Intensive Stuttering Modification Therapy: A Multidimensional Assessment of Treatment Outcomes

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Nineteen adults who stutter participated in a 3-week intensive stuttering modification treatment program (the Successful Stuttering Management Program [SSMP]). A series of 14 fluency and affective-based measures were assessed before treatment, immediately after treatment, and 6 months after treatment. Measures included stuttering frequency; the Stuttering Severity Instrument for Children and Adults, Third Edition (SSI-3); a self-rating of stuttering severity; the Perceptions of Stuttering Inventory (PSI); the Locus of Control of Behavior Scale; the Beck Depression Inventory; the Multicomponent Anxiety Inventory IV (MCAI-IV); and the State-Trait Anxiety Inventory. Statistically significant improvements were observed on 4 of the total 14 measures immediately following treatment and on 4 measures at 6 months posttreatment. Statistically significant improvements observed immediately posttreatment included scores on the SSI and the Struggle, Avoidance, and Expectancy subscales of the PSI. Sustained statistically significant improvements at 6 months posttreatment were observed only on client-reported perceptions of stuttering (the Avoidance and Expectancy subscales of the PSI) and 2 specific affective functioning measures (the Psychic and Somatic Anxiety subscales of the MCAI-IV). The SSMP generated some anxiolytic effects but was ineffective in producing durable reductions of core stuttering behaviors, such as stuttering frequency and severity. The discussion focuses on the strengths, weaknesses, and durability of the SSMP treatment approach.

KEY WORDS: stuttering, treatment, outcomes, stuttering modification, Successful Stuttering Management Program

umerous approaches exist to treat stuttering, yet there remains a paucity of empirically motivated stuttering treatment outcomes research. Despite repeated calls for increased outcome documentation on stuttering treatment programs (e.g., Bloodstein, 1995; Conture, 1996; Cordes & Ingham, 1998; Curlee, 1993; J. C. Ingham, 2003; Onslow, 2003; Yaruss, 2001), the stuttering literature remains characterized by primarily "assertion-based" or "opinion-based" treatments, which by definition are based on unverified treatment techniques and/or procedures. Conversely, "evidence-based" treatments, based on well-researched and scientifically validated techniques, remain relatively rare in the field of stuttering and are usually limited to behavioral and fluency shaping approaches (e.g., Boberg & Kully, 1994; Craig et al., 1996; R. J. Ingham et al., 2001; Onslow, Costa, Andrews, Harrison, & Packman, 1996). With increasing emphasis placed on evidence-based practices in rehabilitation and medicine, objective evaluation of the effectiveness of specific stuttering treatment approaches is imperative.

Objective assessment of specific stuttering treatment approaches is also important to elucidate factors that contribute to desired outcomes. However, identifying these factors can be difficult, given the multidimensional nature of stuttering. Ideally, assessment of treatment outcomes should include aspects related to three primary components of stuttering-core behaviors (such as stuttering frequency and duration of stuttering moments), secondary behaviors (escape and avoidance behaviors), and affective aspects of stuttering (self-perceptions, attitudes, feelings, and anxiety levels; Guitar, 1998). Further, an effective treatment should provide evidence of decreased core and secondary stuttering behaviors as well as improved affective functioning (Curlee, 1993; Langevin & Kully, 2003; Smith & Kelly, 1997; Yaruss, 2001). This investigation employed a multidimensional approach to evaluate one variant of an intensive stuttering modification program.

Historically, a dichotomy of approaches has existed for treating stuttering, specifically those of fluency shaping and stuttering modification. Fluency shaping approaches have focused on teaching the individual who stutters to speak more fluently, while stuttering modification approaches have focused on teaching the individual who stutters to stutter less severely (Guitar, 1998). The goal of fluency shaping therapy is to apply techniques that facilitate a new speech production pattern that operates within the speaker's speech motor control abilities. Some approaches focus solely on speech rate modification using prolonged speech techniques (e.g., Howie, Tanner, & Andrews, 1981; R. J. Ingham, 1975; Ryan, 1974). Other approaches address speech rate ("stretched syllables," "controlled rate") in combination with one or more other fluency facilitating techniques (e.g., Boberg & Kully, 1985; Webster, 1982). Ancillary techniques include respiratory ("full breaths"), phonatory ("easy vocal onsets"), and articulatory targets ("light contacts," "smooth changes," "full articulatory movement"). The ultimate goal of fluency shaping is to automatically incorporate these techniques in all speaking situations. Fluency facilitating techniques are taught using behavioral principles, and treatment is usually criterion-referenced (e.g., Boberg & Kully, 1985; Herring, 1986; Webster, 1982). As such, substantial data are typically collected, including objective pre- and posttreatment stuttering frequencies. Proponents of fluency shaping therapy, in its purest form, do not explicitly address the reactions of the participants to their disorder.

In contrast to fluency shaping, stuttering modification therapies are based on combinations of procedures directed at desensitization to stuttering, increasing acceptance of one's stuttering, and motoric techniques directed at decreasing the tension associated with stuttering moments, when they occur. In this respect, stuttering modification therapy tends to be primarily anxiolytic (i.e., anxiety reducing) in emphasis. Obtaining outcome measures of stuttering modification treatment is somewhat difficult, as the focus is on reducing self-perceived negative consequences of the stuttering such as low self-esteem; shame; fear and anxiety caused by speaking; avoidance of words, sounds, or speaking situations; and problems performing activities related to various careers. Thus, very little data exist regarding the effectiveness of stuttering modification therapy. Further, the research that does exist is dated and tends to be based on limited unidimensional assessments (e.g., Boudreau & Jeffrey, 1973; Dalali & Sheehan, 1974; Fishman, 1937; Gregory, 1972; Irwin, 1972; Prins, 1970; Prins & Nichols, 1974). In spite of the near absence of empirically motivated treatment outcome studies, there remains relatively widespread acceptance of stuttering modification therapy. For instance, the stuttering modification approaches described by Bloodstein (1975), Johnson (1967), Sheehan (1970, 1979), Van Riper (1973), and Williams (1971) continue to be popular, as evidenced by their continued elaboration and support in more recent stuttering texts (e.g., Breitenfeldt & Lorenz, 1989; Conture, 1990, 2001; Gregory, 2003; Guitar, 1998; Manning, 1996; Prins, 1994, 1997; Shapiro, 1999).

The Successful Stuttering Management Program (SSMP; Breitenfeldt & Lorenz, 1989) is an example of a stuttering modification treatment program with essentially no empirical evidence of its effectiveness. The SSMP is an intensive 3-week residential program that is based on an amalgam of desensitization to stuttering, avoidance reduction therapy (Sheehan, 1970), and the stuttering modification techniques advocated by Van Riper (1973). The program originated at Eastern Washington University in Cheney in 1962. Breitenfeldt and Lorenz (1989) have reported that hundreds of people who stutter have attended the program since its inception. Additional SSMP offerings have also been established at other sites within the United States and in South Africa. However, no treatment outcome data of any type are included in the SSMP manual (Breitenfeldt & Lorenz, 1989), and no peer-reviewed group outcome data exist to support the effectiveness of the SSMP.

Two descriptive outcome studies evaluating the SSMP have been published: a conference proceedings paper by Breitenfeldt and Girson (1995) and an article by Eichstädt, Watt, and Girson (1998). Breitenfeldt and Girson described positive treatment-induced changes in attitudes, secondary behaviors, and speech characteristics of 7 participants in an SSMP conducted in Cheney, WA, and 8 participants in an SSMP conducted in Johannesburg, South Africa. Results were reported separately for the two groups. Breitenfeldt and Girson reported improvements in attitude for each group between pre- and posttreatment, and for four of the five aims of the SSMP (taking responsibility for the stutter, not avoiding the stutter, decreasing word and situation fears, and improving self-image). No difference was found for the fifth aim (increasing knowledge of stuttering). A reduction in the number of secondary behaviors was also reported, based on a posttreatment questionnaire. Analysis of speech samples of 5 of the Johannesburg participants pre- and posttreatment revealed an increase in the mean rate of speech for the 5 participants and a decrease in percentage of syllables stuttered. Speech performance for the Washington participants was analyzed using a self-rating scale, which the authors interpreted as support for a reduction in stuttering severity. However, numerical data, criteria for determining significance, and statistical methods were not reported in the paper, rendering most of their claims of success difficult to interpret.

Eichstädt et al. (1998) also reported on changes in speech behaviors and attitudes of a different group of 5 participants who attended the Johannesburg SSMP. Measures included an assessment of secondary stuttering behaviors, assessment of stuttering modification technique use, and the SSMP's own attitude scale that was designed to assess changes in attitudes toward communication. Descriptive outcome data were reported for each participant in a case study format. A limitation of this study was that no pretreatment baseline measures were obtained for the assessment of secondary stuttering behaviors and SSMP technique use. Nevertheless, the authors reported "the general trend was a decline in maintenance" of stuttering modification technique use but that "good maintenance" of attitude toward communication was observed 2 years posttreatment (p. 231).

Three published reviews of the SSMP manual have discussed the structure and some strengths and weaknesses of the program. Manning (1990) stated that the SSMP is a "well organized and detailed treatment program designed primarily for group treatment activities" and added, "The program contains a highly specific description of 17 treatment sessions as well as many useful handouts for both clients and clinicians" (p. 87). However, Manning also noted that some aspects of the program appeared to be unsupported by research and appeared "dogmatic" (p. 88). Two additional reviews (De Nil & Kroll, 1996; Ham, 1996) also identified a series of concerns. Both the De Nil and Kroll and Ham reviews questioned the order of the presentation of some of the treatment components. De Nil and Kroll also questioned the SSMP practice of teaching substitutions of continuants for stop consonants during the prolongation technique. De Nil and Kroll concluded that "while we do not question the clinical potential of much of this treatment program (at least for some stutterers), it is

very difficult to evaluate the effectiveness of the approach without any empirical data" (pp. 63–64).

Thus, little evidence exists to support the clinical effectiveness of the SSMP. The goal of this study was to take a multidimensional approach in evaluating the treatment outcomes of the SSMP. Specifically, this investigation was intended to assess changes in stuttering severity, self-perception of stuttering, locus of control, mood, and anxiety following participation in the SSMP and whether such changes persist for a 6-month period.

Method Participants

Nineteen individuals who stutter (15 males and 4 females) were recruited from two consecutive sessions of the SSMP offered at The University of Utah in Salt Lake City. These 19 individuals were all of the participants enrolled in the two SSMP sessions. All participants volunteered to be part of the study and provided written informed consent as per The University of Utah Institutional Review Board procedures. The 19 participants were all native speakers of English and came from seven different states within the United States. The mean age of the participants was 26.3 years (range = 16-52, SD = 10.1). Seven of the participants had a prior history of fluency shaping therapy, averaging 9.6 years prior to participation in the SSMP (range = 1-22, SD = 7.3). One participant had a prior history of stuttering modification therapy (1 year prior to participation in the SSMP). The majority of the participants were Caucasian (N =11, 58%), followed by African American (N = 4, 21%), Asian (N = 2, 10.5%), and Hispanic (N = 2, 10.5%).

Structure of Treatment

The duration of each of the two SSMP offerings was 3.5 weeks. Therapy was conducted within the Speech and Hearing Clinic at The University of Utah, and transfer practice took place in nearby public settings such as shopping malls. Group and individual therapy was offered for 3.5 hr (1 p.m. to 4:30 p.m.) during the weekdays. Clients were assigned numerous speaking tasks to complete during the mornings (usually in the form of conducting surveys). Group activities were also arranged on Saturdays. The program was directed by an American Speech-Language-Hearing Association (ASHA)-certified speech-language pathologist (T. Gurrister) who had received training in administration of the SSMP at Eastern Washington University by the developer of the program (D. Breitenfeldt). Breitenfeldt also served as a consultant for the Utah SSMP and provided training and supervision for the

graduate student clinicians. Each client was assigned two graduate student speech-language pathology clinicians, who were enrolled in the stuttering workshop as a credited practicum experience. All of the graduate student clinicians had completed graduate coursework in fluency disorders. Two additional ASHA-certified speech-language pathologists served as clinical practicum supervisors. Both of these clinic supervisors had participated as clinicians in previous SSMP offerings and had received training directly from Breitenfeldt. Breitenfeldt, the Utah SSMP director, and the clinical supervisors were *not* involved in the data collection, data analyses, or authorship of this study.

The program consisted of three phases of treatment: (a) confrontation of stuttering, (b) modification of stuttering, and (c) maintenance. The confrontation of stuttering phase was designed to modify the client's attitudes and perceptions of his or her stuttering. Treatment included a series of activities designed to eliminate avoidance strategies. These activities included advertising one's stuttering in all speaking situations, identifying and analyzing moments of stuttering, and directives to consciously eliminate word and situation avoidance behaviors. The first phase lasted approximately 2 weeks. The second phase involved instruction on specific techniques designed to lessen the severity of stuttering moments when they occur. These stuttering modification techniques were based on those elaborated by Van Riper (1973) and included utterance initial prolongations, cancellations, and "pullouts" from moments of stuttering. This second phase lasted approximately 1 week. The final 2 days of the program focused on establishing a maintenance plan for the clients. Clients were encouraged to continue to use the stuttering modification strategies and to employ negative practice (feign stuttering) in outside speaking situations. A 2-day refresher program was offered 6 months following treatment.

Treatment Outcome Measures

Stuttering is a multidimensional disorder, and thus a multidimensional approach is required to appropriately evaluate treatment outcomes. The primary goal of this study was to assess a variety of relevant outcome measures related to the SSMP including (a) overt stuttering measures (stuttering frequency and scores on the Stuttering Severity Instrument for Children and Adults, Third Edition [SSI–3]; Riley, 1994), (b) clientperceived stuttering measures (self-assessed stuttering severity and other perceptions of stuttering), and (c) measures of affective functioning (mood and anxiety) and locus of control. Where appropriate, these constructs were assessed using multiple measures. For instance, evaluation of stuttering severity was based on stuttering frequency during oral reading and a spontaneous speaking task, the SSI–3 scores, and a self-rating of stuttering severity. Evaluation of anxiety was conducted using the Multicomponent Anxiety Inventory IV (MCAI–IV) and the State-Trait Anxiety Inventory (STAI). These various measures (a) assessed the convergent validity of our findings (i.e., the extent to which the same findings are obtained using different measures of the constructs), (b) provided the necessary multidimensional analysis of stuttering treatment, and (c) enhanced the applicability of our results to the research of others.

Audio/Video-Recording Procedure and Speech Material

Speaking samples were collected immediately preand posttreatment, and 6 months posttreatment at the beginning of the 2-day refresher program. Each participant was audio- and video-recorded during an oral reading task ("The Grandfather Passage"; Darley, Aronson, & Brown, 1975) and during a spontaneous monologue-speaking task. For the spontaneous speaking task, participants were informed that they should speak for at least 4 min at a normal rate and loudness. Topics could be related to work, school, or leisure-time interests. A minimum of 200 words were collected for each participant. The audio and video signals were collected using a digital video camera (Canon Elura). The camera was situated approximately 2.5 m from each participant and positioned to obtain a clear video image of the participant's head, neck, upper torso, arms, and hands. Interviewers were not positioned in the video field. Recordings were conducted with only the interviewer and the participant present in the room. In an attempt to minimize possible familiarity effects, interviewers were unknown to the participants and were individuals not serving in a clinical capacity during the treatment phases of the study.

Speech Sample Analysis

The video recordings of each participant's speech samples were later viewed on a video monitor (Panasonic AG-520A). To improve analysis accuracy and reliability, a written transcript of the monologue-speaking task was created for all participants. Whole word repetitions and interjections were transcribed, but otherwise no coding of stuttering type was made on the original transcripts. A second researcher counted the actual stutter moments by marking stuttered words on the monologue transcripts and copies of the reading passage. This individual was a graduate student in communication disorders with specific training and previous experience in conducting stutter counts. Frequency of stuttering was calculated for each sample by determining the number of words stuttered in the sample and dividing by the total number of words spoken. Identification of stuttering was based on the stuttering taxonomy of Teesson, Packman, and Onslow (2003). Words were coded as *stuttered* if they contained any type of repeated movement (whole syllable repetitions, incomplete syllable repetitions, or multisyllable unit repetitions) or any type of fixed articulatory posture (with or without audible airflow). Each word was coded as stuttered only once, regardless of the number of different types of stuttering present within the word. Interjections such as "ah" or "um" were not counted or analyzed. Secondary features and average durations of the three longest moments of stuttering were calculated using the SSI–3 guidelines (Riley, 1994).

Description of Inventories and Questionnaires

Self-ratings of stuttering severity, the Perceptions of Stuttering Inventory (PSI; Woolf, 1967), the Locus of Control of Behavior Scale (LCB; Craig, Franklin, & Andrews, 1984), the Beck Depression Inventory (BDI; Beck & Steer, 1993; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961), the MCAI–IV (Schalling, Chronholm, Asberg, & Espmark, 1973), and the State and Trait Anxiety subtests of the STAI (Spielberger, Gorusch, Lushene, Vagg, & Jacobs, 1983) were employed to assess affective reactions of participants to their stuttering disorder.

Self-ratings of current stuttering severity were made on a 5-point scale, whereby respondents assigned a numerical rating representing the current severity of their stuttering, with 1 = mild, 2 = mild-moderate, 3 = moderate, 4 = moderate-severe, and 5 = severe.

The PSI is a 60-item inventory equally divided into three dimensions: (a) Struggle, (b) Avoidance, and (c) Expectancy. For each item, participants indicated how well the described behavior was characteristic of their stuttering. Struggle refers to the presence of unnecessary physical tension or effort while speaking. Avoidance denotes efforts to avoid situations and words in which an individual anticipates stuttering. Expectancy involves the assumptions and beliefs of individuals regarding their ability to speak successfully, as well as the ways in which the individuals' perceptions of the difficulty of speech interfere with their own speaking (Woolf, 1967). These dimensions were based on the theoretical writings of Bloodstein (1958), Sheehan (1958), and Van Riper (1963). Woolf reported that the PSI is an expansion of Rothenberg's (1963) measure of perception of stuttering, which was itself based on the work of Powell (1963). Rothenberg's inventory showed high test-retest reliability among adult stuttering speakers, resulting in correlations of .88 for Struggle, .89 for

Avoidance, and .85 for Expectancy (as cited in Woolf). The PSI continues to be a popular measure of clientperceived aspects of stuttering (e.g., Brin, Steward, Blitzer, & Diamond, 1994; Ginsberg, 2000; Gordon et al., 1995; Kalinowski, Kalinowski, Stuart, & Rastatter, 1998; Langevin & Kully, 2003; Lawson, Pring, & Fawcus, 1993; Manning, Dailey, & Wallace, 1984; Webster, 1979). Ginsberg found that participants' self-ratings of stuttering severity were closely associated with their scores on the PSI (correlations ranged from .89 for expectancy to .92 for total perceptions of stuttering). Severity levels for each of the three dimensions according to scores on the PSI are *mild* (0-7), *moderate* (8-11), *moderate to severe* (12-15), and *severe* (16-20).

The LCB consists of 17 items that assess the extent to which individuals perceive responsibility for their own problem behavior. Responses are based on a 6point Likert scale for each item. One-week test-retest reliability for a nonclinical sample was .90, and a 6month test-retest correlation with a sample that was awaiting treatment was .73 (Craig et al., 1984). The LCB correlated (r = .67) with the Rotter Internal-External scale (Rotter, 1966) and was able to discriminate between Rotter's personal and political control items. Decreased stuttering frequency immediately following treatment has been found to be associated with an internalization of LCB scores (e.g., Andrews & Craig, 1988; Craig & Andrews, 1985; De Nil & Kroll, 1995; Madison, Budd, & Itzkowitz, 1986). Changes in locus of control have also been reported to predict maintenance of therapeutic gains or relapse in stuttering therapy (Craig & Andrews, 1985), although this finding has not been consistent (De Nil & Kroll, 1995). Higher LCB scores indicate a more external locus of control.

The BDI was designed to reveal a general syndrome of depression involving negative attitudes, performance impairment, and somatic disturbances. It is also sensitive to clinical change (Beck et al., 1961) and is widely used for assessing symptoms of depression and for evaluating subclinical changes in mood (e.g., Gold, Zakowski, Valdimarsdottir, & Bovbjerg, 2004). The BDI offers four response choices (0-3) for each of its 21 items. Participants circle the number next to the statement in each group of 4 or 5 statements that best describes how they have felt during the past week, including the day of assessment. The highest scores from each item are added together to calculate a total score. The BDI has undergone extensive standardization (Beck et al., 1961) and has adequate internal consistency (Beck & Beamersderfer, 1974) and external validity (Bech et al., 1975).

The MCAI–IV divides the assessment of anxiety into groups of symptoms, including cognitive distress,

musculoskeletal manifestations, and various somatic ailments. Rather than treating the construct of anxiety as one-dimensional, this inventory was designed to measure anxiety according to a multidimensional model associated with both cortical and autonomic activity. The MCAI-IV contains three scales: Psychic/Cognitive Anxiety, Somatic Anxiety, and Muscular Tension. Each scale consists of 10 items and uses a 4-point response format. The Psychic/ Cognitive Anxiety scale addresses worry, anticipatory apprehension, slow recovery time following stressful events, sensitivity, insecurity, and social anxiety. The Somatic Anxiety scale focuses on autonomic disturbances, vague distress and panic attacks, and distractibility. The Muscular Tension scale deals with various aspects of subjective muscular tenseness and musculoskeletal symptoms of anxiety. Although standardization data for the MCAI-IV are not available, the MCAI-IV subscales are now integrated into the larger and more widely used and standardized Karolinska Scales of Personality (KSP; Schalling, Asberg, Edman, & Oreland, 1987). The KSP consists of 15 self-report scales. The three anxiety scales of the MCAI-IV were incorporated into the KSP as "anxiety proneness scales" and retain their original labels (i.e., Psychic Anxiety, Somatic Anxiety, and Muscular Tension). For our purposes of assessing anxiety, the MCAI-IV was used rather than the entire KSP.

The STAI consists of two subtests, one that measures state anxiety and one that measures trait anxiety. State anxiety refers to the transient level of anxiety experienced in a particular situation, such as one that is demanding or stressful. Trait anxiety differentiates persistent or dispositional anxiety from mood. Each subtest includes 20 statements that describe various symptoms of anxiety and distress. The participant uses a 4-point scale for each statement to indicate how often the symptom is experienced. A scoring template is used by the examiner to determine a weighted score on each scale. The maximum weighted score on each of the scales is 60, which indicates the greatest degree of anxiety. This inventory has been norm-referenced through extensive testing, demonstrating acceptable psychometric properties (Spielberger et al., 1983), and is frequently used in clinical work and research. Craig (1990) reported that the Trait Anxiety subtest of the STAI is a sensitive measure of clinical change following intensive fluency shaping therapy.

Reliability

To assess accuracy of the stutter counts, 4 participants' speech samples from the group of 19 (21%) were randomly selected for reanalyses. Interjudge reliability was evaluated by having a second researcher, an ASHAcertified speech-language pathologist with experience in fluency disorders, reassess frequency of stuttering. Again, stutter counts were conducted using a hard copy of both the reading passage and the transcripts of the monologue-speaking task. The first (original) and second (reliability) stutter counts for the reading task were, respectively, 14.8% and 15.4% pretreatment, 4.6% and 4.6% posttreatment, and 7.5% and 8.0% 6 months posttreatment. The first and second means for the monologue task were, respectively, 16.7% and 18.6% pretreatment. 6.3% and 6.5% posttreatment, and 14.5% and 15.5% 6 months posttreatment. Interjudge reliability was calculated on the overall percentage of stuttered words for each task. A Hoyt's analysis, which provides a correlation measure of the consistency of rater's judgments (Friedman, 2000), was conducted. The results indicated very high reliability coefficients between the first and second analysis of stuttering frequency for the reading task (r = .998, F = 475, p < .0001) and the monologue task (r = .997, F = 361, p < .0001). To ensure accurate calculation of the scores on the remaining measures, the scores on all of the questionnaires completed by the same 4 randomly selected participants were retabulated by a second researcher. No errors were found.

Results

The pre-, post-, and 6-month posttreatment means and medians for all measures are presented in Table 1. The individual measures were classified under the labels evaluation of overt stuttering, self-evaluation of stuttering, and measures of affective functioning. For each grouping, a factor analysis was performed on the ranked data for the pretreatment variables. Each analysis identified a single factor. The eigenvalue for evaluation of overt stuttering was 2.4, accounting for 80.0% of the standardized variance. The eigenvalue for client-perceived evaluation of stuttering was 2.9, accounting for 71.8% of the standardized variance. In the third analysis, the state variable of the STAI had a factor loading below 0.7, which was 0.3. Consequently, this variable was dropped from the third factor and the analysis repeated. The resulting eigenvalue for the affective evaluation group was 4.3, accounting for 71.0% of the standardized variance. Cronbach's standardized coefficient alpha was used to indicate how well the items in each factor grouping were correlated with one another. The estimates for each group were .87, .87, and .92, respectively. This finding indicates that the final characteristics listed under each of the three categories are highly correlated and load specifically onto an underlying factor in each group.

For most of the outcome measures, the mean scores decreased from pretreatment to posttreatment, and then increased at 6 months posttreatment. Exceptions

Scales	Pretreatment			Posttreatment			6 months posttreatment			Friedman test					
	М	SD	Median	Range	М	SD	Median	Range	М	SD	Median	Range	Value	df	р
Evaluation of overt stuttering															
Reading disfluency (%)	13.8	14.9	9.9	0–60	9.6	8.8	9.1	0-37	10.2	9.7	8.0	0-40	1.23	2	.5410
Monologue disfluency (%)	17.8	16.1	11.0	3–57	11.8	10.0	10.0	1-44	13.8	11.2	12.2	1–39	2.43	2	.2972
Stuttering Severity Instrument	20.5	5.9	21.0	10-30	17.5	5.5	18.0	7–29	19.1	5.6	19.0	9–29	6.68	2	.0355
Self-evaluation of stuttering															
Self-rating of severity	2.8	1.1	3.0	1–5	2.1	0.9	2.0	1-4	2.7	0.9	3.0	1-4	6.53	2	.0382
Perceptions of Stuttering Inventory															
Struggle	11.7	5.4	11.5	2-20	4.1	4.3	3.0	0-17	8.9	6.0	8.0	1–17	20.39	2	<.0001
Avoidance	10.8	5.4	12.5	3–20	2.3	4.1	0.0	0-14	3.3	3.9	2.0	0-12	19.54	2	<.0001
Expectancy	11.0	4.8	10.5	5–20	4.0	3.5	3.0	0-13	7.2	3.5	7.5	1–13	20.70	2	<.0001
Measures of affective functioning															
LCB	28.5	10.5	28.0	6-44	23.2	8.9	23.0	4–36	24.2	11.1	26.0	0-40	4.93	2	.0850
Beck Depression Inventory	7.9	5.9	8.0	0-18	3.7	5.0	1.0	0-18	4.8	5.9	2.0	0-18	9.00	2	.0111
MCAI-IV															
Psychic Anxiety	24.8	7.4	25.0	11–37	22.4	7.2	24.0	13-33	20.3	6.7	20.0	10-32	9.71	2	.0078
Somatic Anxiety	21.6	7.3	21.0	11–36	17.6	5.8	16.0	11-27	16.4	5.7	14.0	10-27	22.25	2	.0036
Muscular Tension	18.4	6.6	17.0	10-34	17.4	5.3	15.0	10-27	17.3	5.3	15.0	10–30	1.44	2	.4863
State-Trait Anxiety Inventory															
State	38.5	8.4	38.5	22–54	34.4	11.1	35.0	20-53	32.4	10.7	31.5	20-51	2.92	2	.2320
Trait	44.1	11.6	42.0	28–62	40.5	10.9	39.0	23–57	38.8	10.6	37.0	21–56	4.59	2	.1009

Table 1. Repeated measures of overt evaluation of stuttering, self-evaluation of stuttering, and affective evaluation for 19 participants in the Successful Stuttering Management Program.

Note. LCB = Locus of Control of Behavior Inventory; MCAI-IV = Multicomponent Anxiety Inventory IV.

to this pattern included the Psychic and Somatic Anxietv subscales of the MCAI-IV, and both scales of the STAI. For the MCAI-IV and the STAI, mean scores decreased between pretreatment and posttreatment, and decreased further at 6 months posttreatment. Fourteen omnibus Friedman tests were performed to evaluate the hypothesis of equality of medians for repeated observations. This nonparametric test is appropriate given that the first two variables (percentage of words stuttered) deviated from normality and the remaining variables followed an ordinal scale. At the α = .05 level, all the variables listed under client-perceived evaluation of stuttering were statistically significant, whereas only one of three variables was significant under overt evaluation of stuttering and only three of seven were statistically significant under affective evaluation.

For those variables where significant omnibus Friedman differences were observed, differences in medians between pairs were further tested. We utilized a simple post hoc procedure for determining which pairs differed, while adjusting for multiple comparisons. A description of the procedure is provided elsewhere (Siegel & Castellan, 1988). Briefly, ranks for each participant were determined across the k = 3 times (pre-, post-, and 6 months posttreatment). R_u equals the sum of ranks for the *u*th variable, R_v equals the sum of ranks for the *v*th variable, and N equals the number of participants with no missing data across the three times. Statistical significance was based on $|R_j - R_{j+1}| \ge z_{\alpha/k(k-1)}\sqrt{Nk(k+1)}/6$.

An evaluation of multiple comparisons between each of the related samples is presented in Table 2. Only scales where the omnibus Friedman test *p* values were less than .05 are listed. No significant post hoc differences were identified for scores on the self-rating of stuttering severity or the BDI. For the SSI-3, a significant decrease in scores was observed between pretreatment and posttreatment, but not between pretreatment and 6 months posttreatment. This pattern was also observed for the Struggle subscale of the PSI. However, the Avoidance and Expectancy subscales of the PSI were significantly decreased at the posttreatment evaluation and remained significantly decreased at the 6-month posttreatment measurement. For the MCAI-IV Psychic and Somatic Anxiety subscales, decreases in anxiety were marginally nonsignificant at posttreatment but were significantly lower than pretreatment scores at 6 months posttreatment.

Effect size calculations were also used to examine the magnitude of the treatment effects, independent of sample size. This approach can facilitate the estimation of the *practical* significance of a research result (Gall, Borg, & Gall, 1996). Cohen's d effect sizes were calculated for each pre-to-posttreatment and pre-to-6months-posttreatment comparison. Effect sizes were classified as small if they were over 0.2, medium if they were over 0.5, and large if over 0.8 (Cohen, 1988). All of the statistically significant findings reported above had effect sizes ranging from 0.5 (moderate treatment effect) to 1.8 (very high treatment effect). The moderate to large effect sizes appear to support the clinical significance of our statistically significant findings. The effect size results are presented with a summary of the significance findings in Figure 1.

Discussion

This investigation examined changes in stuttering severity, self-perceptions of stuttering, locus of control, and affective functioning in 19 individuals who participated in the SSMP. Prior to statistical analysis, group means immediately pre- and posttreatment and 6 months posttreatment revealed a pattern toward improvement across all outcome measures. However, statistically significant improvements were observed on only 4 of the total 14 measures immediately following treatment: the SSI-3 and the three PSI subscales (Struggle, Avoidance, and Expectancy). Of those four scales, the three PSI subscales all yielded large effect sizes and the SSI-3 a medium effect size. At the 6-month posttreatment assessment time, improvement in only 4 of the 14 measures attained statistical significance compared with pretreatment scores. The PSI Avoidance and Expectancy subscales retained their significant decline, and the MCAI-IV Psychic and Somatic subscales continued their gradual decrease to reach statistical significance. Of those four measures, the PSI Avoidance and Expectancy subscales and the MCAI-IV Somatic Anxiety subscale yielded large effect sizes and the MCAI-IV Psychic Anxiety scale yielded a medium effect size. These results indicate that positive treatment outcomes of the SSMP are limited to specific assessment areas and, in the instances of stuttering severity and self-perceived struggle behavior, are temporary. The only sustained improvements were for the client-perceived measures of stuttering avoidance and expectancy, and psychic and somatic anxiety. These results indicate that the SSMP may have some anxiolytic treatment benefit but is otherwise ineffective in durably reducing core stuttering behavior, self-perceived levels of struggle, muscular tension, and other associated affective domains such as locus of control and mood. The following discussion addresses each assessment area individually.

Evaluation of Overt Stuttering

Overt stuttering behavior was assessed in two ways: (a) frequency of stuttering behavior during a reading and monologue task and (b) SSI-3 scores. Although no significant improvement in stuttering

Table 2. M	Jtiple	post	hoc	comparisons	between	k re	lated	sampl	es.
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		Rank (R1)	Rank (Ra)	Rank (R3) 6 months					
Scales	N	pretreatment	posttreatment	posttreatment	$ R_1 - R_2 $	R ₁ – R ₃	$ R_2 - R_3 $	$\mathbf{z}_{\alpha/k(k-1)}/Nk(k+1)/6$	
Evaluation of overt stuttering Stuttering Severity Instrument	19	30	45	34	15	4	11	14.76	
Self-evaluation of stuttering Self-rating of severity Perceptions of Stuttering Inventory	16	21	34	27	13	6	12	13.54	
Struggle	13	16	35	24	19	8	11	12.21	
Avoidance	12	14	30	26	16	12	4	11.73	
Expectancy	12	16	35	27	20	12	8	11.73	
Measures of affective functioning									
Beck Depression Inventory MCAI–IV	14	18	30	29	12	11	1	12.67	
Psychic Anxiety	14	18	30	34	12	16	4	12.67	
Somatic Anxiety	14	18	30	32	12	14	2	12.67	

Note. Statistically significant comparisons are in boldface.

Figure 1. Changes in Cohen's *d* effect sizes from pretreatment to posttreatment and from pretreatment to 6 months posttreatment on all outcomes measures. The three horizontal lines represent the lower limits of small (0.2), medium (0.5) and large (0.8) effect sizes (Cohen, 1988). Effect size points with an asterisk indicate statistically significant pre- to posttreatment score differences. The displayed effect sizes are not continuous data and are connected by lines to facilitate visual comparison only. Effect size = (mean 1_(pretreatment) - mean $2_{(posttreatment)}/SD_{pooled}$.



frequency was identified, mean SSI–3 scores improved significantly immediately posttreatment. However, this improvement was not sustained and was no longer evident at 6 months posttreatment. This pattern of short-term improvement followed by regression to pretreatment levels was also observed on the Struggle subscale of the PSI.

In addition to a stuttering frequency score, the total overall SSI-3 score includes calculation of a stuttering moment duration score and a physical concomitants score. Given that the stuttering frequency counts did not significantly decrease following treatment, it is likely that decreases in stuttering moment duration and decreases in secondary features contributed most to the significant lowering of overall SSI-3 scores. In this regard, two of the central goals of the SSMP relate to eliminating concomitant (secondary) behaviors and decreasing the severity of stuttering moments when they occur. Based on the cursory assessment of stuttering duration and concomitant behaviors provided by the SSI-3, it appears that the SSMP may have been successful in reducing stuttering severity immediately following treatment. This improvement was not maintained, however. By 6 months posttreatment, mean

SSI-3 scores did not differ significantly from baseline measures, indicating that treatment gains in this area were short-lived.

Self-Evaluation of Stuttering

Client-assessed evaluation of stuttering was accomplished using a self-rating of stuttering severity and the PSI. No significant differences were identified in client's self-perceived level of stuttering severity either immediately posttreatment or at 6 months posttreatment. However, significant decreases in all three subscales of the PSI were noted immediately following treatment. Interestingly, only scores on the Avoidance and Expectancy subscales remained significantly decreased at 6 months posttreatment, whereas scores on the Struggle subscale returned to pretreatment levels by 6 months posttreatment. The Struggle scale refers to the presence of excess physical tension and/or effort while speaking, and relates to the physical aspects of the stuttering. This area received little attention in the SSMP, and the short-lived improvement in Struggle scores may reflect the lack of attention given to motor control training. Six-month posttreatment regression of Struggle scores

to near baseline levels may, therefore, reflect fragile motor learning or motor control of the "prolongation" and "pull-out" techniques. In contrast, decreasing avoidance behavior is a major constituent of the SSMP, and scores remained improved 6 months posttreatment. The significant patterns in the 6-month follow-up may reflect the disproportionate emphasis placed on decreasing avoidance behaviors during the program. The posttreatment profile in PSI subtest scores suggests that participation in the SSMP differentially affects selfperceptive aspects of stuttering and vulnerability to relapse.

Although improvement was observed across the three PSI subtests, the effect size was largest for the Avoidance scale at 6 months posttreatment. It could be argued that the sustained decrease in the Avoidance scores reflects one of the most robust outcomes of the SSMP and likely represents the aims and emphasis of the SSMP. Two of the primary aims of the SSMP were (a) "helping stutterers to improve their attitudes about their stuttering" and (b) to "reduce the secondary behaviors of escaping or avoiding the stutter" (Breitenfeldt & Girson, 1995, p. 429). These aims are closely related to two of the three categories that constitute the PSI: Avoidance and Expectancy. Thus, our PSI findings support that the SSMP accomplished these goals.¹

Measures of Locus of Control and Affective Functioning

Locus of control of behavior. A successful therapy program should produce an increased internalized locus of control. Confidence in the ability to successfully perform activities that are necessary for achievement of a particular outcome has been shown to be meaningful for individuals who stutter (Ornstein & Manning, 1985). An internal locus of control may also predict maintenance of the progress made in a treatment program (Craig & Andrews, 1985). No statistically significant treatment effects were observed, indicating that participation in the SSMP did not substantively affect LCB scores. Andrews and Craig (1988) reported that for their clients, one of the dominant predictors of a positive and durable treatment outcome was internalization of locus of control. The apparent lack of internalization of locus of control in the present study may partially account for the return to baseline observed for the SSI-3 and the Struggle subscale of the PSI.

Mood. Symptoms of depression and mood were evaluated using the BDI. It was hypothesized that following a truly successful course of stuttering therapy, one might expect to observe a corresponding upswing in mood. Such an increase might have theoretically represented improved ability to manage stuttering and the difficulties that accompany stuttering, such as fear, anticipatory stress, and self-concept. However, no significant differences in mood were identified either immediately following treatment or at 6 months posttreatment. Mood may be an affective variable that is somewhat independent of stuttering and/or other self-perceived stuttering measures. Alternatively, significant improvements in mood might only occur with real decreases in core stuttering behavior and consequent improvements in self-assessed stuttering severity, decreased struggle behavior, and an internalized locus of control.

Anxiety. Anxiety was assessed using the MCAI-IV and the STAI. The MCAI-IV scores indicated the group means decreased in psychic anxiety and somatic anxiety immediately posttreatment and further decreased to a statistically significant level 6 months posttreatment. The muscle tension scores did not improve, mirroring the other scales that appear sensitive to the physical aspects of stuttering (i.e., stuttering frequency, selfperceived stuttering severity, and the Struggle subscale of the PSI). The pattern of decreased anxiety on the Psychic and Somatic Anxiety subscales over time was also observed for both trait (general) anxiety and state (situational) anxiety group mean scores. The effect sizes for the Psychic and Somatic Anxiety scales of the MCAI-IV and the State Anxiety subtest of the STAI were also similar. However, unlike the MCAI-IV scores, the decreased anxiety scores on of the STAI subtests were not statistically significant. This may be related, in part, to the notion that anxiety is a complex, multidimensional construct. Menzies, Onslow, and Packman (1999) have highlighted the complex relationship between anxiety and stuttering and suggested that global ratings of anxiety as a unitary construct (like the STAI) often lack the resolution to detect differences in specific components of anxiety and its manifestations. Specifically, Menzies et al. state, "The reliance on instruments like the STAI . . . which treat trait anxiety as a single construct, has masked the possibility that persons who stutter and those who do not differ on particular components of trait anxiety" (p. 7).

Taken together, the significant decreases in cognitive (psychic) and somatic anxiety indicates that participation in the SSMP may positively influence these specific affective attributes. Decreased scores on the Psychic Anxiety scale indicated reduced worry, apprehension, sensitivity, insecurity, and social anxiety (i.e., expectancy of negative evaluation). Decreased scores on the Somatic Anxiety scale indicated that the benefits of

¹The participants' knowledge of the treatment goals of the SSMP may have influenced their subsequent (i.e., posttreatment) responses on specific questions within the Avoidance and Expectancy subscales of the PSI. As with any self-report inventory, the possibility exists that posttreatment improvements may partially reflect this influence.

participation in the SSMP might also include decreases in some autonomic disturbances such as vague distress and distractibility. It is likely that these reductions are indicative of improvements in how participants felt about their disorder and themselves. Such effects may alleviate some of the negative consequences of stuttering, which is a goal that Bloodstein (1995) and Yaruss (2001) have suggested stuttering treatment must achieve in addition to reducing stuttering behaviors. Thus, the SSMP appears effective in its aims to decrease fears, avoidance behaviors, and anticipatory apprehension. However, the results indicate a lack of SSMP treatment effects concerning musculoskeletal symptoms of anxiety, such as tense muscles due to stress.

The decreases in cognitive and somatic anxiety relate well to the decreases in self-assessed avoidance behavior and expectancy of stuttering. Conversely, the absence of self-reported decreases in muscle tension also mirror the absence of improvements in self-assessed struggle behavior and the lack of significant decreases in stuttering frequency. Taken together, these findings appear to support the notion that the SSMP is an "anxiolytic" treatment. Although improvements were noted in areas related to self-perception of stuttering and cognitive anxiety, no significant effect was detected for reducing the primary behaviors of stuttering or the associated motor sequelae of stuttering such as "struggle to speak" and "muscle tension."

Caveats and Suggestions for Future Research

This study represents only an initial step in objectively evaluating the SSMP and other stuttering modification treatment approaches. The present results are relevant only to an intensive group treatment format. It is unknown whether the treatment outcomes would be similar using the SSMP techniques in an individual therapy format and/or with less total clinical hours. While the SSMP is a classic example of a stuttering modification approach to stuttering therapy, it is only one variant of many stuttering modification treatments. It is not known whether these results can be generalized to other stuttering modification approaches.

The absence of a nontreatment control group, or an alternative treatment, also makes it difficult to place the present results in context. Given that the majority of the significant results were primarily anxiolytic in nature, one wonders about the mere reactive effects of clinical interaction with clinicians, and other individuals who stutter. Perhaps simply participating in *any* type of group stuttering intervention may be sufficient to bring about the positive anxiolytic changes of the type and magnitude that were observed following the

SSMP. Further, since both SSI–3 scores and self-judged struggle scores returned to baseline, one might wonder if expectancy and avoidance behaviors might not ultimately return to baseline as well. Longer term followup and appropriate use of prospective randomized clinical trial methodologies employing alternative or nontreatment control groups are clearly needed to address these questions.

Given the temporal and contextual variability inherent in stuttering, future SSMP outcome studies may also benefit from an enhanced analysis of multiple and diverse conversational and reading samples. The lack of extraclinical speaking samples in the present study is a considerable shortcoming. Ideally, multiple samples would be collected in diverse environments, by different interviewers, and under varying task demands. Measures of speech rate and speech naturalness would also add to the behavioral measures of speech production (J. C. Ingham & Riley, 1998). Finally, careful control of participants' history of treatment would also be beneficial. Such monitoring would allow greater ability to assess the effects of previously learned treatment strategies on SSMP outcomes.

Conclusions

The present study represents the first multidimensional evaluation of a stuttering modification treatment program. The findings indicate that the SSMP, at its core, is an anxiolytic treatment. The aims are to reduce avoidance behavior, anticipation, and social and cognitive anxiety through desensitization to stuttering. The Avoidance and Expectancy subscales of the PSI and the Psychic and Somatic Anxiety subscales of the MCAI-IV revealed the largest changes in response to participation in the SSMP. In essence, the PSI scores relate to the degree that stuttering speakers view themselves as handicapped by their stuttering. Although not intended to be a handicap scale per se, the PSI is useful in assessing the degree of an individual's self-perceived stuttering-related handicap. The underlying rationale of the SSMP treatment approach was to teach the stutterer "to manage his stuttering and his speech so that he can communicate as a stutterer in any situation without undue stress and strain to himself or his listener" (Breitenfeldt & Lorenz, 1989, p. 5). The significant PSI and MCAI-IV findings at least partially support the intended rationale of the program. It seems reasonable that decreased self-perception of stuttering, as a handicapping condition, paired with decreased anxiety, might facilitate improved self-concept.

Although reduced frequency of stuttering was not an overt goal of the SSMP, some modest improvements in stuttering severity were observed immediately following treatment. However, these improvements were short-lived. Therefore, it is unlikely that communication free of "undue stress and strain" is a viable longterm outcome of the SSMP given the absence of significant improvement in (a) the frequency of stuttering, (b) self-perceived stuttering severity, (c) muscular tension, (d) perception of struggle to speak, (e) locus of control, and (f) mood. While some relapse appears to be inherent in nearly all types of stuttering therapy, the critical question of any treatment program is "do the improvements last?" Based on our 6-month follow-up data, the posttreatment decreases in stuttering severity and self-perceived struggle were not sustained. Sustained improvements were observed for self-perceived avoidance and expectancy of stuttering and for psychic and somatic anxiety. However, without further long-term data(i.e., greater than 6 months posttreatment), even the durability of the changes outlined above is questionable. It is our hope that additional studies will shed further light on the long-term treatment effects of the SSMP.

The practice of evidence-based stuttering therapy requires that clinicians apply the most effective, proven, and efficacious techniques available (Finn, 2003; J. C. Ingham, 2003; Onslow, 2003). In summary, the SSMP outcomes presented here provide qualified support for some changes in affective functioning but negligible improvements in core stuttering behaviors and secondary behaviors. If truly effective treatments need to demonstrate improvements in all three areas to be considered successful, then the SSMP is only partially successful. For some people who stutter, the SSMP may have treatment value in decreasing some anxiety-related symptoms of the disorder; however, as a stand-alone program, the SSMP appears to be ineffective in producing durable improvements in stuttering behaviors.

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