A Mixed-Model Approach to Studying Treatment Outcomes

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Abstract

The purpose of this study was to utilize a mixed qualitative and quantitative methodology to explore treatment outcomes of stuttering treatment. The findings of the study suggested that all four participants made measurable clinical gains, as evidenced by positive changes in speech fluency, stuttering severity, and communication attitudes. The participants’ perceptions of their clinical experiences were explored using semi-structured interviews conducted at the beginning of therapy, the middle of treatment, and at the end of therapy. Results of the qualitative data analysis suggested that the participants reported improvement in their attitudes, feelings, and beliefs about stuttering. In addition, the participants reported an increased sense of control of their stuttering as a result of treatment. Also, the participants reported a belief that therapy was a process still to be worked on following treatment. Finally, participants shared reports of the important impact the clinic had on their lives. The positive changes noted during treatment were maintained 6 months following treatment.

Researchers in speech-language pathology have discussed the use of qualitative methodologies to describe multifactored disorders, their treatments, and the complexity of individual outcomes from treatment (Damico & Simmons-Mackie, 2003). Recent retrospective studies have utilized qualitative methods to explore recovery from stuttering (Anderson & Felsenfeld, 2003; Plexico, Manning, & DiLlollo, 2005). Findings of these studies suggest that adults who stutter experience many changes during recovery due both to treatment and other factors.

Qualitative methodologies could be used in studying therapies for stuttering that incorporate multiple approaches. This study reports initial findings of the benefits and feasibility of an intensive clinic for people who stutter. A mixed-model approach, utilizing both qualitative and quantitative methods, was used. In particular, a deeper understanding of the participants’
experiences during treatment and their perceptions of the benefits of therapy were explored.

**Methodology**

**Participants**

The participants were four adult males who stutter, ranging in age from 21 to 38 years. Two of the participants were college students, one a speech-language pathologist, and one a healthcare worker. One of the participants displayed mild stuttering, two moderate stuttering, and one severe stuttering. More detailed descriptions of the participants’ speech and other symptoms are reported in the results section.

**Procedures**

**Therapy Program.** The therapy program studied was Bowling Green State University’s Intensive Stuttering Clinic for Adolescents and Adults. The clinic employs both fluency shaping and stuttering modification approaches. The therapy was conducted in a “real world” environment; thus, the setting and selection of clients was not controlled. The duration of the clinic was 15 days. The sessions lasted from 5 to 7 hours a day, including both group and individual sessions.

The therapy was divided into four phases. Phase one of the program followed Van Riper's identification phase of therapy (1982), and focused on increasing participant awareness of their stuttering behaviors. The clinicians guided the participants in identifying all the behaviors related to their stuttering, including disfluencies, secondary physical reactions, negative emotional reactions, and negative communication attitudes.

The second phase of the program guided the participants through a process of reducing the severity of their stuttering. The participants were encouraged to stutter openly and to use techniques such as pseudo stuttering. Participants also gave speeches and participated in a variety of conversations with unfamiliar listeners both inside and outside of the clinic. The goal of these methods was for participants to learn to stutter easily and to reduce the anxiety related to their stuttering (Van Riper, 1982).

During phase three, each participant was taught techniques to modify stuttering and improve fluency. The modification techniques included pull-outs and cancellations (Van Riper, 1982). The fluency shaping behaviors included easy onsets, deliberate phonation, airflow management, and reduced rate of speech. Initially, these behaviors were taught using very slow speech rates, which were gradually increased to more normal speech rates. Delayed auditory feedback was used to assist the participants in producing these behaviors. Both stuttering modification and fluency shaping techniques were first used in controlled contexts (clinical setting) and then in real-life situations (talking to strangers, completing phone conversations, giving speeches, etc.).

The final phase of the therapy program focused on developing a personalized maintenance program for each participant. For one of the participants, this maintenance included continued weekly therapy following the intensive clinic. For two of the participants, their continued therapy included 10
hour intensive refresher clinics held during three weekends following the clinic. One of the participants chose not to attend follow-up therapy, but continued to work on his speech individually.

**Outcome Measures.** Similar to past studies exploring outcomes of eclectic programs, the goals related to speech improvement included increased fluency, reduced stuttering severity, and increased perceived speech naturalness (Boberg & Kully, 1994; Langevin & Kully, 2003). Prior to initiating treatment, each participant was involved in a standard diagnostic session, and similar sessions were held during the middle of treatment, the end of treatment, and during a 6-month follow-up period. To evaluate changes in fluency and speech production, the percentage of stuttered syllables per 300 syllables was calculated for a reading and a conversation sample. The Stuttering Severity Instrument-3 (SSI-3) (Riley, 1994) was used to evaluate stuttering severity. A seven point rating scale (1=unnatural to 7=natural) was used to evaluate speech naturalness. During the follow-up period these samples were gathered during a phone conversation.

To assess interjudge reliability, all measurements were completed by three trained independent judges using procedures discussed in the literature (Cordes, 2000). For the identification of stuttered syllables, >90% interjudge agreement was found for each participant during each phase of treatment. The SSI-3 and the naturalness ratings made by the judges were highly correlated (r>.90). The first author completed intrajudge agreement for all measures, with >90% agreement for the measures of stuttering frequency, and high correlations for the SSI-3 and naturalness ratings (r>.90).

The second goal of therapy was to assess changes in the affective and cognitive aspects of stuttering. To measure communication attitudes, the Erickson S-24 scale (Andrews & Cutler, 1974) was used. The second scale was the Locus of Control of Behavior (LCB; Craig, Franklin, & Andrews, 1984). This scale measures an individual’s locus of control of behavior. The final scale was the The Speech Locus of Control (SP-LOC; McDonough & Quesal, 1988), which was developed to determine an individual’s speech locus of control. These measures were completed prior to therapy, in the middle of treatment, and at the end of treatment.

Qualitative methodologies were used to explore the participants’ experiences and their perceptions of stuttering and the benefits of treatment. To gather this data, each participant was engaged in a semi-structured interview (Patton, 2002) during the initial diagnostic, the middle of therapy, and the end of treatment. Six questions (see below) were used to guide the interviews. The narratives for each interview were analyzed thematically, and important themes related to stuttering and recovery were identified (Patton, 2002; Plexico, et al. 2005).

1. Tell me about your speech.
2. Tell me about your stuttering.
3. How does your stuttering affect you?
4. What would you like to change about yourself and your stuttering?
5. What would you like to (or have you) gotten out of therapy?
6. How has your speech and other aspects of your life changed as a part of therapy?

Six months following therapy, the participants completed a questionnaire in which they were asked to provide a written narrative regarding their progress following the therapy, their perceptions of therapy, and their perceptions of their speech. Similar to the interviews, these narratives were analyzed thematically (Patton, 2002). Also, the questionnaire included quantitative items adapted from Boberg and Kully (1994).

Though reliability and validity are not a part of qualitative designs, a related concept of credibility is critical. Credibility refers to a process by which researchers assure that their results are accurate and truthful. For this study, credibility was established using the following procedures (Patton 2002; Plexico et al., 2005):

1. Each interview (beginning, middle, and end of treatment) was audio recorded and transcribed verbatim.
2. The primary interviewer was not the first author, but a clinician known to each participant. The clinician was not acting as an authority figure to the participants and was not providing direct treatment. Thus, this clinician was not seen as an agent of the clinic.
3. The transcripts for each participant and the written narratives were reviewed by the three authors independently. Each developed their own understanding of the theme structures and their interpretations were discussed until consensus on the major themes was established.
4. Member checking is an effective means for authenticating findings of qualitative studies (Patton, 2002). In this study, the first author shared the results of the qualitative analysis with three of the participants and asked them to share whether these themes reflected their experiences with the clinic. Each felt that the themes were a fair interpretation of their experiences and perceptions of therapy.

Data Analysis

The outcome data gathered in this study was analyzed using quantitative and qualitative procedures for each participant who attended the program. From these analyses, changes for each participant during therapy and the impact of certain phases of the clinic were identified.

Results

Quantitative Data

Table 1 summarizes the outcomes related to the speech measures gathered at all three treatment phases and during the 6-month follow-up. The data suggest that each participant made measurable changes in their speech. The largest change occurred during the initial and middle phases of therapy, with a smaller change occurring between the middle and final phases of therapy. For three of the four participants, the reduction of percentage of stuttered syllables was unchanged or reduced at the 6-month follow-up period. Participant 1 had an increase in frequency of stuttering from the end of therapy to the 6-month follow-up period, but reduced his overall stuttering
severity in this same timeframe. This participant’s severity and frequency scores were considerably lower at the 6-month follow-up period compared to initial measurement. This participant continued follow-up therapy after the intensive clinic. Participant 2 had a slight increase in frequency of disfluency from the middle to the end of treatment, but overall, this participant had a steady decrease in %SS during conversation but his fluency during reading was unchanged. This participant continued weekly therapy at the end of treatment and at the 6-month follow-up was dismissed from treatment. Both the measures of fluency and stuttering severity were improved from the beginning of the therapy program. For participant 4, it is clear that his stuttering was well within the mild range during all phases of treatment. This participant was a self-reported “covert stutterer” and more of his change was noted in the other areas of treatment. Participant 3 had improvements in all of his speech measures at the end of treatment, and he maintained these changes.

Table 1. Speech measures for the four participants in the intensive program.

<table>
<thead>
<tr>
<th>Participant</th>
<th>Speech Measures</th>
<th>Initial</th>
<th>Middle</th>
<th>Final</th>
<th>6-Month</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>%SS for Reading/Conversation</td>
<td>28%/9%</td>
<td>15%/7%</td>
<td>3%/6%</td>
<td>5%/9%</td>
</tr>
<tr>
<td></td>
<td>SSI#</td>
<td>45</td>
<td>30</td>
<td>30</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>Speech Naturalness*</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>%SS</td>
<td>3%/16%</td>
<td>2%/10%</td>
<td>2%/4%</td>
<td>2%/3%</td>
</tr>
<tr>
<td></td>
<td>SSI</td>
<td>26</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Speech Naturalness*</td>
<td>4</td>
<td>7</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>%SS</td>
<td>21%/14%</td>
<td>5%/12%</td>
<td>1%/10%</td>
<td>2%/6%</td>
</tr>
<tr>
<td></td>
<td>SSI</td>
<td>36</td>
<td>15</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Speech Naturalness*</td>
<td>3</td>
<td>7</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td>%SS</td>
<td>3%/3%</td>
<td>3%/3%</td>
<td>1%/1%</td>
<td>1%/1%</td>
</tr>
<tr>
<td></td>
<td>SSI</td>
<td>11</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Speech Naturalness*</td>
<td>5</td>
<td>7</td>
<td>7</td>
<td>7</td>
</tr>
</tbody>
</table>

*A naturalness score of 1=unnatural with a score of 7=natural*

Table 2 summarizes the changes in emotional and cognitive measures. For the S-24 scale, a lower score represents a more positive communication attitude. Each participant displayed improvement in communication attitude as a result of therapy. For the LCB and the SP-LOC scales, higher measures are related to an external locus of control and may be indicative of relapse at the end of therapy. Participants 1, 3, and 4 displayed a reduction in these measures, which might reflect a willingness to continue to manage their stuttering. Participant number 3 had an increase in his scores on the SP-LOC from the middle to the end of therapy, but the scores were both in the range of
scores suggesting an internal locus of control. For participant 2, there was little change in these measures and he appeared to have an external locus of control, suggesting a possibility for relapse after therapy.

Table 2. Measures related to emotional and cognitive aspects of stuttering.

<table>
<thead>
<tr>
<th>Participant</th>
<th>Speech Measures</th>
<th>Initial</th>
<th>Middle</th>
<th>Final</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>S-24 Scale</td>
<td>19</td>
<td>16</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>LCB</td>
<td>34</td>
<td>30</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Speech Locus of Control</td>
<td>7</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>S-24 Scale</td>
<td>17</td>
<td>15</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>LCB</td>
<td>29</td>
<td>29</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>Speech Locus of Control</td>
<td>5</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>S-24 Scale</td>
<td>16</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>LCB</td>
<td>22</td>
<td>12</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Speech Locus of Control</td>
<td>4</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>S-24 Scale</td>
<td>13</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>LCB</td>
<td>21</td>
<td>22</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Speech Locus of Control</td>
<td>5</td>
<td>4</td>
<td>3</td>
</tr>
</tbody>
</table>

Qualitative Data

The qualitative data was analyzed to identify themes that described the experiences of the four participants during and following treatment. At the beginning of therapy, the major themes that were identified included the participants’ reports of the negative impact that stuttering had on their lives; specifically the impact the disorder had on their identity and their life goals. Examples of these statements are as follows:

- P1- I think I would be more open to people (if I didn’t stutter). I would probably have more of a chance socially than I do now.
- P3- I think I would have stronger relationships (if I didn’t stutter) and I would be a more fulfilled person.
- P2- I just feel that my stuttering severely affects my life goals. I am 2 years out of school and I still haven’t found a job and I know that stuttering is about 75% of the reason.
- P4- My stuttering has affected everything in my life. It has the highest negative effect on my job, I would say. I think stuttering is one of the things holding me back from doing the type of job I want to do some day.

These comments suggest that the greatest impact of stuttering for these individuals was not just a lack of fluency, but effects that stuttering had on
their ability to achieve goals and experience life. A second theme identified during the first interview reflected participants’ reports of a negative psychological impact related to stuttering, especially in the realms of self-esteem and anxiety. For each participant, this effect appeared to be related to speaking situations, instead of a global feeling of psychological dysfunction:

- P3- The telephone is huge, I hate the telephone. It makes you feel really, really bad.
- P1- I stutter mostly in situations where I’m being put on the spot or I have to make a speech. I get very anxious.

Finally, the participants reported a loss of control related to their stuttering. This theme was also related to specific speaking situations, such as talking on the phone and in public. Avoidance of these types of situations was a common technique as represented by the following:

- P1- Whenever I would try to speak I would get extremely tense and sweaty and I had no control whatsoever. It made the speech impossible to complete, and I would not do them.
- P3- I think it’s just gotten to the point where I don’t think that it is possible for me to control it any more and I feel that now my stuttering is impeding my ability to move forward. I make the choice to not talk often.
- P4- I still avoid talking sometimes and that is not fun. Those are the things that bother me about my stuttering and plus feeling out of control while you’re talking is really a big one too.

The analysis of the participants’ narratives at the middle and end of treatment identified themes related to a positive shift in attitudes, feelings, and beliefs about stuttering. Participant 3 gave the best example of this change:

- P3- I feel that my speech has improved and I feel great about talking. I also feel that my body is more relaxed when I talk.
- P2- My attitude is gradually shifting. I’ve sort of learned that I can talk to strangers and look them in the eye, and be much more fluent.
- P1- I feel I can approach any situation and just start talking and get through it okay, whether I stutter or not. I can talk better and I feel better.
- P1- I’m more confident in myself of going up to people and initiating conversation. I’m more comfortable talking about stuttering.

Thus, the ability to change attitudes, feelings, and beliefs was both a direct goal of treatment and a by-product of improved fluency. This dichotomy was also expressed in a theme related to increased sense of control. For example, all of the participants reported a feeling of control that was attributed to therapy:

- P4- I feel that my speech is much more controlled…and I don’t feel so overwhelmed when I talk.
- P2- Because I realize now that even though it is hard, I do have the ability to control my stuttering. I can manage it.
- P3- My speech is as good as it’s ever been. I never had this much control over my speech and I’ve never felt this free. So it’s really a neat thing.
The final themes during the middle and end phases of therapy were related to an increased knowledge and understanding of stuttering, and being aware that therapy was a process still to be worked on following treatment. Examples of these responses are as follows:

- P3- I think I know exactly what type of problems I was having in stuttering and how I stutter, and the things I do either to avoid stuttering or just to avoid speaking and talking to people. I have a much better understanding of myself and how I stutter.
- P4- I feel that I know the techniques. The hard part is being able to go out and apply them to the situations, which I will need to continue to do.
- P1- I have a much better understanding of myself and how I stutter and I am a lot more confident than I was before I started this program…. I feel I can do pretty much anything; nothing can hold me back or no situation can really hold me back.
- P2- Well I think my speech is quite a bit better than when I first came here. I feel that it has improved, but I still struggle quite a bit with it. I will need to keep working at it.

The themes drawn from the written narratives in the questionnaire gathered at 6 months following were similar to those found during the middle and end of the treatment program. In addition, participants shared reports of the important impact the clinic had on their lives:

- P1- The clinic has been the best experience for me. It was a great.
- P2- The clinic has helped me in all aspects of my life. I have really improved.
- P3- The clinic was exactly what I needed last summer….it has helped me professionally, socially, and educationally.
- P4- The clinic has benefited me in several ways. I can talk in all situations and I have more confidence in my job, socially, and in my future career choices.

The data from the quantitative questionnaire completed at the 6-month follow-up period is reported in Table 3. The participants’ responses to these items suggest that they retained the ability to communicate successfully with more fluency, a sense of control, a positive change in attitude, increased knowledge about stuttering, and a lack of avoidance. These responses suggest that the participants perceived multiple benefits from treatment and continued to experience these benefits following therapy.

<table>
<thead>
<tr>
<th>Question</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither Agree nor Disagree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Following treatment, I was pleased with my level of fluency.</td>
<td>P1, P2, P3, P4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Presently, I am pleased with my</td>
<td></td>
<td>P1, P2, P3</td>
<td></td>
<td></td>
<td>P4</td>
</tr>
</tbody>
</table>
present level of fluency.

3. My present level of fluency is better than before I started the intensive stuttering clinic.

4. I know I have the necessary skills to control my stuttering in more difficult situations.

5. My amount of avoidance has decreased from before I attended the clinic.

6. As a result of coming to the clinic, I presently have a better attitude toward stuttering.

7. As a result of coming to the clinic, I now understand my stuttering better.

8. As a result of coming to the clinic, I am a better communicator.

9. As a result of coming to the clinic, my stuttering is less severe.

10. Compared to the beginning of treatment, my overall approach to speaking has changed.

**Discussion**

This study represents an attempt to assess the outcomes of a therapy program using a mixed-model design. Due to the nature of the study, the authors cannot draw cause and effect relationships among the therapy approaches and changes in the participants’ behavior. The data do suggest that the participants benefited from this program and that the therapy program is feasible in its present design.

The participants achieved a reduction in the frequency and severity of stuttering, as well as an increase in speech naturalness as a part of therapy. Both the quantitative measures and qualitative reports support this finding. It should be noted that only one participant attained a frequency percentage less than 3% (Conture, 2001), or in the range of normal, at the 6-month follow-up measure. This finding suggests that the stuttering of the other three individuals was still noticeable, but improved from the beginning of treatment. Additionally, the participants’ narratives indicated that they experienced an increased feeling
of control over their stuttering. This feeling was attributed to modification techniques, increased fluency, and attitude change. Taken in total, it appears that this therapy program was beneficial in helping the participants reduce speech related symptoms of stuttering and gain a sense of control.

In general, the participants reported a feeling of reduced negative emotions and attitudes related to stuttering as a part of therapy. These changes were less evident in the quantitative questionnaire measures given during the 6-month follow-up period, compared to the themes gathered from the written narratives gathered at the same period. Qualitative interviews allow for more depth in the reporting of the participants’ individual experiences, and thus, allow for more information about attitude and emotional change. The changes that the participants shared in their written narrative appeared to reflect different issues than what is measured by the questionnaires. Thus, both types of data were important to understanding the outcomes of this program.

Each participant reported that the clinic instilled in them a need to continue working on their stuttering after the intensive clinic to maintain their positive changes. For three of the participants, continued therapy was a part of this maintenance. This finding was perceived as a major benefit of the clinic and is an important consideration for future research of outcomes related to this program.

In this study, the use of a qualitative methodology contributed important information regarding the benefits of the program. Primarily, the thematic analysis allowed the researchers to gain a better perspective regarding participants’ experiences as a part of treatment. The findings appear similar to retrospective studies of recovery from stuttering (Anderson & Felsenfeld, 2003; Plexico, Manning, & DiLollo, 2005). Stated simply, long-term goals of the therapy program include personal changes. Among these changes are (a) an increased sense of control, (b) positive changes in emotions and beliefs, (c) an understanding of the need to continue working on managing stuttering, and (d) a positive change in their lives as a result of attending the program. These changes appear to be related, but also separate, from changes in fluency. Thus, the qualitative data was very important to understanding the broad impact of stuttering therapy.

Though this study appears to suggest that this methodology was useful in understanding the benefits of this treatment program, more research is needed to improve the use of mixed-model approaches for measuring treatment outcomes. One of the limitations of this study is that these findings might not be generalized to other clinics, because of the relatively small sample size and the use of qualitative measures. It should be noted that the use of a case study model and the use of qualitative methods did allow for a depth of information about the changes experienced by each participant, which might be difficult to gather in a larger scale, experimental type study. Also, future studies should gather follow-up measures at 12- and 24-month intervals to explore whether the changes reported at 6 months were maintained. It does appear as if these findings have provided insight into the benefits of this treatment program for these four individuals, and suggests a format for measuring the benefits of therapy for individuals attending this and other therapy programs.
References


