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Covert Outcomes of Clients who Stutter After an Interprofessional
Intensive Stuttering Therapy Program

by
McKenzie Jemmett

A thesis
submitted in partial fulfillment
of the requirements for the degree of
Master of Science in the Department of Communication Sciences and Disorders
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Committee Approval

To the Graduate Faculty:

The members of the committee appointed to examine the thesis of McKenzie Jemmett find it satisfactory and recommend that it be accepted.

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Daniel Hudock, PhD
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RE: Your application dated 7/11/2014 regarding study number 4114: Examination of stuttering therapy during intensive stuttering clinic compared to controls

Dear Dr. Hudock:

Thank you for your response to requests from a prior review of your application for the new study listed above. Your study is eligible for expedited review under FDA and DHHS (OHRP) 4. Routine clinical data designation.

This is to confirm that your application is now fully approved. The protocol is approved through 7/21/2015.

You are granted permission to conduct your study as most recently described effective immediately. The study is subject to continuing review on or before 7/21/2015, unless closed before that date.

Please note that any changes to the study as approved must be promptly reported and approved. Some changes may be approved by expedited review; others require full board review. Contact Thomas Bailey (208-282-2179; fax 208-282-4723; email: humsubj@isu.edu) if you have any questions or require further information.

Sincerely,

Ralph Baergen, PhD, MPH, CIP
Human Subjects Chair

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Abstract

Purpose: To examine the effect of a collaborative care treatment approach between speech language pathology and mental health professionals on covert aspects of stuttering in adolescents and adults who stutter.

Methods: Nine participants who stutter completed the Overall Assessment of the Speaker's Experience of Stuttering, Unhelpful Thoughts and Beliefs of Individuals who Stutter, and Speech Situation Checklists (Emotional Response and Speech Disruption), prior to and after taking part in the Northwest Center for Fluency Disorders Interprofessional Intensive Stuttering Clinic.

Results: Results revealed significant decreases in covert impact from stuttering on all assessments and assessment subscales. Four specific domains of positive change were identified: avoidance behaviors, anxiety, negative self-perception and quality of life.

Conclusions: Collaborative care treatment resulted in positive effects and should be considered a viable and effective method for treating clients who stutter. Clients reported significantly decreased avoidance behaviors, anxiety, negative self-perception, and increased confidence after the interprofessional clinic. These changes are likely in part due to the use of counseling techniques such as reframing, grounding, positive self-talk, and mindfulness. Specific speech language pathology techniques also thought to have some influence are awareness training, self-disclosure, speech modification and informational seminars.

Covert Outcomes of Clients who Stutter After an Interprofessional Intensive Stuttering Therapy Program

Stuttering has long been seen as a complex disorder. Over the past several decades, definitions of stuttering have been presented surrounding three basic ideas: speech disturbances, physical behaviors, and internal states/behaviors (Wingate, 1964). Each of these components relates to a specific category in terms of being observable and unobservable. These can be divided into two primary categories: overt and covert stuttering. Overt stuttering behaviors are observable speech disturbances and physical behaviors (Bloodstein & Bernstein-Ratner, 2008). Covert stuttering behaviors are internal states/behaviors, such as avoidance behaviors, circumlocutions, or anxiety that are unobservable to a listener (Bloodstein & Bernstein-Ratner, 2008). As an individual who stutters approaches another speaker and initiates communication, they may incur negative reactions from the listener of being teased, mimicked and other types of intentional or unintentional ridicule. Such experiences may cause the individual to use circumlocutions, substitutions or avoidance behaviors to avoid stuttering and create the image of being a fluent speaker. It is no wonder then that people who stutter (PWS) report higher anxiety, depression, ideation of suicide and low confidence / self-esteem (Klompas & Ross, 2004; Kuster, 2012; Iverach et al., 2009). Negative emotions and experiences can lead to negative social and intrapersonal impacts such as social withdrawal, decreased self-confidence and increased anxiety (Carleton, Collimore & Asmundson, 2007; Craig, Blumgart & Tran, 2009; Iverach et al., 2009).

As individuals stutter, they may expect negative reactions that can alter their internal state and perceptions. Changes in the individual's thoughts and feelings towards speech may influence their willingness to enter social communication exchanges,

involving different domains of health (Iverach et al., 2009). Due to the complex involvement of different domains, stuttering has recently been defined as a multidimensional syndrome (Iverach, Menzies, O'Brian, Packman, & Onslow, 2011). Yaruss and Quesal (2004) describe a multidimensional model of stuttering based on the World Health Organization's International Classification of Functioning, Disability and Health model that takes into account multiple dimensions of stuttering emphasizing that stuttering involves more than observable behaviors. Other behaviors can include negative affective, behavioral and cognitive reactions as well as limited interactions in daily and social activities (Yaruss & Quesal, 2004). A multidimensional model of stuttering treatment presented by Healey, Trautman and Susca (2004) divides stuttering into five domains: cognitive, affective, linguistic, motor and social (CALMS). Interactions between these domains and the impact make up the stuttering syndrome. Impacts to these domains occur simultaneously, causing the individual who stutters to not only experience the motor (overt) forms of stuttering but cognitive, affective, and social (covert) affects at the same time. Experiences of overt stuttering and learned social interactions interact with other domains and have an impact on the individual and their experience of stuttering.

Impacts of stuttering on the individual

Individuals who stutter experience higher levels of fear and anxiety in social or new/strange situations when compared to matched controls (Iverach et al., 2009). In reference to the CALMS model, this can be attributed to the interactions from different domains. For example, when an individual experiences motor manifestations of stuttering, their cognitive and affective domain may be negatively affected depending on

the interaction. Impacts may manifest as negative thoughts about oneself or anxiety about speech in general. This can lead to an interaction of the social domain such as the individual limiting or avoiding social interactions all together. Consequently, adults who stutter may fall into the “social phobia” range (Carleton et al., 2007). Stuttering also negatively impacts emotional stability and self-esteem (Klompas & Ross, 2004). As seen in the above example, thoughts of oneself could possibly be affected causing negative emotional impacts. Such findings suggest an elevated level of anxiety and lower self-esteem which can potentially affect an individual’s desire to live a fulfilling/quality life (Craig et al., 2009), affecting all domains as described in the CALMS model.

Additionally, reactions from fluent individuals may also impact individuals who stutter. Fluent individuals feel more unhappy, nervous, uncomfortable, sad, tense, embarrassed and annoyed when listening to individuals who stutter (Guntupalli, Everhart, Kalinowski, Nanjundeswaran, & Saltuklaroglu, 2007). Furthermore, hesitant speech produced by adults who stutter is shown to elicit thoughts of communicative incompetence and low self-confidence on the part of adults who stuttered (Von Tiling, 2011). Such emotions can be overtly seen with averted gaze and the appearance of apprehension and tension (Bowers, Crawcour, Saltuklaroglu, & Kalinowski, 2010; Zhang & Kalinowski, 2012). Lowe et al., 2012 demonstrated that individuals who stutter observe negative listener reactions more than positive or neutral reactions, indicating individuals who stutter attend more to negative stimuli. When these behaviors are observed by an individual who stutters, the interaction of the cognitive and affective domains (negative thoughts about oneself and speech interactions) may further perpetuate

negative emotions of self-esteem, anxiety and lead to interactions with the social domain characterized by avoidance behaviors on the behalf of the individual who stutters.

Methods of assessment

Traditionally, stuttering has been measured using overt measures such as stuttered word counts (Riley, 2009), speech rate (Ingham, 1985) or speech naturalness (Ingham & Onslow, 1985). Measures of this nature do not fully quantify stuttering in its entirety. For these measures to accurately measure stuttering as a whole, the three components (speech disturbances, physical behaviors, and internal states/behaviors) of stuttering proposed by Wingate (1964) would need to be addressed. Stuttered word counts, speech rate/naturalness may provide a view of overt stuttering (speech disturbances, physical behaviors) but do not quantify covert stuttering (internal states/behaviors).

The nature of covert aspects requires researchers to use other means of quantifying covert stuttering (Guntupalli, Kalinowski, & Saltuklaroglu, 2006). Recently, self-report measures have been used to quantify covert aspects of stuttering. Such self-report measures that have been used are: Overall Assessment of the Speaker's Experience of Stuttering (OASES) (Yaruss & Quesal, 2010), Unhelpful Thoughts and Beliefs about Stuttering Scale (UTBAS) (Iverach et al., 2010), Perceptions of Stuttering Inventory (PSI) (Woolf, 1967), and Speech Situations Checklist (SSC) (Brutten & Vanryckeghem, 2007). The PSI (Woolf, 1967) and SSC (Brutten & Vanryckeghem, 2007) are similar measures quantifying an individual's perceptions of their feelings and experiences connected to daily life in specific situations. Similar to the PSI and SSC, UTBAS (Iverach et.al 2010) measures the frequency of normed negative thoughts experienced by individuals who stutter. The use of these measures helps quantify the cognitive, affective

and social domains, leading to a more comprehensive view of stuttering. It would be expected that negative thoughts and feelings associated with stuttering would decrease with treatment as prescribed in the current study.

Other self-report measures, namely the OASES (Yaruss & Quesal, 2010), are more comprehensive measures of the domains listed above. It aims to measure the overall impact an individual feels due to stuttering through an assessment of multiple aspects of the disorder. As it is based on the World Health Organization's International Classification of Functioning Model (Yaruss & Quesal, 2006), the OASES focuses on the speaker's experience of stuttering. Focusing on the speaker's experience implies quantifying covert features that are unobservable. When combined with overt measures of stuttering, researchers are able to more fully understand the depth of the disorder. With treatment prescribed in the current study, it would be expected to see a decrease in an individual's negative experience of stuttering.

Previous Research

Researchers have examined the effects of intensive treatment of stuttering in adults using similar methods and instruments with differences occurring in the length of study and individuality used in therapy by each clinician (Blomgren, Roy, Callister, & Merrill, 2005; Irani, Gabel, Daniels, & Hughes, 2012; Langevin, Kully, Teshima, Hagler, & Narasimha Prasad, 2010). Outcomes demonstrated positive treatment effects in one or more domains as defined by the CALMS model (Healey et al., 2004) but relapse continues to occur. Specifically, relapse was shown to happen at approximately six months post-treatment occurring in fluency and internal states (Blomgren et al., 2005). Consequently, intensive stuttering programs have been shown to provide temporary

changes with stuttering domains, but have not had long lasting effects. Operating under Wingate (1964), each component of stuttering should be addressed and maintained following treatment to be termed successful. Individuals who stutter may feel the most comfortable talking with their speech language pathologists (SLPs) and therefore, are more likely to converse about their internal disorders in safe environments (Ramig & Dodge, 2005). However, SLPs often report that they are uncomfortable treating fluency disorders and this is one of the feared pathologies (Cooper & Cooper, 1985, 1996; Kelly et al., 1997). Additionally, treatment routinely results in very high rates of relapse from 70-90% (Dayalu & Kalinowski, 2002), and a sense of failure from the client and clinician (Guntupalli, Nanjundeswaran, Kalinowski & Dayalu, 2011). Murphy, Yaruss and Quesal (2007) propose that this sense of failure and reluctance may be due to the SLP feeling uncertain about their role in treating these disorders or a lack of understanding about how to carry out treatment on covert aspects.

It may be possible that SLPs are not the best qualified professionals to treat all covert aspects of stuttering. Providing treatment for fluency is in their scope of practice, but SLPs do not receive adequate training on foundations of counseling or bullying prevention or intervention to help treat associated domains. This is exemplified by Blood, Boyle, Blood and Nalesnik (2010) who presented SLPs with hypothetical scenarios of students that were experiencing various types of bullying. SLP participants suggested ignoring the problem or assertiveness training for relational bullying (repeated occurrences) and only involving other school personnel during instances of physical bullying. Murphy et al., (2007) demonstrate that bullying can have lifelong effects on the

individual and although these effects can be decreased by using psychoeducational strategies, mental health professionals (MHPs) are better trained to treat these aspects.

MHPs

MHPs are specifically trained to treat psychological concerns ranging from depression, anxiety, low self-esteem, or life crises to name a few. Challenges such as these can be seen as internal states/behaviors as described in Wingate's (1964) definition of stuttering. MHPs are specifically trained on theories, methods, and application of counseling procedures and are in a prime position to address social, emotional and academic factors relating to stuttering. Flasher and Fogle (2005) state, "Although SLPs and audiologists do counseling and use counseling skills when working with clients, patients and families, it is not appropriate to identify ourselves as counselors" (p. 5). They further discuss the boundaries of SLPs and the level at which it is appropriate for SLPs to counsel. Previously discussed covert aspects of stuttering highlight depression and suicide as possible symptoms of covert stuttering. Flasher and Fogle (2005) name these as two examples among others of areas that SLPs are not equipped to treat.

In order to help prevent or reduce the impact from negative reactions to their stuttering MHPs and SLPs should collaborate when treating stuttering. The SLP can create peer, family, and social education programs regarding stuttering and employ their client as the "expert" during some instruction phase. MHPs can play an integral role in the intervention process by directly counseling the individual who stutters on assertiveness training, confidence building, and other psychological management strategies, such as anxiety reduction. Due to the anxieties, fears, frustrations and many other social, emotional and academic consequences from stuttering, it is logical that

therapy for the stuttering syndrome includes expertise from counseling personnel (Hudock, Jones & O'Donnell, 2013).

The current study

In order to treat a multidimensional disorder such as stuttering, it is logical for each dimension to be treated by someone adequately trained to do so. SLPs are trained to treat the motor and linguistic aspects of stuttering while MHP's are specifically trained to treat the cognitive, affective and social aspects of stuttering. It is hypothesized that utilizing mental health services delivered by MHPs in conjunction with fluency training administered by SLPs will not only treat covert stuttering but better address accompanying psychological challenges and provide more long lasting effects.

Method

Participants

Participants included nine individuals, two females and seven males [M : 21.67, SD : 8.35]. Three male participants were excluded due to reliability of results being that one individual did not complete the assessments until day ten of the clinic. The other two participants scored measures in a patterned manner, meaning that all the scores were the exact same throughout the entire assessment. It was concluded by the researchers that their results lacked validity. After removing the three participants, the sample size was made up of two females and four males [M : 25.84, SD : 6.85].

Two participants (one male, one female) were bilingual being from Taiwan and Kuwait respectively, and as such, learned English as a second language. All other participants were Caucasian individuals being from different locations in the United States. They were recruited through word of mouth, networking and e-mailing American Speech-Language and Hearing Association (ASHA) special interest group (SIG) four members for possible referrals. All participants signed ISU Human Subjects Committee approved informed consent documentation prior to taking part in the study.

Treatment program

The treatment program, the Northwest Center for Fluency Disorder Interprofessional Intensive Stuttering Clinic (NWCFD-IISC), was a two and a half week program. Graduate clinicians took part in three days of interprofessional education prior to the clients arriving. All students were graduate speech language pathology and counseling students from Idaho State University. These students were supervised by certified SLPs and Licensed Professional Counselors. Once clients arrived, the treatment

program took place over a two-week period with therapy services occurring everyday for seven hours. The clinic occurred in three phases: awareness/acceptance, modification, and generalization/stabilization. Therapy services included but were not limited to: seminars adding knowledge to clients understanding of stuttering and procedures used in therapy, individual counseling sessions, individual speech therapy sessions, client-paired assignments or group counseling sessions. Therapy first occurred individually and moved to speaking situations outside of the clinic to ensure generalization to different contexts. Specific domains targeted in therapy were avoidance behaviors, anxiety, negative self-perception and quality of life.

Mental health professional procedures. Procedures included positive self-talk, reframing, grounding, self-reflection, mindfulness, methods to build confidence, goal planning, and strategies for overcoming obstacles and change. Techniques were taught and practiced in a variety of ways through seminars, individual and group sessions, client-paired assignments, Rap & Review sessions (nightly meetings conducted by the clients) and journal entries.

Techniques related to reducing avoidance behaviors were mindfulness and education focused on overcoming obstacles and change. Mindfulness, as defined by Bishop (2004), is “a process of regulating attention in order to bring a quality of nonelaborative awareness to current experience and a quality of relating to one’s experience within an orientation or curiosity, experiential openness and acceptance” (p. 234). Mindfulness Based Stress Reduction (MBSR) was the specific context in which mindfulness was taught to our clients. Elements of MBSR are meditation, mindful eating, body scan, and awareness and evaluation of experiences as positive, negative or neutral

(Ivey, Ivey, & Zalaquett, 2012). Such techniques would ideally be used in a particularly negative speaking experience to help the client reduce anxiety and focus on oneself. Other generic techniques discussed were methods to build confidence, goal planning, how to overcome obstacles, and how to enact and maintain change.

Anxiety strategies included reframing and grounding. Reframing is a way of viewing and experiencing events, ideas, concepts and emotions to find more positive alternatives. A client might use this after a negative speaking situation. The client would focus on the positive aspects of the interaction, not the negative (Ivey et al., 2012).

Grounding focuses on helping the individual focus on the here and now. This is accomplished by using the senses in a variety of ways such as: taking deep breaths focusing on sounds, tactile feedback from sitting or standing, tactile pressure, visualize and describe in detail things you see, or personalize a sense that is powerful to you. It is a strategy that encourages the client to be in the present moment and exerting change in the present moment. An example would be a client taking a moment before a communication exchange to take some deep breaths or other technique to focus on how to make the previous exchange more positive (Ivey et al., 2012).

Techniques of building self-confidence and positive self-talk were specific strategies to reduce negative self-perception. Positive self-talk is a method of speaking positively to yourself, typically done in front of a mirror (Ivey et al., 2012). This is thought to increase self-esteem and decrease negative perception of self. For example, after having a negative reaction to stuttering, the client may say to themselves, “I maintained eye contact the whole time!” and not focus on the reaction of the listener. Similar to positive self-talk, increasing quality of life involves a lot of different

techniques but goal planning and self-reflection were identified specifically to help aide in this process (Ivey et al., 2012). Self-reflection focuses on looking inward at past or present thoughts, emotions or behaviors and gaining understanding of its impact. This can help an individual understand and be more aware of themselves. A way to use this technique would be a client reflecting on a communication interaction and understanding their emotions and thoughts towards speaking or that individual (Ivey et al., 2012).

While all of these techniques have been identified as targeting a specific domain, just as Healey et al. (2004) describes the multidimensionality of stuttering, treatment follows a similar trajectory. Researchers recognize that different techniques will impact different domains other than the identified specific domain area.

Speech language pathology procedures. Procedures included self-disclosure, video analysis/tallying (awareness to secondary behaviors), speech modification strategies, effective communication skills (socially appropriate behaviors), natural/effort balance, generalization techniques and maintenance skills. Techniques were taught and practiced in a variety of ways through seminars, individual and group sessions, client paired assignments, R & R sessions and journal entries.

Avoidance reduction strategies included self-disclosure and effective communication skills. Self-disclosure is the act of the client or individual who stutters using a disclosure statement (Hello my name is Jane Doe and I stutter, let me know if I need to repeat anything). Using self-disclosure helps the individual set up the expectations for the communication interaction and potentially decrease likelihood of negative reactions. Pseudostuttering is usually associated with self-disclosure. Effective communication skills (socially appropriate behaviors) were also taught as a way to help

clients become more effective communicators. Information presented included: tips for small talk, eye contact, conversation maintenance, and reading nonverbal conversation cues.

Techniques used to target anxiety and quality of life were speech modification strategies. Strategies were used to help clients control their speech the way they wanted to. Each client chose the techniques that they wanted to implement with the help of both clinicians and other clients. Techniques include but are not limited to: easy onsets, light articulatory contacts, continuous voicing, prolongations, diaphragmatic breathing, and pull outs. Techniques were practiced in multiple settings such as individual therapy sessions, Rap & Review sessions, and generalization activities.

Targeting negative self-perception revolved around video analysis and tallying, as well as natural/effort balance. Video analysis and tallying was used as a way to help clients to become more aware of their stuttering behaviors. The clients watched a video of presentations they gave on the first day of clinic. While watching they looked for secondary behaviors, types of overt stuttering, and signs of tension or stress. Tallying is the action of clients carrying a notebook with them at all times and writing a tally mark each time they stutter. During the stutter and tally marking, the client would do a body scan to more fully understand where they felt tension, how their body was feeling and their emotional state.

Along with awareness, clients were instructed to find a balance between the naturalness and effort of their speech. When individuals who stutter use techniques, it may require a lot of effort and make them feel unnatural or as if they are faking their speech. Each client was able to find a balance between using techniques and being

authentic to their desires. As explained above, procedures are not mutually exclusive to have an effect in the identified domain.

Generalization activities with unfamiliar listeners of performing stuttering surveys, asking directions and making phone calls were performed from early in the program throughout graduation. Prior to client engaging in generalization activities with unfamiliar listeners, clinicians pseudostuttered with unfamiliar listeners in a variety of situations. Additionally, clients were taught anxiety and speech modification strategies prior to generalization.

Procedures

Covert assessments of stuttering were administered before and after the treatment program by researchers. Covert is operationally defined as cognitive, affective, and social aspects of stuttering (Yaruss & Quesal, 2004; Healey et al., 2004). This includes but is not limited to anxiety, fear of speaking, social avoidance, circumlocutions, thoughts of oneself and listeners, or impact of stuttering on one's life (Blood et al., 2010; Craig et al., 2009; Murphy et al., 2007). Measures include the OASES (Yaruss & Quesal, 2010), UTBAS (Iverach et al., 2010), and SSC - emotional reaction and speech disruption (Brutten & Vanryckeghem, 2007). The OASES consists of 100 items that are rated on a Likert-style ordinal scale (score ranging from 1 to 5, higher scores indicating a greater degree of negative impact). It is separated into four different sections: general information, reactions to stuttering, communication in daily situations and quality of life (Yaruss & Quesal, 2006).

UTBAS, a self-report measure, consists of three scales each containing 66 question items. The first scale measures frequency of normed thoughts of adults who

stutter while the second scale measures whether the client believes the thoughts presented. The third scale measures if anxiety results from having these thoughts. Scales are then combined to make a total scale score that rates the normed thoughts on total frequency, belief in these thoughts and actual manifestation of these thoughts (if they are experiencing anxiety) (Iverach et al., 2011). For additional information on the assessment, please see Iverach et al., 2011.

SSC is a questionnaire evaluating situations that might arouse negative feelings in individuals who stutter. It is divided into two parts: emotional reactions and speech disruption. Each part lists 55 situations that usually raise negative emotions in people who stutter (e.g. telephone conversation, ordering food). The client rates each situation on a scale of one to five, one being none and five being very high. The emotional reactions section is used to rate the level of negative emotions in the different situations and the speech disruption section ranks the level of speech disruption in these same situations (Brutten & Vanryckeghem, 2007). This measure is normed on children, therefore results are interpreted as general indications of change, not a comparison to standardized scores.

Results

Descriptive Results

Results revealed decreases from every participant on each assessment in overall and subcategory scores. Pre-treatment and Post-treatment means and standard errors for assessments and assessment categories are presented in Figures 1, 2, and 3. Of the assessments used, only the OASES provides nominal severity category classifications. Overall pre-treatment scores revealed that one participant was categorized in the mild range, two in moderate, two in moderate / severe and one in severe. Overall post-treatment data revealed that four participant were categorized in the mild/moderate range, one in moderate, and one in moderate / severe. This shifted the average categorical scores from moderate / severe impact to mild/moderate for levels of severity. Mean assessment scores for pre and post respectively were as follows; OASES Category I (3.083,0.234; 1.795,0.143), OASES Category II (3.302,0.325; 2.34, 0.18), OASES Category III (3.315,0.445; 2.525, 0.301), OASES Category IV (2.672,0.398; 1.935,0.336), OASES Overall (3.095, 0.342; 2.187,0.214), UTBAS Frequency (172.2, 28.01; 114, 18.87), UTBAS Belief (162.33, 24.56; 104.2, 12.92), UTBAS Anxiety (167, 21.15; 110.5, 17.04), UTBAS Overall (501.5, 72.99; 328.67, 48.33), SSC-ER (140.2, 23.51; 97.17, 19.59), and SSC-SD (153, 21.56; 113.17, 18.61). Results indicate a general positive change in covert aspects related to stuttering. It should be noted that one participant omitted three questions on the pre and post UTBAS assessment. One question requires three answers for each domain, therefore the nine total missing values were replaced with group mean values.

Figure 1

Graph of means and standard deviations for OASES sections

* - represent statistically significant findings

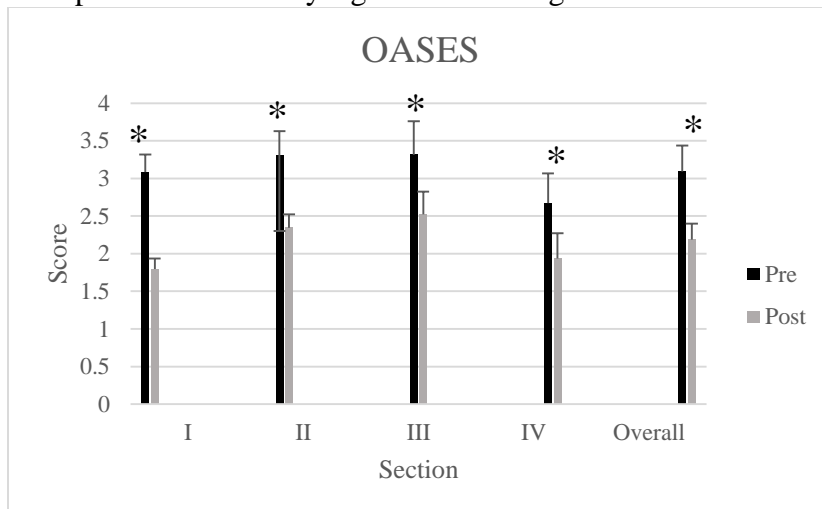


Figure 2

Graph of means and standard deviations for UTBAS sections

* - represent statistically significant findings

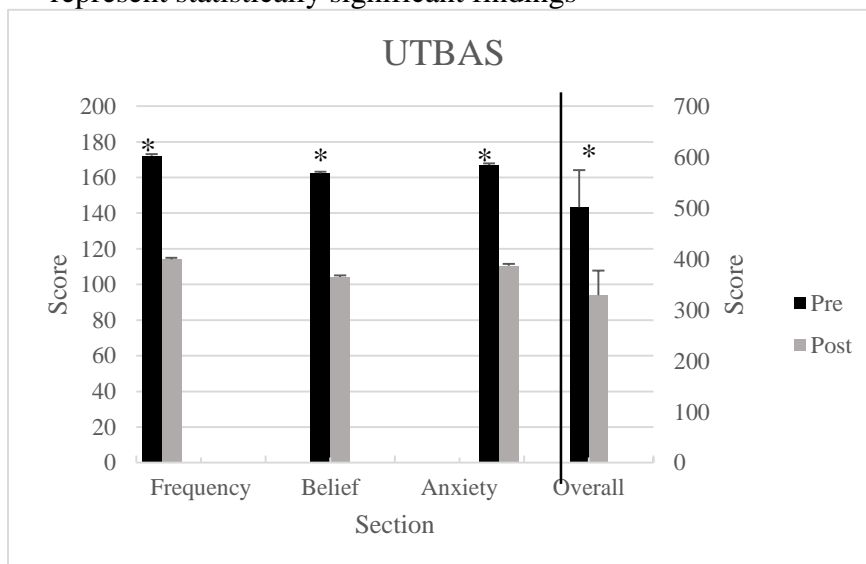
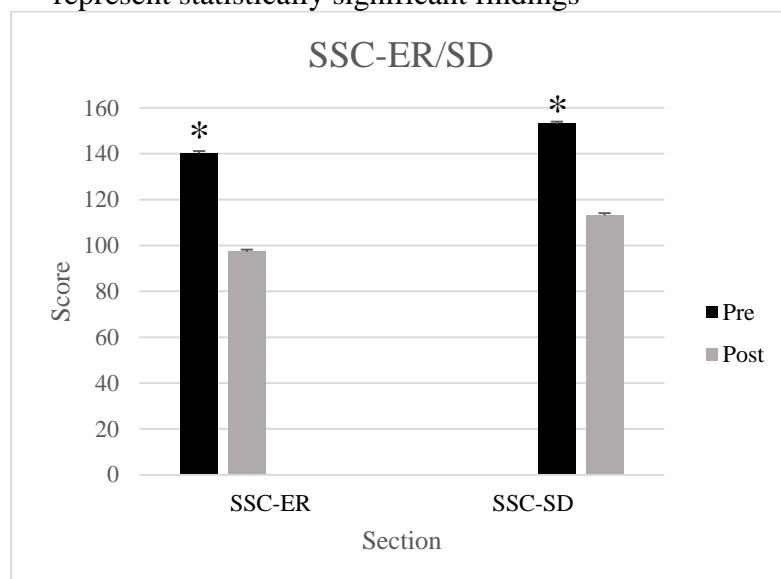


Figure 3

Graph of means and standard deviations for SSC-ER and SSC-SD.

* - represent statistically significant findings



Inferential Statistics

Paired samples t-tests were conducted to examine group differences between pre and post measures. Results of the inferential analysis are listed in Table 1 resulting in statistically significant results in all assessments. Correlations and significance values for the between subtest comparisons are presented in Table 2. A Bonferroni alpha adjustment was used during correlation comparisons, resulting in an alpha value of 0.025.

Researchers initially examined data from all nine participants that resulted in the same significant differences as revealed with the analysis of the six participants. Including the three additional participants with questionable data only resulted in smaller *cohen's d* effect sizes. Researchers ultimately decided to only present descriptive and inferential data from the six participants.

Table 1

Paired t test results

Test	Section	df	t-value	p value	Cohen's <i>d</i>
OASES	I	5	4.973	0.004	2.969
	II	5	5.656	0.002	1.630
	III	5	3.410	0.020	0.930
	IV	5	2.540	0.007	0.895
	Overall	5	5.260	0.003	1.423
UTBAS	Frequency	5	3.830	0.009	1.015
	Belief	5	4.137	0.009	1.264
	Anxiety	5	4.467	0.007	1.239
	Overall	5	4.467	0.007	1.178
SSC	ER	5	3.262	0.012	0.889
	SD	5	5.376	0.003	0.889

Table 2 Pearson Correlations

r-values		Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
		I		II		III		IV		Overall	
Pre	I	1	0.122	0.85	0.718	0.950	0.816	0.647	0.508	0.875	0.697
Post		0.818	1	0.52	0.707	0.340	0.212	0.579	0.680	0.472	0.642
Pre	II	0.034	0.294	1	0.937	0.960	0.805	0.939	0.868	0.997	0.926
Post		0.108	0.116	0.006	1	0.860	0.770	0.912	0.885	0.929	0.960
Pre	III	0.004	0.503	0.002	0.025	1	0.877	0.823	0.747	0.973	0.872
Post		0.048	0.687	0.054	0.074	0.022	1	0.656	0.721	0.813	0.865
Pre	IV	0.165	0.228	0.006	0.011	0.044	0.158	1	0.908	0.929	0.880
Post		0.304	0.137	0.025	0.019	0.087	0.106	0.012	1	0.836	0.947
Pre	Overall	0.022	0.344	< .001	0.007	0.001	0.050	0.007	0.038	1	0.910
Post		0.124	0.169	0.008	0.002	0.024	0.026	0.021	0.004	0.012	1
Pre	Freq.	0.114	0.336	0.004	0.030	0.020	0.064	0.008	0.005	0.007	0.010
Post		0.381	0.307	0.048	0.063	0.140	0.186	0.007	0.005	0.060	0.039
Pre	Belief	0.048	0.308	0.003	0.019	0.004	0.030	0.031	0.018	0.004	0.005
Post		0.215	0.240	0.013	0.024	0.052	0.071	0.008	< .001	0.021	0.005
Pre	Anxiety	0.019	0.389	0.001	0.020	0.001	0.027	0.030	0.039	0.001	0.011
Post		0.279	0.231	0.023	0.024	0.082	0.095	0.006	< .001	0.032	0.008
Pre	Total	0.053	0.334	0.001	0.015	0.005	0.034	0.016	0.014	0.002	0.006
Post		0.293	0.258	0.025	0.034	0.090	0.115	0.005	0.001	0.035	0.014

Pre	Post	Pre	Post	Pre	Post	Pre	Post
Frequency		Belief		Anxiety		Total	
0.710	0.442	0.815	0.593	0.887	0.530	0.806	
0.479	0.505	0.504	0.567	0.434	0.576	0.481	0.551
0.949	0.816	0.961	0.905	0.977	0.874	0.973	0.867
0.855	0.787	0.886	0.871	0.881	0.870	0.884	0.845
0.883	0.672	0.947	0.808	0.983	0.756	0.945	0.744
0.786	0.624	0.864	0.773	0.863	0.736	0.844	0.708
0.928	0.933	0.852	0.924	0.856	0.937	0.894	0.940
0.939	0.940	0.889	0.987	0.834	0.984	0.904	0.976
0.931	0.792	0.947	0.879	0.974	0.850	0.961	0.842
0.916	0.834	0.944	0.944	0.913	0.926	0.936	0.903
1	0.914	0.959	0.978	0.942	0.947	0.982	0.951
0.011	1	0.781	0.953	0.746	0.979	0.832	0.989
0.003	0.067	1	0.923	0.989	0.867	0.994	0.856
0.001	0.003	0.009	1	0.883	0.989	0.944	0.986
0.004	0.089	< .001	0.020	1	0.826	0.987	0.817
0.004	0.001	0.025	< .001	0.043	1	0.897	0.998
0.001	0.040	< .001	0.005	< .001	0.015	1	0.892
0.002	< .001	0.030	< .001	0.047	< .001	0.017	1

Discussion

Stuttering has been defined as a multidimensional disorder, based on the model described by Yaruss and Quesal (2004), which affects, cognitive, affective, social, linguistic and motor domains. A Multidimensional stuttering treatment model presented by Healey et al., (2004) divides stuttering into 5 domains: cognitive, affective, linguistic, motor and social (CALMS). Social and Emotional literature on fluency disorders often suggests that PWS should be treated by both MHP and SLP (Blood et al., 2010; Craig et al., 2009; Murphy et al., 2007), however we have yet to find any empirically published evidence of this occurring. To the best of our knowledge, the NWCFD-IISC and this manuscript, are the first to demonstrate the effectiveness of interprofessional collaborative care utilizing speech language pathology and MHPs when treating PWS. Previous treatment studies (Blomgren et al., 2005, Irani et al., 2012 and Langevin et al., 2010) have examined and reported on covert outcomes during intensive clinics, but these have all used speech language pathology services and did not incorporate MHPs in the treatment process. Post treatment outcomes of the NWCFD-IISC revealed a significant decrease in avoidance behaviors, anxiety, negative self-perception and an overall increased quality of life.

Prior to the clinic, examples of avoidance behaviors were exemplified by clients; not speaking in social situations, avoiding opportunities to speak or changing words/ideas when speaking, as reported by clients. Change in this domain was measured by two assessments: SSC-ER (Brutten & Vanryckeghem, 2007), and section IV of the OASES (Yaruss & Quesal, 2010). The subtests are related in their measurement of likelihood and exhibition of avoidance behaviors. Post-treatment positive change is also supported by

clients self-reporting less fear during speaking situations, especially when speaking to unfamiliar listeners. Section IV of the OASES (Yaruss & Quesal, 2010), quality of life, measures the client's satisfaction and interference in many different interactions (i.e. work, relationships, family/friends, social engagements). By extension, this relates to avoiding interactions within different settings (Bloodstein & Ratner, 2008). As evidenced in Table 1, both subtests revealed significant positive change. An example of positive change when considering avoidance behaviors, an individual might not avoid speaking situations or using previously avoided words. A client would evidence change by not avoiding a previously difficult or avoided situation.

Procedures thought to contribute to the noted changes are counseling techniques related to mindfulness and grounding. As well as education about stuttering, impact and factors related to stuttering, effective communication techniques. Furthermore, using self-disclosure and being open with stuttering allowed clients to not fear the interaction as much and therefore, not avoid interactions. These skills in combination with speech techniques to help clients control their stuttering is thought to help each individual feel more confident in speaking situations with decreased fear and anxiety (Bloodstein & Ratner, 2008). As stated above, this aids the client in approaching more situations.

Another domain identified to have been positively affected by the clinic is anxiety. Pre-clinic manifestations of anxiety would be observed as avoidance behaviors and self-reported levels of anxiety (Iverach et al., 2009). Change of this domain was measured by three different assessments: SSC-ER, SSC-SD (Brutten & Vanryckeghem, 2007) and Anxiety section of the UTBAS (Iverach et al., 2010). These assessments either measure anxiety or anxiety related to stuttering or fear in speaking situations. As

evidenced in Table 1, all three of the subtests experienced significant positive change. Positive change of this domain indicate that clients experience lower levels of anxiety due to thoughts or speaking situations they experience. Change would also be evidenced by less anxiety leading up to speaking situations (Iverach et al., 2011). An example of this change would be a client having less anxiety when approaching a difficult speaking situation or thinking about stuttering in general.

Procedures thought to contribute to this change are counseling techniques such as reframing, grounding, and mindfulness. All of these are ways to manage anxiety (Shikatani, Antony, Kuo, & Cassin, 2014). Speech language pathology services likely to have influenced anxiety are speech techniques and education about stuttering, impact and factors related to stuttering, effective communication techniques and self-disclosure. When combined with counseling techniques, it allows clients to experience more positive social interactions due to not having to hide their stuttering, and being more authentic with the listener. Also, the client feels in control of the situation because they have knowledge of how to be fluent if they choose, how to maintain the conversation and handle negative reactions when or if they happen. This allows them to be more in the moment and be more mindful about how to apply modifications and use other techniques.

Just as avoidance behaviors and anxiety impact an individual who stutters, negative self-perception can have an equally negative impact. Before the clinic, clients typically had low self-esteem, felt that they were a failure and were something to be fixed, not listened too (Guntupalli et al., 2011). Change of this domain was measured by three different assessments: Frequency and Belief sections of the UTBAS (Iverach et al., 2010), and section II of the OASES (Yaruss & Quesal, 2010). The assessments are

related in that they measure thoughts about oneself and whether the individual believes the negative thoughts. As evidenced in Table 1, all three of the subtests experienced significant positive change. Positive change in this domain would indicate that client experience a more positive sense of self such as more positive thoughts towards stuttering and themselves. Change is also evidenced by accepting themselves as an individual who stutters and not feeling a sense of loss or failure because of a decreased emphasis on fluency and increased emphasis on communication and confidence. An example of this change would be a client feeling more positive about stuttering and feeling negative towards acknowledging the fact that they stutter, as well as overall positive thoughts towards themselves.

Procedures thought to impact this area were seminars held every day to educate clients on the nature of stuttering, its impact and other factors along with various counseling techniques such as reframing, grounding, self-acceptance, positive self-talk and awareness/acceptance of stuttering. These services combined enabled the clients to not only understand a part of themselves, but accept themselves for who they are. Once clients were able to accept what was once a negative part of themselves, it is probable that they were able to see themselves for their other wonderful qualities. By extension, having strategies to handle negative thoughts that may reoccur aides in maintenance of skills learned at the clinic. Also, the clients learned to a self-advocate and allows them to stay in control of the interactions around them.

Quality of life is also a prominent domain when considering treatment outcomes of the clinic. Prior to the clinic, low quality of life was characterized by high degree of interference with relationships with others, negative emotions towards others and oneself

and negative thoughts towards stuttering in general (Bloodstein & Ratner, 2008). Change of this domain was measured by three different assessments: section I, III and IV of the OASES (Yaruss & Quesal, 2010). The assessments rate different experiences and thoughts about stuttering and how they relate to quality of life. As evidenced in Table 1, all three of the subtests experienced significant positive change. Positive change of this domain would indicate the individual experiences more positive thoughts and interactions of stuttering, knows more about stuttering, feels more positive about communication in daily situations, experiences less difficulty in these situations. Furthermore, the client would most likely experience more positive relationships and interactions in various interactions at work, with family/friends and social interactions. An example of this change is a client having more fulfilling relationships with others, feeling more positive about stuttering and has more positive thoughts about stuttering. As well as overall positive thoughts towards themselves.

Procedures thought to impact this area were daily educational seminars, knowledge and use of self-disclosure, and speech techniques to help clients control their speech. Counseling techniques, specifically reframing, grounding, self-acceptance, self-reflection, and awareness/acceptance of stuttering were also thought to have an influence. Combination of services likely enabled the clients to be able to converse with others socially for enjoyment and not mere need. Also, having more knowledge about stuttering and the impacts associated helps the clients to seek support to combat and overcome impacts to live a more fulfilling life.

Focusing on the predictability of assessment scores, the Pearson correlations presented in Table 1 proved helpful in describing the differences and validity of the

assessments. They also help the researchers understand the trends of the data. The post scores of section IV (quality of life) of the OASES to the post scores of frequency, belief and anxiety sections of the UTBAS were very highly correlated. Scores respectively were 0.9402, 0.9869 and 0.984. These results indicate that when the clients reported a decreased frequency, belief and anxiety due to negative thoughts of stuttering, their reported quality of life increased (being that the OASES measures impact of quality of life). This relationship can be explained by the multidimensional nature of stuttering. When considering the overall scores of the OASES and UTBAS, the Pearson correlations indicate a strong relationship. Notable correlations existed between the pre and post scores of the UTBAS and OASES. Pre scores had a correlation of 0.9608, indicating the tests measured similar levels of impact of stuttering. The post scores had a correlation of 0.9025. This indicates that the tests measured similar amounts of change. This result helps validate scores and the scores from pre to post, indicating that all clients experienced levels of positive change. Treating multiple domains of stuttering is more likely to increase positive treatment outcomes than treating a single domain of stuttering. The current results can be illustrated using Healey et al. (2004) CALMS model, the results displayed in Appendices A, B and C would indicate that all domains were addressed in some manner during the clinic and that all domains experienced a level of positive change. Additionally, addressing one domain has an associated influence on other domains which is an implication to be considered when considering treatment options.

Conclusions

The aim of this current study was to investigate the effect of collaborative care methods on covert aspects of stuttering. Results revealed positive change with decreased impact in covert features of stuttering in various affected domains. Treatment approaches using more holistic methods, utilizing the expertise of MHPs is a viable means for positive outcomes. Future research should examine specific treatment components and longitudinal outcomes.

Limitations

A limitation of this study was the number of assessments that were used. At the beginning of the first day of the clinic, clients spent on average 3 hours completing assessments, which may have led to fatigue with decreased introspection when answering the questions. Another possible limitation of the current study is sample size. While significant results were found, a larger sample size would aid in support. Also, in relation to the SSC-ER and SSC-SD, these assessments are normed on children, not adults, as such, these measures could only be used as general markers of change.

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