
Results of an Intensive Stuttering Therapy Program¹

Résultats d'un traitement intensif du bégaiement

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Abstract

This paper reports the results of a three-week intensive program for 10 adult and adolescent stutterers. Measurements were made immediately before and after treatment and again during the follow-up period, 12 - 14 months post-treatment. The measures included percentage of stuttering, syllables spoken per minute and three self-report scales designed to measure changes in attitudes, perceptions and self-confidence. In the follow-up period, subjects completed a fourth scale in which they indicated their level of satisfaction with their speech performance. The results indicated that substantial positive changes occurred and were maintained in both speech performance and non-speech variables.

Résumé

Suivent les résultats d'un traitement intensif de trois semaines à l'intention de 10 adultes et adolescents souffrant de bégaiement. Les mesures ont été prises immédiatement avant et après le traitement, ainsi qu'au terme de la période de suivi de 12 à 14 mois. Les mesures comprenaient le pourcentage de bégaiement, le nombre de syllabes prononcées par minute et les résultats de trois échelles d'auto-appréciation conçues pour établir le changement d'attitude, de perception et de confiance en soi. Lors du suivi, les sujets ont répondu à un quatrième questionnaire qui a permis de déterminer le degré de satisfaction face à leur facilité d'élocution. Les résultats révèlent des changements positifs appréciables et durables tant sur le plan du langage qu'à l'égard des variables qui ne se rapportent pas à la parole.

There is a growing awareness that the effectiveness of stuttering treatment programs must be objectively demonstrated. Bloodstein (1987) described 12 stringent tests which a therapy program must meet before it can be considered completely successful. Two of the most important tests are that the stability of the results must be demonstrated by long-term follow-up investigations and that the treatment must remove not only stuttering behavior but also stuttering fears, antici-

pations and the person's self-concept as a stutterer. Bloodstein's expectations present a challenge for most clinicians.

Clinical scientists have approached the task of evaluating the success of therapy in a variety of ways. Andrews et al. (1980) used a meta-analysis technique to study the relative success of various types of treatment. Ingham (1984, 1985, 1993) has written extensively about issues that must be considered in evaluating treatment outcome. A grave concern expressed by Ingham and demonstrated by Kully and Boberg (1988) is the lack of satisfactory inter-rater reliability in the measurement of stuttering. The need to measure speech performance in the post-treatment environment was stressed by Boberg (1981, 1986).

There are a variety of views concerning which aspects of stuttering should be measured, and under what conditions such measurements should be made. Ingham (1985) maintains that there exists a level of agreement among clinical scientists that frequency counts of moments of stuttering and numbers of syllables/words per minute provide the basic data for assessing therapy outcome. These measures are convertible to percentage of stuttering and provide some reflection of speech rate. Cooper (1987), on the other hand, questions the validity of frequency counts and insists that measurement must focus on the cognitive and emotional aspects of stuttering.

Recent advances in speech pathology and related disciplines offer additional options for measuring the results of therapy. Manz (1988) used a battery of neuropsychological tests to predict and measure client response to therapy. Yeudall et al. (1993) tested 17 stutterers before and after treatment with a variety of neuropsychological measures including quantitative analysis of the EEG, brainstem auditory evoked potentials, neuropsychological and intellectual assessments, Galambos 40 Hz and middle latency response. The recent burgeoning interest in speech motor control and stuttering, evidenced by the numerous papers on

this topic presented at the Nijmegen Conference (Peters et al., 1991), should encourage systematic investigations to determine if this new methodology will yield precise and relevant measures of speech change related to therapy experiences.

The purpose of this study is to report on changes in speech performance, attitudes, perceptions, self-confidence levels and speech satisfaction immediately after and one year following a three-week intensive therapy program. In a study of treatment effectiveness it is generally accepted that the most powerful research design is one where subjects are randomly assigned to an experimental group and a control group. The latter group may be untreated, receive a placebo or a comparative treatment. However, we have also gained knowledge about treatment effectiveness through single group and single subject research designs (Goldiamond, 1965; Martin, Kuhl & Haroldson, 1972; Ingham, 1975; Reed & Godden, 1977; Howie, Tanner & Andrews, 1981; Ingham, 1982; Craig & Andrews, 1985).

There is always the possibility that single group designs without control groups, such as the present study, may yield spurious effects which cannot properly be attributed to the treatment. This is particularly true if no allowance is made for spontaneous recovery, or if the treatment effects are not substantial and are not maintained for some period after therapy.

While spontaneous recovery is fairly common in childhood, it is rare in adults and older adolescents. Studies by Andrews and Harvey (1981), Gregory (1972), and Ingham and Packman (1977) demonstrated that when stutterers in this age group were assessed but not treated for at least nine months, there were no clinically significant changes in their stuttering behavior. Moreover, the treatment effects in the current study were substantial and were generally maintained after therapy. Therefore, there is no reason to expect that an untreated control group would provide critical information in this investigation of treatment effectiveness with a group of older adolescent and adult stutterers.

Procedures

Subjects

A total of 21 stutterers enrolled in and completed three-week intensive clinics during May and July, 1992. Working within the time constraints available for data collection for this study, we were able to gather complete data for 10 subjects. The remaining subjects were not available due to summer vacations, or did not return their questionnaires in time to be included in this study. The eight male and two female subjects ranged in age from 16 to 38 with a mean age of 24.2 years.

Clinical Program

All of the subjects completed the three-week intensive Comprehensive Stuttering Program (CSP) (Boberg & Kully, 1985) in which clients meet for approximately 6.5 hours per day each weekday at the Institute for Stuttering Treatment and Research (the Institute). During the first two weeks, the subjects lived in a student residence; during the third week, they could choose to live at home, stay with friends or remain in the residence.

Subjects progressed through the *Establishment Phase* (two weeks) and *Transfer Phase* (final week) of the program. The Establishment Phase included the following: (a) acquisition of fluency skills (prolongation, easy breathing/appropriate phrasing, easy onset, soft contacts, and continuous airflow/blending); (b) acquisition of cognitive-behavioral strategies to achieve attitude change and reduce fears and avoidances; and (c) preparation for the Transfer Phase. Fluency skills were taught using behavior modification strategies. Prolongation rates were systematically increased from approximately 40 syllables per minute (spm) to a near normal rate of 190+/- 40 spm. The remaining fluency skills were practised extensively at the various rates while systematically increasing length and complexity of utterance. Subjects were taught to self-monitor their use of fluency skills and identify and modify errors. Seminars, discussions, readings and written assignments were used to help subjects achieve more positive communication attitudes and reduce fears and avoidances.

The Transfer Phase involved the following: (a) using fluency skills outside of the clinic, progressing from easy to more difficult and more frequently avoided situations; (b) continued discussion and application of cognitive-behavioral strategies to achieve attitude change and reduction of fears and avoidances (subjects were encouraged to discuss stuttering with family, friends and colleagues, seek opportunities to expand social and interpersonal skills and continually seek out previously avoided situations); and (c) preparation for the maintenance period following the intensive clinic.

With clinician guidance, subjects developed an individual maintenance plan comprised of the following: (a) daily fluency skill practice in home, work, school and social environments; and (b) transfer activities which require systematic planning and evaluation of fluency skill use in various situations. Subjects were also encouraged to contact a local speech-language pathologist for follow-up treatment, join or form self-help groups and attend refresher weekends at the Institute. Refresher weekends include a review of skills and concepts, discussion of problems experienced in the maintenance period and transfer assignments. One refresher weekend was included in the fee for the intensive clinic to encourage follow-up therapy in the maintenance period.

Pre- and post-treatment speech measures

Video- and audio-taped speech samples are routinely obtained during the pre- and post-clinic assessment sessions at the Institute. The video samples consist of 3 minutes of conversation with an interviewer and 2 minutes of reading. To minimize the effect of cues for controlled speech associated with the therapy program, the post-treatment interview is always conducted by a stranger, someone who has not been involved with the therapy program.

The two-minute audio samples consist of telephone calls made by the subjects to business establishments. These audio-taped samples are made before and immediately after treatment. During the follow-up period we made "surprise" phone calls to the subject at home or at work in order to obtain a measure of speech fluency in the natural post-treatment environment. The caller, a research assistant not associated with the therapy program, explained that she was phoning from the Institute and needed a short sample of the subject's post-treatment speech. This call was recorded, with the subject's permission, for subsequent analysis.

We chose the telephone sample as the follow-up measure for several reasons: it is generally considered to be the most difficult speech situation for many stutterers (Boberg & Sawyer, 1977); it avoids the problem of inflated measures of improvement which may occur when clients speak to clinicians in the clinic setting; and finally, telephone calls allow us to obtain speech samples from the largest number of subjects even though they live more than 1,000 miles from the clinic.

Analysis of speech samples

The speech samples were analyzed by counting all stuttered and fluent syllables and expressed as a percentage of syllables stuttered, (%SS) and as syllables per minute (SPM). All syllable counts were made on electronic button-press event recorders (Boberg & Kully, 1985).

Training program for the rater

A research assistant, the rater, was trained to criterion level at the Institute by the Clinical Director. The training program involved six hours of training in counting stuttered and fluent syllables from video-taped speech samples using the counting guidelines established at the Institute (Boberg & Kully, 1988). The rater was required to establish 90% agreement with the Clinical Director before she began analyzing the samples for this study.

Intra-rater reliability was assessed by randomly selecting five samples from the sample pool for the rater to re-analyze.

Inter-rater reliability was assessed by the Clinical Director randomly selecting five samples from the sample pool for independent analysis. Reliability was determined using the Pearson Product-Moment Correlation Test. As indicated in Table 1, both intra- and inter-rater reliability were very high, averaging .998 and .992 respectively.

Table 1. Summary of intra- and inter-rater reliability of syllables stuttered (SS), total syllables spoken (TSS), percent syllables stuttered (%SS), and syllables per minute (SPM).

	Intra-rater Reliability	Inter-rater Reliability
SS	.999	.999
TSS	.999	.998
%SS	.999	.999
SPM	.994	.972
Mean Reliability	.998	.992

Pre-and post-treatment non-speech measures

One of Bloodstein's (1987) criteria for evaluating the effectiveness of therapy is that treatment must not only reduce or remove stuttering, but also reduce the fears and avoidance behaviors and alter the person's self-concept as a stutterer. Therefore, in addition to the speech measures, a number of tests and questionnaires are routinely given to clients at the Institute. They include:

1. S-24 Scale — the Revised Communication Attitude Inventory (Andrews & Cutler, 1974). The S-24 scale measures attitudes toward communication ability. Higher scores reflect more negative attitudes.
2. Perceptions of Stuttering Inventory (PSI) (Woolf, 1967). This test comprises 60 items that represent the parameters of struggle, avoidance and expectancy. Higher scores indicate a more negative perception of stuttering.
3. Self-Efficacy Scaling by Adult Stutterers (SESAS) (Ornstein & Manning, 1985). This scale comprises 42 speaking situations for which the clients estimate their average confidence level. Lower scores suggest reduced confidence with respect to speech.
4. An adapted version of the Speech Performance Questionnaire (SPQ) (Perkins, 1981). This self-administered questionnaire was mailed to the subjects 12 to 14 months

after they completed the intensive program and is designed to assess the subjects' own perceptions of their post-clinic performances.

Results

Pre-and post-treatment speech measures

Video-taped samples of conversational speech were obtained immediately before and after the three-week intensive program. Audio-taped samples of telephone conversations were obtained immediately before and after the three-week intensive program and 12 - 14 months post-treatment as a follow-up measure. Table 2 presents the data from the video-taped speech samples and Table 3 presents the data from the audio-taped telephone samples.

Results of the video samples (Table 2) reveal that all subjects experienced a substantial decrease in the percentage of syllables stuttered (%SS). The mean %SS dropped from 14.2 pre-treatment, to 0.53 post-treatment, with 8 subjects having stuttered on less than 1% of total syllables. The mean SPM increased from 126.5 pre-treatment to 140.7 post-treatment.

Results from telephone speech samples (Table 3) reveal that all subjects experienced a decrease in percentage of stuttering at the end of treatment. The mean %SS dropped from 15.3 pre-treatment to 0.8 post-treatment, with 6 subjects having stuttered on less than 1% of total syllables

during their phone calls. The SPM increased from a mean of 122.6 to 152.1 during that same period.

Follow-up phone calls were made to the subjects 12 - 14 months after treatment. These calls were recorded and subsequently analyzed. Results shown in Table 3 indicate a small increase in the mean %SS (2.4) at follow-up compared to the mean %SS (0.8) immediately after treatment. The increase is primarily due to Subjects 2 and 4 who displayed 6.9 %SS and 6.4 %SS respectively. Excluding those two subjects, the mean %SS would be 1.3 at follow-up for the remaining eight subjects.

Table 2. Percentage of syllables stuttered (%SS) and syllables spoken per minute (SPM) in video-taped conversation samples from ten subjects immediately before and after an intensive treatment program.

Subject	Age/Sex	Video % SS		Video SPM	
		Pre	Post	Pre	Post
1	30/M	1.6	0.23	182.1	148.6
2	20/M	22.0	1.9	109.5	117.1
3	38/M	5.3	0.0	166.4	143.5
4	27/M	12.1	0.23	143.1	145.1
5	30/F	13.8	0.23	138.8	138.4
6	20/M	18.9	0.61	72.2	158.9
7	18/M	10.3	1.2	94.1	133.6
8	25/M	17.6	0.45	123.6	134.5
9	18/M	35.8	0.22	58.4	154.2
10	16/M	4.3	0.24	185.3	132.7
X(N=10)	24.1	14.2	0.53	126.5	140.7

Table 3. Percentage of syllables stuttered (%SS) and syllables spoken per minute (SPM) in audio-taped telephone samples immediately before, immediately after and 12-14 months following an intensive program.

Subject	Age/Sex	Clinic Telephone				Follow-up Telephone	
		% SS		SPM		%SS	SPM
		Pre	Post	Pre	Post		
1	30/M	8.3	1.3	146.1	149.8	0.2	172.9
2	20/M	17.2	1.8	136.5	182.6	6.9	119.5
3	38/M	10.0	0.0	150.4	162.3	0.0	182.9
4	27/M	12.3	0.4	121.8	137.7	6.4	137.1
5	30/F	14.5	0.0	147.6	147.4	2.4	170.3
6	20/M	21.5	0.0	77.3	149.3	1.0	195.1
7	18/M	12.2	1.2	96.2	145.2	1.4	72.0
8	25/M	16.1	0.7	122.5	137.2	1.6	131.7
9	18/F	37.1	0.5	35.8	132.3	2.3	158.1
10	16/M	3.7	1.6	191.3	176.7	1.5	156.1
X(N=10)	24.1	15.3	0.8	122.6	152.1	2.4	149.6

Stuttering Therapy Outcome

Pre- and post-treatment non-speech measures

To determine if subjects experienced changes in non-speech parameters, the S-24 (attitudes), PSI (perceptions) and SESAS (self-confidence) scales were administered pre- and

post-therapy and at follow-up. The SPQ was completed only at follow-up as this questionnaire is designed to measure clients' self-ratings after treatment. Results are reported in Table 4.

Table 4. Scores on three scales of self-report questionnaires immediately before, immediately after and 12-14 months following an intensive program.

Subject	Age/Sex	S-24			PSI			SESAS		
		Pre	Post	Follow-up	Pre	Post	Follow-up	Pre	Post	Follow-up
1	30/M	22	6	2	67%	23%	3%	43%	97%	95%
2	20/M	22	8	16	Not Avl.	20%	27%	52%	85%	61%
3	38/M	13	7	6	45%	17%	5%	75%	93%	98%
4	27/M	20	6	14	55%	1.7%	23%	43%	93%	66%
5	30/M	20	6	12	33%	1.7%	13%	55%	81%	73%
6	20/M	24	9	22	67%	3.3%	35%	29%	86%	26%
7	18/M	21	12	10	62%	22%	23%	40%	63%	65%
8	25/M	19	4	14	33%	6.7%	20%	42%	93%	69%
9	18/F	23	15	13	77%	43%	48%	21%	84%	65%
10	16/M	12	11	15	68%	15%	35%	70%	74%	87%
X(N=10)	24.1	19.6	8.4	12.4	56.3%	15.4%	23.2%	47%	84.9%	70.5%

S-24 scale scores revealed very negative attitudes (19.6) before treatment. After treatment communication, attitudes were normal (8.4) and remained so during follow-up (12.4). (Mean for normal speakers on the S-24 = 9.14 with a Standard Deviation of 5.38).

Subjects revealed a similar pattern on the PSI scale. Before treatment, subjects' responses indicated high levels of struggle, expectancy and avoidance (56.3%). These levels decreased dramatically after therapy to 15.4% and showed only a small increase to 23.2% during the follow-up period.

On the SESAS scale, pre-treatment scores showed a low confidence mean rating of 47%. This score almost doubled to 84.9% after therapy, and then declined to 70.5 at follow-up.

Table 5. Summary of 10 subjects' responses to the Speech Performance Questionnaire 12-14 months after an intensive program.

	Number Responding	% Response
1. Satisfaction with speech before therapy		
Very satisfied	0	0
Generally satisfied	0	0
Generally dissatisfied	7	70
Very dissatisfied	3	30

Table 5 - continued

	Number Responding	% Response
2. Satisfaction with speech immediately after therapy		
Very satisfied	10	100
Generally satisfied	0	0
Generally dissatisfied	0	0
Very dissatisfied	0	0
3. Current rating of speech satisfaction		
Very satisfied	1	10
Generally satisfied	7	70
Generally dissatisfied	2	20
Very dissatisfied	0	0
4. Current rating of speech fluency		
Very good	0	0
Generally good	8	80
Generally dissatisfied	2	20
Very dissatisfied	0	0
5. Now have necessary skills to control speech		
Almost always	1	10
Most of the time	6	60
Some of the time	3	30
Seldom	0	0

Table 5 - continued

	Number Responding	% Response
6. Now have necessary skills to sound fluent		
Almost always	3	30
Most of the time	5	50
Some of the time	2	20
Seldom	0	0
7. Now have necessary skills to sound normal		
Almost always	3	30
Most of the time	6	60
Some of the time	1	10
Seldom	0	0
8. I use my speech controls		
Almost always	0	0
Most of the time	3	30
Some of the time	6	60
Seldom	1	10
9. Now able to speak normally without thinking about controls		
Almost always	0	0
Most of the time	2	20
Some of the time	8	80
Seldom	0	0
10. Now feel like a normal speaker		
Almost always	0	0
Most of the time	4	40
Some of the time	6	60
Seldom	0	0
11. As a result of therapy my speech fluency is		
Much improved	4	40
Moderately improved	4	40
Slightly improved	2	20
Not improved	0	0
12. I found the Institute's therapy program to be		
Very helpful	9	90
Moderately helpful	1	10
Slightly helpful	0	0
Not helpful	0	0
13. Prefer stuttering over controlled speech		
All of the time	0 ^a	0
Most of the time	0	0
Some of the time	2	22.2
Seldom	7	77.8

Table 5 - continued

	Number Responding	% Response
14. Currently consider myself a stutterer		
Yes	7 ^b	87.5
No	1	12.5
15. Attribute speech improvements to		
Therapy at ISTAR	8 ^c	100.0
Other therapy	0	0
Factors other than therapy	0	0
16. In order to be fluent I must pay attention to my speech		
Almost always	2	22.2
Most of the time	6	66.7
Some of the time	1	11.1
Seldom	0	0
17. My fluency skills 'work'		
Almost always	3	33.3
Most of the time	4	44.5
Some of the time	2	22.2
Seldom	0	0
18. As a result of ISTAR therapy confidence in my ability to speak is		
Much improved	4	44.4
Moderately improved	4	44.4
Slightly improved	1	11.2
Not improved	0	0
19. As a result of ISTAR therapy general confidence is		
Much improved	3	33.3
Moderately improved	5	55.5
Slightly improved	1	11.2
Not improved	0	0

^a one subject did not complete items 13-19 on the back page of the questionnaire

^b one subject did not complete item 14

^c one subject's response to item 15 was deleted as she did not follow the instructions

The Speech Performance Questionnaire (SPQ) provides an opportunity for subjects to evaluate various aspects of their own speech performance and indicate their levels of satisfaction during the follow-up period. The numbers and percentages of subjects responding to each item are pre-

sented in Table 5. All subjects were very satisfied with their speech immediately after the clinic (item 2), 80% were very or generally satisfied with their speech at the time of follow-up (item 3), and 80% rated their current speech fluency as generally good (item 4). Analysis of individual subject responses to item 3 revealed that the two subjects indicating general dissatisfaction with their current speech were subject 4, who displayed 6.4 %SS at follow-up (Table 2), and subject 6 who displayed 1 %SS at follow-up. Subject 2, who displayed 6.9% %SS at follow-up, was generally satisfied at the time of follow-up. Another interesting point appears in item 7 where 90% of the subjects indicate that they now have the necessary skills to "sound normal" almost always or most of the time; however, the majority (60%) use these skills only "some of the time" (item 8). Responses to items 18 and 19, in which subjects rate their confidence levels, are similar to the responses on the SESAS (Table 4) in that both reflect increased confidence at the time of follow-up measures. Indeed, the results from all four questionnaires indicate a post-treatment change in a positive direction of such factors as attitude, perceptions, self-confidence and speech satisfaction.

Discussion and Conclusions

In order to determine the results of the Intensive Comprehensive Stuttering Program (CSP), 10 stutterers were tested immediately before, immediately after and during the follow-up period, 12 - 14 months after the program. The tests included several speech measures (percentage of syllables stuttered and syllables per minute) and several scales and questionnaires to measure non-speech factors such as changes in attitudes and confidence levels.

An analysis of the video samples indicated that all 10 subjects showed a dramatic decrease in %SS at the end of treatment. Analysis of the telephone samples indicated a similarly marked decrease in %SS at the end of treatment, with a small increase in %SS evident at follow-up. It was noted however, that most of that increase was due to the performance of 2 of the 10 subjects. The other eight subjects experienced only a slight increase in %SS from a mean of 0.8 at the end of treatment to 1.3 at follow-up. In other words, 8 of the 10 subjects, or 80%, appeared to be maintaining their clinical gains, as reflected in the telephone sample used in this study. Although Subjects 4 and 6 did show a slight increase in stuttering at follow-up, their percentages of improvement, relative to pre-treatment stuttering, were 65% and 47% respectively. This improvement is still considerable and illustrates that in evaluating success in therapy, one must also consider how much of the initial improvement has been maintained during the follow-up period as well as changes in attitude and other measures.

These two subjects will be contacted along with all Institute clients and will be invited to attend a refresher course or seek additional treatment if needed.

To determine if the Comprehensive Stuttering Program can also produce changes in subjects' attitudes, confidence and other factors typically associated with adult stutterers, four scales were completed by the subjects. Three of these (S-24, PSI and SESAS) were administered pre- and post-treatment and during the follow-up period. The SPQ was completed only during the follow-up period. Scores on the first three scales indicated a dramatic change in the desired direction at the end of treatment. Although there was a reversal of this pattern at follow-up, it was a relatively small reversal indicating that the subjects' attitudes and perceptions at follow-up remained much improved relative to their pre-treatment attitudes and perceptions. Responses on the SPQ also revealed improved levels of confidence and speech performance. It was encouraging to see that changes in attitudes, perceptions and confidence, as measured in this study, paralleled changes in speech fluency as measured by %SS and SPM: a dramatic improvement at the end of treatment followed by a slight reversal at follow-up. However, there were some unexpected responses to the SPQ which illustrate the difficulty of predicting client speech satisfaction from speech fluency measures. For instance, Subject 4 displayed 6.4 %SS at follow-up but indicated general satisfaction with speech level (SPQ), whereas Subject 6 was generally dissatisfied with his speech although he displayed only 1 %SS at follow-up. These results underline the importance of obtaining several measures including frequency counts and changes in attitudes, perceptions, confidence and speech satisfaction.

It was noted in the description of the CSP (Procedures section) that subjects are encouraged to engage in a variety of post-treatment maintenance activities. All the subjects in this study reported having participated in one or more of the following activities: 1. attended self-help group meetings; 2. followed a home practice program; 3. received follow-up therapy. In this study, we did not track these activities nor attempt to relate them to subjects' performances. Therefore, these data should be viewed as reflecting performance at one point in the post-treatment period rather than as a final measure of treatment outcome.

Obvious limitations of this study are the small number of subjects, the relatively short follow-up period and the use of only one measure of speech performance (the telephone) in the post-treatment environment. The study needs to be repeated with more subjects over a longer period of time, ideally five years.

It would be of considerable interest to expand the study

to include additional measures such as naturalness ratings, neuropsychological tests and tests of speech motor function. For instance, it should be possible, in cooperation with the Nijmegen motor speech research team (Peters et al., 1991), to determine whether there are measurable effects on lip, tongue and jaw movements when treated subjects are producing near-normal sounding speech by using the fluency skills acquired in the clinic. It would be of particular interest to determine whether any effects that accompany fluency skill use are also present when successfully treated subjects are spontaneously fluent without using their fluency skills.

The main purpose of this study was to determine if changes in speech performance would be accompanied by changes in attitudes, perceptions and confidence levels, and whether such changes would be maintained during the follow-up period. The results of this study confirm that positive changes did occur immediately post-therapy in both speech performance and attitudes and were generally maintained during the follow-up period.

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