes. However, it was not a reflection of school psychologists' levels of knowledge regarding diagnostic criteria and associated characteristics of TS or understanding of interventions. Question 2 asked the participants

to select the types of intervention method they prefer to use when working with students diagnosed with TS. However, the type of intervention strategies chosen by the school psychologists was subjective and depended on their levels of comfort in making their choices. Therefore, Questions 1 and 2 were descriptive and not included in the Knowledge of Characteristics or Knowledge of Interventions score.

Data Analysis

The first hypothesis predicted that school psychologists would have significantly stronger understanding on their Knowledge of TS Characteristics compared with their Knowledge of TS Interventions. Many graduate programs in school psychology are predominantly designed to educate students in a variety of areas of psychology. These programs provide a broad knowledge base with different courses. In regard to classes on psychiatric and neurological disorders, professors are more likely to spend time educating students on the characteristics of a particular disorder rather than the treatment recommendations. Therefore, school psychologists are more likely to have a general understanding of the characteristics than of interventions of TS.

Two independent measures were used to compute the levels of the subjects' knowledge of characteristics and intervention scores. As mentioned previously, the Knowledge of TS Characteristics score ranged from 0-18. The Knowledge of TS Interventions score ranged from 0-16. In order to standardize results and to make them comparable, the knowledge of characteristics and intervention scores were converted to percentages by dividing both sets of scores by 18 and 16, respectively. A paired-sample t-test is a statistical measure utilized when comparing two separate scores within a single group of subjects. Therefore, a paired-sample t-test was used to test the hypothesis that

school psychologists have a significantly higher percentage score on the Knowledge of TS Characteristics Scale of TS compared with their understanding of effective interventions.

Independent sample t-tests are used for comparing the mean of two separate groups on a certain measure. Therefore, an independent-sample t-test will be used to test the second hypothesis, that New York school psychologists have a significantly higher mean in comparison with New Jersey school psychologists in regard to their understanding of diagnostic criteria and characteristics of TS. The hypothesis was a result of the knowledge that New York school psychologists are primarily not case managers. Therefore, they have time to practice their clinical skills when working with students. New Jersey school psychologists have case management responsibilities and therefore do not always have the time to work with children directly in order to increase their psychological skills.

Another independent-sample t-test will be used to test the third hypothesis. The third hypothesis investigated whether New York school psychologists have a significantly higher mean in regard to their understanding of effective interventions for students with TS in comparison with New Jersey school psychologists. The hypothesis is based on the differences of the respondents' nature of employment responsibilities.

A Pearson correlation two-tailed test will be used to test the fourth hypothesis. The fourth hypothesis focused on the positive relationship between the participants' self ratings of their knowledge about TS characteristics and their actual efficacy about the Knowledge of Characteristics score. This is expected to be a positive correlation if respondents have a good understanding about their actual knowledge of TS.

Chapter 4

Results

The purpose of this study was to research school psychologists' levels of knowledge about the diagnostic criteria and characteristics of Tourette Syndrome and their understanding of effective interventions. The areas of investigation included identifying school psychologists' efficacy of associated disorders and disabilities, as well as various interventions and modifications which are implemented within the school systems. Participants were also asked to respond to survey questions which focused on how they would rate their own understanding of TS and appropriate interventions. In addition, the respondents were asked to indicate areas of school interventions which they were more comfortable in implementing. Additionally, the study investigated and discovered the various types of evaluation methods that the school psychologists were utilizing. Appropriate assessment tools are essential in order to provide effective educational behavioral strategies for students who have been diagnosed with TS. A thorough evaluation will uncover children's cognitive, academic and social functioning, all of which are necessary for developing successful support services for students with TS.

The purpose of this chapter is to analyze the research findings which were gathered from the survey questions. The data being summarized are linked to the research questions that were previously formulated. The results have been translated and interpreted from tables which include all of the variables within the study. School psychologists employed in New York and in New Jersey were mailed survey packages which included a cover letter and questionnaire. School psychologists who were

attending various workshops in New Jersey and New York were also presented with a cover letter and survey.

Demographic Data and Characteristics of Respondents

A total of 138 of the surveys were returned. This represents a 27.4% response rate. There were 4 of the surveys that were unusable because the potential respondents either were retired, working in private practice or not working in a school system and therefore did not meet the inclusion criteria for the study. Therefore, this left a total of 134 respondents between New York and New Jersey. All of the surveys which could not be used were from New Jersey.

The school psychologists who were represented were from different areas of New Jersey and of New York and were employed either in a public or in a private school setting. The school psychologists who participated in the study were asked to specify whether or not they worked in preschool, elementary, junior high, post-secondary or high school settings. There were a total of 525 school psychologists who were asked to participate in the study by completing the survey. The school psychologists were located through the use of the directories from the New Jersey and New York school psychology associations. One mailing was sent to 505 subjects. There were also 20 surveys distributed to school psychologists who were attending various workshops within New York and New Jersey. There were 18 (90%) of these participants who completed the survey; 12 were employed in New York and 6 in New Jersey. Therefore, there were a total of 134 (25.5%) of the surveys between New York and New Jersey, with 116 (23.0%) used from mailings and 18 (90%) from workshops that were recorded and computed in order to analyze the results and answer the hypotheses.

Table 1 shows the characteristics of the respondents' school districts. It indicates that 78 (58.2%) of the respondents were from New Jersey and 56 (41.8%) were from New York. The highest percentage of respondents taught at the elementary school level (n=92, 69.2%), which is substantially higher in comparison with participants employed at the junior high school, postsecondary, or preschool level. There were 109 (81.3%) school psychologists who worked in school districts that were located within a suburban setting. This number was considerably larger compared with the participants who were employed in urban (n = 19, 14.1%) or rural areas (n = 5, 3.7%). A strong majority of school psychologists who participated within the survey were employed from a district with over 900 students (n=116, 86.6%). The school psychologists were evenly spread among those who worked in districts from lower, middle and upper middle class backgrounds. There were 39 (29.1%) respondents who were employed at lower income areas; 34 (25.4%) who were from middle income, and 33 (25.0%) who were from upper middle level class households. There were 19 (14.2%) of the participants who were from mixed backgrounds and 7 (5.2%) who were from upper class neighborhoods.

Table 1

Characteristics of School Districts for Participants (N = 134)

Characteristic	<u>n</u>	%
Size of District		
900 and under	15	11.5
over 900	116	86.6
Setting		
Rural	5	3.7
Urban	19	14.1
Suburban	109	81.3
Grades		
Preschool	47	35.3
Elementary School	92	69.2
Junior High School	67	50.4
Postsecondary	10	7.5
State		
New York	56	41.8
New Jersey	78	58.2

(Table 1 continues)

(Table 1 continued)

Characteristic	<u>n</u>	%
Socioeconomic Class of Families in District		
Lower	39	29.1
Middle	34	25.4
Upper Middle	33	25.0
Upper	7	5.2
Mixed	19	14.2

Years of experience as a school psychologist and years employed within their current positions and levels of education are indicated on Table 2. The participants were asked to respond to a question which focused on their levels of education. All of the 134 respondents who participated in the study disclosed the type of psychology degrees they possessed. The highest number of respondents (n=54, 40.3%) held a Doctoral degree in Psychology. There were slightly more than a quarter (n=36, 26.9%) of the respondents who were working as school psychologists for 21 or more years. There were almost one-half of the subjects who were employed in their respective districts for under 10 years (n=64, 47.8%).

Table 2

Characteristics of Participants (N = 134)

Characteristic	<u>n</u>	%
Education level		
Masters	48	35.8
Education Specialist	29	21.6
Doctorate	54	40.3
Other	3	2.2
Years as School Psychologist		
0-5	32	23.9
6-10	32	23.9
11-15	16	11.9
16-20	17	12.7
21 or more	36	26.9
Years at Current Position		
0-5	47	35.1
6-10	37	27.6
11-15	11	8.2
16-20	15	11.2
21 or more	22	16.4

(Table 1 continues)

(Table 2 continued)

Learning Source			
Independent Study		48	35.8
Parents or Children		34	25.4
Other		17	12.7

Years of experience as a school psychologist and years employed within their current positions and levels of education are indicated on Table 2. The participants were asked to respond to a question which focused on their levels of education. All of the 134 respondents who participated in the study disclosed the type of psychology degrees they possessed. The highest number of respondents (n=54, 40.3%) held a Doctoral degree in Psychology. There were slightly more than a quarter (n=36, 26.9%) of the respondents who were working as school psychologists for 21 or more years. There were almost one-half of the subjects who were employed in their respective districts for under 10 years (n=64, 47.8%).

Research Questions

There were five research questions dealing with whether or not the participants had a strong understanding of diagnostic criteria and of effective interventions of TS. The first dealt with the respondents' knowledge of diagnostic criteria and effective interventions of TS. The next two focused on whether or not New York and New Jersey

school psychologists differed in their knowledge in these two areas. The fourth focused on testing the correlation of how the participants rated their knowledge of TS characteristics compared with their actual knowledge of TS, which was measured on their knowledge of characteristic score. The final question was exploratory and designed only to investigate the actual knowledge of TS characteristics and TS interventions the participants possessed.

The first research question was: Do these school psychologists have a stronger understanding of the diagnostic criteria of the characteristics of TS in comparison with their awareness of effective interventions as measured by the Knowledge of Characteristics and the Knowledge Interventions score?

Many School Psychology graduate programs are designed to educate students in many different areas of psychology. Although these programs do go beyond being superficial, they do not always aim to certify the students as experts in any one of the many psychological disorders such as TS. These programs are more likely to delve into the diagnostic criteria of psychiatric and neurological disorders in comparison with effective interventions. Consequently, it is predicted that school psychologists are likely to have more knowledge of the characteristics than of interventions of TS.

The hypothesis was that respondents would have significantly stronger knowledge of characteristics of TS in comparison with their knowledge of interventions with students diagnosed with TS. Two measures were used to analyze the level of school psychologists' knowledge of TS scores. They included the Knowledge of TS Characteristics and Knowledge of Effective Interventions Scales.

The range of Knowledge of Characteristics score 0-18 was different in comparison with the Knowledge of Interventions score, which ranged from 0-16. The procedure for calculating each score was detailed in the Methods section. Standardization of the scores was necessary in order to make the two sets of scores comparable. The change was accomplished by converting the Knowledge of Characteristics score and the Knowledge of Interventions score to percentages. Percentages were calculated by dividing all of the Knowledge of Characteristic scores by 18 and the Knowledge of Intervention scores by 16.

A paired-sample t-test is a statistical measure utilized when comparing two separate scores within a single group of respondents. Therefore, a paired-sample t-test was used to test the hypothesis that school psychologists have a significantly higher percentage score on the Knowledge of Characteristics Scale of TS in comparison with their understanding of appropriate interventions as measured by the Knowledge of Interventions Scale.

Table 3

Paired-Sample Differences Between Knowledge of Characteristics Percentage Scores and Knowledge of Interventions Percentage Scores (n = 87)

<u>Characteristics</u>		<u>Intervention</u>		<u>t</u>
<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	
.654	.162	.679	.121	-1.12

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

Table 3 shows that school psychologists do not have significantly more knowledge of characteristics of TS in comparison with their levels of understanding of effective interventions; there is no significant difference between the two scores. The results produced from the paired-sample t-test disconfirmed the hypothesis that school psychologists have significantly more knowledge of characteristics of TS when compared with their knowledge of interventions. Additionally, the greater emphasis on diagnostic criteria for school psychologists did not play a role in regard to their levels of knowledge between characteristics and interventions of TS. There is no significant difference ($p=.266$) in the percentage scores that participants have between characteristics and interventions; one is not higher than the other. Therefore, the hypothesis is disconfirmed.

The second research question was: Do New York school psychologists have more knowledge of TS characteristics in comparison with New Jersey school psychologists?

The reasoning behind this question stemmed from the fact that New York school psychologists are primarily not case managers and have more time to work with students on a clinical level. New Jersey school psychologists have case management responsibilities and their role does not always include practicing their clinical skills and working with students directly.

The second hypothesis was that the New York school psychologists would have more knowledge of diagnostic criteria and characteristics compared with New Jersey school psychologists. Scores were measured by the Knowledge of Characteristics score, which measured diagnostic criteria and associated characteristics of TS. Independent sample t-tests are used for the purposes of comparing the mean of two different groups on a certain measure. Therefore, an independent sample t-test was used in order to test the

second hypothesis, whether or not New York school psychologists have a significantly higher mean score on their understanding of diagnostic criteria and characteristics of TS when compared with New Jersey school psychologists. Another independent sample t-test was used to test the third hypothesis, that New York school psychologists have a significantly higher mean score on the Knowledge of Interventions Scale than the New Jersey respondents.

Table 4

Differences Between New York and New Jersey Respondents

Measure	<u>New York</u>		<u>New Jersey</u>		<u>t</u>
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	
Knowledge of Characteristics	11.17	3.36	12.09	2.55	-1.49
Knowledge of Interventions	11.02	2.01	10.76	1.80	0.72

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

Table 4 shows that the second hypothesis was disconfirmed at the .05 level of significance. There was no significant difference between the New York and New Jersey groups on the knowledge of diagnostic and associated characteristics score ($p = .141$). These scores reflect the fact that New York school psychologists did not have significantly more knowledge of TS characteristics, diagnostic criteria and associated disorders when compared with the New Jersey participants. Having no significant difference between the New York and New Jersey respondents in regard to their

knowledge also disconfirmed the hypothesis that the nature of the school psychologists' job descriptions plays a role in their level of knowledge of TS characteristics.

The third research question was: Do New York school psychologists have more knowledge of effective interventions with students diagnosed with TS as measured by the knowledge of interventions TS score in comparison with New Jersey school psychologists, which is due to the differences in the nature of the respondents' employment responsibilities.

The hypothesis was that New York school psychologists will have a significantly stronger understanding of effective interventions in comparison with New Jersey school psychologists. The t-tests on the Knowledge of Interventions score, reported in Table 4 indicates no significant difference between these two groups ($p=.477$). These results disconfirmed the prediction that New York school psychologists have more knowledge of TS interventions when compared with the New Jersey respondents. Therefore, these results disconfirmed the hypothesis that job descriptions played a role in the levels of knowledge of interventions of TS.

The fourth research question was: Is there a positive correlation between school psychologists' self-rating of their knowledge of academic, social and executive functioning in comparison with their actual understanding, which was scored on the Knowledge of TS Characteristics Scale?

The hypothesis was that a Pearson correlation would show a positive relationship between the participants' own rating of scores on their Self-Rating of Knowledge score in comparison with their actual knowledge score on the characteristics scale. The results showed that there was not a positive, significant correlation between the two scores. The

correlation coefficient was low and the significance was well above .05 ($r = .104$, $p = .312$), meaning there was no significant correlation between these two scores. The hypothesis was disconfirmed.

All three forms of ratings showed the same results. There was no correlation between the way in which the school psychologists rated their knowledge of TS characteristics and their actual test scores on their knowledge of TS characteristics. The correlations of the three rating scales to the respondents' actual knowledge are indicated as follows: the Rating of Knowledge of Social Skill Deficits Scale, $r = .15$, $p = .137$; the Rating of Knowledge of Academic Ability Scale, $r = .06$, $p = .553$; and the Rating of Knowledge of Executive Functioning Scale, $r = .077$, $p = .455$.

Exploratory

The fifth research question was exploratory and there was no hypothesis. How much knowledge do school psychologists who are employed in New York and New Jersey schools have, in regard to knowledge of characteristics and interventions of TS?

An important portion of the study investigated the breakdown of the correctly answered questions which were weighted differently, depending on their importance. The figures in Table 1 indicated that the respondents had an average of 65.4% of points available for correct knowledge of characteristics and 67.9% of the points available for correct answers asked about effective interventions of TS. If this were a class in which students were tested on recently taught material focusing on TS, these scores would be considered low. However, because TS was not a primary area of expertise, the participants' scores indicated that they demonstrated a rather strong understanding of TS characteristics and effective interventions. They were fairly knowledgeable, in

consideration of the fact that working with students diagnosed with TS may not necessarily have been pertinent to some of their duties as professionals. Some of the respondents have also not had the opportunity to work with students who have been diagnosed with TS.

In regard to Knowledge of Characteristics score, more points were rewarded to questions that were considered more important. The results in Table 5 indicate that there was an even distribution among school psychologists who answered correctly to the degree of achieving 50 to 80% of the available points. There were 98 of the participants who responded to the questions on the Knowledge of Characteristics Scale with 81 (82.6%) answering correctly to the degree of achieving between 50-79% of the available item points. Only one respondent received 10-19% of the available points, and only one participant was correct on more than 90% of the available items.

On the Knowledge of Interventions score, respondents earned full points for answers that were totally correct. They also earned partial credit for answers that were considered not as bad or not as good as the perfect score. Table 5 below shows how the school psychologists within the study scored on the Knowledge of TS Interventions Scale. There were 107 participants who answered the Knowledge of Interventions Scale. The highest percentage of participants (n=42, 39.3%) responded correctly, to the degree of achieving 60-69% of the available points which focused on the Knowledge of TS Interventions. Only one participant had 90-99% of the intervention available points. On the lower end, one respondent earned only 30-39% of available points in regard to effective interventions and there were no participants who got less than 30% of the available points on intervention questions.

Table 5

Frequencies of Knowledge Percentage Scores for Correct Answers

Knowledge Score	<u>n</u>	%
Knowledge of Characteristics (n = 98)		
10-19%	1	1.0
20-29%	1	1.0
30-39%	7	7.1
40-49%	7	7.1
50-59%	17	17.3
60-69%	21	21.4
70-79%	25	25.5
80-89%	18	18.4
90-99%	1	1.0
Knowledge of Interventions (n = 107)		
30-39%	1	0.9
40-49%	4	3.7
50-59%	22	20.5
60-69%	42	39.3
70-75%	15	14.0
80-89%	22	20.5
90-99%	1	0.9

The participants were requested to indicate the type of weaknesses that the students diagnosed with TS possessed. The number of school psychologists who responded to this item within the survey was 100. The majority of areas shown to be limitations were students' difficulty with sustaining attention. There were 69 (69%) of school psychologists who selected concentration as a deficiency among students with TS. Other areas of weaknesses which were considered problematic for children with TS included emotional regulation, (n=63, 63.0%), self-control, (n=62, 62.0%) and interpersonal skills, (n=50, 50.0%). These scores were substantially higher than some of the other areas of student limitation, which are listed in Table 6.

Table 6

Responses Checked on Weaknesses of Children (N = 100)

Weaknesses	<u>n</u>	%
Decision-making	40	40.0
Anger Management	35	35.0
Emotion Regulation	63	63.0
Self-control	62	62.0
Concentration	69	69.0
Label Emotions	15	15.0
Decoding Nonverbal	21	21.0
Using Nonverbal	18	18.0
Eye Contact	23	23.0
Conflict Resolution	32	32.0
Peer Cooperation	27	27.0
Social Communication	39	39.0
Turn-taking	11	11.0
Interpersonal Skills	50	50.0
Peer Interaction	49	49.0

School psychologists answered items asking if students were receiving counseling services within their educational setting. The respondents were also asked to indicate the type of counseling techniques used, as well as the skills that they wanted students to develop. There were 96 of the subjects who answered this particular item. There were 33 (34.4%) of the participants who selected conflict resolution as a type of skill performed with students who were diagnosed with TS. Other methods used by school psychologists who participated in the study are reported in Table 7.

Table 7

Responses Checked on Skills Used (N = 96)

Skill	<u>n</u>	%
Conflict Resolution	33	34.4
Experience Sharing	12	12.5
Reciprocal	22	23.2
Social Referencing	22	22.9
Nonverbal Behavior	16	16.7
Interpreting Nonverbal	21	21.9
Turn Taking	11	11.0
Perspective Taking	23	24.0
Other	6	6.3

Table 8 shows the school personnel responsible for assuming the primary role in cases of TS. The participants were given the opportunity to select all of the responses that applied. The number of respondents who answered this item was 133. The majority checked school psychologists (n=90, 67.7%) as the contact person for working with students diagnosed with TS. There were other school personnel who assumed primary responsibility. However, they were substantially lower in comparison to school psychologists.

Table 8

Responses Checked on Roles of School Personnel (N = 133)

Role	<u>n</u>	%
Principal	11	8.3
School Nurse	34	25.6
School Counselor	29	21.8
School Psychologist	90	67.7
Social Worker	34	25.8
Other	22	16.5

The participants were asked to select the techniques with which they felt most competent in utilizing when working with students with TS. A strong majority of the school psychologists (n=108, 81.2%) indicated teacher consultation was the strategy they

felt most comfortable in implementing. Individual counseling (n=94, 70.7%) with these students was another technique very often used by school psychologists. Table 9 shows the other methods and how frequently they are used by these respondents.

Table 9

Responses Circled on Techniques (N = 133)

Role	<u>n</u>	%
Parent Consultation	81	60.9
Educating Parents	50	37.6
Individual Counseling	94	70.7
Group Counseling	83	62.4
Teacher Consultation	108	81.2
Educating Teachers	62	46.6
None	11	8.3
Other	4	3.0

The participants were requested to select the assessment batteries used when evaluating students diagnosed with TS. The areas of focus included cognitive, educational and emotional functioning. A strong majority of school psychologists (n=117, 89.3%) indicated that they used the Wechsler Scales of Intelligence when evaluating cognitive ability. There was an even distribution among the participants who

indicated they used the Woodcock-Johnson (n=41, 31.3%) and Wechsler Individual Achievement Test (n=36, 27.5%) when assessing the TS students' academic ability. When investigating children's emotional stability, the Conner's Rating Scale (n= 82, 62.6%) and the Behavior Assessment Scale for Children (BASC) (n=78, 59.5%) were the methods most frequently utilized. Table 10 shows the rest of the methods and the frequency of their use when determining students' intellectual, academic and emotional capacity.

Table 10

Responses Circled on Methods of Evaluation (N = 131)

Test	<u>n</u>	%
Wechsler IQ	117	89.3
Stanford Binet-Fifth Edition	29	22.1
Different Ability Scales-Second Edition	12	9.2
Woodcock-Johnson-Third Edition	41	31.3
Wechsler Achievement-Second Edition	36	27.5
BASC-2	78	59.5
Conner	82	62.6
BRIEF	32	24.4
Other	20	15.3

When respondents were asked if they consult psychiatrists and/or neurologists in order to investigate whether or not a student has a diagnosis of TS (n=114, 85.1%), school psychologists responded. The results indicated an even distribution when school psychologists were asked to answer if they consult psychiatrists and/or neurologists for appropriate diagnosis of students who show signs of TS. These results revealed that one-half of the participants who responded to this question understood that seeking out a psychiatrist and/or neurologist was an important aspect for instituting an appropriate intervention and obtaining a correct TS diagnosis. Additionally, one-half of the respondents indicated that they did not consult psychiatrists and/or professionals. This suggests that these latter individuals were not as knowledgeable about using appropriate mental health professionals when seeking an accurate diagnosis.

Conclusion

There were a total of 134 surveys completed by respondents, 78 from New Jersey and 56 from New York. These professionals were employed primarily at school systems located within suburban communities and in districts with student populations larger than 900. There was an even distribution among the participants who were school psychologists within lower, middle, and upper middle income neighborhoods. The highest number of respondents worked with students at the elementary school level. There was also a good portion of the participants who worked with students at the junior high school level.

The participants were asked to respond to a question which focused on their levels of education. An even distribution existed among the respondents who had earned Doctoral and Master level degrees in psychology. A smaller portion of the school

psychologists earned Educational Specialist degrees. These results reflect the fact that a high percentage of the respondents were highly educated in the field of psychology.

There were a large number of the participants who had been working as school psychologists from 0-10 years and 21 years and more. There were also a smaller but respectable number of the respondents who had between 11-20 years of experience. Consequently, these professionals had shared varied levels of skills and familiarity with regard to practicing in the field of school psychology. These results indicated that respondents had accumulated a diverse amount of time and experience in helping students in need within their respective school systems.

It was evident from the scores on the Knowledge of TS Characteristics and Knowledge of TS Interventions Scales that the respondents had a similar understanding of the TS characteristics, diagnostic criteria, associated disorders and appropriate interventions. The results indicated that there was similar knowledge of characteristics of TS in comparison with the participants' understanding of interventions of TS among the school psychologists surveyed. The group of school psychologists who participated did not possess more knowledge of characteristics of TS relative to their understanding of interventions. Graduate training for school psychologists did not play a role in the respondents' levels of knowledge of TS characteristics relative to their understanding of interventions, as was originally hypothesized.

The results indicated no significant difference between New York and New Jersey school psychologists in relation to their knowledge of characteristics, diagnostic criteria and associated disorders. The results also revealed there was no significant

difference between New York and New Jersey school psychologists in regards to their knowledge of effective interventions of TS.

New York and New Jersey school psychologists have a similar understanding of the characteristics of TS, diagnostic criteria and co-morbid conditions which can exist among the children and adolescents diagnosed with the disorder. Additionally, New York and New Jersey school psychologists have comparable knowledge of effective interventions for children diagnosed with TS. The results, therefore, revealed that having more time to practice clinical skills with students does not play a role with these respondents in having more knowledge of TS characteristics and interventions.

There was no correlation when results of the respondents' self-ratings on their knowledge of academic, social and executive deficits with children diagnosed with TS correlated with their actual scores measured on the knowledge of TS characteristics scale. Consequently, the results on the school psychologists' self-ratings suggested that participants did not have a firm grasp on how well educated they were about TS.

The results revealed that only a small percentage of the school psychologists were able to obtain 90% and above of the available points in regards to knowledge of characteristics and effective interventions of TS. Additionally, a small number of the participants scored below 50% both for knowledge of characteristics and for interventions of TS.

The entire group of school psychologists who participated in the study had an average of 65.4% of TS characteristics available points and 67.9% of the available points for effective interventions of TS. These results emanated from a study and TS was not a primary area of expertise for a high percentage of these school psychologists who

participated. Therefore, their scores indicate they performed well and had a rather strong understanding of TS characteristics and effective interventions, considering the fact that TS is relevant to their jobs.

Being fairly knowledgeable about the characteristics, associated disorders and diagnostic criteria indicated that, overall, these respondents had the skills to identify students exhibiting signs and symptoms of TS. Having an understanding of effective interventions among a respectable portion of school psychologists within the study showed they could also have the knowledge to implement effective strategies and modifications for these students who are being educated within school settings.

Participants were asked to indicate the type of social deficits the TS students possessed within their respective school systems. Concentration deficits, emotional regulation and self-control were checked most frequently by the participants. When the school psychologists were counseling these students, prominent areas included conflict resolution, reciprocal and social referencing, and perspective talking. Interpreting non-verbal behavior was endorsed by the highest number of respondents. These results reflected the need for social skills training and counseling among TS students. It is evident that a respectable percentage of school psychologists have been trained appropriately in order to teach these specific social and emotional skills.

A strong majority of the participants within the study indicated that the school systems in which they were employed gave the responsibility of working with TS students to school psychologists. Teacher and parent consultation as well as individual and group counseling were interventions selected with the highest frequency. These were techniques that school psychologists felt most comfortable using when assisting students

diagnosed with TS. The high level of comfort in selecting parent and teacher consultation as well as individual counseling may be attributing to the frequency of experience that the participants have acquired with these particular strategies during their careers.

The school psychologists who were surveyed used, primarily, the Wechsler Intelligence Scales when assessing cognitive ability among students diagnosed with TS. The number of respondents who used the Wechsler Scales had a substantial frequency in comparison with school psychologists who utilized the Stanford-Binet-Fifth Edition and the Differential Ability Scales-Second Edition. There was an even distribution among the participants who used the Woodcock-Johnson-Third Edition (WJ-III) and the Wechsler Individual Achievement Test-Second Edition (WIAT-II) when determining academic abilities among students diagnosed with TS. A high percentage, and an even distribution, of participants selected the Connor's Scale and Behavior Assessment System for Children-Second Edition (BASC-II) when evaluating a TS student's emotional development. These results could reflect that the school psychologists who participated in the study were most familiar with utilizing these particular testing batteries when assessing cognitive, academic, and emotional functioning.

Among New Jersey and New York school psychologists there was an equal split (n=114, 85%) with 57 of the participants responding each way relative to the utilization of mental health professionals. One-half of the school psychologist indicated they did and one-half responded that they did not seek out the appropriate mental health professionals for accurate TS diagnosis. These results revealed that fifty percent of the respondents who answered this particular item understood that seeking out a psychiatrist and/or neurologist was best practice for identifying TS. Additionally, fifty percent of these

professionals who did not seek out psychiatrists and/or neurologists suggest that these specific participants were not aware that seeking out these professionals would be beneficial and was required for accurate TS diagnosis.

Overall, the school psychologists who completed the survey were moderately knowledgeable about characteristics, diagnostic criteria, associated disorders and effective interventions of TS. These results were positive, considering the fact that the participants were not considered experts in regard to their knowledge of TS. The participants exhibited an adequate degree of accuracy when determining different strategies, interventions, modifications and accommodations appropriate for school settings. The respondents demonstrated an understanding of the variety of academic problems, emotional issues, and co-morbid disorders that can negatively impact students within the school environment. They recognized the limited social skills and emotional immaturity which was sometimes prevalent in students who struggled with TS. This understanding was evidenced by the participants' selections of the different social deficits that the TS students needed to improve upon during school-based counseling sessions.

Teacher and parent consultation and individual and group counseling were identified as the most commonly employed interventions which the participants felt comfortable in utilizing. However, a good number of the school psychologists indicated that they felt competent in implementing additional strategies when assisting TS students. A large portion of respondents reported that school psychologists were given the responsibility of working with students diagnosed with TS. Appropriate assessment batteries have been frequently administered by the participants when determining academic, social, and executive functioning. Therefore, it was evident from the high

percentage of participants who indicated having used assessment materials, that they understood the importance of investigating the different ability levels of students diagnosed with TS. The degree of knowledge of TS characteristics and interventions that these school psychologists demonstrated can be viewed only as benefiting TS students who are experiencing a variety of difficulties within their school settings.

Chapter 5

Discussion

Summary

The participants who completed the surveys were for the most part similar in demographic characteristics. They were also comparable in gender, professional training and education, and the amount of work experience they accumulated as school psychologists. There were a substantial number of the respondents who were employed in suburban school settings. A small number of participants also practiced in rural and urban areas. They worked primarily in preschool, elementary, junior high school and secondary settings that were located in lower, middle and upper middle income neighborhoods.

The demographic descriptions showed a strong percentage of the respondents were from districts with over 900 students compared with a small number that were from student bodies with 900 students or fewer. The majority of these practitioners were also primarily employed within elementary school settings. Junior high and preschool settings were also selected by a respectable number of participants as places of employment. However, the results reflected the fact that the overall sample population were more familiar with working with pre-adolescent students compared to helping middle-school and high school aged teenagers and children who were of preschool age.

There was a roughly even distribution among those that earned Doctoral degrees in psychology and those that earned Master level degrees. There were also a respectable number of school psychologists who had obtained Educational Specialist degrees. In addition to the respondents being well educated, the results revealed that these participants possessed different levels of experience and skills as practicing school

psychologists, as shown in Table 2. Overall, the school psychologists who participated in the study produced scores on the knowledge of TS characteristics scale and knowledge of TS interventions scale that were similar.

There were 98 of the participants who responded to the Knowledge of Characteristics Scale and 107 who answered the Knowledge of Intervention items. A large percentage of the respondents were rather knowledgeable about the characteristics, diagnostic criteria, associated disorders and appropriate interventions of TS. The group as a whole had an average of 65.4% of the available points for correct TS characteristics and 67.9% of the available points for right answers about effective interventions of TS.

These school psychologists were not considered experts nor were they required to have formal training and courses that concentrated on their knowledge of TS. Consequently, the results indicated that, overall, the school psychologists who participated in the study were somewhat knowledgeable of the characteristics of TS and associated disorders. The respondents overall were also somewhat knowledgeable about effective interventions for students diagnosed with TS within the school systems.

A large portion of the school psychologists answered 50-89% of the questions on the Knowledge of TS Characteristics Scale accurately. The highest percentage of participants answered between 70-79% of these items correctly. In regard to the Knowledge of Interventions Scale, the largest numbers of school psychologists were accurate on 60-69% of these particular questions. A small number of school psychologists were able to answer a high percentage of the items correctly on the knowledge of characteristics and knowledge of interventions scales. Also, a small

percentage of respondents were able to answer only a low percentage of the questions correctly on both knowledge scales.

The initial hypothesis predicted that the entire group of school psychologists would have more knowledge of characteristics of TS in comparison with their understanding of interventions, which was based on school psychology graduate training. The entire group of school psychologists demonstrated no significant differences between the two scores and the hypothesis was disconfirmed, indicating that there was no difference in their levels of knowledge of TS characteristics in comparison with their understanding of effective interventions. On the Knowledge of Characteristics and Knowledge of Interventions Scale, the respondents' scores reflected the fact that their knowledge of characteristics of TS was similar to their understanding of interventions of TS. Therefore, the graduate training for school psychologists did not have an impact on their levels of knowledge of TS characteristics versus their knowledge of interventions.

The second hypothesis predicted that New York school psychologists would have significantly more knowledge of TS characteristics in comparison with the New Jersey participants. The hypothesis stemmed from the differences in job descriptions between these two states. New York school psychologists are not primarily case managers as are New Jersey professionals. Therefore, New York respondents have more time for practicing their clinical skills in comparison with New Jersey school psychologists.

The respondents' scores measured by the Knowledge of Characteristics and Knowledge Scale showed that there was no significant difference between New York and New Jersey knowledge of TS characteristics. These results reflected the fact that New York and New Jersey school psychologists have a similar understanding of the

characteristics of TS and the co-morbid disorders which can exist among the children and adolescents diagnosed with the disorder. The respondents' scores indicated that both New York and New Jersey school psychologists had comparable knowledge in regard to recognizing characteristics and associated disorders of students who have been diagnosed with TS. The results also revealed that having more time to practice clinical skills with students does not seem to play a role into possessing more knowledge of TS characteristics.

The third hypothesis predicted that New York school psychologists would have a significantly higher mean in comparison with New Jersey school psychologist in regard to their understanding of effective interventions with students with TS, which was due to the nature of their different roles as school psychologists. The scores on the Knowledge of Interventions Scale disconfirmed the hypothesis. The New York school psychologists who participated in the study did not have substantially more knowledge of effective interventions in comparison with New Jersey participants. These results reflected the fact that the respondents employed as school psychologists in both states had a similar understanding of effective and frequently used techniques and interventions when assisting students diagnosed with TS within school settings. These results also reflected the fact that the nature of job descriptions did not impact upon knowledge of effective TS interventions within educational settings.

Utilizing a Pearson correlation, the fourth hypothesis predicted that there would be a positive relationship between the participants' own ratings of scores on their knowledge of cognitive, academic, and executive functioning among children with TS and their actual knowledge score as measured by the knowledge of characteristics rating

scale. This hypothesis was disconfirmed because there was no significant correlation in how the school psychologists rated their knowledge when compared with their actual score that evaluated them on their knowledge of characteristics. These results revealed that the school psychologists had a limited awareness of their actual knowledge of TS.

A variety of characteristics and symptoms of TS students were indicated by these respondents. Children with concentration deficits, emotional regulation and self-control deficits were reported most frequently by the school psychologists who responded to the survey. Turn-taking and understanding how to label emotions had the lowest percentages among the skill areas selected by the respondents.

Conflict resolution was selected as the most frequently used social skills strategy when helping TS students improve their emotional and social functioning. Teacher consultation and individual counseling were other methods these professionals felt most comfortable in utilizing when working with students diagnosed with TS. The majority of the participants were employed in school systems, which gave the responsibility of working with TS students to the school psychologists.

A large percentage of the school psychologists surveyed used, primarily the Wechsler Intelligence Scales when assessing cognitive ability among students diagnosed with TS. The Woodcock-Johnson-Third (WJ-III) and the Wechsler Individual Achievement Test-Second Edition (WIAT-II) were evenly selected when respondents were asked to select methods used when evaluating academic abilities. The highest percentage of participants indicated using the Connor's Scale and Behavior Assessment System for Children-Second Edition (BASC-II) when evaluating a TS student's emotional development. These results reflected the school psychologists' obligation to be

knowledgeable of appropriate testing batteries when assessing cognitive, academic, and emotional functioning. They also understood how the discovery of students' intellectual, academic and emotional development assists in implementing appropriate interventions within school settings.

Implications of Findings for School Psychologists

The findings of the study offer several implications regarding the school psychologists' levels of training and professional practice. There is potential for school psychologists to be involved in assisting students diagnosed with TS. The majority of the participants in this study were not considered experts in their understanding of TS characteristics, associated disorders, diagnostic criteria and interventions. However, the results of the study reflected a respectable number of the respondents having a rather strong knowledge of characteristics and an understanding of effective interventions of TS. Although the majority of school psychologists were not considered experts, the respondents could have gained knowledge of TS through attending continuing education workshops and being enrolled in courses. In addition to exposure to training, direct clinical experience with TS students within school systems could have been a significant factor in school psychologists' adequate knowledge of TS.

The respondents' scores demonstrated the fact that they are somewhat knowledgeable about the characteristics of TS as well as co-morbid disorders and diagnostic criteria. Knowledge of these areas indicated that the participants were more likely to be effective at identifying children with TS within their school settings. The discovery of children with TS assists in understanding the type of interventions needed to best help these students. Being aware of effective interventions implied that these

professionals could have adequate ability in order to implement appropriate strategies and modifications for TS students within school settings.

Results were inconsistent with the original hypothesis regarding the levels of knowledge of TS. The school psychologists within the study did not have stronger awareness of specific TS characteristics as compared with effective interventions, which was previously speculated. These findings could have indicated that respondents as a whole were reasonably well educated in regard to TS. Their training from continuing professional classes and graduate courses could have focused on presenting material which gave equal attention to learning both TS characteristics and interventions. The school psychologists' experiences with TS students make the need for knowing about characteristics and effective interventions of TS important in order to become skilled practitioners.

New York and New Jersey participants possessed comparable understanding of TS characteristics, diagnostic criteria, associated disorders and interventions, indicating that there may not be substantial differences in their levels of training. The results also reflected the fact that having primarily case management responsibilities does not equal fewer clinical skills. These results revealed that having more time to practice clinical skills did not contribute to New York respondents having more knowledge of TS characteristics and interventions when compared with New Jersey participants. Consequently, this could indicate that school psychologists within both states had comparable amounts of direct contact experience while working with students.

The knowledge of characteristics and intervention scores were not consistent with the school psychologists' self-ratings of their knowledge which was initially

hypothesized. The lack of awareness could have been attributed to these professionals' overestimation or underestimation of their own understanding of TS knowledge. Some of the respondents who thought they were knowledgeable actually earned low scores on the characteristics and effective interventions scale. There were school psychologists who thought they were not knowledgeable of TS, but obtained high scores on the knowledge of characteristics and effective interventions scales. There were a small number of participants who believed they were knowledgeable and were actually correct. A small percentage of respondents thought they did not possess adequate knowledge and they were accurate. However, the entire group as a whole demonstrated no relationship between participants' estimations of how knowledgeable they were and their scores that indicated how much they actually knew.

The fact that some of the respondents were accurate in their understanding of their knowledge of TS is consistent with these results. At least some of the participants would have to be correct in their awareness of their own knowledge of TS. If the entire group were mistaken about how much they knew there would have been a negative correlation rather than the expected positive relationship. However, because there was not a positive relationship, as a group one could not predict which individuals would perform well on their knowledge scores simply by knowing how they rated themselves.

The results revealed the level of TS knowledge among the respondents was acceptable. However, there are factors which could have contributed to the fact that there were not higher percentages of the respondents' scores in regard to the knowledge of TS characteristics. School psychologists are not allowed to diagnosis TS because it is considered a medical condition. The role of these professionals is to gather information

and report observed characteristics to non-school professionals to use in formulating their diagnosis. Because diagnosis does not present as a primary role of school psychologists for the TS population, when provided with information about TS, it is possible that they may be less likely to focus on or memorize diagnostic criteria and characteristics. Instead they may gather more information about general characteristics with the understanding that, if they needed to know the diagnostic criteria, they could look up the information in the TS literature or in the Diagnostic Statistical Manual-Fourth Edition-Text Revised (DSM-IV-TR).

The respectable knowledge level indicated a reasonable number of the participants may have been previously and appropriately trained in regard to TS. However, there was also a portion of the respondents whose scores on the knowledge of characteristics and interventions scales that were not acceptable. These particular individuals may have had an insufficient amount of training or education in diagnosing of TS and effective intervention practices. There may have also been a high percentage of the school psychologists who had a limited amount of education which had focused on TS. It was evident the participants within this sample were not completely knowledgeable of characteristics and effective interventions of TS. Consequently, it is reasonable to assume that because of the lack of formal training among some of the school psychologists they needed to rely on their clinical judgment and diagnostic knowledge to respond to the survey questions successfully.

School psychology is a field that is always evolving and changing. Therefore, these professionals have a responsibility to take a personal initiative to remain at the forefront of new information. In order to increase the reasonably strong percentage of

trained school psychologists to an even greater percentage, school psychologists should be encouraged to attend continuing education classes. Although the respondents' results on knowledge were respectable, school psychologists could use more education on TS in order to increase their awareness even further. Increasing school psychologists' efficacy regarding TS would require more continuing educational professional classes focusing on knowledge of TS. Effective preparation could include additional course work on TS, which could be implemented at graduate programs. The graduate school courses and workshops should focus primarily on increasing the understanding of TS characteristics, diagnostic criteria, and associated disorders that have educational and emotional implications. Effective interventions, such as appropriate accommodations and modifications in school settings for students diagnosed with TS should also be part of additional training.

The high percentage of the participants within the study indicated that they implemented a variety of social-skills training for TS students. These interventions were utilized for youngsters in individual and group counseling sessions. The results revealed they were familiar and empathetic to the different psychological and social deficits these students may be experiencing. However, new challenges are always surfacing with TS students who are experiencing social and emotional problems. As mentioned in the literature, many of the TS students have difficulty developing friendships and they can be defiant. They may also need help in coping with the frustration they feel because of their tics. Therefore, the development of more training programs should include updated information on new practices which focus on assisting children who are struggling socially and emotionally.

Even if graduate training provides the sufficient amount of course work, it is possible that school psychologists may no longer recall the information after they have completed school. Additionally, their knowledge which was previously obtained may have been forgotten if they have not been working with students with TS during the years serving as practicing school psychologists. Among all school personnel who were given the duty to oversee TS cases, the results reflected the fact that school psychologists reported they were the ones most likely to take on responsibility for TS cases. Therefore, it is evident that as mental health professionals, it is the school psychologists' responsibility to remain current with literature which could assist with increasing their effective identification and treatment of TS students.

Limitations of Study and Future Research

The reliability of the questions could have been a possible limitation within the study. The formatting of the knowledge of characteristics and interventions items could have had a negative impact on the reliability. The survey had some forced-choice items which were used when respondents were asked to rate their own knowledge. However, these types of questions could have some potential disadvantages. There is a tendency for raters to dislike this method because they may feel forced to make decisions which takes the control away from them. It is also unknown the extent to which participants really had knowledge of these questions or the extent to which they made educated guesses.

The questions were checked for clarity beforehand by presenting the survey to five school psychologists from the Philadelphia College of Osteopathic Medicine. All of these students were practicing school psychologists within the state of Pennsylvania. Their comfort level with the survey appeared evident by their being able to respond to all

of the items. However, even with piloting the survey, the study may have lacked validity in regard to the questions and items. Another limitation to the study was that TS experts were not consulted. This could have been an effective method in order to check for survey validity. The survey was not an instrument tested for psychometric properties but was designed for this study. Unless there had been another scale developed with strong psychometric property which has focused on TS knowledge and could be compared with the current survey, there is not a way to test for validity. There is not an adequate test to evaluate whether or not the questions that had been created for the survey were assessing, in fact, what they had been designed to measure. If there were such a test, it would have been used in the study.

Non-response was also a limitation which could have caused a potential issue for the study. Prior to sending out the surveys to potential participants, specific measures were made in order to maximize the response rate. These included the use of stamps for the initial and for the return mailings, multiple contacts, and the use of a relatively brief survey. Additionally, researchers could follow up with the school psychologists who chose not to complete the survey. This technique may help to determine similarities and differences among participants and non-participants.

A respectable percentage of school psychologists responded to the survey. However, the number of participants who did not complete the questionnaires could have been attributed to the survey being too long. Additionally, the school psychologists may not have thought that the questions were relevant to the time expended on them, particularly if they were not interested in what the study was set out to measure. Consequently, this could have contributed to the percentage of non-respondents.

Selection bias could be viewed as one of the limitations in this study. There were a respectable number of respondents who completed the survey. These specific individuals may have been willing to complete the survey because they believed they were knowledgeable about TS characteristics, associated disorders, diagnostic criteria and effective interventions. Respondents may have been more willing to respond because they had a strong understanding of TS. Participants in the study were 25.5% of the entire population who were presented with surveys. Approximately three-quarters of the participants did not return the surveys. There is the possibility that the individuals who did not return the surveys were not as knowledgeable about TS characteristics and interventions. Consequently, the sample of school psychologists used in the study may have been composed of professionals more prepared to complete the survey, thus creating selection bias.

The professionals chosen from the state directories may have had a stronger understanding of TS compared with the school psychologists who were not on the membership listings. The school psychologists selected from the New York and New Jersey registry could have been more likely to be knowledgeable about TS. School psychologists who have not registered may be different in either a positive or negative direction in regard to their understanding of TS characteristics and interventions.

Internal consistency among the results of these questions and items was investigated as another limitation. A lack of internal consistency indicates that the participants' answers resemble a chaotic, rather than a consistent pattern. The internal inconsistency of the survey questions was indicated on the Cronbach's Alpha test which

revealed a .407 for the items on the Knowledge of Characteristics Scale and -.097 for the Knowledge of Interventions Scale questions.

However, the goal of the study was designed to measure knowledge rather than a construct. When a study is measuring knowledge, it is investigating correct and incorrect answers. In this study, points were dependent on the amount of accurate and inaccurate answers. In contrast, the purpose of assessing a construct is to evaluate behavior and attitudes of the participants, in which points are given for these attitudes and behaviors, without reference to any idea of accuracy. The nature of the low internal consistency within this study may have been related to their ability to give correct answers, rather than to the scale itself. Therefore, it may be that the internal consistency did not have to be high in this particular study in order for the results to be valuable.

Surveying the knowledge of other school personnel, such as teachers, principals, and social workers may provide valuable information for future research. Discovering how much other school professionals understand about TS could be helpful in identifying whether or not more training is needed for members in other educational fields.

Assessing other school personnel could also be useful in an attempt to evaluate whether or not they feel comfortably knowledgeable enough to assist students diagnosed with TS. Questions can also be centered on asking respondents if they believe that the school psychologists in their schools have been effective with working with students with TS.

It may be beneficial for future researchers to investigate whether or not knowledge of TS was dependent on experience and longevity of school psychologists. It would be interesting to investigate the possibility that the more experience a school psychologist has, the more understanding he or she obtains about TS characteristics and

interventions. It would also be useful if future research includes survey items that ask school psychologists in what capacity they specifically gained knowledge of TS. It would be useful to investigate if there is a common resource from which these professionals learned about TS.

Although there were some participants who had surveys presented to them at various workshops, a large majority of them had the questionnaires mailed to them. Therefore, it is possible that the participants could have utilized aids in order to assist them with some of the answers. One of the aids could have been the use of the Diagnostic Statistical Knowledge-Fourth Edition-Text Revised (DSM-IV-TR) in order to obtain the correct information. Looking up psychological disorders in the DSM-IV-TR is what competent school psychologists regularly do and should be part of their job description. However, future research could provide an alternative approach by conducting face-to-face interviews with the participants through the use of non-quiz formats, such as case vignettes, allowing for different kinds of insights.

Overall, based on the lack of research in this area and the limitations of the present study, it would be beneficial to take steps to develop future studies on school psychologists' knowledge of TS. Future psychological research on the knowledge of TS would be beneficial in order to identify if more training is needed for school psychologists. Discovering an increase in education is needed in regard to school psychologists' awareness of TS and will assist with appropriate diagnosis and implementations of effective interventions within school systems.

Conclusion

The purpose of this study was to investigate the levels of knowledge school psychologists possessed in regard to their understanding of TS characteristics and effective interventions for students. The goal was to determine if school psychologists were knowledgeable in regard to their understanding of the various characteristics, diagnostic criteria and associated disorders of TS. Respondents' knowledge of appropriate and effective interventions was also investigated. The purpose of the study was to discover if graduate training played a role between school psychologists' knowledge of TS characteristics in comparison with their understanding of effective interventions. Additionally, the study set out to discover if differences between clinical practice and direct contact with students for school psychologists contributed to stronger knowledge of TS characteristics and effective interventions.

The school psychologists who participated in this study possessed similar demographic characteristics. They were comparable in gender, professional graduate training, ethnicity, and type of districts in which they were employed. Those who completed the survey were reasonably knowledgeable about the current information regarding TS characteristics, co-morbid disorders and effective interventions. Overall, the participants demonstrated accuracy when determining the appropriateness of a variety of accommodations and modifications for the TS population. Consultation, referral for medical evaluations, as well as appropriate assessments and teacher consultations were indicated as commonly used effective interventions. Although, a respectable number of the respondents were knowledgeable, more training would be beneficial in order for school psychologists to become even more aware of TS and possibly reach expert status.

Additionally, there are a number of practitioners who have limited experience and knowledge of characteristics and interventions of TS. An increase in training and education would help these professionals to further their understanding of diagnostic criteria of TS, increase awareness of co-morbid disorders and be able to implement effective interventions.

The results of the current study have provided pertinent information for the profession in regard to the level of knowledge and service these participants possess and provide to students. Because they are Mental Health professionals, it is the responsibility of these school psychologists to enhance the academic and emotional functioning of students diagnosed with TS. In addition to being aware of TS, school psychologists will attend to a variety of other mental health conditions that students with TS may be experiencing. If these professionals have limited knowledge and training, they must ascertain the appropriate skills necessary to develop the competence for helping these students. School psychologists were viewed as the ideal professionals to take primary responsibility for the TS population in comparison with other school personnel. Therefore, it is essential that they utilize their skills to further their knowledge of TS as well as relay it to school personnel, students, and families.

Overall, the results from the current study have provided information for the profession of school psychology in regard to knowledge of TS. It is the responsibility of these professionals to provide services that contribute to the enhancement of the academic and social and emotional functioning of all students. It is school psychologists' obligation to attend to students who are experiencing medical and mental health conditions, which includes TS. A lack of adequate knowledge may hinder their ability to

help these individuals. Therefore, they must be assertive in developing the skills necessary to identify TS and to be able to provide appropriate interventions for the students who are suffering from the disorder. School psychologists are viewed as the ideal professionals to take over the case responsibility for students diagnosed with TS within schools. Consequently, it is important that they use their abilities to further the knowledge of other school personnel, community, and students about TS.

Presently, there is no formal training or assessment required by school psychologists practicing in New Jersey and New York that focuses on their levels of their knowledge about TS. There is training available through continuing education workshops; however, neither mandates school psychologists to participate and gain additional knowledge. School psychologists are mental health professionals who are important and influential figures within the educational environment. Consequently, they have a duty to educate school personnel and provide interventions for students with a variety of mental health disorders and learning disabilities. Children and adolescents who are referred for evaluations demonstrate different emotional issues and learning difficulties which must be appropriately identified by school psychologists. School psychologists must use their knowledge in order to educate and train teachers and school administrators and other members of the school community who work with students diagnosed with TS.

The investigation of the study was preliminary in nature and additional data are necessary in order to more accurately identify school psychologists' knowledge base with regard to TS. The increased awareness of the knowledge level about TS, established in this current study among school psychologists within New York and New Jersey, may

also be useful for other states. Changes in the methodology and the results of the current study could be replicated in order to be used for future research and to be generalized to school psychologists in different states within the country.

There are numerous articles written in the literature in regards to TS. However, there is limited information on the responsibility that school psychologists have in providing services to TS students. There were also limited articles found which investigated school psychologists' actual knowledge of TS. Therefore, the current study was utilized to provide basic information relevant to school psychologists' knowledge of TS. Results obtained from this study may serve as a spring board for future research about the role of school psychologists for students diagnosed with TS and may increase the presentation of such studies in school psychology literature.

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Appendix A

Cover Letter- Survey

Dear Fellow School Psychologist,

I am a doctoral student in the School Psychology Program at the Philadelphia College of Osteopathic Medicine. The attached survey was developed to provide information on school psychologists' knowledge of Tourette Syndrome and appropriate interventions which should be utilized within school systems. As you complete the survey, I am asking you to think about your experiences related specifically to working with children and adolescents with Tourette Syndrome within your school systems. You may choose either to participate or not to participate in the survey. If you complete the survey, and then change your mind, please draw a line through the completed information so that it will be clear that you do not want the information to be used. You may at any time stop filling out the survey. The length of time to complete the survey is estimated to be 15 minutes. There is an enclosed stamped envelope in order for you to mail back the survey. Results will be kept confidential and you will not be identified in any way.

There are no foreseen benefits or risks to you from participating in this study other than your contribution to school psychologists' awareness of Tourette Syndrome. I would be happy to send you the results of this study if you contact the School Psychology Department at PCOM. As I know that the school year is a busy time, I appreciate your participation in this questionnaire. Please feel free to ask me questions now, or contact my committee chair in the future. This page is yours to keep.

Sincerely,

Jesse Glassman
201-585-8598
jessegl@pcom.edu

Dr. Carrie Yurica, Committee Chair
215-871-6442
CarrieY@pcom.edu

Appendix B

Tourette Syndrome Awareness Survey for School Psychologists**A. Background Information**

1. What is your level of education?
 - Master's Degree
 - Education Specialist
 - Doctorate
 - other

2. In what year did you obtain your highest degree? _____

3. How many years have you been employed as a school psychologist?
 - 0 to 5
 - 6 to 10
 - 11 to 15
 - 16 to 20
 - 21 or more

4. How many years have you been employed in your current position?
 - 0 to 5
 - 6 to 10
 - 11 to 15
 - 16 to 20
 - 21 or more

5. What is the size of the district in which you are currently employed?
 - < 100 students
 - 101 to 300
 - 301 to 500
 - 501 to 700
 - 701 to 900
 - > 900 students

6. With which grade levels do you work? (check all that apply)
 - preschool
 - elementary
 - junior high
 - high school
 - post secondary
 - (ie: vocational/abilities training for 18 to 21)

7. Which of the following best describes the setting in which you are employed?
 - rural
 - urban
 - suburban

8. What is the average household income level of the families residing in your district? _____ upper socio-economic class
 _____ upper middle socio-economic class
 _____ middle socio-economic class
 _____ lower socio-economic class
9. In what county of New Jersey or New York are you employed? _____
10. In what town/city are you employed? _____

	Little or no knowledge	Somewhat knowledgeable	Very knowledgeable	Expert level
11. How would you rate your level of knowledge about the social deficits often present with Tourette Syndrome?				
12. How would you rate your level of knowledge about the executive function deficits often present with Tourette Syndrome?				
13. How would you rate your level of knowledge about the academic deficits often present with Tourette Syndrome?				

14. If you feel at least somewhat knowledgeable about Tourette Syndrome, from what source did you primarily learn about the disorder?
 _____ University or College training program
 _____ workshops or seminars
 _____ independent study
 _____ parents of children with the disorder
 _____ other
15. How many children diagnosed with Tourette Syndrome have you worked with in your capacity as a school psychologist? (either through evaluation, case management, consultation, etc.)
 _____ None
 _____ 1 to 5
 _____ 6 to 10
 _____ 11 to 15
 _____ 16 or more
16. Do you have any personal experience working with children with Tourette Syndrome or other movement disorders? (optional)
 _____ Yes
 _____ No

B. Student Information

If you have previously or are currently working with children diagnosed with Tourette Syndrome, please think of one particular student and respond to the following questions.

1. What is the age of the child (or the age during which you worked with the child)? _____

2. At approximately what age was the child first diagnosed? (if known) _____

3. How was the diagnosis made? (if known)
 - ___ by a neurologist or psychiatrist based on child study team evaluations and examination of the child
 - ___ by a neurologist or psychiatrist based on input provided by the parent and examination of the child
 - ___ other (explain)

4. Was the child referred for special education services? ___yes ___no
 If so, at what age? (if known) _____

5. What, if any, comorbid conditions has the child been diagnosed with? (if known)
 - ___ ADHD
 - ___ Depression
 - ___ Bipolar Disorder
 - ___ Anxiety
 - ___ Obsessive-Compulsive Disorder
 - ___ other

6. Regardless of formal diagnoses, which of the following characteristics does the child demonstrate?
 - ___ attention difficulties
 - ___ hyperactivity and/or impulsivity
 - ___ depression
 - ___ anxiety
 - ___ obsession patterns of thought or obsessive-compulsive behaviors

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7. Please use the following list to select weaknesses or areas of need with this particular child.
- decision-making
 - perspective-taking
 - anger management
 - emotional regulation
 - self-control
 - attention/concentration
 - labeling/identifying emotions in self and others
 - decoding nonverbal behavior in others
 - appropriate use of nonverbal behavior
 - eye contact
 - conflict resolution
 - peer cooperation
 - social communication
 - turn-taking
 - interpersonal skills
 - peer interaction
8. What type of educational program is the child receiving?
- general education
 - supplemental instruction such as pull-out support service
 - in-class support
 - pull-out replacement resource instruction
 - self-contained within district
 - out-of-district placement
 - other
9. If you provide counseling services for a child with Tourette Syndrome what is the focus of these services? (check all that apply)
- appropriate use of nonverbal behavior
 - decoding nonverbal behavior of others
 - decision-making
 - labeling/identifying emotions in self and others
 - perspective-taking
 - cognitive restructuring
 - attribution retraining
 - exploring and examining alternatives (to address dichotomous thinking)
 - anger management
 - emotional regulation
 - increasing self-control/behavioral regulation
 - correcting cognitive distortions and dysfunctional beliefs
- social competency
- other (please list) _____
-
10. Does the child receive aide services and, if so, what type?
- individual aide
 - classroom aide
 - none
 - other (please fill in) _____

11. Please rate the child on the frequency of discipline problems (those resulting in being sent to the principal, detention, or suspension) very often
 somewhat often
 occasionally
 rarely
 never
12. Does the child have modified discipline expectations? yes
 no
13. How would you rate the student's level of social functioning, as compared with other students of the same grade or age? excellent
 good
 fair
 poor
14. How would you rate the child's level of academic functioning, as compared with other students of the same grade or age? excellent
 good
 fair
 poor
15. If the child receives social skills training or instruction, what skills are addressed? (check all that apply) conflict resolution
 experience-sharing
 reciprocal communication/interaction
 social referencing
 appropriate use of nonverbal behavior
 interpreting nonverbal behavior in others
 turn-taking
 perspective-taking
 other

C. Interventions of Students with Tourette Syndrome and Knowledge of Diagnosis

1. Within your district, who assumes the primary role in your school system in cases of Tourette Syndrome? (circle all that apply)

- a principal a school psychologist
a school nurse a social worker
a school counselor other (identify) _____
no one don't know

2. Which of the following intervention techniques do you feel competent to employ with regard to Tourette Syndrome? (circle all that apply)

- parent consultation teacher consultation
parent education teacher education
individual counseling none of these
social/group counseling other (identify) _____

3. Did you or other school staff refer the child for outside psychiatric or neurological consultation or treatment?

___ Yes ___ No

4. As a school psychologist, what method do you utilize in order to evaluate the cognitive, academic and emotional functioning of a child with TS? (circle all that apply)

- A. Wechsler Intelligence Scales -WPPSI-III WISC-IV WAIS-III
- B. Stanford Binet Intelligence Scales-Fifth Edition
- C. Differential Ability Scales-Second Edition
- D. Woodcock-Johnson Test of Achievement-Third Edition (WJ-III)
- E. Wechsler Individual Achievement Test-Second Edition (WIAT-II)
- F. Behavior Assessment Scale for Children-Second Edition (BASC-2)
- G. Conner's Behavior Rating Scale
- H. Behavior Rating of Executive Functioning (BRIEF)
- I. Other (Identify) _____

5. For each of the following statements please indicate, by circling true or false, which of the following symptoms are necessary for a diagnosis of Tourette Syndrome.

- T F A. both physical tics and vocal tics
- T F B. ability to suppress tics for varying lengths of time
- T F C. both uttering obscenities and physical restlessness
- T F D. onset of symptoms before the age of 18
- T F E. symptoms have to be present continuously for 1 year without "symptom free" periods.

6. Please indicate whether the following statements are consistent (C) or inconsistent (I) with the current professional literature on TS.

- C I A. Tourette Syndrome is a neurological and genetic disorder
- C I B. Children with Tourette Syndrome often have obsessive-compulsive disorder
- C I C. Tourette Syndrome is most effectively treated with stimulant medications
- C I D. Tourette Syndrome occurs in equal numbers of boys and girls
- C I E. Children with Tourette Syndrome often have attention deficit hyperactivity disorder
- C I F. Uttering obscenities is the most common symptom of Tourette Syndrome
- C I G. The symptoms of Tourette Syndrome may not be seen for weeks at a time
- C I H. Look for learning problems in math and written language and reading

7. Please indicate whether the following classroom modifications are Never (N), Sometimes (S), Often (O), or Almost Always (A) appropriate for a child displaying symptoms of TS.

- N S O A A. Allow the child to periodically leave the classroom
- N S O A B. Establish a separate test-taking room for the child
- N S O A C. Educate the child's classmates about Tourette Syndrome
- N S O A D. Gently remind the child to try and control his/her tics
- N S O A E. Seat the child near the front of the classroom
- N S O A F. Establish time limits for assignments and tests

