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Stuttering and Tourette's: A Comparative Study

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Running Head: STUTTERING AND TOURETTE'S: A COMPARATIVE STUDY

Stuttering and Tourette's: A Comparative Study

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Abstract

The purpose of this research study was to provide pilot data regarding the similarities and differences between stuttering and Tourette's, specifically the physical, emotional and psychosocial aspects and the effects the behaviors had on the clients' thoughts related to their disorder.

Recently published articles pertaining to stuttering and Tourette's Syndrome were collected, analyzed and summarized in the paper. Once the literature review was completed, similarities and differences were deduced and explained in later chapters.

The overall results of this study showed that the two behavioral disorders have little overlap in terms of physiological and behavioral similarities because they are incredibly variable. However, this study demonstrated that multiple disorders could be lined in different ways; various conditions were reported as comorbidities of the main disorder. In conclusion, there could be multiple relationships between stuttering, Tourette's and many other syndromes.

Therefore, this paper will serve as a preliminary review that can be used to guide future research concerning the qualities of various disorders including stuttering and Tourette's Syndrome.

Chapter 1

Introduction

The human race prides itself on obtaining knowledge and solving problems; ideas and theories are constantly being researched, refuted, or proven. The scientific lengths that have been covered in the past 100 years alone are extraordinary. And yet, the human brain, the most important structure in the body, is still a complete mystery. Most of the data that have been published regarding this vital organ consist only of speculation because that is the best that can be done. The intricacies can only be imagined.

This reality has become much more detrimental to medical personnel in the last century who are focused on different behavioral disorders. The diagnosing process is difficult enough because no condition seems to be unique; the amount of overlap in terms of symptoms and ailments are astonishing and can make one's job incredibly frustrating. How can a doctor or medical professional not have a straight answer for their patients? This paper is, first and foremost, a literature review of several articles and studies to try to uncover similarities and differences between stuttering and Tourette's Syndrome so a distinction between these two disorders might be made clearer. The following chapters outline these reviews, the comparisons that were uncovered and possible treatment options and educational avenues that could be employed for these patients and their loved ones in order to better cope with their diagnosis. The hope is that this research will aid in future studies that will further distinguish between these diseases in order to better serve those who suffer from stuttering or Tourette's.

Chapter 2

Literature Review

*Tourette's Syndrome**What is Tourette's?*

In order to be diagnosed with TS according to the DSM-IV-TR, an individual must demonstrate multiple motor and vocal tics many times a day or intermittently during a one year period which impair many areas of functioning. The disease must have started before age eighteen and the tics must not be caused by substances or other medical conditions. The researchers claimed that the most common motor tics associated with TS are jumping, eye blinking, head turning, and poking, among others (Burd et al., 2008, p. 171).

Tic behaviors are categorized into three groups: simple motor tics, complex motor tics, and vocal tics. The difference between simple and complex motor tics is the number of muscle groups that are used to tic (Kutscher & Atwood, 2005, p. 197). For example, an eye blink only uses the eye muscles so that would be considered a simple motor tic. But, twisting one's body involves arm, torso and sometimes leg muscles so this would be classified as a complex motor tic.

In terms of speech, tics often interrupt normal communication between individuals but the patterns are still being identified. Specifically, it is believed that these motor and vocal behaviors occur more in sentences and longer clauses and not for single word utterances (Burd et al., 1994, p. 278).

Ben Trubody began investigating Tourette's in a very different light in 2014. This is where the paradoxical nature of the tic comes in. He, along with many other researchers, postulated that people with Tourette's are in a constant battle between their conscious mind that resists a tic and their unconscious mind that wills a tic to occur. In short, a tic is paradoxical in nature; what someone with TS wishes, according to Trubody, is to feel neither the urge to tic nor the urge to suppress it. However, this is not possible. Instead, those with Tourette's tend to rely on their current state of consciousness in order to suppress a tic.

Perhaps one of the most challenging aspects of Tourette's Syndrome is clearly identifying the common behaviors and actions associated with the disorder. De Nil et al. (2005) studied the specific behaviors associated with Tourette's Syndrome by questioning sixty-nine children from the Toronto Western Hospital who were diagnosed with Tourette's and twenty-seven children from the General Medical Clinic who were not diagnosed with the disorder. Medication was not halted for the study but was recorded by the researchers in each individual's file. Each participant partook in a routine assessment to officially diagnose TS and any other comorbidities and then was given a questionnaire to fill out regarding self-perceived language deficiencies as well as asked to record a short speech sample. Results showed that there was not a significant difference between the two groups; the frequency of disfluencies that were considered atypical was not as high in the TS patients as expected and the data suggested that the higher prevalence of stuttering observed in TS may just be a combination of many disfluencies. But, the control group's disfluencies tended to decrease with age while the individuals with TS tended to maintain their speech and language deficiencies. And in 2012, researchers in London discovered that people with TS may have a hard time identifying a true faux pas, or inappropriate behavior, verses a minor issue (Channon et al., p. 256). However, it can be argued that many, if not all,

behavioral disorders are uniquely expressed depending on the individual and, therefore, no universal characteristics of Tourette's Syndrome can be identified.

What Causes Tourette's Syndrome?

One article proposed three evolutionary brain systems: reptilian, paleomammalian and neomammalian. The reptilian brain system is the most primitive and includes the basal ganglia which are thought to be in control of instincts. This part of the brain may be very resistant to both genetic and environmental change which may be where the tics originate. Therefore, a tic could be the result of a disconnect between one's stagnant past and changing present (Burd et al., 2008, p. 183). It has also been observed that tics tend to come through more when the individual is uncomfortable or stressed (Burd et al., 1994, p. 279).

Perhaps the most commonly researched hypothesis concerning the cause(s) of Tourette's Syndrome involves the theory that the neurotransmitter dopamine is involved. For example, Burd et al. (1994, p. 285) postulated that tics may be the result of unmodified impulses from certain portions of the brain or basal ganglia that are not functioning properly. Increased levels of dopamine in these areas could also explain the obsessive tendencies that many TS patients exhibit; Rajagopal et al. (2013, p. 70) reviewed research concerning premonitory urges (PUs) in terms of TS. They determined that dopamine was a key factor in these behaviors and outlined theories that could explain the urges in terms of the neurotransmitter. For example, a sensorimotor gating dysfunction could point to an excess of dopamine. The basal ganglia in the brain are responsible for choosing behavioral patterns and utilize this gate to do so. Therefore, an excess in dopamine would deplete the gate's function. Another theory focuses on a phenomenon

called “structured event complexes” which could cause PUs if the individual does not allow these SECs to occur. Or, in the case of Tourette’s Syndrome, PUs could be due to a lack of inhibitory neurons. In addition, a prepulse inhibition theory has been proposed which states that a weak stimulus which precedes a startling stimulus could reduce an individual’s reflexes. This could be used to explain how some tics develop; an event that caused some adverse reaction could lead to a reflex developing which could manifest itself as a tic.

In terms of dopamine itself, some research suggests that the neurotransmitter’s pathway could be overactive and that leads to an increase in premonitory urges (Rajagopal et al., 2013, p. 66). Mermillod et al. (2011, p. 3) conducted research on a theory known as the dopaminergic dysregulation hypothesis which suggests that individuals with Tourette’s Syndrome tend to uptake more dopamine which causes the motor characteristics synonymous to TS. These deficits may also explain emotional instabilities associated with the condition; elevated dopamine levels can have adverse effects on emotional processing.

Comorbidities

It was determined that many TS patients report comorbidities such as compulsive behavior, obsessive thoughts and vocalizing obscene statements (coprolalia). According to Kutscher and Atwood, “60% of people with Tourette’s have ADHD; conversely, 7% of people with ADHD have tics” (2005, p. 199). Also, TS is thought to be related to learning disabilities and speech disfluencies that are observed in patients with the condition. Research suggests that some tics are brought on by certain situations and that coprolalia varies based on the language which implies knowledge of speech.

Burd et al. (1994) further investigated the phenomenon known as coprolalia and found some commonalities. For example, coprolalia, or the tendency to speak inappropriately in social situations, is observed in 5-8% of individuals with TS and could be used as stress release. Mental coprolalia could also occur if the individual with TS is experiencing the same symptoms but limiting them to their minds. Palilalia, or “the repetition of one’s own verbalizations”, has been noted by researchers who study Tourette’s and could be yet another defense mechanism employed by these patients (Burd et al., 1994, p. 274).

Multiple authors further classified behaviors associated with Tourette’s Syndrome by categorizing them as simple or complex; simple behaviors include coughing and tensing muscles while complex behaviors could range from word repetitions to pinching themselves or others (Burd et al., 1994, p. 273). Some researchers also made the distinction between motor tics and phonic, or spoken, tics. Motor tics are considered simple if they are “brief and involve only one muscle group” and “complex if they appear as longer, more purposeful sequential movements” (Van Borsel & Vanryckeghem, 2000, p. 228). Similarly, simple phonic tics are classified by sudden and meaningless sound while complex phonic tics are meaningful and ritualistic in nature (Van Borsel & Vanryckeghem, 2000, p. 228).

In addition, a pediatrician who had been practicing for thirty-five years sent out surveys to patients who came in for treatment of Tourette’s Syndrome. Those who did not report positive outcomes from the treatment mentioned ADHD, learning disabilities, and low education levels in their surveys. Most of the individuals who responded said that they experienced a significant reduction in their tics as they aged but more than 40% still reported some comorbidity, such as ADHD and OCD (Byler et al., 2014, p. 143). The researchers determined that, even though

motor and vocal tics became minimal or non-existent with age, psychiatric problems persisted and continued to be treated.

Treatment

Ben Trubody (2014) presented a phenomenological analysis of TS which focuses on first person cognitive experiences. There are two types of intentionality that are used in these analyses: 'ready-to-hand', which alludes to the idea that the world guides our actions and 'present-at-hand', which is normally how we refer to our consciousness. These concepts can be used to help someone with Tourette's interpret their experiences in a different way as well as present new ways to treat. However, these views would not exist if we did not first decide that our actions and activities were meaningful. Therefore, one must say that they are a being of this world before the other classifications can be applied. But, this can become excessive if used repeatedly. The 'ready-at-hand' analysis, by comparison, is utilized to show the person with TS that the tics are a part of them, not a disorder like the 'present-at-hand' analysis suggests. This all comes back to the fundamental belief that every person lives in a way that only they can, which is known as ontological difference. Based on this belief, it can be said that the 'ready-at-hand' view can be employed to explain tics and TS in terms of ontological difference. For example, it has been determined that tics can diminish in quantity and severity if the individual is participating in activities that are meaningful to them, such as music or sports. This brings the person with TS back to their 'being-in-the-world' state and tends to alleviate their syndrome.

A pediatrician sent out surveys to patients who came in for treatment of Tourette's Syndrome. 95% of patients had not heard of CBIT, or Comprehensive Behavioral Intervention

for Tics, which is a nonpharmacologic treatment that focuses on behavioral modification rather than medicinal treatment. This is relatively new and there has not been much research done concerning the specifics of CBIT; the physicians “had not mentioned this treatment, nor were they exposed to information sources that kept them up-to-date with developments in the treatment of TS” (Byler et al., 2014, p. 143). However, if more research is conducted and this therapy is investigated further, CBIT may become an effective means of treating Tourette's in the future.

Currently, the most common form of treatment for this disorder is medicinal. Although multiple medications are utilized and have shown positive results, the effectiveness varies from person to person; for example, “doctors had prescribed different medications in the past to help with [a] patient's tics but they were all taken irregularly and ended prematurely” (Van Borsel & Vanryckeghem, 2000, p. 230). Ergo, different patients will react to the same medication in different ways and these variations make it extremely challenging to pinpoint one substance that will universally treat Tourette's.

But, Kutscher and Atwood made a good point in their book; “Medications do not cure the symptoms [of Tourette's]; they just control them for the days that the [person] takes them” (2005, p. 205). So, it is really up to the patient whether or not they want their tics to be diminished. Some commonly used medicines for Tourette's include Catapres, Tenex and Risperdal (Kutscher & Atwood, 2005, p. 205).

Recorded brain activity could also play a major role in the treatment of TS. Bour et al. (2015) monitored the electrochemical signals emitted from three individuals who were diagnosed with severe Tourette's Syndrome. Their results showed that “a spontaneous tic is preceded by

significant repetitive brief thalamo-cortical coherent discharges” (Bour et al., 2015, p. 1583). In other words, there was a measurable amount of brain activity in the thalamus prior to a unplanned tic. If more in-depth research could be conducted to further investigate this relationship, a possible cause of Tourette's could be discovered, which would make treatment much easier. Kaido et al. (2011) came to the same conclusions after their completed study showed measurable improvement and reduction of tics in three case studies with Tourette's Syndrome following deep brain stimulation (DBS) of the thalamus. Although the study was successful, the sample size would have to be larger and randomized in order to determine the reliability of the treatment.

Self-Perceptions

In 2013, a group of researchers interviewed six children, ages 14-16, who had Tourette's Syndrome. The purpose of this study was to determine how these individuals felt about themselves and their relationships with others. By categorizing the various answers from the interview questions, the researchers were able to define five themes that were synonymous with all six participants: “TS as ever-present”, “Learning to cope well with TS”, “Worries about getting a job”, “Developing supportive relationships” and “Talking to peers about TS.” Like previous studies, the children reported that they felt obligated to try to control their tics. However, one child commented that they preferred to focus on the humorous aspects of their tics. In terms of future plans, most participants hoped that their TS would lessen with age because they were worried about getting a job or raising a child with their condition. As for relationships, there was not a clear pattern. Some of the children reported having very strong and

supportive relationships while others said that their friends did not understand their condition and therefore could not offer sufficient support. The researchers did determine that relationships tended to strengthen as the individuals aged which offered some good news. Lastly, although most of the participants were open to answering questions concerning their TS, they were worried about how others would react to the information; some of the children were annoyed because most of the people they talked to about TS assumed that all people with TS swear. But, there was a low percentage of bullying reported which could have been associated with age. Overall, the participants felt that they were learning how to cope with their TS but voiced concerns about relationships and interactions with others.

Stuttering

What is stuttering?

Stuttering is characterized by interruptions in speech fluency that can hinder one's communication and interactions with others. Like most communication disorders, a stuttering diagnosis is influenced primarily by the individual's age; a potential stutterer's current speech is compared to the speech of non-stutterers and is rated according to the perceived dissonance between the two measures.

There are various behaviors associated with stuttering with some of the most common including sound and syllable repetitions, blocking, prolongations and interjections. However, as was mentioned previously in terms of Tourette's, these characteristics can vary significantly from patient to patient.

In 2009, Spencer et al. conducted a study to determine how people who stutter communicate verbally. The results of ten stuttering adults were compared to the results of ten fluent adults. Each individual submitted a speech sample in a recording booth by speaking into a microphone when prompted by the researcher. The samples were analyzed using two measures: number of times a word or phrase appeared in the transcript and subcategories of the Systemic Functional Linguistic, or SFL. The SFL is a sociologically based tool used to compare the features available in a certain language to those used by a speaker. Specifically, this tool was employed to determine patterns in grammar, theme, attitude and politeness of the speech samples. Results showed that, on average, the stuttering individuals' speech samples were less complex grammatically, showed less variability in structure and modality and tended to be shorter in length when timed. When combined, the data led to the conclusion that stuttering can adversely affect a person's communication and social interactions. The researchers postulated that these characteristics may be linked to behaviors meant to protect the person who stutters from the social consequences of stuttering. For example, a person who stutters may limit their interpersonal speech in order to limit the number of times that they could possibly stutter during a conversation.

What causes stuttering?

A physiological study was conducted to determine how brain activity differs for people who have persistent developmental stuttering compared to people who exhibit no communication disorders. Ten adults with PDS were compared to ten fluent adults. The researchers conducted an MRI for each participant to compare the activity found in both the gray and white matter. The

researchers discovered that there was an increase in white brain matter in the right hemisphere of PDS patients. This could be due to atypical communication between the right and left hemispheres. Specifically, the MRIs showed “an atypically enlarged WM volume in the right auditory cortex” instead of the left hemisphere, which was characteristic of non-stuttering individuals (Jancke, Hanggi, & Steinmetz, 2004, p. 4). Also, the pictures showed an increase in WM in the right sensorimotor cortex in stuttering individuals which could suggest different processing strategies. However, the data could not be used to conclude whether this increase was the cause of the stuttering or the effect.

In 2014, a case study with stuttering was observed and their brain activity was monitored during their stuttering behaviors. From the results, it was hypothesized that there is an inverse relationship between stuttering and the contingent negative variation measured in the brain, or CNV. CNV is an electrophysiological characteristic of motor preparation and can be tracked using electrodes. During this study, Vanhoutte et al. (2014) discovered this supposed relationship between CNV and stuttering behaviors and were able to explain these findings by citing a lack of motor planning in the brain. But, due to the limited sample size, these data can't be generalized to all people who stutter.

In short, there is no definitive cause of stuttering at this point. It has been postulated that dopamine levels could lead to behaviors associated with stuttering but that has yet to be proven. Many theories have been suggested over the years but no concrete answers have been discovered.

Treatment

Craig, Blumgart and Tran (2011) conducted a study regarding the factors that aid stuttering patients in fighting the adversity they experience as a result of their condition. 200 adults who had stuttered since childhood were asked to participate through the self-help groups that they were involved in. First, each participant filled out a global severity index or GSI, which was used to determine each person's psychopathology, or negative behaviors and attitudes toward their stuttering. Once the scores were collected, the researchers split the participants into two groups: resilient or non-resilient. In this context, resilience is defined as the ability to cope in adverse situations. Then, each individual was brought in for a two to three hour interview with a speech pathologist which consisted of a short conversation to determine the extent of the patient's stuttering, a demographic analysis and multiple questionnaires concerning perceived quality of life, symptoms of stuttering, lifestyle and significant others. The results showed that the resilient individuals had lower health risk levels, felt more in control in terms of perceived stress, higher levels of social functioning, and fewer physical limitations. These were not only adaptations but also ways of protecting oneself from negative comments and interactions. The analysis of the results demonstrated that this increase in self-efficacy correlated with a decrease in depressive moods. And, the increased social interaction that the resilient individuals reported led the researchers to postulate that these people have a safety net of sorts, or a group of people that they can go to in times of trouble or distress. This study can be used not only to design treatments but also to educate individuals with chronic disorders about these resilient behaviors and tools which can positively influence one's life and well-being.

Michael Boyle involved two hundred ninety-one stuttering adults in a study to create a scale that could be used to measure levels of internalized stigma or the act of devaluing oneself

because of a trait or attribute they possess. Boyle sent out a web survey to each individual comprised of questions pertaining to demographics, existing measures of self-esteem, satisfaction in terms of one's life, and self-efficacy, and the preliminary Self-Stigma of Stuttering Scale, or 4S. After eliminating multiple questions due to redundancy and irrelevance, rewording unclear statements and conducting a final analysis, the 4S was released as "adequate for research and clinical purposes" (Boyle, 2013, p. 1524). The scale consists of three different subgroups: stigma awareness, stigma self-concurrence and stereotype agreement. Although the results showed that there are "negative associations between internalized stigma and self-esteem", the researcher stressed that increasing awareness is not the same as assessing the impact of such perceptions (Boyle, 2013, p. 1524).

Boyle also conducted a study in 2015 to analyze how psychosocial factors such as support, self-help group participation and identification with a group influence an individual's perceived quality of life, or QOL. Two hundred forty-nine individuals were selected from the Board Certified Specialists in Fluency Disorders and the NSA. A nine-point Likert scale was filled out by participants to self-rate their stuttering and the Quality of Life Enjoyment and Satisfaction Questionnaire, the Multidimensional Scale of Perceived Social Support, and the Empowerment Scale were used to measure QOL, social support and empowerment, respectively. Self-help support group participation (SHSG) was covered in one question and levels of group identification were measured using four questions. The results supported previous findings regarding social support/activity and engagement depleting the adverse effects of stuttering on patients' psychological well-being and coping strategies becoming more proactive if centered on the stutterer and their needs. The researcher stressed that people who stutter should be

encouraged to interact with others even when they stutter in order to strengthen their self-esteem. This is where SHSG would become beneficial.

Self-Perceptions

Baylor et al. (2011) researched communication restrictions associated with seven different disorders including stuttering in order to revise the Communicative Participation Item Bank or CPIB. Once the results were analyzed, the responses were categorized into two broad themes; the participants explained how the interference in their speech was both functional and emotional, and reported many different variables that influenced their speech patterns. For example, a forty-two year old male who stuttered described how difficult it was to complete different tasks with his stutter and how hard it was to deal with his disorder emotionally. He referred to a stuttering tax which is “the cost to someone for leaving a problem unresolved in order to avoid speaking” (Baylor et al., 2011, p. 275). He said that, if a bill was overcharged, he would most likely pay the extra instead of trying to make it right because he did not want to talk to someone about the issue. Compared to the other participants, the man with a stutter was the only one who said that talking louder actually made communicating easier because it improved his fluency. Along with this, the individual with the stutter said he felt more comfortable in noisy situations because he could talk louder and not attract attention.

O'Brian et al. (2004) asked stuttering patients to rate themselves on the severity of their stuttering behaviors. The sample consisted of ten adults who stutter. The researchers asked that each participant make six 5-minute audio recordings of them speaking in certain situations. Three of the recordings were done in the clinic and involved reading a passage, talking to the

clinician and talking on the phone to someone they did not know. The other recordings were done outside of the clinic with a tape recorder during social interactions. After each recording was collected, the individual was asked to rate their stuttering severity on a scale from one to nine, with one being no stuttering and nine being very severe stuttering. One to two months later, each participant was called unexpectedly and brought into the clinic to listen to the recordings and rate the perceived severity again. The speech-language pathologist involved in the study also rated each recording during the study and six months later as a professional comparison. Results showed that roughly 78% of the ratings were comparable within one point. That is, eight out of ten judgements from the participants and the SLP were extremely similar. However, not all participants rated themselves as well; for example, one individual consistently rated their stutters as less severe compared to the SLP. The difference ranged up to six points. In terms of the participants' two ratings, the researchers found that, on average, the severity ranking that was determined right after the recording was very similar to the rankings taken two months later. This study could be cited as support for using self-rating scales during therapy. Even if the perceived levels of severity differ substantially between the people who stutter and the SLP, the results could be used to further discussion as to why the people who stutter listed the severity of their behaviors so differently. Finally, measures of stuttering did not differ as much as the researchers expected when comparing clinic recordings to social recordings. The takeaway from this would be that therapists should not assume that clients will stutter more or less in the clinic verses outside the clinic until samples are collected.

Another study was done to collect adults' ratings of their stuttering behaviors but utilized self-figure drawings instead of scales. Twenty adults who stuttered from childhood were given a piece of paper and a pencil with the instructions to draw themselves. No other guidelines were

given. Some indicators that the researchers looked for were enlarged ears, which could indicate auditory disabilities, piercing or omitted eyes, which could mean the person is feeling hostile and emphasized mouths, indicating a difficulty to express themselves. These characteristics were then compared to self-figure drawings of non-stuttering individuals. On average, the eyes, ears and throat differed the most between the two groups. Lev-Wiesel et al. (2005) postulated that these features were accented in the pictures drawn by the stuttering patients because of heightened levels of social anxiety. The throat tended to have a line drawn across it to indicate a tight collar which could symbolize the coordination of the vocal cords and breathing, or lack thereof for people who stutter (Lev-Wiesel et al., 2005, p. 92). This type of therapy could be useful in increasing a stuttering patient's confidence in their communication because the drawings can tell a trained therapist a multitude of information without requiring a client to speak. This heightened confidence could, in turn, cause an increase in speech fluency.

In 2009, a research study was done by Bricker-Katz et al. to determine how older individuals with a stutter react to emotional responses to their stuttering behaviors. Twelve stuttering volunteers over the age of 55 were asked to fill out four questionnaires and their results were compared to a control group of fourteen 55-year-olds with fluent speech. One scale known as the Endler Multidimensional Anxiety Scale-Trait, or EMAS-T, was used to measure anxiety levels in certain situations. Interpreting the results showed that, although the younger population that was previously questioned reported higher levels of anxiety, the individuals over the age of 55 still showed concern about persistent anxiety in social situations. Another questionnaire focused on self-perceived quality of life for each participant. All measures were found to be within the normal range except for the subtest "Satisfaction with Health." On average, the stuttering individuals were more concerned about their health than the control group.

Others' Perceptions

In 2010, a pilot study was conducted by Bowers et al. to determine how eye gaze affects speech. Twelve adults who had no reported hearing/speech impairments and no training in speech and language were asked to watch three 20-second videos of stuttered speech and three 20-second videos of fluent speech. The screen showed only the face of the speaker (eyes, nose, and mouth) so that the participants would have less to focus on. The participants were asked to place their head on a chin rest so that they would hold their gaze and an instrument that tracked their eye movement was running during the course of the videos. The researchers found that the participants tended to look at the eyes more often during fluent speech and the nose during disfluent speech. In other words, the individuals usually broke eye contact with the person who stuttered. It was inferred that this gaze aversion could signal discomfort and other negative emotions from the participants in the study, which could cause social anxiety and similar discomfort in individuals who stutter. However, the change in attention could also be attributed to the break in communication that is caused by a stuttering action instead of personal insecurities. The researchers suggested that the averted gaze could be a result of polite behavior because the listener does not understand what the stutterer is going through and could be trying to react in an appropriate and respectful manner.

A similar study was previously conducted by Guntupalli et al. in 2007 regarding emotional and physiological responses of fluent speakers when interacting with people who stutter. Twenty fluent individuals were shown four videos, two of stuttered speech and two of fluent speech, each thirty seconds long. Both stuttering samples were rated as severe by certified speech language pathologists. The researchers collected results using two methods; first, the participants were asked to assess arousal and valence ratings using a scale consisting of five

faces ranging from calm to excited and happy to unhappy, respectively. And second, each participant was hooked up to sensors that measured their skin conductance and heart rate. Once the data were collected, some patterns were determined. Firstly, the samples collected from the stuttering videos showed elevated skin conductance and lower heart rate. Second, the individuals reported that they were uncomfortable, nervous, sad, etc. when watching the videos with the stuttered speech. Finally, the responses did not vary between subsequent stuttering and fluent samples. The researchers hypothesized that the physiological reactions occurred because the severe disruptions in speech triggered a response from the autonomic nervous system, resulting in the increased skin conductance. The sudden stuttering action could be perceived, in evolutionary terms, as a threat. So, it would make sense that the human body responded in such a way. The researchers also postulated that the participants rated themselves negatively on the scale because they were experiencing an emotional state synonymous to empathy; they perceived that the act of stuttering was unpleasant and therefore reported feeling unpleasant, as well.

Data were collected in Poland by Przepiorka et al. (2013) to determine public attitudes towards stuttering. A survey associated with the International Project on Attitudes Toward Human Attitudes (IPATHA) was approved by an ethics committee and distributed to 268 responders across Poland to try to obtain as representative a sample as possible. The participants were told to honestly evaluate five human attributes. Four of the attributes served as “anchors” - intelligence, left-handedness, mental illness and obesity – to which stuttering was compared. Questions were also posed concerning demographics, physical and mental health, and learning/speaking abilities. Results show that most of the participants fell within the average in terms of their attitudes towards stuttering. Those who fell above or below the mean were thought to have the following beliefs; those who ranked stuttering as lower than average thought that the

medical system was sufficient enough to help said individuals with their disorder. Those who ranked higher on the scale were also proponents of self-helps therapies. Overall, the participants exhibited acceptance of these individuals and did not attribute their behaviors to godly involvement or social experiences. Instead, they most frequently stated that the disorder was hereditary. However, there was an anomaly between people who stutter leading normal lives but being unable to successfully hold a job. The Polish, when compared to other countries, were more inclined to reject asking the person to slow down their speech but opted for more distance between themselves and the individual who stutters.

Similarly, data were collected from sixty-four participants to determine the extent of gaze aversion when interacting with people who stutter. The participants were split equally by culture; they identified as African-American, European-American, and Chinese. Each person was asked to watch six videos of speech samples comprised of normal speech and stuttered speech. The researchers asked that the participants focus on the video with limited head movement so an eye-tracking device could record as much information as possible. Four regions were outlined on each face that the eye-tracking device focused on: eyes, nose, mouth, and the surrounding background. From the information obtained, three measures were formulated and recorded: percent of time spent on each region, gaze fixation count on each region and average duration on each region. Although the fixation count was not affected, the average fixation duration on the eyes decreased during the stuttering samples. Also, the average duration of time focused on the mouth increased if the speaker stuttered. This information could lead to the conclusion that stuttering behaviors can be overwhelming to those watching someone stutter, which could be used when advising the general public on stuttering. However, the researchers postulated two different reasons for an increased focus on the mouth during a stutter. One was that the behaviors

were deviant and therefore attracted attention. The other was that the stuttering was coupled with auditory stimuli and the participants were looking compensate for the “acoustic degradation” (Zhang & Kalinowski, 2012, p. 393). In terms of culture, the two American groups were very similar in their tendencies, but the Chinese participants differed substantially. On average, those with a Chinese background focused more on the background and mouth than the other two groups.

Chapter 3

Method

In order to complete this project, keyword searches were done on the Academic Search Complete database provided by the University of Akron. Successful searches included “Tourette’s syndrome”, “stuttering”, “social aspects of stuttering”, etc. Once articles were found and analyzed, pertinent information was summarized in Chapter 2. Very few articles compared stuttering and Tourette’s so comparisons were drawn after all articles were thoroughly reviewed. Data and findings that were referenced in this study were from recent publications; most of the articles were written within the past ten years.

The purpose of this research study was to provide pilot data regarding the similarities and differences between stuttering and Tourette’s, specifically the physical, emotional and psychosocial aspects and the effects the behaviors had on the clients’ thoughts related to their disorder. This project can be used as a base to conduct more in-depth studies with a larger and more demographically diverse target population.

Chapter 4

Results

The overall results of this study showed that Tourette's syndrome and stuttering have little overlap in terms of physiological and behavioral similarities because these disorders are incredibly variable. In fact, during the course of this research, it was discovered that perhaps the only characteristic that multiple behavioral and speech disorders share is that they are unpredictable; the signs and symptoms vary not only from one gender or ethnic group to another but between individuals, as well. Due to the sporadic nature of these ailments, conclusive results could not be reached. However, multiple trends were observed in the following articles that could serve as hypotheses to be tested in more depth.

For example, Mermillod et al. (2011) reported that some cognitive literature related to Tourette's syndrome was found to have significant flaws, mainly that a second group of researchers could not replicate the findings outlined in the methodology. Tourette's patients with OCD were compared to Tourette's patients without OCD to determine if there was a difference in the brain's ability to process disgust and threat stimulations. However, the study could not be replicated to confirm the difference between the experimental and control groups regarding brain activation for disgust stimuli. This could lead to the conclusion that attempts to redo experiments would just yield a new set of results since the researchers are testing new individuals or even the same participants who have changed over time.

Conversely, Granana and Tuchman (1999) reported on a case study of a seven year old boy that supported the hypothesis that different developmental disorders can overlap and occur

simultaneously in one individual. The child was first brought in at seventeen months due to severe head banging, rocking and limited social interaction. His symptoms worsened and by 2,5 was continuously rocking himself and flapping his hands. His team originally thought that he had autism and prescribed a medication called fluoxetine to reduce his head banging behavior. However, the child was diagnosed with stuttering, as well, and was seen by a speech-pathologist to help him with his communication skills. At age five, the child's communication had improved but motor and vocal tics were observed as well as symptoms consistent with obsessive-compulsive disorder. The fluoxetine was prescribed once again to treat the tics and the behaviors were ameliorated. This case serves as an example of multiple disorders being identified for one patient. The boy's medical team first thought that he had autism due to his lack of speech and social interaction along with the physical behaviors exhibited. However, this case along with previous studies show that autism spectrum disorders and Tourette's Syndrome could be linked as well as stuttering and Tourette's. Also, head banging has been found to subside by age five and be replaced with characteristics synonymous with obsessive-compulsive disorder, as seen with this seven year old. In conclusion, this case study was meant to support the idea that developmental disorders can happen in succession and sometimes even simultaneously.

Similarly, in their study concerning the relationship between Tourette's syndrome and speech and language, Burd et al. determined that people with TS could be misdiagnosed as schizophrenic because some patients have conversations with themselves (1994, p. 281). Tics are often a positive indicator of autism because they impair verbal and non-verbal communication which is an incredibly significant symptom of this disorder. In short, the possibilities are numerous and that muddies the process of diagnosing disorders.

In fact, Van Borsel and Vanryckeghem (2000) determined through their case study that the supposed relationship between TS and stuttering should still be researched by the professional community. An eighteen year old male was given three weeks of speech therapy to see if his tics could be ameliorated. The subject was diagnosed with Tourette's Syndrome at age twelve. Speech samples were taken before therapy started and six weeks later when the individual was released from the ward. Therapy was only three weeks long. The resulting data were then compared to previous studies that compared stuttering to Tourette's and supported the hypothesis that these two developmental disorders are pathogenetically linked. Therefore, the researchers concluded that more should be done to determine the similarities between different disorders in order to successfully diagnose patients, including stuttering and Tourette's.

Chapter 5

Discussion

How to Educate Others

One of the most challenging aspects of helping those who have behavioral and social disorders is educating family, friends, colleagues, and even complete strangers on the characteristics and intricacies of the condition that they struggle with every day. How can a parent help the teacher of their child understand that a student in their class will most likely take much longer to answer a seemingly simple question? How can a person with Tourette's explain to a stranger that the noises they make are involuntary and unable to be controlled? How can a therapist or professional figure make a client's life easier and help them feel comfortable in their own skin? Many of the studies that were analyzed for this paper outlined findings and proposed new ideas to help aid people with disorders lead healthy and prosperous lives.

Nussey, Pistrang and Murphy (2012) conducted a mixed-method study to determine if participants' attitudes towards Tourette's Syndrome would change when educated about the disorder. 100 people took part in the study; four were children with TS, and the rest were comprised of parents, teachers and classmates. A presentation was put together about Tourette's Syndrome and shown to four classes of students ages 9-10 in four different schools after initial interviews were conducted. Two weeks after the presentation, the classmates and teachers were given a questionnaire to fill out to determine how much they had learned from the information. Overall, the classmates showed improvement and although causation could not be gleaned from this study, different theories were presented to try to explain the observed change in attitude. For

example, if a child thought that their classmates were more accepting of someone with Tourette's Syndrome, they would be more likely to accept that person, as well. Also, the four children became less focused on trying to control their tics after the study; instead, their attention shifted to other tasks which gave the researchers the impression that the children felt more relaxed and accepted around their peers.

Olufs et al. (2013) conducted a study to determine how different forms of education regarding Tourette's Syndrome influenced a person's perception of someone with the disorder. 197 undergraduate psychology majors were chosen to partake in the study. Each individual was shown a two-minute video of an actor displaying tics consistent with TS. Then, they were randomly assigned to one of three groups. One group received no education regarding the condition, one group watched a video meant to educate people about TS and the final group watched the educational film and a self-disclosure film where the actor shared past experiences and personal information with the participants. Finally, each individual was shown a picture of the actor and asked to fill out a questionnaire, social acceptance scale, and classroom seating chart. Some of the hypotheses posed by the researchers were confirmed; the groups that watched the videos reported an increase in knowledge regarding TS compared to the control group, and the group that watched the self-disclosure film demonstrated an increase in acceptance of individuals with TS. However, this study was unable to show that the generic educational video was helpful in increasing acceptance of TS patients compared to the control group, even though both the educational and self-disclosure videos shared the same content. This could lead to the conclusion that self-disclosure has a very strong, positive effect on people and that it should be used more in order to increase acceptance of TS.

Roger H. Sasnett wrote his dissertation in 2008 on how Tourette's Syndrome specifically affects parenting. He observed that many parents reacted negatively to their child's diagnosis mostly because they reported difficulty supporting their child at the beginning of the process. Some parents said that their physician did not want to formally diagnose their child with TS unless they observed the supposed tics during an examination. The doctoral student said that the "elevator phenomenon" occurs in these types of situations; the child will not tic when asked either because they are very uncomfortable or because they somehow regained control of their physical behavior. But, as soon as they reach the elevator, the tics start again. However, once the initial shock subsided, most parents said that they were relieved that they finally had an explanation for the behaviors that their child was exhibiting. From here, parental feelings went in many directions; some parents, consistent with previous research, became increasingly uncomfortable as their child's tics became more violent or disturbing (ex. shrieking, kicking, etc.). School became increasingly difficult due to uneducated teachers and staff who punished the children for incorrect behavior. Family life was challenged as daily schedules were uprooted and activities cancelled; this may be explained by the child's underlying anxiety and compulsive behaviors at home due to extreme seclusion at school in order to hide their tics. These problems can be emotionally and physically taxing on the parents and many reported as much during interviews. Many parents said that they sometimes felt embarrassed when taking their children out in public because some of the behaviors could be misunderstood by bystanders. Although the method of collecting data was flawed, the results provided explanations and personal accounts of parents' daily trials and tribulations due to their child's TS.

Future Research

In terms of future studies, the possibilities are endless. Based on the results and trends that were determined from this literature review, the relationships between a multitude of behavioral and social disorders ranging from stuttering to Tourette's to schizophrenia to autism could be researched in more detail in the future. Also, the origins of specific characteristics related to certain disorders could be investigated. For example, Burd et al. (1994, p. 286) suggested that it would be beneficial to further define common phonic tic patterns in TS patients; more specifically, do tics occur more frequently when speech is related to basic needs like feeding and sexuality and less frequently during abstract thought and conversation? In addition, an 18 year-old male who suffered from intense vocal tics experienced an incredible cessation in his verbal impediments after he got his tongue pierced (Barnhill, 2007, p. 3). The human brain and its deficiencies are so vast and beyond the scope of human comprehension; at this point, there are more questions than answers. In other words, if one can think it, one can investigate its validity.

Limitations

In terms of this study, the literature review that was completed was far from comprehensive. During the course of the research process, many articles and studies were unable to be used in this paper. For example, some of the research studies were presented in a different language and therefore could not be summarized. Also, a few of the articles required payment in exchange for access which was not an option for those involved in this study. Perhaps one of the most limiting aspects of this literature review, however, was the fact that it was just that: a

review. Most, if not all, of the articles referenced in the study were pared down and simplified, which means that a great deal of information was left out. This study, by no means, covered all the bases when it comes to stuttering and Tourette's syndrome; it is just the tip of the iceberg.

Conclusion

This study was meant to be a literature review comparing stuttering and Tourette's Syndrome in order to determine if there was any overlap between the two disorders. In the end, the overall consensus was that these conditions do not share any major characteristics but this idea cannot be proven by this study; behavioral and social disorders vary from client to client so forming a conclusion that could be generalized to a population would be extremely difficult. Therefore, this paper will serve as a preliminary review that can be used to guide future research concerning the qualities of various disorders including stuttering and Tourette's.

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