EFFECTS OF TREATMENT SESSION FREQUENCY AND DURATION FOR STUTTERING TREATMENT CONDUCTED IN PUBLIC ELEMENTARY SCHOOLS

by

NINA MONIQUE SANTUS

Under the Direction of Anne Marcotte

ABSTRACT

The study reported in this dissertation used a quasi-experimental design to evaluate the effects of the frequency and the duration of treatment sessions for four elementary-school aged children who stuttered. Within the setting of the public schools, two students received fluency therapy two times per week for 30 minutes, one student received therapy three times per week for 30 minutes, and one student received therapy four times per week for 15 minutes. Dependent variables included the children's stuttering frequency as well as reports of perceived social, emotional, and academic functioning gathered from the children's speech-language pathologists, parents, and teachers. The four students showed minimal improvements in their stuttering and no consistent changes in reported social, emotional, or academic functioning during this study, but important and previously unknown details of practices in the public schools were obtained. Other results included a strong negative correlation between group size and the number of syllables per minute the participant was able to practice. Implications and limitations are discussed.

INDEX WORDS: Fluency; Treatment Scheduling; Treatment Intensity; Treatment Duration; Public Schools; Children Who Stutter; Elementary School Children

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DEDICATION

This study is dedicated to people who stutter, their families, and the speech-language pathologists who serve them.

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CHAPTER 1

INTRODUCTION AND SUMMARY

Stuttering is a disorder of speech motor production in which the speaker repeats or prolongs sounds, syllables, words, silences, and/or speech postures (Harris, 1964; Wingate, 1964). The resulting speech does not display the fluency, flow, or forward movement that characterizes typical speech production; that is, the person who stutters is essentially "stuck" at one point in the intended speech stream, rather than being able to move on to the next sound or word. This problem often leads persons who stutter to feel anxious, frustrated, embarrassed, or even ashamed about themselves, or to feel that their ability to participate in any of life's many tasks or activities that require speech production is restricted (Guitar, 2013).

Stuttering begins in early childhood. Most cases are self-limiting or temporary; thus, at least 5% of preschool-aged children stutter, while only approximately 1-3% of school-aged children and approximately 1% of all adults stutter (Andrews et al., 1983; Bloodstein, 1983). Because of this link to childhood, and because stuttering and its social, emotional, and cognitive correlates can affect children's academic engagement and performance, stuttering may be treated by speech-language pathologists (SLPs) in the public schools in the United States. Indeed, the American Speech and Hearing Association (ASHA) states that it is the responsibility of the school-based SLP to treat stuttering in the school-age child. SLPs are the only professionals within the school system who focus and work with students on their dysfluencies. The SLP is responsible for selecting and implementing a treatment approach with students who stutter

(Nippold & Packman, 2012). SLPs are also the main coordinator in terms of decision making for treatment scheduling, and they are responsible for educating and assisting not only children who stutter but also both teachers and parents.

Despite these established responsibilities within the public schools, and despite decades of research that have attempted to understand the nature and treatment of stuttering in other settings, relatively little is known about the specific questions of how to best treat stuttering in the setting of the public schools, how treatment in this critical setting should be structured or administered, and how SLPs can work most effectively with teachers and parents. The projects described in this dissertation attempted to address some of the many questions in this area.

To provide the necessary background for this work, a review of existing literature regarding the treatment of stuttering in the public schools, about scheduling therapies for other disorders in the schools, and about treating school-aged children who stutter in other settings is found in Chapter 2. In Chapter 2, related questions regarding SLPs' knowledge and beliefs about stuttering and stuttering treatment are also explored. Among the most salient conclusions to be drawn from existing literature, with respect to treating stuttering in the public schools, are that relatively few of the existing options for stuttering treatment are well-supported for use in reducing the frequency, severity, or impact of stuttering. Among those that have been shown to be effective in the schools are variations on controlled and then gradually expanded utterance lengths, and prolonged speech with or without delayed auditory feedback, especially in intensive schedules. In other contexts, intensive treatment scheduling, either with an SLP or in a model that asks parents to provide several minutes of treatment contingencies every day, is also known to be most effective for stuttering treatment and for other speech and language disorders as well.

Based on that literature, it became apparent that any attempt to improve stuttering treatment in the public schools needed first to establish current practices, which anecdotally did not appear to be consistent with these best-supported practices. The preliminary study described in Chapter 3, therefore, surveyed SLPs in several county school systems in northeast Georgia. Results were consistent with previous research in showing that SLPs are not comfortable treating this population. More importantly, results extended previous knowledge by showing that SLPs are not using, or are not comfortable using, the research-based approaches that have been established as the best treatments for stuttering in the schools or in other settings—despite factors such as years in practice and highest degree earned. Even highly experienced participants in this survey and in ensuing conversations with the researcher discussed their perceived need for training, admitting their lack of comfort and knowledge when treating this population and expressing that they would welcome furthering their knowledge base.

The findings from the first survey and the additional interactions that occurred after the survey itself thus led to a second preliminary phase for this project. In particular, a second preliminary study, reported in Chapter 4 of this dissertation, was designed and conducted to interview multiple stakeholders, including parents, teachers, principals, and SLPs. These interviews attempted to gain further insight into several findings from the initial survey, including specifically the fluency therapy approaches being used, the frequency and duration of treatment sessions, and the feasibility of introducing changes to these variables to determine whether such changes might improve fluency outcomes. As described in Chapter 4, clear trends emerged in the responses from the participants. SLPs discussed that students who stutter were struggling to meet their fluency goals. They also noted, in particular, that they were treating their students who stutter at a standard frequency of twice a week for 30-minute (min). At the

same time, principals, teachers, parents, and SLPs agreed that, if a student who stutters needed a change in the frequency or duration of treatment sessions, the school could work around the rigorous academic and daily schedule of all involved to do what was best for the student.

The quasi-experimental intervention study reported in Chapters 5 and 6, therefore, was designed to assess the effects of changing how treatment sessions are scheduled for elementary school children who stutter. Participants included three SLPs and four children who stuttered in one county school system in northeast Georgia. Data were gathered from the children's treatment sessions and from the SLPs, classroom teachers, and parents. Results did not support the hypothesized effects of increasing the frequency or the duration of treatment sessions, but other data suggest that part of the reason for this lack of improvement may be an overall low amount of treatment administered, a prominent issue in other previous research about treatment intensity. Results also did not support the hypothesis that seeing a child more frequently would increase the comfort level of the SLP. Another key finding showed that the smaller the size of the therapy group, the more talk time the child who stuttered received, suggesting that smaller groups or more one-on-one therapy time could increase practice time and lead to better outcomes.

As described in Chapter 7, therefore, the set of studies that constitute this dissertation has provided important knowledge about current practices for stuttering treatment in the public schools and raised several important questions for future research. First, further research should continue to address how to improve outcomes for this population in the public schools by changing the frequency, duration, or overall amount of therapy—perhaps specifically by intensifying treatment for some period on the order of days to weeks and then continuing on a more sustainable schedule that fits with the child's academic needs and the school calendar. In

addition, further studies might address grouping or group size, to determine the most effective ratio of students to clinicians to meet goals and minimize dysfluencies. Finally, and perhaps most importantly, research regarding how to increase the comfort and confidence of SLPs when treating this population should continue, as answers will only result in better outcomes for the population they serve.

CHAPTER 2

REVIEW OF THE LITERATURE

To provide the necessary background for the studies reported in this dissertation, the review below examines previous research about (a) treating stuttering in the schools; (b) scheduling therapies for other disorders in the schools; (c) treating school-aged children who stutter in other settings; and (d) SLPs' knowledge and beliefs about stuttering and stuttering treatment.

Stuttering Treatment Research Conducted in Schools

As mentioned in Chapter 1, relatively little research has been published about conducting stuttering treatment in the specific setting of the public schools. Because of the central importance of this directly relevant literature to the present projects, this research is first reviewed and addressed separately. Later sections place this work into the larger contexts of treatment scheduling questions for other disorders within the public schools and treatment for stuttering in other settings.

Search Method

To identify relevant studies, a computer-based search was implemented using *GALILEO,* a state-wide (Georgia) collection of databases. The "choose databases" option, allowing simultaneous searching of multiple *EBSCO* databases was selected. The selected databases were MEDLINE, CINAHL, Communications and Mass Media, Education Research Complete, PYSCH INFO, and ERIC. Searches were also completed in ProQuest's Linguistics & Language

Behavior Abstracts, Web of Science, and the Cochrane Library. The search terms *stutter**, *fluen**, *school** (*treat* or therap**), and *public school** were used.

An initial search yielded 79 studies. Preliminary review of these studies' abstracts identified 16 studies that met all of the following preliminary (P) criteria:

(P-1) the study was written in English;

(P-2) the study was a data-based publication from a peer-reviewed journal;

(P-3) the study identified participants as being between the ages of 4 and 12 years; and

(P-4) the study identified participants in the study as persons who stutter.

Further review of these 16 studies sought to identify papers that met all of the following final inclusion (I) criteria, modeled after some of the criteria used by Bothe, Davidow, Bramlett, and R. Ingham (2006):

(I-1) participants' pretreatment stuttering frequency or stuttering severity was reported;

(I-2) participants' years in previous treatment was reported;

(I-3) the treatment approach or protocol used during the study was reported;

(I-4) the treatment schedule at which therapy was administered was reported;

(I-5) the study utilized repeated evaluations of speech performance before, during, and after treatment; and

(I-6) the study evaluated speech beyond the treatment setting.

The intent of these inclusion criteria was to identify studies that had provided enough information about the participants and their treatment for valid conclusions about the effects of those treatments to be possible. In addition, it would have been preferable to specify that studies were to have met some methodological design criteria, such as random assignment to treatment or control conditions or the use of single-subject design experimental procedures. Because no

study met the inclusion criteria described above and used such methodological design features, the decision was made for the purpose of this literature review to include studies regardless of their basic design features if they met the other inclusion criteria. As a result of this decision, several of the studies discussed below lack methodological strength or rigor, impacting the conclusions that can be drawn from this literature, but this outcome was considered preferable to excluding all available research from this review. These issues are further addressed in the following paragraphs.

Study outcomes (O) were initially evaluated using the four binary summary measures developed by Bothe et al. (2006):

(O-1) results showed stuttering below 5% syllables stuttered (%SS) at posttreatment,

(O-2) results showed stuttering below 5%SS at a 6-month (or longer) follow-up,

(O-3) social, emotional, or cognitive (SEC) measures at posttreatment were within a normal range or were improved from pretreatment values, and

(O-4) SEC at a 6-month (or longer) follow-up were within a normal range or were improved from pretreatment values.

As described by Bothe et al. (2006), these four summary measures are intended to measure the two types of variables that can be considered important in assessing stuttering treatment [speech performance, specifically stuttering frequency, and non-speech perceptions or participation restrictions, including any measure of social, emotional, or cognitive (SEC; Bothe et al., 2006) function]. They are also intended to measure outcomes both immediately posttreatment and after a follow-up time of at least 6 months, because stuttering treatment outcomes are known to be vulnerable to relapse. They are intentionally lenient, intended not to identify ideal treatments but to eliminate clearly problematic treatments; that is, studies that meet these criteria are not

necessarily providing ideal outcomes, but treatments that cannot meet even these very lenient criteria can reasonably be set aside as inadequate options for working with clients who stutter.

Synthesis of Studies

No study met all of the six inclusion criteria (Table 1; all tables and figures are presented following the References section). Five studies met at least two of the inclusion criteria and were included in this review. In addition, review of the published references in those five led to the identification of one additional study, which also met two of the six inclusion criteria. These six studies formed the basis of the review described below, because they did at least report severity, treatment type, post treatment %SS, and/or frequency and duration of therapy, for elementary-aged children receiving treatment for stuttering in the public schools.

Participants. In total, the six studies reviewed included 85 participants ages 3.8 years to 18.0 years. Two of the studies included middle school and high school age participants; however, they were included in this review as the studies also involved and addressed elementary-aged participants. None of the six studies provided participant details such as previous treatment history, years in treatment, co-morbidities, etc.; thus, all of the results discussed below could be confounded by the participants' previous treatments or other conditions.

Independent variables. The following treatment protocols were researched in the reviewed studies: airflow, tension, and relaxation, with EMG biofeedback (n=1); Van Riper approaches in a typical administration (n=1) and in a programmed administration (n=1); Monterey Fluency Program (n=1); Fluency Rules Program (n=1); Delayed Auditory Feedback (DAF) (n=3); Gradual Increase in Length and Complexity of Utterance (GILCU) (n=2); and

Response Contingencies (n=1). Note these numbers do not add to six total studies reviewed because some studies researched more than one approach or treatment protocol.

Summary of Individual Studies

All of the selected 6 studies were published between 1981 and 1995, and relatively little research about treating stuttering in the public schools setting has been published since approximately 1995. The following summary of the 6 articles was organized chronologically by publication date for a historical perspective.

Turnbaugh and Guitar (1981). Turnbaugh and Guitar (1981) sought to examine the effectiveness of utilizing short- and long-term intensive schedules within the setting of the public schools. As shown in Tables 1 and 2, this paper met four of the six inclusion criteria, and its outcomes met three of the four outcomes criteria. This was the only research study found that directly assessed scheduling changes for a particular client, but the change in scheduling was confounded by a change in treatment type.

The study was a single-case study or case report, for one 12-year-old male whose treatment protocol incorporated both long-term (non-intensive) and short-term intensive fluency therapy. The SLP who conducted the treatment worked for the public schools, had a caseload of 40 students total, and commuted between two schools, which is not an uncommon demand of school-based SLPs. The student received long-term non-intensive therapy two to three times per week for 8 months (most of one academic year). The 20-min sessions targeted negative attitudes that the client experienced, using techniques of attitude modification that stemmed from Van Riper's (e.g., 1973) methodology. During 2 consecutive days in the sixth month, he also received a short-term intensive program, which consisted of 5 ½ hours of treatment using delayed auditory feedback (DAF) to assist in prolonged speech therapy techniques.

The student's pretreatment stuttering was described as 10.47%SS. After the first 6 months of attitude-focused treatment, stuttering was 5.6%SS in one sample taken in the treatment room; after the 2 days of intensive prolonged speech treatment his stuttering was 0.28%SS but with a slow speech rate (103 syllables per minute, SPM). At the end of the full 8 months, stuttering remained at 0.80%SS, with a speech rate of 129 SPM (Turnbaugh & Guitar, 1981). An abridged version of the *Erickson Scale of Communication Attitudes* (the S-24, Andrews & Cutler, 1974) was administered with a score of 17 out of 24, indicating that the student felt influenced by his stuttering.

Interpretation of Turnbaugh and Guitar's (1981) results is very difficult, because of its uncontrolled case study design. The client did reduce his stuttering, most noticeably during and after the intensive prolonged speech portion of his treatment, but the absence of any controls and the minimal duration and number of the speech samples limit the conclusions that can be reached. Nevertheless, as a case report from the public schools setting, this study does speak to the substantial decrease in stuttering that can be achieved when the frequency and duration of therapy are changed to meet the needs of the student and his or her disorder, as well as to the importance of using such research-based procedures as prolonged speech (see Effectiveness of Other Stuttering Treatments in Other Settings, below).

This study is also encouraging, in that the SLP was able to successfully carry out an intensive, client-centered treatment program for this student while maintaining a caseload of a variety of students and disorders in multiple locations. Another key component was the support of the school district, as well as the other stakeholders in the life of a student who stutters. The SLP and student had significant support and approval from the student's parent, principal, and fellow teachers. Such support, encouragement, and flexibility are necessary, as the student

missed several hours of class time during the short-term intensive portion of the therapy program. It is largely valuable that adults in the student's life believe in the value of fluency therapy. In short, this first study introduced and highlighted the need for future research both about the frequency and duration of stuttering treatment in the schools and about the effectiveness of different treatment types or approaches in the public schools setting. The authors discuss the traditional schedule of two 30-min treatment sessions per week, often used in the public schools, as "too short and too infrequent" (Turnbaugh & Guitar, 1981, p. 107).

Ryan and Ryan (1983). In 1983, Ryan and Ryan researched the effectiveness of four established stuttering treatment programs with 18 students who stuttered (8 elementary school students and 8 of middle and high-school age) within the setting of the public schools. This study met three of the six inclusion criteria, and its outcomes met one of the four O criteria (stuttering frequency immediately posttreatment); none of the other three O criteria were measured. The treatments included an approach referred to as "Programmed Traditional," DAF, pause, and GILCU.

Programmed Traditional (Ryan, 1966; 1970; 1974) was an eight-step program that attempted to create a systematic framework for the style of stuttering therapy first described by Van Riper (1973). It began with three identification steps, two cancellation steps, one pullout step, one prolongation step, and one fluent speech step. All eight steps were repeated separately for reading, monologue, and conversation, creating a total of 24 steps (Ryan & Ryan, 1983). Minimal run time for the Programmed Traditional therapy was 111 minutes.

DAF (Goldiamond, 1965) was utilized in a four-step series in which the student who stutters was taught to speak fluently. The initial series was followed by three 7-step series in which reading, monologue, and conversation were used. During the seven steps, DAF was

gradually decreased from 50 msec to no DAF. DAF was utilized to aid in the use and production of slow prolonged speech. At the end of each series the student was asked to speak for 5 minutes with no DAF, yielding a total of 25 steps. Token rewards were given for achieving each step. Run time for this protocol was 110 minutes.

Pause treatment (Haroldson et al., 1968) was a time-out program that was adapted to fit a range of time-out or paused times that gradually decreased from 10- to 7- to 3- to 1-second pauses to no pause and fluent speech. Reading was performed first, followed by monologue, and finally conversation. The student was instructed to stop reading or talking whenever a light turned on and to not continue to speak until the light turned off. The clinician controlled the activation of the light when the student produced a stuttered word. The final step was to produce 5 consecutive minutes of fluent reading or conversation without the visual cue of the light box. Students were given tokens for passing steps, and a total of 21 steps were needed to complete the task. Run time for Pause was 105 minutes.

Finally, GILCU (Ryan, 1971; 1974) was utilized in a total of 60 steps that began with one-word utterances and increased to 5 minutes of fluency during reading, monologue, and conversation. Tokens were also used for the students, this time for each correct response. Run time was 105 minutes.

Students in Ryan and Ryan's (1983) study ranged from 7 to 18 years of age. For the study, the students were grouped by age, severity, and school location in groups of four. Neither groups nor students were assigned randomly to treatments, and there was no untreated control group, but some preliminary comparisons between the four programs are possible from this treatment comparison design. All programs were administered using a traditional schedule of two 30-min sessions per week. Over the course of 9 months during one school year, eight public

school-based SLPs participated in this study, each assigned two students. They were also asked to maintain their regular caseloads at this time. They were chosen based on interest in the study and if they had two students who stutter on caseload. Clinicians were trained by the authors to conduct one of the programs listed above (and to conduct one common transfer phase and one common maintenance phase), so the differences across programs obtained in this study may reflect differences in clinicians' general abilities.

All four of the programs studied by Ryan and Ryan (1983) were shown to reduce stuttering, from a grand mean across all students of 6.7 stuttered words per minute (SW/M) pretreatment to a posttreatment grand mean of 0.5 SW/M, but there were noticeable differences across programs. Two of the very structured programs, Programmed Traditional and GILCU, had similar results: from a mean of 7.1 SW/M pretreatment to a mean of 1.2 SW/M posttreatment for Programmed Traditional, and from a mean of 4.4 SW/M pretreatment to a mean of 0.4 SW/M posttreatment for GILCU. The Programmed Traditional treatment required the greatest amount of treatment time (with a mean run time of 17.9 hours), in part because of students' difficulty with identifying stuttered words. This program was also described as difficult for clinicians to implement, because of the complexity of clinician responses needed. GILCU treatment was simpler for clinicians and required 9.6 mean hours of run time.

The DAF program, in contrast, required a mean of 6.0 hours of run-time but was much less successful at reducing stuttering: this group showed a mean of 6.8 SW/M pre-study and a mean of 6.1 SW/M posttreatment. The students in this group also used unacceptably slow speech rates posttreatment. It is unclear why the students were unable to regain their previous rate of speech, as had been shown for DAF in previous studies. Ryan and Ryan (1983) speculated that prolonged speech treatment was not being taught correctly to the students, a

possibility that was not further explored in their report. It is also noteworthy that the students in this group had poorer outcomes but had received only approximately one-third as much treatment time as students in the Programmed Traditional and two-thirds as much as students who had completed GILCU. The students' talking time was also the lowest for DAF treatment, at only 50.5% of the sessions; that is, practice with fluent speech had occurred for only approximately 3 hours in the DAF program as administered by Ryan and Ryan (1983) over the 9-month study, suggesting that perhaps their relatively poor outcomes could have been improved by additional treatment time.

The Pause program, finally, differed somewhat from the other programs in that the student was to develop fluent speech with very little instruction about specific manners of speech or fluency techniques. The mean run-time was 14.4. hours. This group of participants showed the most stuttering pretreatment of all four groups (mean of 7.7 SW/M) and a mean of 3.3 SW/M posttreatment. Ryan and Ryan (1983) concluded that GILCU treatment in particular, and to a lesser extent all four of these treatments, could be carried out successfully within the setting of the public schools by the SLP.

Another important feature of Ryan and Ryan's (1983) study is that the clinicians were given scripts to follow, as well as continued trainings to implement the programs correctly (although they did speculate that DAF and prolonged speech may have been ineffective in their study because they were not taught correctly). Thus, giving SLPs a script to follow to utilize an evidence-based protocol such as GILCU, or a similarly overtly programmatic variation on traditional therapy, appeared to lead to success even within the traditional schedule of 30 min twice per week. Interestingly, Ryan and Ryan's (1983) paper was the only one of these six that that addressed frequency and duration of treatment and that did not suggest a need to change

frequency and duration in future studies. All other studies in this literature review were found to recommend further studies with changes in frequency and duration.

Runyan and Runyan (1986). Runyan and Runyan's (1986) test of their Fluency Rules Program (FRP) met 3 of the 6 inclusion criteria, and 2 out of the 4 outcomes measures were met. The FRP was a treatment program that had been designed specifically for the setting and the time constraints of the public schools. It consisted of seven rules that were intended to explain smooth, fluent speech to children: speak slowly, use speech breathing, touch the "speech helpers" together lightly (light contact of articulators), use only the speech helpers to talk (not other concomitant behaviors from other muscle groups, such as eyeblinks), keep the speech helpers moving (to prevent blocks), keep voicing smooth (easy onsets or continuous vocalization), and say each word only once (no repetitions). Rules that were deemed necessary for each child on the basis of assessment observations were taught with a range of tactile and pictorial cues intended to be age-appropriate, such as the use of train cars and animals.

Two groups of students participated in Runyan and Runyan's (1986) study over a 2-year period. The first group, followed for 2 years, ranged in age from 4.6 to 6.5 years at the beginning of the study. This group was instructed regarding the steps of FRP during the first year of the study and was monitored during second year. The second group consisted of four students aged 3.8 - 7.1 years who were enrolled in the study at the beginning of its second year (as the first group was moving into its posttreatment monitoring phase). Both groups were seen for two or three sessions per week, as a group, with each session lasting 20-30 minutes.

Results showed that members of the first group reduced from a mean of 61 stutters in a 5-minute speech sample pretreatment to a mean of 1.87 stutters at the end of the first year and a mean of 2 stutters at the end of the second (monitoring) year. Members of the second group

reduced from a mean of 17.25 stutters in 5-minute speech samples pretreatment to a mean of 2.67 stutters after the end of their first year. No SEC outcomes were listed or recorded in the study.

Runyan and Runyan's (1986) study, like Ryan and Ryan's (1983), failed to include a control group of untreated children and did not test or compare different treatment schedules. In Runyan and Runyan's 1986 study, the replication of effect in the second group does provide some evidence that the treatment was related to the children's improvements, but it is also noteworthy that the children continued to show "slight residual" stuttering that was of "lingering concern" (p. 282). Runyan and Runyan's study is also relevant to the question of group therapy, which is very common in public schools; the positive outcomes achieved for both groups were from group administration of therapy.

Hasbrouck et al. (1987). Hasbrouck et al. (1987) sought to examine two intensive stuttering treatment programs for school-aged children. To accommodate the desired intensive schedule, treatment was administered during the summer, within the setting of the public schools, rather than during the regular academic year. This study met 3 of the 6 inclusion criteria and 2 out of the 4 outcomes criteria.

A total of 15 students participated in the two-phase study. The first group of six ranged in age from 10 to 16 years (mean 13.17), and the second group consisted of nine students aged 5 to 16 years (mean 8.22). In the initial program, six students were treated using graded airflow, tension/relaxation, and EMG biofeedback procedures to reduce stuttering frequency. An extensive generalization phase, referred to as a discriminative stimulus control procedure, was also to be included, but only one of the six students completed that phase. This group's intensive treatment schedule was 4 hours per day, 5 days per week, for 4 weeks, totaling 80 hours of

treatment. This treatment reduced stuttering, but gains were not well maintained: The group showed a mean of 9.71% stuttered words pretreatment, 0.21% after the 4-week program, and 3.48% at a 6- to 7-month follow-up. The one student who did complete the discriminative stimulus control phase showed the least stuttering at follow-up. No SEC outcomes were measured or reported.

In attempting to improve on these results, Hasbrouck et al. changed to a more rapid acquisition of fluency so that all students could complete all steps or aspects of the treatment program. First, treatment procedures were changed to reflect a decrease to the overall amount of time spent in treatment. In addition, they changed the airflow procedures to facilitate acquisition in a more rapid manner. Finally, members of the second group were treated for only 2 hours per day, 5 times per week, for 4 weeks, totaling only 40 hours of treatment, or half the treatment time of group one. This altered program was successful in allowing all students to complete the discriminative stimulus control phase, and results were better overall for this group than they had been for group one: Group two showed 4.49% stuttered words pretreatment, 0.26% posttreatment, and 1.22% at a 6- to 7-month follow-up.

In attempting to interpret these results, Hasbrouck et al. commented that the changes made for the second phase of the study, including especially the efforts made to include the discriminative stimulus control portion of the therapy, were quite effective in reducing stuttering frequency to the criterion of less than 1% words stuttered and to the maintenance of those gains. However, the mean age for group one was 13.17 years and the mean age for group two was 8.22 years; thus, group two's greater success may have been because they were younger, with a greater likelihood of spontaneous recovery. Hasbrouck et al. also discussed the need for more

intensive programs in the public schools, noting that "with cooperation among clinicians, administrators, parents, and students, intensive stuttering therapy could be programmed in almost any academic setting" (Hasbrouck et al., 1987, p. 341).

Mallard and Westbrook (1988). Mallard and Westbrook studied a total of 33 students who stuttered, in kindergarten through the 5th grade, over the span of 2 years. Twenty children were scheduled per year; 13 per year were unique to that year, and 7 students participated in both years. All children in the first year's group attended the San Antonio Independent School District, as did 11 of the 20 in the second year. Nine of the children in the second year attended Northeast Independent School District. This study met 3 out of 6 inclusion criteria and 2 out of 4 outcome measures.

Mallard and Westbrook (1988) used stuttering modification therapy (Van Riper, 1973) during the first year, including identification, desensitization, and stuttering modification. Students were treated for two sessions per week for 30-45 minutes. The Monterey Fluency Program (Ryan & Van Kirk, 1978) was used the second year. This program moves the child sequentially through reading, monologue, and conversation. At each phase, the child was also gradually moved to increase the length of utterances, and response contingencies of "stop, speak fluently" were to be utilized by the clinician. Tokens and verbal praise were given as rewards.

After the year of the Van Riper therapy, the group of 20 students had made almost no improvement: Stuttering frequency averaged 12%SS pretreatment and 11%SS after one year. No SEC type outcomes were recorded during this study. Results from the Monterey Fluency Program during the second year were marginally better than had been obtained during the first year: Stuttering frequency averaged 12%SS at the beginning of the second year and 9%SS at the end of the second year. Both groups showed 7%SS during follow-up.

The researchers concluded that the results indicated children who stutter "may need more assistance than can be provided by scheduling therapy two times a week for 30-45 minutes" (Mallard & Westbrook, 1988, p. 367). Mallard and Westbrook also hypothesized, on the basis of what they described as increased talking and reduction of avoidance behaviors, that as the children became more comfortable and accepting of their stuttering, the frequency of dysfluencies was decreased, but the lack of change in stuttering frequency after a full year of stuttering modification therapy does not support such a conclusion. During the second year program, only fluency was emphasized and the researchers stated that dysfluencies were "not allowed," but Mallard and Westbrook's application of the Monterey Fluency Program also resulted in very little change in stuttering.

Ryan and Ryan (1995). Finally, in a 1995 follow-up to their 1983 report, Ryan and Ryan (1995) sought to compare two therapy protocols, Delayed Auditory Feedback (DAF) to implement prolonged speech and GILCU, within the setting of the public schools. Both programs also included a response contingency component as well. This study met 5 out of 6 inclusion criteria and 2 out of 4 outcomes criteria.

One of the stated goals of the study was to determine if either of these two procedures could be carried out successfully within the setting of the public school system by public school SLPs. Twenty school-age children who stuttered participated in the study, ranging from 7 to 17 years of age. Three school districts and 12 SLPs participated in the study. The SLPs were selected based on interest in the study as well as availability of students who stutter on their caseloads. The SLPs were trained for 15 hours over the course of a 3-day workshop. The training included proficiency in counting stuttering events as well as training in the administration of the DAF and GILCU procedures or therapy protocols. As had been the case in

several of the studies discussed above (Runyan & Runyan 1986; Ryan & Ryan, 1983; Turnbaugh & Guitar, 1981), in Ryan and Ryan's (1995) study all SLPs continued their normal caseloads in addition to providing children who stutter the protocols of DAF or GILCU.

Results of Ryan and Ryan's (1995) study indicated that both DAF and GILCU were effective and efficient in treating children who stutter. Stuttering was reduced from 7.9 stuttered words per minute (SW/M) pretreatment to 0.3 SW/M posttreatment for the DAF group and to 0.4 SW/M for the GILCU group posttreatment, with 0.8 SW/M for all children who completed a 14-month follow-up (n = 11; Ryan & Ryan, 1995). Ryan and Ryan also noted that two 30-min sessions weekly was not enough time to complete all phases of the treatment, including transfer and maintenance, in one 9-month school year calendar. They suggested more studies be conducted that focus on treatment procedures in the setting of the public schools and specifically hours of treatment, as these issues had been "woefully neglected" in the past (Ryan & Ryan, 1995, p. 74).

Summary

The six studies described above provide a few suggestions but very little well supported evidence about treating stuttering in the public schools. Relatively positive outcomes were reported from the intensive prolonged speech portion of one case study (Turnbaugh & Guitar, 1981), from therapy that combined intensive prolonged speech with an active "stimulus control" generalization program (Hasbrouck et al., 1987), and from one of two investigations of delayed auditory feedback (which is intended to help the speaker produce prolonged speech) using a traditional schedule of two 30-min sessions per week (Ryan & Ryan, 1995). Equally positive outcomes were reported from a very programmed variation on traditional (i.e., Van Riperian) therapy and from both of two studies that used GILCU treatment administered twice per week in

30-min sessions (Ryan & Ryan, 1983, 1995). Somewhat less positive outcomes were reported from a year of fluency-rules treatment, which incorporates some prolonged-speech type ideas, when that treatment was used with young children in a group-therapy context (Runyan & Runyan, 1986). These studies also included one demonstration that a time-out type program administered twice per week in 30-min sessions was only partially effective with older children (Ryan & Ryan, 1983), and two demonstrations that 6 months (Turnbaugh & Guitar, 1981) or a full year (Mallard & Westbrook, 1988) of classically administered Van Riperian type or "traditional" therapy had no effect on the children's stuttering.

Overall, then, the best outcomes were from GILCU provided in individual sessions and, for older children, from intensive prolonged speech programs. Again, as mentioned throughout this review, all of these studies had several serious design weaknesses, making it somewhat difficult to draw firm conclusions based on their results. Nevertheless, as a whole, these studies suggest, among other possibilities, that GILCU and prolonged speech seem to be the best supported approaches for this population and also that more intensive therapy could positively influence treatment outcomes for school-aged children who stutter. Future research could focus on refining the elements of the treatment protocols and could also focus on assessing the influence of various frequencies and durations of fluency therapy regardless of which protocol is being used.

As noted above, it is also important that none of the studies addressed how many previous years the students had been in therapy or what type of therapy they had received before the research study. Only one study noted normal or improving SEC measures from participants, and none of the studies described the activities or materials used during therapy, important details that may affect treatment and that SLPs in the public school system would need to know

to be able to recreate these research studies using recommended activities, settings, and other details. Future research should record these details of previous therapy and SEC measures as recorded by teachers, parents, and SLPs to gain a clearer picture of treatment processes and outcomes within the setting of the public schools.

Finally, these studies were all conducted well over 20 years ago. The public schools have changed tremendously, including with respect to special education. Specifically, these studies were conducted before No Child Left Behind (NCLB) was implemented in 2001. With NCLB came a larger emphasis on test scores and the accompanying removal from students' schedules of activities that did not directly impact their test scores, such as fine arts and physical education. It is unclear whether NCLB potentially impacted the changing of frequency and duration of students receiving fluency therapy in the public school setting and the actual researching of various frequencies or durations of speech therapy specifically fluency therapy within the public schools or if NCLB was perceived as a greater obstacle to further this research. Regardless, a large gap in the literature currently continues to exist regarding researching fluency treatment within the public schools, specifically frequency and duration.

Treatment Scheduling for Other Speech Disorders in the School-Aged Child

Given the many remaining questions about how treatments for children who stutter can best be scheduled in the public schools, it is also of value to examine whether and how treatment scheduling details have been studied for other disorders in this setting. Thus, an attempt was made to identify research studies that had directly tested the effects of changing the frequency or the duration of therapy for any disorder provided to children in the public schools.

Search Method

To identify relevant studies, a computer-based search was implemented using *GALILEO,* the statewide collection of databases. The "choose databases" option, allowing simultaneous searching of multiple *EBSCO* databases was selected. The selected databases were MEDLINE, CINAHL, Communications and Mass Media, Education Research Complete, PSYCH INFO, and ERIC. Additionally, the ProQuest database Linguistics & Language Behavior Abstracts, as well as Web of Science, and Cochrane Library. The search terms *"speech language" or "speech language therapy"*, (*treat* or therap* or intervene),* and *public school** and *(frequenc* or duration or time or times)* were used as well as *(stutter*)* and *(therap* or treat*))* and *(frequency or duration or intens*).* Reference lists in all obtained articles were also reviewed.

Terminology and Research in the Schools

Two issues became immediately apparent in attempting this literature review. First, almost no research has been published about how or why therapy sessions in the public schools can best be scheduled. Warren, Fey, and Yoder (2007) reached this same conclusion almost a decade ago, in a thoughtful paper that has become one of the standard references in the area of treatment intensity and scheduling for child language disorders. Warren et al. also addressed the second major issue in this area, which is that related terms such as intensity, duration, dose, frequency, and so on can be complex and challenging to define. With respect to scheduling stuttering therapy in the public schools, all of Warren et al.'s (2007) terms may be relevant, depending on the type of treatment and other variables:

> Dose: "the number of properly administered teaching episodes during a single intervention session" (Warren et al., 2007, p. 71)
>
> Dose Form: the "task or activity within which the teaching episodes are delivered" (p. 71)

Dose Frequency: “the number of times a dose of intervention is provided per day and per week” (p. 72)

Total Intervention Duration: “the time period over which a specified intervention is presented” (p. 72), typically in weeks or months

Cumulative Intervention Intensity: “the product of dose x dose frequency x total intervention duration” (p. 72).

Warren et al. (2007) also provided an example of “cumulative intervention intensity,” by this definition, that begins to illustrate some of the complexities in this area. Their example was of a 40-week intervention (total intervention duration) that includes approximately 60 defined teaching episodes per hour (dose) and is provided in one 1-hour session per week (dose frequency). The product of these three terms, 2400 intended teaching episodes, was referred to as the “cumulative intervention intensity,” by Warren et al.’s 2007 definition, but in another sense this definition misses an important element of another typical definition of treatment intensity: whether that treatment is provided in sessions that are closer together and/or longer, resulting in more treatment during a given amount of calendar time, or in sessions that are farther apart and/or shorter, resulting in less treatment during a given amount of calendar time. Treatments known as “intensive,” to make matters even worse, tend to combine these two features (i.e., use longer sessions closer together), resulting in treatment schedules that provide more treatment faster. To the extent that more treatment faster is necessary for clients’ success, this is a reasonable clinical decision. The problem is that almost no research has directly compared the same “cumulative intervention intensity,” by Warren et al.’s 2007 definition. By

using different schedules ("dose frequency") and holding enough variables constant, conclusions can be reached about the specific scheduling or dosing elements that are necessary to clients' success.

Since Warren et al.'s (2007) paper, they and their colleagues have attempted to conduct some research about the scheduling of children's language intervention. Gillam, Baker, and Williams (2012) reviewed some of the results and recommendations from this work and related literature in a conference presentation that, again, identified more gaps in knowledge than well-supported evidence. They did conclude that there appears to be a "consistent relationship between intervention duration and intervention outcomes" (Gillam et al., 2012, slide 65) for child language and phonology treatment, and also that this relationship has a "ceiling" (slide 36). This finding does not directly address the question of how to best schedule therapy, however; it says only that more therapy is better than less therapy, up to a point. Indeed, Gillam et al.'s (2012) comprehensive review of this area concluded with the same questions that drive the present project: "Is it better to provide 3 [sessions per] week over 6 weeks OR 1 [session per] week over 24 weeks? What is an optimal dose per session for a specific intervention approach?" (slide 69).

Yoder and Woynaroski (2015) recently addressed the same issues, in a paper regarding how to study and define the intensity of treatment for students with disabilities. One issue identified by Yoder and Woynaroski (2015) was again that, because researchers do not use a common definition of intensity, they do not all manipulate the features that would be consistently considered to represent treatment intensity. In addition, changes in treatment intensity often depend on the dynamic aspects of a child, including his or her profile or disorder. Similarly, Fey et al. (2013) noted that, while school clinicians do provide a more intensive treatment model to children who are more severe in their communication deficits, this change typically refers only to

moving from one or two to two or three 30-min sessions per week. It also appears that this decision may be based as much on caseload issues as on the nature and severity of the child's needs; again, there is essentially no evidence base to guide these decisions. Yoder and Woynarski stressed the importance of studying intensity separate from treatment approaches, including through studies that compare groups or conditions that vary only on one aspect of intensity (as Warren et al., 2007, had originally recommended).

The only study to have attempted such manipulations in public schools identified for the present review was Ross and Begeny's (2015) study of 4 children in three 2nd-grade classrooms who had deficits in reading. Using an alternating treatments design, all 4 children received reading instruction under five conditions on multiple occasions over the 8-week study. Four of the conditions were the four experimental conditions created by the combination of 7-min and 14-min sessions, in small group or one-on-one formats; the fifth was an active control condition (with math worksheets and the opportunity for the motivational rewards used in the other conditions). Results showed few statistically significant differences, but visual inspection and general patterns in the data favored the 14-min sessions, with little influence of group size. Ross and Begeny attributed the latter result, in part, to the fact that this particular intervention engaged all students even during the group conditions (e.g., using whole-group read-aloud activities), raising the important point that group interventions can be organized in ways that do not reduce the amount of attention, feedback, or practice provided to each student. An additional important feature of Ross and Begeny's (2015) design is that the combination of the different reading assessments created for each session, the control condition, and the alternating-treatments design allowed for meaningful interpretation of the shorter versus longer treatment sessions: The passages that were studied during 14-min sessions were better understood by the students, and

were re-read showing greater gains after a 2-day delay, as compared with the passages studied during 7-min sessions, even against the backdrop of the total amount of treatment provided (i.e., if the total amount of treatment were the more relevant factor, scores per passage would have steadily increased across the study regardless of condition, which did not occur).

In short, Ross and Begeny (2015) concluded, as Warren et al. (2007) and others had concluded previously, that treatment intensity research is still relatively sparse but that careful evaluation of these treatment-process components is possible and could improve student outcomes. Their conclusions were also similar in suggesting that one way to evaluate treatment intensity is through the changes of intensity and duration but keeping a specific protocol the same. Future research is needed to examine the effects of varying levels of treatment intensity, including increasing one aspect of treatment intensity while decreasing another, and lastly, future studies should examine treatment intensity related to students of various educational needs (Ross & Begeny, 2015).

Related Research from Other Settings

Given the lack of research from the public school setting in particular, it seemed of some value to examine the few studies of speech-language treatment intensity or scheduling conducted in other settings with children who are receiving treatment for the same speech or language disorders commonly treated in the public schools. In one of the few such studies available, Fey et al. (2013) studied the impact of changing treatment intensity and duration in 64 children with intellectual and communication delays. Participants were between 18 and 27 months of age, and the therapy technique utilized was Milieu Communication Teaching (MCT), provided in the context of a university clinic. Half of the students were assigned to one 60-min session per week, and the other half were assigned to five 60-min sessions per week, both for 9 months. This

comparison obviously manipulated not only scheduling (one session per week vs. five sessions per week) but also total amount of treatment (60 minutes per week for 9 months vs. 300 minutes per week for 9 months, a large difference in cumulative treatment intensity as defined by Warren et al., 2007). Results were more complex than might have been expected, in part because of the severity of the children's intellectual and language delays and in part because of the very large amount of treatment provided in the five-session condition. In short, there was a moderate enhancement of outcomes at the higher treatment frequency if the child presented with high interest in the objects utilized, an important finding that includes an important caveat: more intense treatment schedules may be more effective, but only if therapy remains engaging to the child.

In a related study, Yoder, Woynaroski, Fey, and Warren (2014) continued to do research with MCT effects on intellectual disabilities, including children with Down syndrome. Sixty-four children (31 in one group, 33 in the other, aged 18-27 months) were studied in their homes or while at childcare centers. The schedule was the same as in Fey et al.'s (2013) study: One group received one 1-hour session per week, while the other group received five 1-hour sessions per week for nine months. In Yoder et al.'s (2014) study, results clearly indicated that the high dose frequency group yielded higher vocabulary production. Yoder et al. concluded that more frequent treatment may accelerate learning rate over time, but the total amount of therapy provided needs to be taken into account, in that the children who received more frequent treatment in this study received five times as much therapy overall.

Similar issues affect the interpretation of Neil and Jones's (2015) study of two children with Down syndrome, ages 6 and 8, who received Applied Behavioral Analysis (ABA) therapy. The purpose of this study was to examine the effects of dose on acquisition of skill in children

with Down syndrome. Dose was manipulated, keeping dose frequency and dose form constant. Dose was characterized by session duration, opportunities per session, and spacing between those opportunities. The researchers manipulated the number of opportunities per session across treatment intensity conditions. One child was studied in the developmental disabilities lab playroom, and the other child was studied at home. In Study 1, the number of opportunities on rate of skill acquisition was measured in sessions to mastery. They compared two levels of dose: either 20 or 5 opportunities in a 10 min session for one child and spacing between opportunities held constant at 30 seconds for the other child.

In Study 2, the researchers expanded Study 1 by examining five dosage levels on rate of skill acquisition measured in number of opportunities and minutes to master skills in children with Down syndrome. The number of opportunities (meaning 1 to 20 opportunities) that results when session inter-stimulus (meaning sessions duration, opportunities per session, and spacing between opportunities) was held constant, low intensity levels produced faster rates of acquisition and fewer errors. When session duration was held constant, higher doses resulted in fewer minutes to mastery (Neil & Jones, 2015).

Summary

In summary, the research and other literature reviewed in this section showed that defining terms related to the intensity, frequency, duration, and other features of treatment is a complex task that has been sparsely addressed in the field of speech-language pathology. In addition to the research described above, these questions have also been raised in the context of aphasia therapy. Early studies of constraint-induced motor learning in animal models showed advantages of treatment intensity that were interpreted as support for intensive, constraint-induced parallels in aphasia, and these constraint-induced treatments can be effective in aphasia.

More generally, however, this research has yielded complex and qualified evidence in support of intensive schedules for some clients using a variety of therapies, not just constraint-induced methods. As reviewed above for children, outcomes appear to depend, in part, on time post onset, severity, treatment goals, outcomes measures, and timing of measures, among other variables. In many ways, therefore, the aphasia literature shares many characteristics with the work of Yoder and colleagues, as reviewed above, in that it remains important to define terms, base future research on past research outcomes, and carefully investigate the timing, duration, frequency, and intensity of speech-language treatment in ways that are not confounded by treatment type or by total amount of treatment provided. In other words, future research should focus on keeping all other variables the same while only frequency and duration are changed. As one of the many important questions in this area, studies of differential treatment intensities could help the field determine whether varying intensities are more or less effective for children who have different cognitive and communication abilities, discover specific side effects that could occur when children and families experience higher levels of intervention intensity, or provide other information about the impact of treatment intensity on child development or treatment outcomes more generally (Warren et al., 2007).

Effectiveness of Other Stuttering Treatments in Other Settings

A large amount of research has been conducted about treating stuttering in elementary school aged children in settings other than the public schools, and it was also important to this project to incorporate a complete understanding of that literature. This third section therefore reviews the literature that identifies evidenced-based therapy for fluency treatment. Over the decades several systematic reviews and meta-analyses of treatments producing beneficial results have been published (Andrews et al., 1980; 1983; Bothe et al., 2006; Cordes, 1998; Nye et al.,

2013; Thomas & Howell, 2001). The various treatments shown to produce beneficial results all possess common themes for effectiveness by providing contingencies for fluency and for stuttering, reducing and then gradually increasing the length of utterance, beginning treatment with a variation of prolonged speech that becomes shaped, systematic transfer of skills across all settings, as well as the shared theme for maintenance and follow-up.

To identify relevant studies, a computer-based search was implemented *using GALILEO,* the state-wide collection of databases. The "choose databases" option, allowing simultaneous searching of multiple *EBSCO* databases was selected. The selected databases were [MEDLINE, CINAHL, Communications and Mass Media, Education Research Complete, PYSCH INFO, ERIC,] Additionally the ProQuest database Linguistics & Language Behavior Abstracts, as well as Web of Science, and Cochrane Library]. The search terms *stutter**, (*treat* or therap*and "evidence based")* were used (Table 3).

Best-supported approaches to treating stuttering in the early childhood years include ELU (Costello, 1983; Riley & J. Ingham, 2000), GILCU (Ryan, 1974; Ryan 2001; Ryan & Ryan, 1995), response contingencies (Costello, 1975; Martin, Kuhl, & Haroldson, 1972), and the Lidcombe Program (Koushik, Shenker, & Onslow, 2009). Prolonged speech and its variations are best supported for late childhood and early adolescence (Bothe et al., 2006; Druce, Debney & Byrt, 1997; Langevin & Kully, 2003; O'Brian et al., 2003).

Synthesis of Studies

Treatments for the school-aged child are based largely in various themes of response contingent stimulation, including the Lidcombe Program, ELU, and GILCU. The Lidcombe Program was originally designed for use with the preschool population, but it has been shown to be a viable option for the school-aged child (Lincoln, Onslow, Lewis & Wilson, 1996; Rousseau,

Packman, & Onslow, 2005). With the Lidcombe Program in the school-aged child, stutterfree speech is not as well obtained as it is with the preschool population and will require a longer period of time to achieve; however, it continues to be an evidence-based viable option.

Several studies have shown the success of the Lidcombe Program in older children (Lincoln et al., 1996; Rousseau et al., 2005). In 1996, Lincoln et al. tested the Lidcombe Program with 11 children aged 7-11 who responded to treatment. Posttreatment, all children had reduced stuttering rates to 1%SS in everyday speaking situations and maintained that level at the 12-month posttreatment time. Five of the 11 children did not meet maintenance criteria at some time during the posttreatment period; however, the majorities were stuttering below 1.0%SS in all speaking situations at 12 months posttreatment.

In 2009, Koushik and Shenker evaluated 14 children aged 6-10 years, also with outcomes suggesting that the Lidcombe Program can be an effective treatment in the establishment of stutterfree speech. The pretreatment mean of the group was 6%SS, and a posttreatment mean of 0.6%SS was obtained. The Lidcombe Program is an option for evidence-based therapy for the school-aged child, though it does take longer to achieve stutterfree speech and parental involvement during the school day can prove to be a challenge.

In addition to the Lidcombe Program, GILCU (Ryan, 1995) and the ELU (Riley & J. Ingham, 2000) are very effective in treating school-aged children who stutter and are both based on the idea of gradually increasing the length and complexity of the utterance. GILCU, a programmed criterion-based direct treatment, has 54 programmed steps in the treatment phase. The progression starts at the word level, then 2 words, 3 words to 1 sentence, 2 sentences, 4 sentences, timed talking in 30 second increments up to 5 minutes in a clinical setting. The goal or criterion for progressing through the program is stutterfree speech at each level. Positive

feedback is given in a variety of ways to the child. Once stutterfree speech is established, the transfer phase is 10-15 hours and maintenance goals are to reduce the frequency of treatment sessions over a 2-year period. Treatment outcome data indicates a mean of 0.6 SWPM, 15 months after maintenance (Ryan, 1995).

As stated above, much like the Lidcombe Program and GILCU, ELU is another criterion-based, programmed treatment (Riley & J. Ingham, 2000). ELU works much like GILCU in controlling the length of utterance as well as the complexity and by reinforcing stutterfree speech and periodically stopping the child during the time that a dysfluency is occurring. Pass/fail criteria are utilized for each step of the program and determine progression. Maintenance phase is also utilized in this protocol and includes monthly %SS outside of the therapy session and a larger amount of space between visits. In 2000, Riley and J. Ingham tested this protocol using 6 children who stuttered ages 3 to 8. Pretreatment the children had a median of 4.3%SS with 1.9% post treatment.

In addition to the Lidcombe Program, GILCU, and ELU, fourth evidenced-based therapies seen and evaluated throughout the literature are versions of changing the speech known as prolonged speech. Prolonged speech is the most evidence-based treatment option for adults who stutter (Bothe et al., 2006). This technique has been successful in numerous studies with children of school age including adolescents (Druce et al., 1997; Langevin & Kully, 2003; O'Brian et al., 2003). By prolongation and the slowing down of the rate of speech of the person who stutters, the dysfluencies are reduced or eliminated. The student is then trained on increasing their rate of speech back into a more normal rate without dysfluencies. Instruction begins by teaching the technique of prolonged speech at a starting rate of one syllable per second. This technique is taught using a variety of speaking tasks that are functional and

relevant to the client, or in this case, the adolescent. Contexts for this population may include monologues for presentations or book reports, speaking over the phone to potential employers, talking with friends, calling stores, conversations with one or more partners such as teachers or peers, etc. In addition to prolonged speech training, the program also focuses on how natural the student's speech sounds throughout this process. Speech naturalness is significant, as the goal of the prolonged speech method is to eliminate stuttering and produce natural-sounding speech. Both the SLP and student participates in rating the speech naturalness of the student with the majority of responsibility falling onto the student after appropriate training has taken place. From the details of this program, one can see why it is used with older students as they assume much of the responsibility for the success of the program. Self-monitoring is a key component to the success of persons who stutter, as seen by a variety of researchers (i.e., Bothe et al., 2006). Self-management might include components such as self-observation, self-judgment, and self-reaction (Prins & R. Ingham, 2009). Not only self-monitoring and self-management, but also the amount of time spent practicing these techniques outside of the speech therapy setting is crucial in establishing this new behavior or speech pattern. The final component to the prolonged speech program is the phase in which maintenance is conducted. When the student has met their goals of eliminating stuttering there is a period of time that is of benefit to the client in which they "check-in" with their SLP, performance-contingent maintenance phase, which is essentially a contingent treatment continuation phase (Bothe et al., 2006). In 1997 Druce et al. studied a protocol that used prolonged speech and tokens to reinforce fluency. Fifteen children who stuttered participated in this intensive program for 6.5 hours a day for 5 days and ranged in age from 6-8. Children reduced their dysfluencies by 76%; however, relapse was noted post treatment—a challenge when working with the school-aged child who stutters. As stated

above, maintenance and follow-up are key when working with this population, especially as they enter the school-aged years. Parent, peer, and family involvement is an important piece of the post treatment success as well.

Summary

Interestingly, these conclusions have been relatively similar across several meta-analyses and systematic reviews (Andrews et al., 1980; 1983; Bothe et al., 2006; Cordes, 1998; Nye et al., 2013; Thomas & Howell, 2001). These conclusions are also similar to conclusions drawn from the research conducted in the public schools, as described in the section about the public schools, above (e.g., Ryan & Ryan, 1983;1995). Despite the consistency in the research, however, one final element that must be considered in attempting to study stuttering treatment in the schools is that these best-supported practices do not appear to be the most widely used. This question is related to questions of what SLPs know about stuttering and several related issues, including how comfortable they are treating this population, as reviewed in the next section.

Speech-Language Pathologists' Knowledge of Stuttering and Comfort with Stuttering

SLPs have been surveyed to address questions such as their feelings, attitudes, comfort level, educational backgrounds, knowledge, training, etc., in regards to stuttering. In Tellis, Bressler, and Emerick's (2008) study, for example, 255 SLPs participated in a survey in which they were asked general questions about stuttering as well as specific questions regarding assessment and treatment. The survey was then replicated 5 years later, when 173 SLPs participated in the same survey (Tomaselli & Tellis, 2013). Despite the 5 years that had passed, participants in the second study were unaware, as those in the first study had been, regarding such topics as current genetic testing in the field of stuttering or how to contact a fluency specialist. The knowledge and comfort that SLPs possess when treating and assessing children

who stutter did not change in the 5 years that passed between studies, suggesting a need for continuing education (Tomaselli & Tellis, 2013). "Systematic training in specific aspects of assessment and treatment for people who stutter is urgently needed for speech-language pathology students and practicing clinicians" (Tellis et al., 2008, p. 21).

Initial preparation programs provide only a small part of the lifetime clinical or continuing education that clinicians receive (Yaruss & Quesal, 2002), but the relative lack of instruction about fluency in master's-degree programs may be related to clinicians' continuing discomfort or difficulty with fluency therapy (Kelly et al., 1997; Tellis et al., 2008; Yaruss & Quesal, 2002). In addition, this relative lack of confidence complicates and may have even led to some of the difficulties with stuttering treatments discussed above, in that clinicians may not have the basic knowledge and comfort to serve as a base from which they could investigate the best possible treatments or treatment schedules for their students who stutter.

Summary of the Literature and Purpose of the Present Projects

In general, the literature summarized in this chapter has established several points. First, and perhaps most important, is that, in the context of the public schools and in other contexts, treatments such as GILCU and the Lidcombe Program for younger children, and prolonged speech for adolescents, are known to be effective at improving both children's stuttering and related social, emotional, or other outcomes. Most of the research about these treatments, however, has not been conducted in the public schools. The research about stuttering treatment that has been conducted in the public schools seems to have shown that GILCU and prolonged speech (with older children) can be successful in that setting, but two of the six studies conducted in the public schools depended instead on 6 months to a full year of ineffective Van Riperian type treatment (Mallard & Westbrook, 1988; Turnbaugh & Guitar, 1981), and one used

prolonged-speech type therapy for very young children with only marginal success (Runyan & Runyan, 1986). It is also clear that intensive schedules seemed better in the schools-based stuttering treatment literature, but, as was also the case in the attempts to understand treatment intensity in other disorders or settings, this conclusion is confounded by differences across studies in treatment type or in total amount of treatment received (i.e., "cumulative intervention intensity," Warren et al., 2007). Overall, then, the literature suggests that treatment for stuttering in the public schools might be more effective and efficient if it were changed to include treatments that are best supported in other research or in the public schools research, and/or if it were changed to include schedules that provided more treatment or provided treatment on a more frequent basis (e.g., 4 days per week instead of 2). The fact that SLPs are not comfortable treating stuttering remains critical, however, because recommendations to change treatments or to change treatment schedules may not be useful to clinicians who are not comfortable treating this population.

The general purpose of the projects reported in this dissertation, therefore, was to address several questions related to treatment scheduling for elementary school aged children who stuttered. The basic intent of the main project was to manipulate treatment scheduling, in ways similar to those recommended by Warren et al. (2007). Before that study could be designed, however, two preliminary studies, reported in Chapters 3 and 4, were conducted to gather necessary background from the clinicians and the school systems who would be cooperating in the primary treatment study. On the basis of the information gained in those preliminary studies, the intervention study described in Chapters 5 and 6 was then designed and implemented. Overall implications of these studies are addressed in Chapter 7.

CHAPTER 3

PRELIMINARY STUDY 1: SURVEY OF PUBLIC SCHOOL SPEECH-LANGUAGE PATHOLOGISTS

The purpose of this study was to obtain current, local information about fluency therapy approaches being used in public school settings. Specifically, a written survey was used to investigate relationships between SLPs' education and experience, use of specific stuttering treatment approaches, and perceived need for additional training in stuttering treatment methods, for clinicians working in the public schools and with an emphasis on those treatment methods that are best supported in the research literature for use with children who stutter.

Method

The methods of this study were preapproved by the Institutional Review Board (IRB) of the University of Georgia. Methods were also preapproved by all appropriate persons, offices, or committees in the school districts, including building principals, superintendents, and/or research review committees. Two school districts had their own IRB review board, and three districts required a specific proposal for each school.

Participants

Participants included all 43 state-certified SLPs with active caseloads in six school districts in northern Georgia. Districts were selected for their proximity to the University of Georgia.

Instrument

A written survey was developed to gather information about participants' knowledge, beliefs, and practices with respect to treatment of fluency in the public schools. In an effort to minimize errors such as question interpretation, nonresponses, and incorrect recording of answers, a pretest of the survey was first piloted with 5 clinicians in the field who work in the public schools. After final revisions, the final instrument was four pages in length, with 15 total questions, and included questions about (a) caseload, discharge goals, success in meeting those goals, and therapy techniques used; (b) whether respondents had "learned about" or "used" seven specific possible treatment approaches for children who stutter; and (c) demographic information and comfort level with stuttering. The full survey is provided in Appendix A.

Procedure

Six school districts selected for their proximity to Athens, Georgia, were initially called and/or emailed by the researcher to inquire about their potential interest in participating in the survey. All school districts contacted participated in the study. One school district had only one elementary school principal that was interested, thus only one SLP was contacted in that district. Permission to contact SLPs was first obtained from the SLPs' principals, special education directors, or lead SLPs, as requested or required by the district. Once permission was obtained, SLPs were contacted by way of phone or email. Participants chose days/times to speak with researchers regarding possible participation in the survey.

The environment used for meeting in person for review of the consent form and survey distribution was that of their individual schools respectively or at the countywide SLP meetings hosted monthly. Participants were educated regarding the nature of the study and the consent form was given to each participant prior to the distribution of the surveys. They were informed

that there was no benefit to them to participate and no monetary value involved. SLPs returned signed consent forms to researcher. SLPs that chose to participate were instructed to not place their names on the surveys, as the surveys were anonymous and no identifying information was recorded on the survey. SLPs completed the survey at a time that was convenient to their schedules with the researcher present to answer any questions that arose. During the actual administering of surveys to the SLPs in each school district, one researcher was present during the signing of the consent form and while SLPs were completing the survey to field any questions that arose. The completed surveys were given back to the researcher the same day they were dispersed. Response rate was 100%, as all surveys dispersed to the SLPs were completed.

Analysis of Data and Reliability

The data were analyzed using Statistical Package for the Social Sciences (SPSS; IBM Corp. Released 2013. IBM SPSS Statistics for Windows, Version 22.0) in conjunction with Microsoft Excel. Averages, percentages, and proportions were obtained from the data.

Results

All respondents held a master's degree (60%) or higher. Approximately 86% had practiced 6-20 years; 83% had completed a full course in stuttering during their graduate program, and almost all had also completed 1-4 continuing education events about children's stuttering. More than 75% of respondents had treated 1-11 children who stuttered, and more than 75% of respondents had 1-6 children who stuttered on their current caseloads (Tables 4 and 5).

Typically reported discharge goals included a goal of 75%-95% fluency in the school environment and/or across multiple settings; less than 3-5% dysfluencies; no more than 3 stuttering events in

classroom; the ability to know and use fluency techniques; the ability to be proud and confident in their speech; the ability to self-monitor or solve fluency problems; or the ability to participate actively in class and with peers.

Out of the SLPs surveyed, just over half (55.8%) of respondents stated that 50-75% of their students who stutter met the goals they listed.

Treatment techniques. Respondents reported using techniques that could be described as representing prolonged or smoothed speech approaches (e.g., easy onset, soft contact, turtle talk), stuttering modification approaches (pull-outs, cancellations), response contingent approaches (timeout, Lidcombe Program, GILCU), and others (relaxation techniques, education/awareness, choral reading). The treatment approaches with the best research support for younger (response contingent approaches) and older (prolonged speech approaches) school age children, respectively (Bothe et al., 2006; Nye et al., 2013), were not taught in many master's programs and were not used by many respondents (e.g., positive responses to "I have used this with a child who stutters" were 51.2% for response contingencies and 16.3% for the Lidcombe Program). In contrast, more than 65% of respondents had been taught to use, and had used, indirect treatments and treatments aimed at changing children's attitudes. (Table 6 for SLP percentages of the treatments they had "learned about" or "used.")

Interactions. Finally, data were analyzed to assess interactions between or among training, treatment approaches, reported comfort with stuttering, and reported overall goals met. Out of 43 respondents, 7 reported feeling "very comfortable" treating students who stutter, but of those, only 23.5% (2 of the 7) reported that clients met their fluency goals with 80% or higher accuracy; that is, comfort was not strongly related to positive outcomes. However, none of the SLPs who had not learned about GILCU or ELU reported feeling very comfortable, and only

22.2% of SLPs not trained in GILCU/ELU had students who were meeting or had met their fluency goals with 80% or higher accuracy. Similar results were found for the generally best supported treatment approaches for young children (response contingencies), although it was not possible to complete this analysis for the Lidcombe Program in particular because so few respondents had learned about it or used it (Tables 6-9).

It is also important to note that the vast majority (95.3%) of SLPs were interested in free seminars and/or workshops regarding the treatment of stuttering in the public schools. Item 15 regarding any other comments about treating children who stutter yielded the following responses most frequently occurring and worth noting:

- I have dismissed children who have not met their goals because it was not impacting academics.
- I have dismissed children that later began to stutter again.
- We need updated fluency videos.
- SSI not a good measurement.
- We need better measurements.
- Difficult to stay up to date on something seen sporadically.
- We would appreciate a seminar from you.
- Gaining experience is difficult with so few students who stutter.
- Seminars in the past have been more on research and not treatment.
- I feel somewhat at ease treating PWS.
- Would love feedback and training!
- I am confident in every other area but stuttering.
- Difficult to treat stuttering especially students with multiple needs.
- Graduate programs mainly focus on theory not treatment.
- I do not feel confident despite attending conferences.
- What do you do when a student is not concerned?
- I feel very unprepared in helping children who stutter.
- Please help me!

- There is a need for practical help.
- Fluency CEUs typically "take the back burner."

Discussion

Results of this survey indicated that clinicians who are not using the treatment methods best supported in the research literature are less comfortable with stuttering and report less positive treatment outcomes. The results of this study also suggested that SLPs were most likely to utilize techniques of smooth or prolonged speech (i.e., fluency shaping, as many had learned about this in their master's program), or a blend of indirect and direct therapy, and were less likely to have learned about or to use response contingent treatments or, specifically, the Lidcombe Program. There were many fluency therapy approaches being used, including such specific programs as Color Me Fluent (Farley, 2006), Turtle Talk (Gustafson & Spielvogle, 2002), Easy Does It (Johnson & Roseman, 1998), and others.

Despite the large list of fluency therapy approaches listed, the large majority of SLPs feel somewhat or not comfortable treating this population.

Conclusion

Item 15 became very critical when analyzing the data, as SLPs were very candid about the challenges they face. Also, many open dialogues took place between the SLPs and researchers when the results were presented at the schools. They expressed their challenges treating this population in the public schools, stating that continuing education expenses often needed to be spent on disorders of higher prevalence in the public schools. This explains the low frequency with which they have attended continuing education regarding fluency therapy (on average 1-2 seminars or workshops/continuing education). Due to the lower prevalence of this population in the public schools, the SLPs also expressed a challenge in keeping their therapy

skills fluid and relevant, as some school years they do not have any children who stutter on their caseload. A clear need for continuing education is present in these findings for best evidence-based practices. Also a clear need exists for training SLPs in specific therapy approaches such as GILCU/ELU, response contingencies, and prolonged speech—all techniques with a high success rate among persons who stutter as well as researching ways to build the infrastructure of their therapy to make these therapies work effectively.

Limitations

The limitations in this study included a small sample size ($n = 43$). Nevertheless, it seems reasonable to anticipate that if this study were performed on a larger scale it would yield similar results, as six school districts participated in this study and not all SLPs were from this region of the country nor had they attended the same universities or institutions. A second limitation could have been possible ambiguity when the respondent was reading and answering the questions, although this was minimized as much as possible by the researchers being present for any questions during the administration of the survey. A third limitation is that the survey did not capture the frequency in which fluency therapy is administered in the public school settings. In conversations with the SLPs in the varying school districts, the majority of students who stutter were seen two times per week for 30 minutes.

Future Research and Implications

Continuing interactions with several of the SLPs who had participated in this survey focused on several questions related to treatment approaches and also on such infrastructural variables as grouping, timing, and frequency. In particular, in conversations with the SLPs during post-survey in the varying school districts, it became apparent that the majority of students who stutter were seen two times per week for 30 minutes at the elementary school level

and then met with less frequency and duration at the middle/high school environment. In addition, as a future intervention study was being contemplated, it became more important to understand the scheduling constraints of these particular schools, including such issues as their Response to Intervention (RTI) systems, their Individualized Education Program (IEP) systems, their administrative decision-making routines, and other infrastructural details. Because the initial survey had not gathered complete information about these topics, and to support a future intervention study addressing this issue, a second preliminary study became necessary and was completed, as described in Chapter 4.

CHAPTER 4

PRELIMINARY STUDY 2: INTERVIEWING THE STAKEHOLDERS

Interviews with SLPs, principals, teachers, and parents were conducted as a follow-up to the survey study reported in Chapter 3. The information to be gained from these respondents was critical to the design of any intervention study, because these individuals are the stakeholders related to appropriate education and treatment for school-age students who stutter. Guided interviews were used, to allow in-depth examination of all issues, including those that might emerge during a conversation and that could not have been predicted by the researchers.

Material and Methods

The methods of this interview study were preapproved by the Institutional Review Board (IRB) of the University of Georgia. Methods were also preapproved by all appropriate persons, offices, or committees in the school districts, including building principals, superintendents, and/or research review committees.

Participants

Participants included 10 total stakeholders in two school districts surrounding the Athens area: three SLPs, two principals, three regular education teachers, and two parents. The SLPs were identified first and were required to have students who stuttered on their current caseload. The SLPs then helped to identify principals, teachers, and parents who also had direct interactions with students who stutter. The three SLPs each had 5-7 years of experience in their current districts and each had 14-15 years of total experience as an SLP. Teachers were interviewed at the elementary and middle school level. Teachers involved in the interview

process had a total of 6 months to 17 years experience. Middle school teachers were added to the study as well as elementary school teachers because middle school teachers can have on average 100+ students that they instruct each day, which differs from the elementary classroom setting where teachers have a smaller number of students (less than 30) and often a teaching assistant part-time. Principals had 16-24 years of experience in education. Parents interviewed had a child that stuttered at either the elementary or middle school level.

Instrument

A questionnaire guide was created by the researchers to use as a guide during the actual interview (Appendix B). Questions regarding personal background were asked first (e.g., role within the district, length of employment, and relationship to students that stutter). Content questions included topics such as comfortable/knowledge with regard to Response to Intervention (RTI), effects of RTI in special education specifically with regard to students who stutter, procedures involved during the Individualized Education Plan (IEP) process, consideration regarding changing the frequency and duration that students who stutter engage in treatment with their SLP, effects of changing the frequency, any barriers, as well as questions regarding a continued partnership with the University of Georgia.

Procedure

The researcher met each participant (principals, teachers, parents, and SLPs) at their schools at a time that was convenient to them. Interviews took 20 minutes and were audio-recorded.

Results

SLP Interviews

When discussing RTI, SLPs ranged from not comfortable, to fairly comfortable, to comfortable with the overall RTI process. Some expressed a feeling of the students who stutter being "in limbo," when they really need to get started in speech therapy, as they are coming to speech regardless during the RTI process to get "checked on." It can be difficult to carve out the time to train the teacher in what they need to be doing for the student who stutters that is in RTI.

Some SLPs believe that students that stutter benefit from RTI when the SLP periodically assesses the child and obtains data regarding the child's current levels; some SLPs referred to this time as, "Speech Clinic." Speech clinic involves 15 minutes of treatment during the week and homework packets being sent home for further follow-up. One SLP commented, "The state tells us that we follow RTI process for this population. It works well with children that are experiencing language and articulation disorders as it is beneficial at times to keeping students out of speech therapy. For fluency it can fall in that gray area in terms of how long they have to remain in RTI. If they already have an IEP for articulation, and if they find that fluency is an issue then they can evaluate right away. Otherwise 6-12 weeks' worth of data needed for fluency. Parents get frustrated at time because it does take long. However, sometimes SLPs spend hours testing when student does not place and this is why RTI can be helpful."

Currently, no data exists regarding the number of students who stutter that are placed in RTI that never need speech services. When asking the SLPs if they have thought of changing the frequency and duration, all replied yes; however, they acknowledge that twice a week is kind of "your standard." It is challenging to change the frequency and duration particularly at the middle and high school level as the older students have heavy academic demands placed upon

them. SLPs reported that they did not remove students from core academic courses for speech therapy, but when the researcher further probed as to why they do not, the answer was less clear. The consensus was that they all knew they were not permitted to pull students who stutter from academics. One SLP replied, "I am not sure where that comes from."

During the discussions and interviews, one SLP stated that she does question the students and observe them to get an idea how their stuttering is impacting them academically as well as socially (e.g., let's call and see what time the movie starts). She stated that no one has ever questioned her regarding whether or not stuttering impacts academics.

In terms of responses when brainstorming solutions to aid and assist school-based SLPs with this population, the interviewer asked the SLPs their thoughts regarding a fluency specialist that would float around the district or region or state. Their responses varied from perhaps on a PRN basis, to stating a fluency therapist would be very beneficial. "Even if one of us gets trained in the Lidcombe Program (LP), but then we rarely use it, it is difficult to keep up your skill level, it is all in the practice." "Having someone that is specialized in fluency would be a huge advantage to the system." "We don't see a dysfluent child often, so when we do, we are back to teaching ourselves all over again." In brainstorming with one SLP, she stated, "what if there was a contract for a fluency specialist that covered so many counties that all the students who stutter could benefit from and everyone pays into it to utilize it?"

When the primary research assistant inquired, all SLPs replied absolutely yes and very open to a continued partnership with UGA. "Use the resources available to us!" One SLP called it a, "huge help because funds/time are tight. Biggest barrier to partnerships would be scheduling but otherwise all were very comfortable with a partnership." One SLP stated she would be interested in a partnership but never would be comfortable leaving a UGA student or

SLP without observing the child and the relationship between them, as her name is on the IEP as the responsible party. Perhaps more of a partnership in which the university is a resource for the SLP, rather than actually performing the treatment with the student who stutters.

One SLP responded, "seeing PWS in the public schools is an obvious pathway if the therapist is properly trained." "I feel like fluency is something that should be looked at differently in the field. I feel like it can be treated effectively in the public schools just maybe not as quickly or as efficiently."

In terms of the question if the SLP has ever considered changing the frequency and duration, the answers varied from yes it has been a thought to no. SLPs reported that the challenges to changing frequency and duration include high caseload numbers as well as scheduling issues. Scheduling difficulty includes managing their own schedule as well as the academic coursework schedule of the student throughout the day. SLPs agreed it would be very difficult to pull a student for an hour-long treatment session as it would spill over into academic coursework time.

Teacher Interviews

Teachers reported that regarding RTI, some training had been done during their college experience as well as on the job training with the school district during small focus group sessions.

In terms of working with their students who stutter, SLPs perform training regarding current students that stutter to show what the specific characteristics of student's stuttering are and what to do to help decrease the student's frustration.

Questions about RTI or IEP are referred back to special education teachers. As a whole, regular education instructors can field general questions and rely on team support from other sources such as the assistant principal or SLP.

When asked from the perspective of the regular education teachers how easy or challenging it would be to accommodate changes in therapy frequency and duration for students who stutter at the middle school level they were unsure of the answer as it had not come up in the past. They were certain that students could not be pulled from academics but reported they are supportive of special education and would advocate for whatever the student might need. In terms of scheduling, they would just have to work that out, but they cannot pull from academics only from "connections." Due to the amount of testing that now takes place in the public schools, teachers have asked SLPs to pull classroom content to the speech room, i.e. use of novels in speech for articulation or reading comprehension, etc. The middle school teachers also suggested ongoing education regarding stuttering for them by way of handouts, fliers, a website, or email to provide them with information, as they have very little time for face to face meetings.

Elementary educators feel there is quite a bit of support at the elementary school level in terms of resources, support staff, and parental support when dealing with students who stutter. "Many positions are ready to support us as educators as well as our students, it is just a matter of figuring out how to work it in to your schedule." When asking the regular education instructors at the elementary level regarding further support in aiding them with students who stutter by way of a continued partnership from UGA, they were all interested. One teacher stated, "Absolutely definitely without a doubt." Middle school instructors were more inclined to prefer a flyer or handout, because of the academic time constraints at the middle school level.

Overall, there appears to be much less resistance and obstacles at the elementary school to welcoming support from other sources for students who stutter because as the child goes on to middle and high school, there is a higher amount of academic demands that are placed upon the student, thus less time can be spent with regard to speech therapy.

Principal Interviews

Principals all stated they do "whatever is best for the student" in terms of the needs of each student. The IEP team decides what each individual student needs. Principals suggested the main barriers to changing frequency and duration are at the district level as SLPs are only allotted a certain amount of time to each school. The amount of testing makes pulling students out for two 1-hour blocks very difficult on academics and SLP schedule. One principal expressed the concern that it becomes difficult to take students out and not impact their testing. "It comes down to leadership and the principal can try to work with and manipulate the student's schedule as much as they can to make it work to the level that the parents, teachers, and everyone is comfortable while following the laws. You have to have a leader that sees it as important and some see it as more important than others." Principals were all interested in an ongoing and active partnership to assist their SLPs with students who stutter.

Parent Interviews

Parents provided a unique point of view and perspective regarding their thoughts and feelings when interviewed by the researcher. Some parents report feeling a certain level of stress when they begin the IEP process for their child. During meetings, parents sometimes reported forgetting some of the details of the IEP meetings. Parents often defer to the regular education instructor and SLP in the decision making for their child. Parents stated they were open to changes in frequency and duration; however, again defer to their child's SLP for their clinical

judgment regarding such matters. They also stated they would have no problem if the SLP or IEP team suggested changes to the frequency and duration of treatment. One parent expressed concern if changes were made to frequency and duration that the child may miss educational instruction time. Parents were very open to UGA students and partnerships between the university and the school district.

Discussion and Implications for the Intervention Study

Overall, it was abundantly clear throughout this interview process, and with all of the professionals and parents who were interviewed, that they each cared deeply about the well-being of all students in their district. All stakeholders were interested in collaborations or partnerships that might best serve children who stutter. They were also open to the idea of changing the frequency and duration of therapy sessions, especially at the elementary school level, which has more freedom with regards to scheduling and class time than exists at the middle-school and high-school level. When combined with the literature reviewed in Chapter 2, therefore, these two preliminary surveys provided the local information that was necessary to support the development of an intervention study intended to test variations on therapy scheduling for children who stutter in the public schools. The intervention study is described in Chapters 5 and 6.

CHAPTER 5

METHOD OF THE INTERVENTION STUDY

Purpose and Hypotheses

This intervention study was designed on the basis of the literature reviewed in Chapter 2 and the preliminary information described in Chapters 3 and 4. In general, the purpose of the study was to investigate the effects of changing how stuttering treatment sessions in the schools were scheduled, while attempting to keep all other variables constant. This study was conducted cooperatively between the primary researcher and all SLPs in one public school district in the southeast who were treating students who stuttered during the 2015-2016 academic year. Standard practice in this district assigns students to two 30-min therapy sessions per week, one 30-min session on each of two different days. Treatment sessions are always separated by at least one non-treatment day and typically use a Monday/Wednesday or Tuesday/Thursday schedule. If severity warrants, frequency can be changed to three 30-min therapy sessions on three different days per week. The basic (quasi-experimental) design of this study, therefore, as explained in greater detail in the following sections, was intended to change half of the students who were currently receiving two 30-min sessions to an alternative schedule of four 15-min therapy sessions per week (each on a different day). Three main hypotheses guided this study, all of which were based on the research reviewed in Chapter 2 and shaped by the preliminary information gained from the studies described in Chapters 3 and 4:

H1: Elementary-school-aged children being treated for stuttering in public-school settings who receive four 15-min therapy sessions per week will show faster decreases in stuttering frequency than children who receive two 30-min sessions per week.

H2: Elementary-school-aged children being treated for stuttering in public-school settings who receive four 15-min therapy sessions per week will show greater improvements in ratings completed by their parent(s), regular education instructor, and SLP of perceived overall social, emotional, and academic functioning as related to their stuttering, as compared with children who receive two 30-min sessions per week.

H3: SLPs who work more frequently (4 sessions per week) with elementary-school-aged children will show increases in self-reported comfort level for treating children who stutter, as compared with SLPs who work with children who stutter only 2 days per week.

Participants and Other Persons Involved in this Research

Participants

The primary research participants included all elementary-age students in one public school district who were receiving therapy at school for their stuttering, whose parents approved of their participation, and whose therapy schedules were viewed as potentially open to change by the SLP and IEP team. Prior to their participation in the study, students were required to meet all of the following inclusion criteria:

(a) identified as a student who stutters by a school-based SLP who had agreed to participate in this study;

(b) had a current (2015-2016 academic year) IEP for fluency that specified that fluency goals were to be addressed by the school-based SLP;

(c) consent and assent, respectively, were obtained from the parent/guardian and the participant (see IEP and consent details, below).

Students with diagnoses in addition to stuttering, and students who were English-language learners, were included if they met the inclusion criteria above.

Exclusion criteria included students who stutter that were currently in the Response to Intervention (RTI) process; the district specifies that these students are to be seen by the SLP once per week for less than 15 min, and this schedule cannot be changed or adapted. Students who stutter at the middle and high school level were also excluded from this study, in part because the structure of the school day differs from elementary schools to middle and high schools and in part because the appropriate stuttering therapy approaches differ for younger children versus adolescents.

Complete descriptive data were gathered about each participant after parental consent was obtained, using a parent interview question guide (Appendix C) that included such questions as the child's current age, gender, age at diagnosis, family history of stuttering, history of fluency therapy provided, other diagnoses or developmental issues, and other relevant variables. These data are provided with the results of this study in Chapter 6.

Speech-Language Pathologists

Other persons involved in this study included all SLPs in the school district who had elementary school-aged students who stutter, if the parents of those children gave consent for them to participate, and if the SLP was willing to participate. Four SLPs were initially selected based on approval from their principal, their own interest in participating, and availability of students who stutter on their Fall 2015 caseload. Three of the four participated, based on the consent obtained from the students' parents/caregivers; that is, the participants in this study were

effectively all SLP/client pairs for whom parent consent was obtained, student assent was obtained, the IEP team approved, and the SLP agreed to participate. (The child assent form can be found in Appendix D, and the parent/guardian consent form can be found in Appendix E.) The SLPs were considered both care providers and participants for this study, because they provided services to the children and also completed an SLP input inventory form (Appendix F) as well as an SLP survey (Appendix A).

Student Research Assistants

Finally, a group of 8 undergraduate students were involved in this study as research assistants. These students enrolled in an elective course taught by the primary researcher for the fall semester of 2015. The course provided them with information and training about stuttering, the use of the audio recorders, specialized software to allow them to measure the percentage of syllables stuttered and other speech-related variables (Stuttering Measurement System, R. Ingham, 1984), overall accuracy with data collection sheets, and other relevant topics (Table 10). Information was also presented to the research assistants about several therapy options for elementary-aged children who stutter, including GILCU (Ryan, 1974; Ryan & Ryan, 1995), response contingencies (Costello, 1975; Martin et al., 1972), the Lidcombe Program (Koushik et al., 2009), and others. Research assistants were not aware of the specific hypotheses of this study regarding session frequency and duration. All research assistants completed the required fieldwork experience application through the University of Georgia College of Education Student Services Office. This application included a background check, liability documentation, and authorization of release of their information to the specific elementary school site in which they were collecting data.

Materials and Devices

Instruments for Use with Participants

Parent input inventory. The parent input inventory (Appendix G) was used to gather data from parents on five occasions: once during this study's pre-experimental phase (i.e., during the week before Week 1) (see Detailed Procedures and Timelines, below), every 3 weeks during the study (after completion of Week 3 and after completion of Week 6; again, see Procedure for complete explanations), once after the primary data collection phase of the study was completed (after completion of Week 8), and once more approximately 6 months after the beginning of the study (Week 26). This form was developed by the researchers specifically for this study and included four main questions of interest to this project, including perceived severity of stuttering and perceived impact of the child's stuttering on academics, social functioning, and emotional functioning, as judged by the parent or guardian.

Teacher input inventory. The teacher input inventory (Appendix H) was used to gather data from each student's primary general education classroom teacher. Administration was at the same occasions used for parents (before Week 1; upon completion of Weeks 3, 6, and 8; and at Week 26). The teacher input inventory was created by modifying the parent input inventory, and the inventories were purposefully similar, to allow comparisons between parent responses and teacher responses.

SLP input inventory. The SLP input inventory (Appendix F) was used to gather data from SLPs. They completed one copy of this form for each of their students who stutter, on the same schedule used for the parent and teacher inventories. The SLP input form was again a variation on the parent and teacher input form, to allow comparison of responses; the SLP input

form also included a question about the SLP's comfort with treating stuttering. Administration was at the same occasions used for teachers and parents (before Week 1; upon completion of Weeks 3, 6, and 8; and at Week 26).

Parent interview guide. The parent interview guide (Appendix C) was utilized by the primary researcher once during the pre-experimental time period as a way to gather information from parents during the initial IEP meeting. This form was developed by the researchers, in part by modifying items in a parent inventory form that is part of the Tennessee State Department of Education *Resource Packet for Assessment of Speech: Fluency* (Department of Education, 2009). Their parent input form was intended to allow school-based SLPs to gather information regarding students' speech in a variety of settings such as the regular education classroom or within the home. Questions were developed by the researchers to guide this parent interview and drawing in part on the Tennessee *Resource Packet* materials despite unknown reliability and validity, as it has been used by clinicians in the public school settings in several states including Tennessee and Michigan and appeared to provide the types of background information that was of interest for this study.

SLP survey form. The SLP survey form (Appendix A) was used to gather more in-depth information from SLPs. They completed this form once during the pre-experimental phase of this study and once at Week 8. This form was developed by the researchers during the preliminary research described in Chapter 3. This survey has not been modified from the previous study and consists of questions that target information such as SLPs' educational background, goal writing, therapy protocols utilized, overall knowledge base of stuttering and when it was acquired, and comfort level treating this population.

Data Collection Materials

Other materials included hand held digital audio recorders, the Stuttering Measurement System (SMS) software running on laptop computers, and a session analysis form.

Hand Held Audio Recorders. The UGA assistant researchers recorded all of every speech therapy session using an Olympus VN-722PC Voice Recorder, with 4 GB Built-In-Memory recorders. The recorder was chosen for its large LCD screen and speaker, convenient controls for use in school settings, and a large diameter multidirectional microphone, which provided audio files of more than adequate quality for this project. Audio files saved on the recorder were automatically marked with the date, eliminating the need to record any identifying information about the child as part of the recording.

Stuttering Measurement System. The SMS is a computer program developed by R. Ingham, J. Ingham, Moglia, and Kilgo (1999). The main purpose of SMS is that it allows a trained judge or rater to measure stuttering frequency, speech rate, and speech naturalness simultaneously, while listening to on-going speech, by pressing one button on a computer mouse for each syllable perceived to be spoken fluently and the other button on a computer mouse for each syllable perceived to be stuttered, and by entering a one-digit naturalness rating at designated intervals or at the end of the sample.

A research-supported training program (Bainbridge, Stavros, Ebrahimian, Wang, & R. Ingham, 2015) associated with the SMS was also used for this study, and was completed by all student research assistants before they gathered data for this project. The training program uses a range of simpler to more complex tasks (beginning with assessing speech rate only in audiovisual recordings of slow, nonstuttered speech, and ending with assessing speech rate, stuttering frequency, and speech naturalness for a mixture of longer speech samples at a range of

rates and characterized by a range of stuttering frequencies and topographies). The training program concludes with a "Criterion Test" that all student research assistants completed successfully before they gathered data for this project.

Session Analysis Form. A session-analysis form (Appendix I) was developed by the researchers for this project to allow the assistant researchers to record characteristics of the therapy session. It included keeping a record of start and stop times for phases or stages of a treatment session, such as before treatment begins, treatment time, transitions, closing of session, and any other times or sections that were recognizable to the research assistants. During the session they also recorded what type of therapy was being administered and what game, manipulative, or other activity was in use. Accurate use of the session analysis form was ensured through group and individuals practice, via audio and audiovisual recordings of stuttering treatment sessions, during the research assistants' class (described above).

Procedure

Setting

The study took place at three elementary schools in one school district in the Southeastern region of the United States that had students who stutter with IEPs for the 2015-2016 school year. This school district is made up of one primary school, five elementary schools, two middle schools, and two high schools. The racial makeup of the school district is 88.4% White, 5.0% Black or African American, 4.4% Hispanic, and 3.1% Asian.

Experimental Design

A quasi-experimental design with repeated measures was used to evaluate the effects of changing frequency and duration of fluency treatment on children's stuttering frequency (Hypothesis 1), on the same children's associated social and emotional behaviors in classrooms

and at home as rated by relevant adults (Hypothesis 2), and on the SLPs' perceptions of comfort with the stuttering treatment process (Hypothesis 3). A quasi-experiment can be used to estimate the causal impact of an intervention on its target population. Quasi-experimental research shares some of the features of true experimental designs but lacks the element of random assignment to the protocol. In this case, the researchers could control some aspects of the frequency and duration of fluency therapy, but assignments could not be made randomly because of multiple factors that control how therapy is administered in the public schools (e.g., the IEP team's input based on the student's other needs, or limitations imposed on the SLPs or the teachers because of other students or programs).

To the greatest extent possible, therefore, the design of this study was intended to change therapy sessions from the standard schedule (two 30-min sessions per week) to the experimental schedule (four 15-min sessions per week) for as close to half of the participants as possible and in a manner that equated the total number of treatment minutes that each child received each week (i.e., 60 minutes). Due to multiple factors and constraints placed upon the public schools, the final design of the study included one participant who received therapy as four 15-min sessions per week, two participants who received therapy as two 30-min sessions per week, and one student who received therapy as three 30-min sessions per week. The reasoning behind these schedules is discussed with the children's results in Chapter 6.

Detailed Procedures and Timelines

Institutional Approvals and Coordinating with SLP Participants: Spring and Summer 2015. Required approvals for the basic design of this study were sought and obtained during the spring and summer of 2015 from the University of Georgia Institutional Review Board, the Director of Special Education and the Research Review Board of the school system,

each building principal, and the potential SLPs. The primary researcher also maintained ongoing communication with the SLPs during this time. Meetings with the SLPs during August and September 2015 allowed the researcher to answer any of their questions and disperse letters that SLPs sent home with their students after the proposal for this study was preliminarily approved.

Training Research Assistants: August 2015. The class for the UGA research assistants began at the beginning of Fall semester 2015. Eight students/assistants were educated and trained in the areas of stuttering, therapy protocols, data collections, utilization of SMS, and Family Educational Rights and Privacy Act (FERPA) regulations. Each UGA assistant researcher was then assigned to a specific SLP and student who stutters. All UGA research assistants participated in all necessary coursework over the span of 6 weekly class meetings that began during the first week of Fall semester 2015. At the time of scheduling for the course in May 2015, students were asked to complete necessary paperwork which included background checks, liability insurance or the waiver thereof, and authorization of release of their information to the specific elementary school site in which they will be collecting data.

Week one addressed the format of the class, topics in the weeks ahead, and class expectations. Week two addressed a review of the American Speech and Hearing Association (ASHA) Code of Ethics, education regarding FERPA, Collaborative Institutional Training Initiative (CITI) training, definition of stuttering, history of stuttering, and the different types of dysfluencies and so on. Other course topics are presented in the complete class schedule (Table 10).

Initial Contact with Potential Participants: September 2015. In compliance with the FERPA, researchers did not directly establish initial contact with the parents or guardians, nor did they attempt to contact the students. Instead, the SLPs at the elementary school level sent

letters home with their speech students on behalf of the researchers (Appendix J). The letter stated the type of study and how to contact the researchers for more information or how to seek more information about the study from the SLP. If a parent showed interest to the researchers directly or to their child's SLP, and if the SLP believed the child to meet the inclusion criteria provided above, then an IEP meeting was scheduled.

IEP Meetings and Assignment to Schedules: September 2015. For any parents and students who expressed interest in potentially participating in the study, IEP meetings were scheduled during September 2015 at the location of the student's elementary school. The IEP team included the principal or vice principal, parent/guardian, SLP, student, other relevant support staff, and the primary researcher. This group discussed the study and the student's needs. The primary researcher attended all IEP meetings, to answer any remaining questions regarding the study as well as gain consent/assent from both parent/guardian and student respectively for those that chose to participate.

During the IEP meeting, it was explained that students who participated in the study would be assigned either to (a) change to the treatment schedule that involved four 15-min sessions per week, or to (b) remain at their regular treatment frequency and duration. It was also explained which frequency and duration the child had preliminarily been assigned to; these initial assignments had been made randomly.

Despite the support of all involved during the IEP process for all four children who stutter, SLP scheduling conflicts and student academic schedules were a challenge when trying to select a child or children whose treatment could be scheduled as four 15-min sessions per week. During the IEP meeting for the child referred to as "DI4," it was decided that he should remain at the traditional two sessions per week for 30 min, due to his level of academics in the

4th grade as well as the SLP being unable to change her schedule to accommodate four times a week. The child referred to as "LY1" also remained at that traditional frequency and duration, per his mother's request. His mother explained that even though she understood the amount of total time for the week was the same, he had many upcoming doctor's appointments and she would like him to only been seen twice a week. Due to AM5's severity, the SLP and parent decided that the best decision was to keep him at his current frequency of three 30-min sessions per week, as changing to four 15-min sessions would represented a decrease of therapy time. The child referred to as RP3 was changed to the experimental schedule of four 15-min sessions per week.

Parent, SLP, and teacher input inventory forms were dispersed and administered directly after the conclusion of the IEP meeting. The researcher continued to be present to answer questions and collect the input forms. SLP survey forms were also dispersed at this time.

Weeks 1 through 8: Primary Data Collection, Fall 2015. Because of the design and intent of this study, all children were already receiving therapy on the standard schedule of two sessions per week (with one student receiving therapy three times per week for 30 min). Because of how the IEP process was administered and interpreted in this school district, the children's schedules were changed as soon as the IEP meeting establishing that change had been concluded. Beginning with Week 1 of this study, therefore, and continuing through Week 8, the children received their assigned frequency and duration of treatment. One of the trained UGA research assistants was present at every session for every child, and every session was audio-recorded for later analysis. (The assigned assistant remained with the same SLP/student throughout the study.) During the session, the research assistant used the session analysis form (Appendix I) and the stopwatch app on their phones to identify and record the sections of the session, the therapy

approach and stimuli, and other features of the treatment session. The research assistant also audio recorded the session in its entirety, for later confirmation of the session data and for other detailed analyses of the child's speech.

In all other aspects, the cooperating school-based SLPs continued their therapy, as they would have otherwise, with no changes other than in scheduling. All therapy protocols, materials, goals, stimuli, grouping of students, etc., were of the SLPs' choosing while working with their student who stutters. The treating SLPs determined what was best for their students who stutter within the academic setting of the public schools, with the single exception of the cooperatively determined scheduling, as this research study was testing solely the frequency and duration of the treatment sessions.

Best Condition Phase. The initial plan was to hold each participant in the schedule to which he or she was assigned for 8 weeks of therapy. Given previous research completed by Ryan and Ryan (1983, 1995), Guitar et al. (2015), and others, this amount of time was expected to be sufficient for any changes or differences between the schedules to become evident. If after 8 weeks of therapy all children on either schedule had improved and no child on the other schedule had improved, the researcher was to suggest to the SLPs that all children should be moved to the better schedule. The obtained data did not meet this non-overlapping criterion, as further explained in the Results chapter, so all children remained in their assigned schedule throughout the academic year.

Additional Data Collection: Week 8. After the 8 weeks of intensive data collection, teachers, parents, and SLPs completed the input forms again. The SLP survey was also administered once more at this time.

Continuing Therapy and Final Data Collection: Weeks 9-25 and Week 26. All of the children who participated in the first 8 weeks of this study required continuing therapy. They remained on their assigned schedule through the 2015-2016 school year. Complete data were then collected for one session toward the end of the academic year, at Week 26 of the study, including recording a session and distributing and collecting input forms from teachers, parents, and SLPs.

Data Collection and Analysis

Dependent Measures

The independent variable being tested in this quasi-experimental study was the frequency and duration of fluency therapy sessions, with all other aspects of therapy held constant. The primary dependent variable for Hypothesis 1 was stuttering frequency; the primary dependent variables for Hypotheses 2 and 3 were from the parent, teacher, and SLP surveys. The procedures and definitions used to assess these and other (secondary) dependent variables are described below.

Goal of session part and minutes of therapy time. As the first step in data analysis, its starting time and ending time in minutes and seconds identified each recognizable segment or part of each treatment session. This judgment was made initially by the research assistant during the treatment session and confirmed from the recordings. Segmented parts of the session included the following:

1. Beginning of session: Talking that occurs before any treatment condition has been introduced for the day. Gathering, getting seated, finding materials, and similar activities that start at the beginning of the session were counted as "Beginning of the session." It is possible that the very first segment of a session may be "Treatment," with no "Beginning" segment.

2. Treatment: Talking that occurs while the child knows or the therapist intends that treatment conditions or tasks are in place. The treatment segment began when the SLP made any statement or asked any question that defined the time as therapy, such as "Welcome, we are going to play a guessing game today" or "What are we working on in speech today?" or "Remember what we worked on last time?" This was also marked by the use of materials such as manipulatives, cards, worksheets, board games, etc. On the session analysis form, research assistants recorded the therapy protocol or approach, as well as what materials/activity were utilized. Treatment time was identified using a decision rule that erred in the direction of referring to the segment as treatment if the observer had any reason to suspect that either the child or the SLP might have intended or perceived it as such.

3. Transition: Talking that occurs between therapy segments. Transition was marked by the ending of one activity and the beginning of another, such as ending a board game and moving to an art project. It was also marked by the SLP's instructions that suggested a goal or an intermediate point had been reached (e.g., "Look, you got 10!" or "Good job, what should we do next?"). Transition segments were identified using a decision rule that erred in the direction of referring to the segment as transition if the observer had any reason to suspect that either the child or the SLP might have intended or perceived it as such, to prevent counting any such speech as a therapy segment. Speech data gathered from transition segments represented within-session generalization of therapy gains and represented time that was perceived by the child as therapy. The alternative, to count all session time as therapy, was less than desirable for this study because including time that may not be perceived as treatment time by the child may decrease the apparent influence of treatment. In addition, all observers made this decision the

same way, to prevent any differences in apparent treatment outcomes that could actually be attributed to observer differences in deciding whether treatment was occurring.

4. Conclusion*:* Talking that occurred after the SLP had signaled that the session was ending. This was time when materials were being put away, time was spent discussing what will happen next for the child, or time while data of any sort was being written down by the SLP. Conclusion segments were also judged using a decision rule intended to err on the side of separating treatment segments from conclusion segments, as discussed immediately above for transition segments.

Speech measures. After the sessions were divided into Beginning, Treatment, Transition, and Conclusion segments, speech variables were measured for every segment of every session using as many consecutive 200-syllable speech samples as possible for each session segment. If the segment did not include 200 syllables, all syllables were counted and the number of syllables was recorded. If the segment included more than 200 syllables, more than one speech sample per session segment was counted, and there was one sample at the end of each segment of less than 200 syllables. This division was accomplished through SMS settings that specified a maximum speech sample length of 200 syllables.

Within each 200-syllable speech sample, three speech-related variables were assessed: stuttering frequency, speech rate, and speech naturalness. These three areas of measurement are an evidence-based standard for describing important characteristics of the speech of a person who stutters (R. Ingham, 1984). The three measurements are necessary to describe pertinent and functional aspects regarding the participant's speech (Costello & R. Ingham, 1984; J. Ingham & Riley, 1998).

Stuttering frequency. The construct of stuttering frequency addresses, essentially, how much the child stutters. It is known to range from zero, for speakers who do not stutter, to as much as one-quarter or more of words, for very severe stuttering. It can be measured in terms of specific dysfluency types, but dysfluency types judgments are known to show low reliability, and comparisons across participants are difficult if they present with different dysfluency types. Stuttering frequency was therefore measured in terms of percentage of syllables stuttered (%SS) and defined for this project in a manner that drew primarily from Martin and Haroldson's (1979) perceptual definition of stuttering, as shaped through the stuttering judgments training program associated with the SMS. Specifically, stuttering was defined for this study as speech productions including repetitions such as part-word repetitions, whole-word repetitions, phrase repetitions, and sentence repetitions; interjections such as "um" or "you know"; revisions; dysrhythmic phonations (i.e., prolongations of sounds, silent prolongations, and improper stress); and tense pauses. Associated Motor Behaviors (AMBs) or secondary characteristics that occurred in the absence of any speech characteristic were not counted as stutters, nor were typical or normal disfluencies. When an event came into question to the research assistants as to whether or not it should be counted as a stutter, that event was counted as such because they (the listeners) perceived it as different from normal speech. As shown by Bainbridge et al. (2015), the SMS training program improves the accuracy of judges' %SS measures with respect to standards established for multiple exemplars of stuttered speech. All research assistants for this study had completed the SMS training program, including passing its final Criterion Test, before gathering any speech data for this study. To further address the known problems with potential lack of reliability for stuttering judgments, %SS was counted twice for every segment of every

recording. The average of the two ratings was used as the best estimate of stuttering frequency for that 200-syllable segment (see also the Intraobserver Agreement and Interobserver Agreement sections, below).

Speech rate. Speech rate was also measured from all speech produced by all children who stutter, from all segments of all therapy sessions. Speech rate was defined in terms of overall syllables spoken per minute of speaking time (Syllables Per Minute, SPM), as judged by the trained research assistants using the SMS. Typical conversational speaking rates range from 140 to 220 SPM for elementary-school-aged children as reported by Guitar (2013): age 6 ranged from 140-175 SPM; age 8, 150-180 SPM; age 10, 165-215 SPM; and 12 years of age, 165-220 SPM. The SMS software also automatically calculates syllables spoken per minute of stutterfree speech (Stutterfree Syllables per Minute, SFSPM), which can be used if SPM values are problematic for any particular child (as occurs, for example, with very severe stuttering), but SPM was preferred for this study in part because norms for SFSPM are not available for children of this age range. All samples were rated twice, with the average used as the final data.

***Speech naturalness*.** Speech naturalness was measured using Martin, Haroldson, and Triden's (1984) speech naturalness scale. The speech naturalness scale is a 9-point equal-appearing-interval scale (Metz, Schiavetti, & Sacco, 1990) that ranges from 1 (defined as representing "highly natural" speech) to 9 (defined as representing "highly unnatural" speech). Naturalness ratings are intended to capture the judge's global impression of the normalcy or naturalness of speech, including the combination of such variables as voice quality, pitch, loudness, variability, rate, disfluencies, articulatory errors, and other issues. Reliability (within 1 scale point) and validity of naturalness ratings have been shown to be acceptable (Runyan, Bell, & Prosek, 1990).

Naturalness was rated by the research assistants once for every 200-syllable (or less) speech sample, by recording a number between 1 and 9 once at the end of that segment. Analysis for naturalness of each 200 syllable or less segment was completed twice for every recording. The average of the two ratings was used as the best estimate of the speech naturalness if they were within one scale point number of each other.

Type of therapy protocol utilized. The therapy protocols that the SLP implemented during the session were recorded by the student research assistant based on what the SLP reported they were using. The research assistants then also recorded what they observed the SLP utilizing on the session analysis form during the session. This information was intended to allow comparisons between therapy protocols and implementation of them within the setting of the public schools. If the therapy protocol changed during a session (e.g., from response contingencies to GILCU), the research assistants were trained to circle the second therapy protocol as well as to record the times the therapy protocol(s) occurred.

Type of game/materials being used. Specific game, worksheet, craft, activity, manipulative, etc., was also recorded. Often research studies regarding fluency treatment in the public schools do not specify what materials are being used. This will help the reader to gain information regarding materials and possible outcomes the researchers may or may not find in the data.

Size of group or individual session. Each session (or part of session, if changes occurred during a session) was coded as either individual treatment (defined as a student who stutters and SLP with no other students present) or group treatment (SLP with student that stutters as well as other peers receiving speech therapy during the same time of day). If group therapy was being conducted, the number of total students was recorded.

Input forms. For parents and teachers, the input form consisted of four questions, all answered on a scale of 1-10, with 1 defined as "almost never" and 10 defined as "all of the time" (forms are provided in Appendices F-H). For SLPs, the input form consisted of the same four questions as well as a fifth question about their comfort level in treating the child who stutters. With regards to this question a scale of 1-10 was also used, with 1 defined as "very comfortable" and 10 defined as "not comfortable at all." The constructs underlying these single-item measures are described below.

"***How much stuttering" construct.*** How much was defined as pertaining to quantity, as in how often the listener perceived the child to be stuttering in a given environment in which the listener is present. Teachers were asked to think about how much the child was stuttering during class time, lunch, recess, etc. Parents were instructed to consider the home setting as well as any other settings in which the parent may observe the child speaking, such as church, during a game, on a play-date, with family and/or friends, etc. SLPs were asked to think of this term as it pertains to the speech room or any other environments in which the SLP could possibly observe her student outside of the speech treatment room. The question was phrased as "almost never" to "all of the time" to avoid the difficulties that occur when respondents do not know if the question refers to how severe stuttering can be for the most severe possible case or how severe stuttering has ever been observed to be for the case in question by the particular respondent.

"***Interfere with academics" construct.*** The question asked was "Does the stuttering interfere with his or her academic work?" Interfering with academic work was defined if respondents asked as any academic outcome that was impacted by stuttering in a negative manner. This included decreased ability to perform public speaking or presentation tasks, difficulty with spelling, and/or decreased reading fluency.

"***Social difficulties" construct.*** The question asked was "Does the stuttering seem to cause any social difficulties for this student?" Social difficulties was defined if respondents asked as avoiding playing, speaking, or interacting with peers; avoiding speaking to teachers or other authoritative figures within the school; and/or an observation that the student engages in more solitary activities.

"***Emotional difficulties" construct.*** The question asked was "Does the stuttering seem to cause any emotional difficulties for this student?" Emotional difficulties were defined if the respondents asked as showing visible verbal or nonverbal signs of frustration, anger, sadness/crying, and/or embarrassment as judged by the person completing the input form.

"***Comfort" construct (for SLPs only).*** Finally, the SLPs were also asked "How comfortable are you in treating this child who stutters?" Comfort was defined as ease with evaluating and/or treating children who stutter. This included selecting proper testing materials and obtaining necessary information during evaluation as well as ease in selecting the most evidenced-based fluency treatment protocols based on the age and needs of the child.

Data Analysis

Speech data were summarized and graphed weekly, as research assistants were required to turn in data via data collection sheets and Microsoft Excel each Friday by midnight. By requiring the data weekly, the primary researcher could perform ongoing visual inspection of each participant's data and ensure interobserver agreement during the study. Because of the repeated measures, quasi-experimental, nature of these data, most conclusions were reached from visual inspection of the graphed speech data and from informal analyses of the ratings of academic, social, and emotional functioning. Other areas of analysis included overall amount of speech (as total number of syllables) during treatment time for each participant during their

therapy sessions; therapy protocol as they relate to %SS, SPM, and naturalness; which type of activities/materials are used most often during therapy; relationships between those activities and %SS; and whether students who stutter have increased success in decreasing %SS when in individual therapy or group therapy.

Reliability

Intraobserver agreement. As noted above, each research assistant rated all recordings from her assigned child twice, and all data analyses were based on the average of those two ratings for all dependent variables. Intraobserver agreement for percent syllables stuttered data was assessed for all recordings as the percent of recordings for which the two ratings of %SS were within 1 percentage point. If the observer's two %SS scores for a given recording differed by more than 1 percentage point, the recordings from the relevant child were re-assessed by the primary researcher (Table 11).

Interobserver Agreement. Each week, 15 minutes of session time from each child (either one 15-min session or the middle 15 min of one 30-min session) was re-rated by a different research assistant. Interobserver agreement for the %SS data was assessed in terms of the absolute difference between (a) the mean %SS value from the primary observer's two ratings and (b) the secondary observer's one rating. Agreement was summarized and is presented as the percent of sessions for which these two values did not differ by more than 1 percentage point. For all sessions where observers differed by more than 1 percentage point, the recordings from the relevant child were re-assessed by the primary researcher. The student assistants also listened to the recording together to review for agreement, and then independent counting was redone until agreement within 0.5 percentage points was achieved for that session (which approximates 90% total counts agreement for 5%SS) (Table 11).

CHAPTER 6

RESULTS OF THE INTERVENTION STUDY

This chapter provides the results of the study, primarily in a descriptive form for each child individually. Research assistants were assigned to each specific child; therefore, each research assistant's intraobserver and interobserver agreement will be discussed as well. A summary of findings across students, SLPs, teachers, and parents will close the chapter.

All participants completed the study, and all data were complete and usable, with the exception of isolated absences as described for each child. The 8 weeks of therapy that constituted this study's primary phase of intensive data gathering were structured as 7 consecutive weeks, followed by a 1-week break for the Thanksgiving holiday, followed by 1 additional week. All sessions during Weeks 1-8 were recorded and analyzed in their entirety, and one session was recorded and analyzed per child in Week 26. Due to the small amount of speech produced by each participant, the data as presented in most of this chapter are from complete sessions rather than from the session segments of beginning, transition, treatment, and closing.

Individual Participant Results

Participant DI4

Characteristics. DI4 was a 4th-grade male. His mother reported no significant medical history and no family history of stuttering. She noticed DI4's dysfluencies when he was 3 years old. Initially certain letters were more difficult (reportedly p, b, m, and t), and she described him as unaware of his stuttering when it was first emerging. At the time of initial interview conducted by the researcher at his IEP meeting, DI4's mother felt that his dysfluencies occurred

most often when he was reading. She stated that at the beginning of the school year DI4 appeared to be holding back what he wanted to say, but she had only noticed him voicing his frustration once. She also reported her perception that his dysfluencies tended to decrease as the school year progresses and that his dysfluencies have decreased over the years as well. DI4 had been receiving therapy in the public school, two 30-min sessions per week, since the 1st grade. He has never received outside private therapy for fluency.

Treatment. DI4 was treated throughout the study using the traditional schedule of two sessions per week, with each session scheduled to be 30 min. He attended 13 out of the 16 possible sessions in the 8 weeks of intensive data collection, and mean session duration as administered was 25 min 38 sec (range 22:04 to 30:59). Of the resulting 334 min of actual session time, 287 min (86.47% of his session time) was judged by the research assistant to be treatment time (using the definitions provided in the Data Analyses section of Chapter 5). He spoke an average of 753.31 total syllables per session (Tables 12 and 13), or approximately 5 minutes of speech (estimated from his syllable count using 150 syllables per minute as an approximate speech rate). The most commonly used activity for DI4 was games (33%), followed by conversation (23%) (see Figure 1 and Table 14). He was in a group therapy setting for all treatments, with an average of 2.62 participants per session (including him). The other students in his group throughout the study were being treated for articulation, specifically /r/.

In terms of therapy protocols, the most commonly used treatment protocol as reported by the SLP was the Lidcombe Program (73%), followed by periods of no activity (14%) (Figure 2). As observed, however, treatment sessions included no collaboration with parents or any other of the home-based activities that characterize the Lidcombe Program. During sessions, the SLP praised DI4's smooth speech and requested that he repeat stuttered words or sentences. He also

produced some self-corrections after Week 4. Utterance length was not systematically controlled, but he was given cues such as to think of a paragraph as individual sentences, and he was observed to stutter the most during conversation. No social, emotional, counseling, or other non-speech activities were noted during his sessions. Specific session notes from the research assistant included the following:

- At Week 6, DI4 appeared to only be stuttering in conversation and not on the card activities. He appeared very competitive during session 10, including arguing about the game.
- He tends to struggle when starting a sentence with the /d/ sound.
- Into Week 6 continued attempts were made to speak in different voices, but SLP continues to ask him to stop when that behavior occurs. SLP also asks him to start sentences with the /d/ sound during this time.
- During Week 8, when DI4 was asked to go back and repeat the sentence he appeared frustrated. SLP instructed DI4 to think of the paragraph as separate sentences; however, he seemed to stutter more at that time. DI4 had just returned from holiday break and was more dysfluent than previous sessions and weeks, rising from 2.44%SS in Week 7 to 4.38%SS in Week 8.

Outcomes. DI4 stuttered 4.18%SS (percentage of syllables stuttered) in Week 1, between 2.39%SS and 4.38%SS in Weeks 2 through 8, and 1.99%SS in Week 26 (Table 16, and Figure 3). As shown in Table 17, DI4's SLP initially rated him at 4 or 5 on the 10-point scale for all items related to academic, emotional, and social functioning, indicating her perception that his speech moderately affected his functioning in these areas. At Week 3, her responses were the same, with the exception of rating him at 6 for emotional difficulties. At Weeks 6 and 8, several

of her responses differed from previous weeks, suggesting more stuttering (a rating of 7 for amount of stuttering) but less influence of that stuttering (3 for interference with his academic work, 2 for social difficulties). At Week 26, her stuttering rating was lower, corresponding to his 1.9%SS observed stuttering frequency, and her other ratings had remained at 3 or 4. Before the study, she rated her own comfort level as a 5, and at Week 26 she rated herself a 2 (more comfortable).

The perceptions reported by DI4's parents and classroom teacher were similar to those reported by his SLP. As shown in Table 18, his parents' ratings reduced from between 3 and 5 at the beginning of the study to scores of 1 and 2 at Week 26. His teachers perceived more stuttering (Table 19) but with little impact on academic, social, and emotional levels (scores of 1-3; Table 19).

Observations. Overall, DI4 decreased his dysfluencies the most out of all four participants, showing a reduction of 2.19 percentage points (a reduction of just over 50% from his initial values) to a final level of 1.99%SS at Week 26. The ratings from his teachers, parents, and SLP also showed improvements in his academic, social, and emotional functioning during the time of this study. All of these adults also reported verbally to the primary researcher that DI4 appeared more confident in his speech at Week 26. He was very interested in helping a peer who stutters navigate through the speech therapy process.

Reliability. The research assistant assigned to DI4 showed 93.15% intrarater agreement for Weeks 1-6 (as percent of recordings re-rated within 1 percentage point) and 100% intrarater agreement for Weeks 7-26 (Table 11). Interrater agreement was noted at Week 6 to be only 69.23%, and steps were taken at that time to assure the dependability of this research assistant's data (as described in the Method section). The research assistant agreed to within 1 percentage

point with the primary researcher for 86% of sessions, and by the end of the study she met the criterion of agreement within 1 percentage point with another assistant for 83.33% of sessions.

Participant AM5

Characteristics. AM5 was a 1st-grade male. His mother reported he had received private speech therapy at the beginning of 2015, but that it stopped in May 2015 because she believed it was not helping. She stated that the private practice SLP was focusing more on articulation and the dysfluencies were increasing. His mother also reported no significant medical history, including no family history of stuttering. AM5 attended the gifted program at school. While AM5's mother states she is supportive of speech therapy, her shifts at work and other family dynamics make carry-over activities difficult in the home. AM5's attendance was impacted by mother's work schedule, and a significant other has been getting AM5 ready for school and assisting in his care. Toward the end of the study AM5 had a moment of recorded realization for the first time that he was stuttering; although he could identify "bumpy speech" in the SLP, he personally appeared to have had no awareness about his own speech prior to that specific session.

Treatment. AM5 was treated throughout the study using a schedule that sought to provide three 30-min sessions per week. This was the frequency of therapy he had been receiving since the beginning of the current school year, as the result of an evaluation process completed the previous spring. At that time, based on the severity of stuttering, rapid rate of speech, and overall decreased intelligibility due to stuttering and articulation errors, it was recommended that AM5 receive therapy three times a week for 30 min. Thus, for the purpose of this current study, the IEP team decided that he should continue at this frequency and duration and not be decreased or changed.

AM5 attended 19 out of the 24 possible sessions in the 8 weeks of intensive data collection, with a mean session duration as administered of 25 min 51 sec (range 21:04 to 30:22). Of the resulting 492 min of actual session time, 371 min (75.56% of his session time) was judged by the research assistant to be treatment time. AM5's SLP placed him in individual and group therapy depending upon the day and schedule. On average, his group therapy consisted of 2.68 participants that were enrolled in speech therapy for a variety of disorders (including AM5; Table 13). The most commonly used activity was games (51%) followed by conversation (33%) (Table 20 and Figure 4). He spoke an average of 677 total syllables per session.

In terms of therapy protocols, the most commonly used approaches for AM5 were response contingencies (68%) followed by Prolonged Speech (13%) (Figure 5). The research assistant also noted activities she described as GILCU, LP, auditory discrimination tasks, and modeling. The SLP was noted to use a tactile cue of touching the student's arm when a dysfluency occurred. She often reviewed his progress with him, and she checked on him frequently in his regular classes. Specific comments from sessions include the following:

- During Week 1, the SLP touched the student's arm when he stuttered but contradictorily also praised him when he stuttered. When asked by the research assistant, the SLP was unsure what the therapy protocol was called, stating she did not know which therapy she was using.
- During the third session of Week 1, AM5 was upset as SLP was reviewing his progress. At times during the first week, there were more positive than negative response contingencies being utilized by the SLP.

- During one individual-therapy session in Week 3, the SLP and student were able to walk in the halls and classrooms and pretend to interview people. The SLP would have him repeat smooth speech when he asked a "bumpy" question.
- During Week 4, the SLP explained progress to the student and asked him to speak slowly so he could think carefully of what to say. The SLP was increasing the complexity of task to increase length of utterance for AM5. AM5 did not appear to have difficulty shifting from fluency to articulation treatment during this time.
- At Week 6, AM5's SLP received an email from his mother saying that the child stuttered eight times on a word and that it was the first time the child may have had a true realization that he stutters. His mother also stated he was very upset about this situation. SLP discussed this episode with AM5, suggested that he could "stretch out" his speech when similar instances occurred in the future. The SLP was also working with several other students during this session, and AM5 produced many uncorrected stutters during the final minutes. AM5 did try to self-correct but still would stutter the second time.
- During Week 7, the SLP utilized various environments such as the speech room and the library to "interview" others as a speech task.
- During Week 8, AM5 appeared confused, tired, and asking why he was in speech so early. He requested this date that he only receive short questions to answer. AM5 spent time deciding what questions to ask people during interviews but did not appear interested in the activity and asked to end the activity early. He interviewed one person. SLP sat with him and changed questions while in the library to keep him interested. SLP was not correcting speech when he was interviewing people, but when they were sitting together and talking, SLP did correct his speech.

- In session 18, AM5 was experiencing hiccups but he was able to understand the difference between a dysfluency and hiccups. In the last session, as they were starting the session and setting up a game, they were working on and talking about AM5's speech, relating him to Superman in that he is in control of his own speech. SLP used prolonged speech one time when student was having dysfluencies. SLP told research assistant that he wasn't talking as much as it was hard to get a response from him today.

Outcomes. AM5 stuttered 5.72%SS in Week 1, between 2.90% and 4.71% in Weeks 2 through 8, and 3.90%SS in Week 26 (Table 21 and 22, and Figure 6). As shown in Table 23, AM5's SLP initially rated him at 1 or 2 on the 10-point scale for all items related to academic, emotional, and social functioning (low responses indicating her perception of no difficulties). At Week 3, her responses were the same, with the exception of rating him at 4 for emotional difficulties. At Week 26, her scores ranged from 3-5 in those areas. Throughout the study her judgment of how much AM5 stuttered stayed within the higher range of 5-9. In terms of comfort when treating AM5, before the study she rated her comfort to be a 4, and at Week 26 she rated herself an 8 (less comfortable).

His parent's responses to the input instruments showed her perception of a high level of dysfluencies (ratings of 8-9 throughout the study), but she felt that his stuttering had only minimal or moderate impact on his academic, emotional, or social functioning (scores of 1-4; Table 24 and 25). His teacher also rated his amount of stuttering as 8, 9, or 10, meaning the child was seeming to stutter nearly all or all of the time. The teacher reported high ratings for interference with academic performance (between 6 and 10), a very different perception than that

of the SLP and the parent. The classroom teacher also reported social and emotional difficulties that were present for AM5 throughout the study (scores of 8 and 6 prior to Week 1 and also at Week 26).

Observations. Overall, AM5 reduced his stuttering by just over 1 percentage point, or by approximately 25% from his initial levels, to a final level of 3.90%SS in Week 26. All three adults reported their perception throughout the study that he stuttered frequently. The classroom teacher also perceived academic, social, and emotional difficulties throughout the study that the parent did not report from home and that the SLP did not report.

Reliability. The research assistant assigned to AM5 showed 87.60% intrarater agreement for Weeks 1-6 and 88.9% intrarater agreement for Weeks 7-26 (Table 11). Interrater agreement was noted at Week 6 to be 75%, and steps were taken at that time to assure the dependability of this research assistant's data (as described in the Method section). The research assistant's agreement with the primary researcher was 88%, and by the end of the study her agreement for all data with another assistant averaged 85%.

Participant LY1

Characteristics. LY1 was a 2nd-grade male. He was evaluated in the spring of 2015, began therapy for his stuttering at that time, and continued therapy for stuttering in the fall of 2015. His mother reported that he had never received outside private therapy for fluency. She also reported that LY1's medical history included cerebral palsy and nutritional needs that are addressed at a feeding specialty center. While on grade level, he also has Other Health Impairment (OHI) eligibility secondary to cerebral palsy. She noticed LY1's dysfluencies when the child was in prekindergarten but stated he was unaware of his deficits at the time.

At the time of initial interview conducted by the researcher at the IEP meeting, LY1's mother felt that his dysfluencies occur most often at the beginning of school year, during an exacerbation of his medical diagnoses, and at other transitional times. She states his fluency gets worse when he is away from school, specifically during summer break. Now as a 2nd grader, his mother reports that he seems more careful when attempting words, slows down, and shifts his gaze away from listener. While his mother states that she is supportive of speech therapy, she said the priorities have been his health and academics. Neither she nor the other members of the IEP team believed that he was an appropriate candidate to change to four 15-min speech therapy sessions per week, in part because he has frequent medical appointments that would be difficult to schedule if he had speech therapy 4 days per week.

Treatment. LY1 was treated throughout the study using the traditional schedule of two sessions per week, with each session scheduled to be 30 min. This was the frequency of therapy he had been receiving since he was enrolled in speech therapy in the spring of 2015 (the spring before this study was conducted). He was in a group therapy setting for all treatments, with an average of 4.15 participants per session (including him) that were receiving speech therapy for a variety of disorders (Table 13).

LY1 attended 13 out of the 16 possible sessions in the 8 weeks of intensive data collection, with a mean session duration as administered of 27 min 12 sec (range 22:49 to 31:40). Of the resulting 354 min of actual session time, 335 min (94.6% of his session time) was judged by the research assistant to be treatment time, the highest of all four participants. Over the course of 8 weeks, on average he spoke 505.65 total syllables per session (approximately 3-4

minutes of speech), which is the lowest out of the four participants. The most commonly used activity for LY1 was games (30%) followed by various card decks (Tell Me All About It, etc.) (33%) (Table 26 and Figure 7).

LY1's SLP reported that she used the LP (96% of treatment time). LY1's assigned research assistant questioning the accuracy of this report, recording no parental involvement during treatment sessions and varying verbal praise by the SLP for smooth speech. Specific comments from sessions include the following:

- During most sessions, the SLP stopped LY1 when he produced dysfluencies. Activities included having LY1 finish the story from a story-starter card or produce a monologue as he told a story about a card he had selected.
- During many sessions (including Weeks 2, 3, 5, and 6) LY1 participated in nonverbal tasks such as coloring or playing with blocks, and his amount of talking time was very low because of the number of children in the group. During one session in Week 3, the SLP instructed him to speak for at least 3 minutes, which he completed. During the first session of Week 6, he did not speak until 17 minutes into the session.
- LY1 was absent for all sessions during Week 7. The following week was the Thanksgiving break for all students, and Week 8 data were gathered in the following week. During Week 8, the SLP explained the game and everyone's specific treatment plan, and LY1's job was to read all of the questions for the game aloud.

Outcomes. LY1 stuttered 1.61%SS in Week 1, between 1.34% and 2.82% in Weeks 2 through 8, and 1.53%SS in Week 26 (Tables 27, 28, and Figure 8, 9), showing essentially no change in stuttering frequency during the time of this study. LY1's SLP initially reported a score of 3 regarding how much the child stuttered, with some variability during the study (ratings of 7

in Week 6 and Week 8, and then a rating of 2, indicating very little stuttering, at Week 26). In terms of comfort level of the SLP, she was more comfortable at the beginning of the study (with a score of 3) than during Weeks 6 and 8 (scores of 5), and she then reported a score of 2 for comfort at Week 26 (Table 29).

Throughout the study, LY1's parent reported her perception that LY1 was stuttering a substantial amount (ratings of 4-7; Table 30). The parent's perception was that this stuttering caused little academic interference (all ratings of 2), little emotional difficulty (ratings of 1-3), and more noticeable social difficulty (ratings of 3-5, ending with a score of 3 at Week 26) for LY1. LY1's teacher's ratings also noted a substantial amount of stuttering (ratings of 5-10; Table 31). The teacher's perceptions of academic or other difficulties for LY1 varied during the study. During Week 6, when LY1 was given a score of 10 for amount of stuttering, the teacher also gave him a 10 for impact on academics. All scores decreased after Week 6 and were in the range of 2-3 during Week 8 and Week 26 (with the exception of a rating of 5 for academic interference during Week 8).

Observations. Overall, LY1 maintained a consistent rate of stuttering, approximately 1.5-1.7%SS most weeks, throughout the entire 26 weeks of this project. He did stutter more in Week 5, an increase that appears to be reflected in the adults' ratings provided during Week 6. These ratings also suggest some minimal or variable academic, social, and/or emotional difficulties caused by his stuttering, as perceived by his SLP, parent, and teacher. LY1 spoke an average of only 505.65 syllables per session (Table 28) and spent a considerable amount of time in nonverbal activities.

Reliability. The research assistant assigned to LY1 showed 100% intrarater agreement for Weeks 1-6 and 100% intrarater agreement for Weeks 7-26 (Table 11). Interrater agreement was noted at Week 6 to be 92%, and at the end of the study her agreement for all data with another assistant averaged 87%.

Participant RP3

Characteristics. RP3 was a 5th-grade female. She had been evaluated and enrolled in therapy for her stuttering the previous spring and was continuing in fluency therapy at the time of this study. RP3's mother reported that she had never received outside private therapy for fluency. Her mother also reported that RP3's medical history included attention deficit disorder (ADD), anxiety, depression, and obsessive-compulsive disorder (OCD). She noticed RP3's dysfluencies when the child was in 3rd grade.

At the time of initial interview conducted by the researcher at the IEP meeting, RP3's mother reported that she was more dysfluent during oral reading than during other speaking tasks. She also reported her perception that RP3 had stopped answering questions in class, which the mother attributed to the child being embarrassed by her stuttering, and her perception that RP3's dysfluencies increase with her anxiety medication. Other situations that reportedly increased dysfluencies included when RP3 was telling a story, gets excited, and/or is talking to teachers. Although RP3's other medical diagnoses might have made it difficult to change the frequency and duration of her speech therapy sessions, she was asked what she thought of changing to four 15-min sessions per week and she liked the idea. Her mother was very supportive of speech therapy and thought the change might actually benefit RP3, because it would allow her to receive therapy at different times of day and several days in a row.

Treatment. RP3 was treated throughout the study using a schedule that was intended to provide four 15-min sessions per week. She was seen in individual treatment sessions (Table 13). She attended 28 out of the 32 possible sessions, or 87.5% attendance (the highest attendance out of all four participants) in the 8 weeks of intensive data collection. Mean session duration as administered was 13 min 56 sec (range 7:48 to 19:09). Of the resulting 368 min of actual session time, 281 min (70.3% of her session time) was judged by the research assistant to be treatment time focused on her speech goals. She spoke an average of 875.48 total syllables per session, which is the highest out of the four participants. The most commonly used activity was books (33%) followed by cards (artic cards, conversation starters, etc.) (14%) (Table 32 and Figure 10).

In terms of therapy protocols, the most commonly used approaches were the LP (89%; Figure 11), but the research assistant recorded no parental involvement during treatment sessions and inconsistent verbal praise by the SLP for smooth speech. During many sessions, the SLP spent time talking to RP3 regarding issues other than her speech, including the anxiety she was experiencing. Specific comments about individual sessions included the following:

- The SLP reported in the first week that the student was doing better in spontaneous speech. The SLP had the student tap her finger on the table when the student heard a dysfluency, to allow the SLP to know if she was able to detect dysfluencies in her own speech.
- During Week 3 (session nine), RP3 appeared to be avoiding sentences that she thinks she will be dysfluent on.
- In session 12 of Week 4, treatment was held in the media center, which increased the child's anxiety.

- In Week 5, RP3 was asked to read the same passage every day, with the SLP expressing some hope that it will become smoother after many days of practice. RP3 was again to tap when she recognizes a dysfluency while reading. At the end of this week, the child had read the passage 4 times. In Week 6, the SLP continued to have RP3 tap when she has dysfluencies.
- During Week 7, in session 23 of Week 7, she was tired and paying less attention towards her speech as a result. During session 24, the student had encountered a difficult issue in the morning and was trying to talk through it. The SLP suggested several options, but no speech activities were performed and no correction of dysfluencies occurred.

Outcomes. RP3 stuttered 1.44%SS in Week 1, between 1.04%SS and 2.47%SS in Weeks 2 through 8, and 1.85%SS at Week 26 (Tables 33, 34, and Figure 12). Her SLP reported fluency ratings between 3 and 7 (Table 35), but with relatively little impact on her academic functioning (scores of 1-2 for academics except during Week 8). Social and emotional difficulty were initially rated by the SLP at 5 and 4, respectively, and fell between 3 and 8 during the study, with the highest ratings associated with the report of the most stuttering (Week 8). The SLP consistently rated her own comfort level as a 3, with the exception of a score of 5 at the conclusion of Week 8 (Table 35).

RP3's parent reported a perception of decreasing stuttering during the study (from ratings of 6 in Weeks 1 and 3 to ratings of 2 for Weeks 6, 8, and 26; Table 36). The parent's perception of academic, social, and emotional difficulty followed the same pattern: higher in Weeks 1 and 3, and then rated as 2-3 throughout the rest of the study. RP3's teacher, in contrast, rated RP3's

stuttering frequency as high throughout the study (between 6 and 8 in all weeks; Table 37); the teacher perceived relatively little academic, social, or emotional difficulty, except during Week 3 (Table 37).

Observations. Overall, RP3's stuttering remained relatively consistent throughout the 26 weeks of this study, ending 0.41 percentage points higher at Week 26 than it had been at the beginning of the study (Tables 16 and 34). The SLP and her parent perceived some improvement in RP3's academic, social, and emotional functioning during this time, which might have been associated with the amount of time that the SLP spent discussing emotional issues with RP3. Overall, the teacher did not seem to feel the student was impacted academically, socially, or emotionally.

Reliability. The research assistant assigned to RP3 showed 87.31% intrarater agreement for Weeks 1-6 and 100% intrarater agreement for Weeks 7-26 (Table 11). Interrater agreement was 85% for Weeks 1 through 6, and at the end of the study she agreed within 1 percentage point with another assistant for 100% of sessions.

Summary of Findings Across Children

The treatment dose or intensity variables and the treatment outcomes variables presented above for each child are summarized for all children in Table 38. As reviewed above, only one of these four children (DI4) showed substantial reductions in stuttering during the 26 weeks of this project (Figure 13). As is clear from Table 38, however, that change did not appear to be related to the dose or intensity variables that this study was attempting to investigate. Specifically, DI4 was scheduled to receive the standard two 30-min sessions per week, yet he made more progress than did the child who was scheduled for three 30-min sessions per week and also made more progress than did the child who received more frequent treatment sessions.

He also received less actual treatment time than the other child assigned to two 30-min sessions received, and his speech output during sessions was among the lowest of these four children. AM5 showed some reduction in stuttering and received three 30-min sessions, but the reported difficulties associated with his stuttering were perceived to be worse at the end of the study than they had been at the beginning. Neither LY1 nor RP3 reduced their stuttering during this study, but the adults who reported their perceptions seemed to notice that RP3's stuttering caused fewer difficulties for her by the end of the year. In short, this study found essentially no consistent relationships between the therapy process, dose, or intensity variables of scheduling, session duration, or amount of speech practice completed during therapy with the therapy outcomes variables of speech production or perceived academic, social, or emotional difficulties for these children.

Other Results

With respect to the treatment dose and dose intensity variables, the most striking feature of these data was the decreased amount of therapy the children received (Table 39). As mentioned above, most of the children spent a large portion of their time playing games during therapy. DI4 spent 33% of his time playing games; AM5, 51%; and LY1, 30%. RP3 spent most of her therapy time utilizing books at 33% (Figure 14 for further details). Certainly, therapy for children can be accomplished in the context of games, but the data from this study do not suggest that much therapy was occurring. Three of the four children received most of their therapy in groups of 2-4 children, which reduced the amount of time that each child could receive instructions or feedback or could be practicing fluent speech. Moreover, the session time that was judged to include treatment conditions in particular (as opposed to opening, transition, or closing segments of sessions) totaled only 281 to 371 min.

In terms of specific therapy approaches, two of the three SLPs reported or believed that they were using Lidcombe Program (LP) techniques or using the LP itself: 96% of the time with LY1, 90% of the time with RP3, and 73% of the time with DI4. Similarly, AM5's clinician reported that response contingencies were used most often with her student, at 68% of the time (Figure 15 for further details). Across all SLPs, self-reported comfort levels ranged from 2 to 5 throughout the study, with the exception of AM5's clinician rating herself as an 8 in Week 26. This would suggest that overall, more often than not, these clinicians felt relatively comfortable treating this population, but these comfort ratings were not related to any of the dose, intensity, or outcomes variables. The fact that these clinicians described their work as incorporating the LP, and the relative lack of progress the children made, is further addressed in Chapter 7.

With respect to teachers and parents, all teachers tended to rate their student who stuttered as stuttering quite a bit throughout the study, with scores ranging from 4 to 10. While all teachers thought stuttering impacted the child's academics in some way, AM5's SLP rated the highest scores of academic interference throughout the study ranging from scores of 6-10. Parents did not tend to rate higher or lower than teachers or SLPs, nor did they perceive their child as getting better when they were not; however, RP3's parent perceived her emotional difficulty to be much lower at the end of the study (from a rating of 9 at the beginning of the study, revealing that stuttering was impacting her emotional state all of the time, to a score of 2 at Week 26).

There was a strong negative correlation between group size and number of syllables spoken ($r = .516$, $p < .01$). The data suggest that when children who stutter are in smaller groups,

they tend to talk more and utter more syllables. This is perhaps due to increased opportunities to speak and practice speech when there is less competition for talk time; however, this increased opportunity to speak did not relate to progress.

CHAPTER 7

DISCUSSION

The initial and intended purpose of the intervention study described in Chapters 5 and 6 was to evaluate the effects of changing the frequency and duration of therapy sessions for students who stutter within the setting of the public schools. As addressed in this final chapter, the results of the intervention study did not suggest that increasing either the frequency or the duration of therapy led to greater improvements for the children in this study, but several complexities made interpreting these data somewhat complex. The following sections summarize and interpret the obtained data and then attempt to place these results into the larger context of stuttering treatment research and practice more generally.

Summary and Interpretation of Results

Hypothesis One: Influence of Therapy Scheduling on Stuttering Frequency

The first hypothesis addressed by this study was originally phrased as "Elementary-school-aged children being treated for stuttering in public-school settings who receive four 15-min therapy sessions per week will show faster decreases in stuttering frequency than children who receive two 30-min sessions per week." As discussed in Chapter 5 and 6, the final design of the study included three treatment schedules that varied both in number of sessions per week and in total amount of treatment time per week (two 30-min sessions, four 15-min sessions, or three 30-min sessions). Overall, for these four children, these variations in treatment scheduling appeared to have no effect on speech outcomes. In particular, the child who arguably showed the greatest reduction in stuttering from Week 1 to Week 26, DI4, was assigned to two sessions per

week, receiving the fewest number of sessions per week and the least amount of session time overall; that is, neither more sessions nor more time with the clinician was associated with improved speech outcomes for these children. DI4 was the oldest participant in the study, and he did not have any other medical diagnoses that might have interfered with his school-work or other behaviors, both characteristics that might have contributed to his relatively greater improvements during the year.

LY1 who, like DI4, also received therapy at the frequency of two 30-min therapy sessions, did not show the decreases in stuttering frequency that DI4 showed. Instead, LY1 began the study at 1.61 percentage of syllables stuttered %SS, decreased slightly to 1.34%SS at Week 8, and showed 1.85%SS at Week 26, showing overall essentially no change in his stuttering during this study. RP3, who was scheduled for four 15-min therapy sessions, did not show the hypothesized faster decrease in stuttering frequency that was expected to be associated with an increase in therapy frequency. In fact, RP3 began the study at 1.44%SS, had increased to 1.55%SS at Week 8, and had further increased to 1.85%SS at Week 26. RP3 did have other diagnoses, which may have been a barrier to further progress, as many sessions were displaced by emotional breakdowns with very little to no speech-focused therapy being able to take place. Despite her ongoing emotional problems, however, she did not receive the highest ratings for difficulties in emotional or social functioning.

Finally, AM5 received more scheduled therapy than any of the other children, aiming for three 30-min sessions per week, and did show some decrease in stuttering frequency. AM5 began the study with the most stuttering of all participants, 5.72%SS, and by the end of 8 weeks had decreased to 4.71%SS. At Week 26, his stuttering was at 3.90%SS, suggesting a slow but steady decrease in his stuttering during this project. It is difficult to interpret these results in

terms of treatment dose, intensity, or scheduling, however, because despite the three scheduled 30-min sessions, AM5 received only slightly more treatment-condition time within those sessions than LY1 received, and AM5 did not produce the greatest amount of speech in sessions. In summary, Hypothesis One was not supported, and the present data do not provide any consistent alternative explanation for the relationships between treatment time and children's progress.

Hypothesis Two: Influence of Therapy Scheduling on Perceived Social, Emotional, and Academic Functioning

The second research hypothesis was originally phrased as "Elementary-school-aged children being treated for stuttering in public-school settings who receive four 15-min therapy sessions per week will show greater improvements in ratings completed by their parent(s), regular education instructor, and SLP of perceived overall social, emotional, and academic functioning as related to their stuttering, as compared with children who receive two 30-min sessions per week." There was some evidence to support this hypothesis, in that the one child who received four brief therapy sessions each week (RP3) did show the greatest improvement in overall perceived academic, social, and emotional functioning (Table 38), but the many complexities with this child and other children make it difficult to determine that the increase in treatment frequency was the cause of this change. In particular, and perhaps because of her concomitant diagnoses of anxiety and depression, RP3's SLP spent much more time in counseling-type activities than any of the other SLPs spent with any of the other children; that is, RP3's reduction in social and emotional difficulties might more reasonably be attributed to the social and emotional intervention she received that the other children did not receive, rather than to the change in treatment scheduling. It is also relevant to note that neither the child who was

scheduled for more treatment (three 30-min sessions per week, AM5) nor the two children who received the greatest number of treatment-condition minutes (LY1 and AM5, Table 38) showed changes in reported academic, social, or emotional functioning throughout the study. In summary, the hypothesis that greater treatment time or more treatment sessions per week would lead to greater improvements in academic, social, or emotional functioning was not supported, within the parameters tested in this study.

Hypothesis Three: Influence of Therapy Scheduling on SLPs' Comfort Levels

The third hypothesis, finally, was originally phrased as "SLPs who work more frequently (4 sessions per week) with elementary-school-aged children will show increases in self-reported comfort level for treating children who stutter, as compared with SLPs who work with children who stutter only 2 days per week." This hypothesis was also not supported: There was no improvement in self-reported comfort level for the SLP performing the four therapy sessions per week (RP3's SLP rated her own comfort level with consistent scores of 3 and 5 throughout the study), and the SLP who worked with one of these children 3 days per week (AM5) reported a decrease in her comfort level during the study. This hypothesis was based on previous research that has evaluated SLPs' experience with stuttering and comfort with stuttering, showing consistently that SLPs report relatively little exposure to stuttering and relatively low comfort with this disorder (Tellis et al., 2008; Yaruss & Quesal, 2002). The implicit (and occasionally explicit) conclusion drawn from such research is that exposure and comfort are related, or that engaging in treatment activities with children who stutter on a regular basis might make SLPs more comfortable. It appears from these data, however, that SLPs' comfort cannot be improved simply by increasing the frequency with which they encounter or treat children who stutter.

Two other reasonable possibilities, that comfort might be related to the children's stuttering frequency or to their progress in therapy, were also considered. Neither explanation seems to be fully consistent with these data, but there is some suggestion that these variables might be more important than simple exposure. DI4 and AM5, for example, began with more severe stuttering initially, but only DI4's clinician reported being less comfortable than the clinicians working with milder stuttering reported. DI4 then made some improvements during the year, and his SLP reported feeling more comfortable by Week 26, but the same was not true for AM5 and his SLP: He made some improvement, but she reported feeling noticeably less comfortable (a self-rating of 8 at Week 26). LY1 started with relatively mild stuttering and made little progress; her therapist reported variable but generally good and improving comfort. In summary, then, it may be the case for some clinicians that a combination of the student's severity and the student's improvement is related to the SLP's own comfort, but that pattern was not consistently supported in these data.

Assessing the Present Data in the Context of Previous Literature

In general, and beyond the specific hypotheses discussed in the previous sections, one of the primary findings of this study was the overall lack of improvement shown over the course of a full academic year by these four children. On the whole, neither their stuttering frequency nor their academic, social, and emotional functioning as reported by their parents, teachers, and SLPs showed the types of gains that might have been expected from more than 6 months of therapy.

One possible reason for this result could be essentially a treatment fidelity issue. In particular, as mentioned in Chapter 6, the SLPs in this study reported using the Lidcombe Program treatment but were not doing so. As discussed in Chapter 2, the Lidcombe Program is a well-supported approach for working with families to increase fluency in young children who

stutter. Previous data suggest that the Lidcombe Program treatment requires more time with children in the age range of those in the present study than it requires with younger children, but mean treatment time as reported by Lincoln et al. (1996) and others is only 6-10 weeks (Koushik et al., 2009). O'Brian et al. (2013) addressed the question of the fidelity with which the Lidcombe Program is used, and there is a relationship between fidelity of implementation and outcomes. Given that the treatments administered in the present study showed many departures from the desired format of the Lidcombe Program, it is not at all surprising that the children showed very little progress during the year.

The SLPs in this study also reported use of GILCU, response contingencies, and prolonged speech, although, again, it was not clear from watching the sessions that they were implementing these techniques correctly, and the SLPs also reported they were unsure of these protocols and not comfortable administering them. It may be that any use of comments about a child's stutters or praise for fluent speech was referred to by these clinicians as "using the Lidcombe Program," just as any attempt at using shorter utterances was described as "using GILCU" or any comments about stutters or about fluent speech were described as "response contingencies." The finding that these children made very little progress does not necessarily provide any information about the effectiveness of these programs as used correctly, but it does provide some very important information about what may be needed, if stuttering treatment is to be conducted effectively in the public schools. It is not that the various research-supported treatment protocols are not working; in fact, quite the opposite appears to be true from the literature review. However, if SLPs are not properly trained, or do not have access to complete information about how to implement treatment approaches, the result may be less effective, or ineffective, therapy.

There may also be additional treatment dose or intensity issues to consider, probably in the context of treatment fidelity issues (Warren et al., 2007). The finding that increasing treatment frequency and duration did not improve children's speech in this study is interesting because the Lidcombe Program scheduling model of very brief sessions in the home every day is associated with success, and truly intensive scheduling is also associated with success (Hasbrouck et al., 1987; Koushik et al., 2009; Turnbaugh & Guitar, 1981). As previous research about the duration or intensity of treatment has suggested, however (e.g., Ross & Begeny, 2015; Warren et al., 2007), comparisons between two amounts of therapy will not produce the most informative results if neither amount is sufficient to achieve the desired change. It may be that the difference between 3 or 4 sessions per week with a therapist, as this study was designed, and 7 days per week at home, as the Lidcombe Program uses, is a large and important distinction. Similarly, this study used three or four 15- or 30-min sessions to represent the larger amount of therapy, but successful intensive scheduling uses several days or even weeks of many hours per day. Rather than increasing incrementally from the standard of two 30-min sessions, in other words, research might more effectively decrease incrementally from the intensive schedules that are known to be effective. The fidelity of implementation of the therapies must also be incorporated into that future research, as must the use of non-therapy time for practice; school-age children are old enough to complete substantial amounts of self-managed practice outside of therapy, if they are properly motivated and aware of precisely what to practice. The amount of, or lack of, such practice might be very relevant to attempts to quantify treatment dose or intensity (if treatment is occurring outside of treatment sessions) and therefore to attempts to improve treatment outcomes.

Limitations

Several features of this study limit the applicability or interpretation of its results. First, the sample size of only four participants was relatively small. These participants did represent all children in one school district for whom all approvals could be obtained, but this issue raises several interesting factors. Several of the school districts originally approached declined to consider a study in which researchers needed access to actual students. Most school districts were comfortable with researchers interacting with their SLPs and teachers; however, when the researcher was requesting to be in the presence of a student some principals were not even willing to read the research proposal. One district in particular declined the proposal specifically because of the researchers' request to speak with the parents of students who stutter. Within the school district that was utilized for this study, at least eight children initially were recognized as children who stutter who seemed to be potential participants. Two of those students were housed in the preschool section of the school district, however, which operates under different rules and requirements. Though the research assistants applied for clearances to observe in the preschool, the SLP then declined, stating that her schedule was too hectic; therefore, she was not interested in participating at that time. The third student moved to another school district, and the fourth student's father was non-English speaking and refused the study despite a translator being present to help him understand the proposal. Going from eight potential participants to four was a significant change; however, this is the very struggle and complexities that researchers are faced with when doing actual clinical research in a setting such as the public schools. Because of this small sample size, extending the results of this study to larger populations is needed. Generalizability of this study is limited without further replications. Another limitation included

the lack of feedback or input requested of the student. A student input form in which the student had a chance to address their own social, emotional, academic, etc. levels would have been beneficial to gain their insight.

Implications for Practice

Ongoing clinician and child research speaks to the need for a continued partnership and, in this instance, specifically between the University of Georgia (UGA) and local school districts. Not just for research, but for ongoing support as SLPs navigate changing the way in which fluency therapy frequency is given in the public schools. Researchers will be met with increased acceptance in school districts if a relationship is formed. Ongoing communication is vital in supporting SLPs and aiding them in the treatment of students who stutter.

This partnership has begun at UGA through the research projects discussed throughout this study as was mentioned in the preliminary data: surveys and interviews. Long after the completion of both preliminary studies, several districts have requested ongoing fluency training from UGA. Currently, this continuing education takes place as the districts request and occurs during monthly meetings of the SLPs, in one-on-one time between this researcher and a single SLP, or as coaching during therapy sessions with a student. Due to this partnership, SLPs in the school districts surrounding Athens are beginning to request permission from their administration to accept assistance from UGA during the ongoing actual therapy sessions of students who stutter. All involved, parents, principals, SLPs, and students are seeing this as a very welcomed and positive addition in their districts. Continuing this partnership would also greatly reduce the isolation that the SLPs in the public schools currently feel when treating students who stutter.

Results of this study also show current clinicians the need to think critically when assigning the frequency and duration of scheduling to a child that stutters within the setting of the public schools. The standard two 30-min sessions may not be the most effective means for treating this population. Also based on this study's findings, there are benefits from decreasing the group size when working with students who stutter as it increased the amount of talk time the student who stutters receives. This could result in decreased dyfluencies if done consistently over time with increased opportunities to practice speech.

Implications for Future Research

There is a demonstrated need for studies that contribute to the testing of frequency and duration of therapy within the setting of the public schools. School-based SLPs play a vital role in treating this population, as this is the most practical and accessible setting to all students who stutter to receive fluency therapy.

Future research should continue to test various frequencies such as intensive programs that last one week for an hour a day before tapering down to lesser frequencies or durations. This would take a whole team approach to ensure the student receives the necessary academic instruction time as well. In addition, as mentioned above, the use of non-therapy time to achieve therapy practice deserves to be explored with school-age students; self-managed practice schedules are known to be relevant in a range of treatment applications for adolescents and adults and have not been completely explored for school-age or older children who stutter.

Ongoing training is also needed to increase the comfort level of the SLP. SLPs the researchers worked with in public schools have also stated that they do not have access to many journals that contain research regarding evidence-based treatment protocols. Some journals that

stuttering research is published in requires memberships or a cost per article, which is often a price school-based SLPs are unable to pay. Perhaps another area to research would include methods of sharing information. A free printed or online "goal bank," for example, might help SLPs develop appropriate goals for students who stutter, potentially improving their own comfort level or the students' outcomes.

SLPs reported to the primary researcher that they have difficulty relating academic impact with students who stutter. Creating a booklet to aid in the wording of how stuttering impacts and effects academics could be tested for potential use of such a resource on behalf of the SLP and they may or may not then be more likely to use this wording during IEPs, when discussing treatment with teachers and principals, and/or be more likely to retain this population to treat the ways academics are impacted by stuttering.

After being researched, the ideas of booklets could very quickly be dispersed through events such as the yearly American Speech and Hearing Association (ASHA) convention, email, and even social media such as the use of Twitter. Every day SLPs connect using Twitter for professional use, networking, sharing of ideas, and so on. Frequently tweeting and using hash tags such as #slpeeps and #slp2b are ways to categorize and spread information in speech therapy. Additional social media outlets could be explored and utilized such as Pinterest, Facebook, and Instagram, to spread the information regarding fluency therapy in the public schools.

Despite some limitations and a need for continued research, the results of this study were important in beginning to close the gap of this missing research in our field. These ideas, and any other changes that might help SLPs in the public schools provide the best possible treatment

for children who stutter, would have only positive implications for the profession and for the children we attempt to serve.

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APPENDIX A

SLP SURVEY FORM FOR PRELIMINARY STUDY 2013

Public School Speech-Language Pathologists' Intervention Approaches
for Children who Stutter

This survey does not ask about individual students.

Please do not write students' names or any identifying information about students.

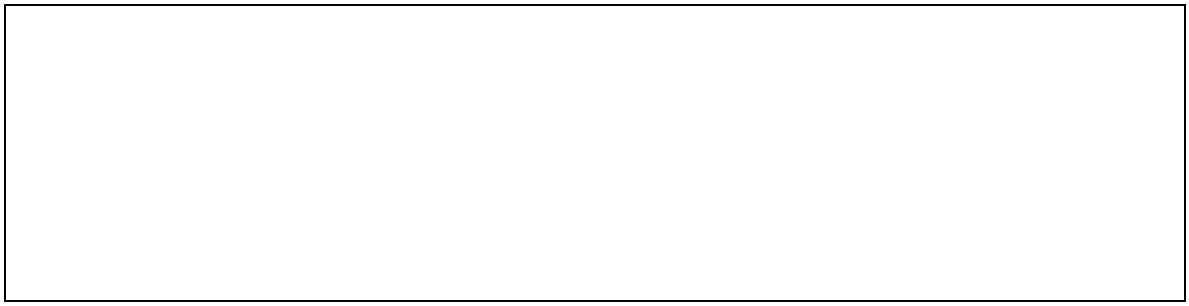
1. This survey is about stuttering treatment. During your **total years** practicing as an SLP in the public schools (after you completed your master's degree), **how many students** have you treated for stuttering?

_____ none _____ 1-5 _____ 6-11 _____ 12+

2. How many students that stutter do you have on your caseload **THIS SCHOOL YEAR**?

_____ 0 _____ 1-2 _____ 3-4 _____ 5-6 _____ 7 or more

3. In your goals for your students who stutter, what do you want them to obtain before discharge (i.e., 95% fluent in school environment or maybe not a percentage but a goal of able to speak in multiple environments, etc.) Please write briefly (a sentence or two) in the box provided below. PLEASE WRITE N/A IN THE BOX IF YOU HAVE NOT WORKED WITH A STUDENT THAT STUTTERS.



4. What percentage of your students you have ever treated for stuttering have met the above goal?

_____Not Applicable, I have not treated students who stutter.
_____80% or higher
_____50-75%
_____less than 50%

5. Are there any specific approaches/therapy techniques you incorporate in your fluency treatment? If so, list them below in the box.

_____Not Applicable, I have not treated students who stutter.
_____Applicable, I use the following techniques:

6. Have you learned about or used these treatments? Please write yes or no in each box.

	I learned about this in my master's program	I learned about this at a continuing education event	I have used this with a child who stutters	I am using this this year
Gradual Increase in Length and Complexity of Utterance (GILCU)				
Extended Length of Utterance (ELU)				
Lidcombe program				
Response contingencies (reinforcers and corrections)				
smooth or prolonged speech; fluency shaping				

change parents' speech or behaviors; indirect treatment				
change child's attitudes about speech/stuttering				

7. Would you describe yourself as using direct, indirect, or blended/integrative approaches to stuttering therapy?

_____ direct
_____ indirect
_____ blended/integrative
_____ not sure

8. These last questions are about you. Please place a check beside how many TOTAL years you have practiced as an SLP, starting after you received your Master's Degree.

_____ Less than one year
_____ 1-5 years
_____ 6-10 years
_____ 11-15 years
_____ 16-20 years
_____ 20+ years

9. What is the highest degree you currently hold?

_____ Bachelors Degree (B.S., B.A., or equivalent)
_____ Masters Degree (M.S., M.A., M.Ed., or equivalent)
_____ Ed.Ms.
_____ Doctor of Philosophy (Ph.D.)

10. At the university you attended for your master's and/or Ph.D., did you take a course in stuttering?

_____ Yes, a full course
_____ Yes, fluency and another disorder in the same graduate course
_____ Yes, in some other way: _____
_____ No
_____ I cannot remember and/or I am unsure.

11. How many years have you practiced in the public schools as an SLP?

_____ Less than one year
_____ 1-5 years
_____ 6-10 years
_____ 11-15 years
_____ 16-20 years
_____ 20+ years

12. How comfortable or uncomfortable are you in treating children who stutter?

_____Not Applicable, I have not treated students who stutter.
_____Very Comfortable
_____Somewhat Comfortable
_____Not Comfortable
_____Very Uncomfortable

13. Have you ever attended workshops, seminars, or continuing education regarding the treatment of stuttering in the public schools? If so, how many?

_____No, I have not attended any
_____1-2
_____ 3-4
_____5 or more

14. Would you be interested or not interested in **free** seminars and/or workshops on the treatment of stuttering in the public schools?

_____YES, I would be interested!
_____No thank you I would not be interested at this time.

15. Do you have any other comments about treating children who stutter? We would appreciate your thoughts!

THANK YOU FOR YOUR TIME!

APPENDIX B

INTERVIEW QUESTION GUIDE FOR PRELIMINARY STUDY 2014

Introduction

My name is Nina Santus, and I am currently a researcher for a research project about stuttering in the public schools. As part of this process, we are looking to gather insights from people from multiple perspectives to gain insight into your knowledge regarding the treatment of students who stutter in the public schools. We thought you might be a great resource to speak to regarding this information. Before we begin, do you have any questions of us?

Personal Background Information Questions:

- Could you tell us a bit about yourself and your role within the school district/community?
- How long have you been employed by the district?
- Do you work directly with students that stutter?

Content Questions:

- How comfortable/knowledgeable do you feel with the term RTI?
- How did the school district educate you regarding RTI?
- What are some of the main points of RTI?
- How did the implementation of RTI effect special education specifically with regard to students who stutter?
- Do students that stutter benefit from RTI?
- How many students who stutter are currently on RTI now?
- Does anyone collect data on those students who stutter that have been placed in RTI that NEVER end up needing treatment by an SLP?
- Are parents generally supportive of the RTI process with their child that stutters?
- Are you a participant in the IEP process? If so what is your role?
- Have you ever considered changing the frequency and minutes that student who stutter engage in treatment with their SLP?
- What effect if any would changing the IEP frequency of treatment for students who stutter have on the school district, staff, etc.?
- What would happen if the SLP changed the frequency of treatment?
- Do you think you would be met with resistance or is this a case of doing what you've always done?
- We have the same goals to help students who stutter get effective evidence-based treatment. What would an active partnership look like? Barriers?
- Any other thoughts that might be helpful for us to hear?

Closing

Thank you so much for your time. I can be reached at my email address and/or phone number found in the consent form. Please do not hesitate to contact us the researchers with any further questions or comments.

APPENDIX C

PARENT INTERVIEW GUIDE FOR DISSERTATION 2015

Parent Interview Questions
Guide for the Researchers

Student ID Code_____

Exact date/age when stuttering was first noticed?
Who noticed the stuttering first?
In what situation was it first noticed or commented upon?
Under what circumstances did it occur?

Did your child seem to be aware of the fact they were speaking in a different manner?
If so, how did they react?

Was there an awareness of stuttering, by the student in any way at first? If so, explain.
After having a lot of trouble on a word, are any behaviors observed?
Suddenly stopped trying?
Suddenly left the speaking situation?
Shout/cry/hit etc.
Seemed to be a little more careful with his/her speech?

Does stuttering occur more often when speaking with certain people? Who?
Does your child talk to strangers with less trouble than to people they know well?

Since the stuttering first began, has there been any change in the stuttering symptoms?
Have you noticed a gradual increase or decrease in stuttering?

Is there a family history of stuttering?
If so who in your family stutters?

Past therapy:
How old was your child when they began fluency treatment?
Was initial therapy conducted at his or her school?
Does your child also receive therapy outside of the public school?
Do you know what types of therapy protocols have been used with your child in the past?
Has that type of therapy improved his or her speech?

(continue to next page)

Any other diagnoses?
Developmental issues?
Other relevant variables?

APPENDIX D

STUDENT ASSENT FORM

Approved by University of Georgia
Institutional Review Board
Protocol # STUDY00002123
Approved on: 7/27/2015
For use through: 7/26/2016

UNIVERSITY OF GEORGIA
STUDENT ASSENT FORM

Dear Student,

My name is Miss Nina and I know your speech teacher. My helpers from UGA and I would like to listen to you when you are in speech class. You will see your speech teacher either as you normally do, two times a week, or you may see them four times a week. Your speech teacher will continue to do all of the activities that you all normally do together. We will watch your sessions, listen, and record your speech. Is that something that would be ok with you? We do not have to listen or record your speech if you do not want us to.

Do you have any questions? If it is ok to be in your speech class doing these things, you can write your name on the line below.

_____	_____	_____
Name of Researcher	Signature	Date

_____	_____
Student	Date

The student/parent will keep one copy and return the other one to the researcher

APPENDIX E

PARENT CONSENT/PERMISION FORM

Approved by University of Georgia
Institutional Review Board
Protocol # STUDY00002123
Approved on: 7/27/2015
For use through: 7/26/2016

UNIVERSITY OF GEORGIA
PARENT PERMISSION FORM

Frequency and Duration of Therapy Sessions in the Public Schools: Effects on Children's Speech and Other Outcomes in Children Who Stutter

Researcher's Statement

We are asking your child take part in a research study. Before you make a decision for your child to participate in this study, it is important that you understand why the research is being done and what it will involve. This form is designed to give you the information about the study so you can decide whether to allow your child to be in the study or not. Please take the time to read the following information carefully. Please ask the researcher if there is anything that is not clear or if you need more information. When all your questions have been answered, you can decide if you want your child to be in the study or not. This process is called "informed consent." A copy of this form will be given to you.

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Advisor: Anne K. Marcotte, Ph.D., CCC/SLP

Purpose of the Study
The purpose of this project is to compare two ways of scheduling your child's speech therapy at school.

Study Procedures
The researchers are working with your child's Speech-Language Pathologist (SLP). The basic design of this study involves continuing the therapy that your child's SLP deems necessary for your child, with a possible change in how your child's treatment sessions are scheduled. The content of the therapy and the total amount of time your child will spend in speech therapy will not change. The only difference is that your child's speech therapy may be scheduled twice a week for 30 minutes, or the sessions may be changed to four times a week for 15 minutes.

The treatment will continue to be provided by your child's SLP at his or her school. If the sessions for your child are changed to four times a week for 15 minutes, the IEP team will request your presence at the beginning of the school year to change the sessions to four times a week for 15 minutes on the IEP.

Your child's speech samples will be analyzed for any changes and will be kept confidential. We will use an audio recorder to ensure accurate analysis of speech samples. Audio recordings may be kept up to 5 years and then deleted by the researchers. We will also ask you to fill out a questionnaire about your child's stuttering. An example of the most personal information that will be recorded is your child's speech during treatment sessions with the SLP, or questions about when you first noticed your child's stuttering or what situations seem to make it worse.

Risks and discomforts
We do not anticipate any risks from participating in this research. Your child will receive either the treatment he or she would have received, or the same treatment but on a different schedule.

Benefits
There are no benefits to you or your child in participating in this survey. We believe there are expected benefits to scientific knowledge as the data we obtain will be analyzed to determine best practices, as well as possible needs for incorporating changes to IEP process, frequency, and duration of treatment for future children who stutter. This will meet the district's school improvement plan and Georgia performance standards by increasing knowledge base of best practices to better serve this population of students who stutter in the public schools. Under the Georgia performance standards, many areas may be affected when a child stutters, including but not limited to both reading literary and reading informational. Children that stutter may not be actively engaging in oral reading, proper use of phonetics, speaking and listening, fluency, and expression. All of these require fluency and fluent speech. Decreasing or eliminating dysfluencies in the students who stutter will increase their academic and overall success in the public schools.

Incentives for participation
No incentives for participation will be given.

Audio/Video Recording
An audio recording will be used to aid in accurate transcription of your child's speech. Upon completion of the study the audio recordings will remain on the 5th floor of Aderhold, locked in room 528 for up to 5 years and will then be destroyed.

Privacy/Confidentiality
The information we obtain will be kept confidential. The auditory recording will not have any information that identifies you or your child directly by name or email. The recordings will be labeled with a pseudonym (fake name) and will never be associated with your child's real name. Information about your child and everything your child says during the study or on the recordings, will not be released to anyone other than individuals working on the project without your written consent unless required by law.

Taking part is voluntary
Your consent and the involvement of your child in this study is voluntary. You may refuse to have your child participate before the study begins, and discontinue at any time, with no penalty or loss of benefits to which you are otherwise entitled. If you choose not to participate in this study, your child will continue to receive speech therapy as determined by his or her SLP and the IEP team.

If you decide to have your child stop or withdraw from the study, the information/data collected from or about you or your child up to the point of your withdrawal will be kept as part of the study and may continue to be analyzed.

If you have questions
The main researcher conducting this study is Anne K. Marcotte, Ph.D., CCC/SLP. She is a Professor and Department Head of Communication Sciences and Special Education at the University of Georgia. Nina Santus is a co-investigator and doctoral student in the Department of Communication Sciences and Special Education. Please ask any questions you have now. If you have questions later, you may contact Anne K. Marcotte at abothe@uga.edu or at (706) 542-4561. Nina Santus can be reached at nsantus@uga.edu or phone number 724.840.9115. If you have any questions or concerns regarding your rights as a research participant in this study, you may contact the Institutional Review Board (IRB) Chairperson at 706.542.3199 or irb@uga.edu.

Research Subject's Consent to Participate in Research:
To voluntarily agree to take part in this study, you must sign on the line below. Your signature below indicates that you have read or had read to you this entire consent form, and have had all of your questions answered.

_____	_____	_____
Name of Researcher	Signature	Date

_____	_____	_____
Parent	Signature	Date
_____	_____	_____
Parent	Signature	Date

Please sign both copies, keep one and return one to the researcher

APPENDIX F

SLP INPUT FORM

SLP:_____
Date: _____
Student ID Code:_____

SLP INPUT FORM
Please read each question below. On a scale from 1 (almost never) to 10 (all of the time), please rate how your student who stutters is currently performing.
****For the fifth question, note the change to 1 (very comfortable) to 10 (very uncomfortable).**

1. How much does this child stutter?

1 2 3 4 5 6 7 8 9 10
(almost never) (all of the time)

2. Does the stuttering interfere with his or her academic work?

1 2 3 4 5 6 7 8 9 10
(almost never) (all of the time)

3. Does the stuttering seem to cause any social difficulties for this student?

1 2 3 4 5 6 7 8 9 10
(almost never) (all of the time)

4. Does the stuttering seem to cause any emotional difficulties for this student?

1 2 3 4 5 6 7 8 9 10
(almost never) (all of the time)

5. How comfortable are you in treating this child who stutters?

1 2 3 4 5 6 7 8 9 10
(very comfortable) (not comfortable at all)

Other comments:

APPENDIX G

PARENT INPUT FORM

Parent:_____
Date: _____
Student ID Code:_____

PARENT INPUT FORM:
Please read each question below. On a scale from 1 (almost never) to 10 (all of the time), please rate how your student who stutters is currently performing.

1. How much does this child stutter?

1 2 3 4 5 6 7 8 9 10
(almost never) (all of the time)

2. Does the stuttering interfere with his or her academic work?

1 2 3 4 5 6 7 8 9 10
(almost never) (all of the time)

3. Does the stuttering seem to cause any social difficulties for this student?

1 2 3 4 5 6 7 8 9 10
(almost never) (all of the time)

4. Does the stuttering seem to cause any emotional difficulties for this student?

1 2 3 4 5 6 7 8 9 10
(almost never) (all of the time)

Other comments:

APPENDIX H

TEACHER INPUT FORM

Teacher:_____
Date: _____
Student ID Code:_____

TEACHER INPUT FORM:
Please read each question below. On a scale from 1 (almost never) to 10 (all of the time), please rate how your student who stutters is currently performing.

1. How much does this child stutter?

1 2 3 4 5 6 7 8 9 10
(almost never) (all of the time)

2. Does the stuttering interfere with his or her academic work?

1 2 3 4 5 6 7 8 9 10
(almost never) (all of the time)

3. Does the stuttering seem to cause any social difficulties for this student?

1 2 3 4 5 6 7 8 9 10
(almost never) (all of the time)

4. Does the stuttering seem to cause any emotional difficulties for this student?

1 2 3 4 5 6 7 8 9 10
(almost never) (all of the time)

Other comments:

APPENDIX I

SESSION ANALYSIS FORM

Session #_____

Date: _____UGA Research Assistant Name_____
Student Identifier Code_____
SLP: _____School: _____
Circle Which You are Observing: 2x/wk X 30 minutes OR 4x/wk for 15 minutes
Group or Individual? _____If group, how many students total in the group? _____
For each recognizable segment/activity during the session

Write Down: Start time and End time	**Circle One: What section/part of therapy is taking place?**	**Circle what therapy is being used (May circle more than one)**	**Write in the name of the activity/manipulative i.e. board game, artic cards, worksheet, art project, etc.**	**Notes? Anything else?**
EXAMPLE ROW Example Row 4:22 – 12:26	Pre Treatment ~~Treatment~~ (Transition) Closing Other:	GILCU Response Contingencies (RC) (Lidcombe) Other:	Just talking Jenga	Student arrived 5 minutes late, was allowed to pick the game, other students were working on their /r/
	Pre Treatment Treatment Transition Closing Other:	GILCU Response Contingencies (RC) Lidcombe Other:		
	Pre Treatment Treatment Transition Closing Other:	GILCU Response Contingencies (RC) Lidcombe Other:		
	Pre Treatment Treatment Transition Closing Other:	GILCU Response Contingencies (RC) Lidcombe Other:		

Continue on this chart as needed.

Write Down: Start time and End time	**Circle One: What section/part of therapy is taking place?**	**Circle what therapy is being used (may circle more than one)**	**Write in the name of the activity/manipulative i.e. board game, artic cards, worksheet, art project, etc.**	**Notes? Anything else?**

	Pre Treatment Treatment Transition Closing Other:	GILCU Response Contingencies (RC) Lidcombe Other:		
	Pre Treatment Treatment Transition Closing Other:	GILCU Response Contingencies (RC) Lidcombe Other:		
	Pre Treatment Treatment Transition Closing Other:	GILCU Response Contingencies (RC) Lidcombe Other:		
	Pre Treatment Treatment Transition Closing Other:	GILCU Response Contingencies (RC) Lidcombe Other:		
	Pre Treatment Treatment Transition Closing Other:	GILCU Response Contingencies (RC) Lidcombe Other:		
	Pre Treatment Treatment Transition Closing Other:	GILCU Response Contingencies (RC) Lidcombe Other:		

Obtain the following information from audio-recorders AFTER each session has ended—please record in Microsoft Excel.

Primary (label as 1) or secondary observer (label as 2)	**Write whether it is your 1st time or 2nd time listening to the speech sample**	**Segment time from session observation sheet**	**Record the number of syllables (in 200 syllable segments or less)**	**%SS (Syllables Stuttered)**	**Stuttered Events**	**Stutterfree SPM (Syllables Per Minute)**	**SPM (Syllables Per Minute)**	**Naturalness**	**Remember record first words and last words of segment so you can easily find your place**

EXAMPLE ROW 1	2nd	0:00- 3:24	188	12%SS	23	165	47	3.2	First: apple for lunch Last: dinosaur museum
									First: Last:
									First: Last:
									First: Last:
									First: Last:
									First: Last:
									First: Last:
									First: Last:
									First: Last:
									First: Last:

Continue on this chart as needed.

Primary (label as 1) or secondary observer (label as 2)	Write whether it is your 1st time or 2nd time listening to the speech sample	Segment time from session observation sheet	Record the number of syllables (in 200 syllable segments or less)	%SS (Syllables Stuttered)	SPM (Syllables Per Minute)	Naturalness	Remember record first words and last words of segment so you can easily find your place
							First: Last:
							First: Last:

							First: Last:
							First: Last:
							First: Last:
							First: Last:
							First: Last:
							First: Last:
							First: Last:
							First: Last:

APPENDIX J

PARENT/GUARDIAN INITIAL CONTACT/INTEREST LETTER

Dear Parent/Guardian,

Greetings! My name is Nina, and I am a Speech-Language Pathologist and doctoral student at the University of Georgia. I wanted to talk with you about a research study that Dr. Anne Marcotte and myself are conducting. Dr. Marcotte is the head of the Communication Sciences and Special Education Department at UGA. The study is titled Frequency and Duration of Therapy Sessions in the Public Schools: Effects on Children's Speech and Other Outcomes in Children Who Stutter.

The inclusion criteria is that your child is currently being treated under the direction of an IEP by a speech-language pathologist in this school system for stuttering. Your child will be excluded from the study if they do not have an IEP for stuttering. We are studying how to schedule therapy sessions at school for children who stutter. We will work with your child and his or her speech teacher. The study will compare having treatment two times a week for thirty minutes versus having treatment four times a week for 15 minutes. Everything else about your child's treatment will remain the same.

Should you choose to find out more, or have your child participate in the study, please let your child's speech therapist know and/or I would be happy to answer any questions you might have at a time that is convenient for you. I can be reached at nsantus@uga.edu. Looking forward to hearing from you!

Thank you,

Nina Santus

Nina Santus, M.S. CCC/SLP

TABLES

Table 1

Systematic Review, Part One: Details from Stuttering Treatment Research Studies Conducted in the Public Schools that Met at Least 2 of 6 Inclusion Criteria (see Text)

Study	Sample Size	Age	Severity	Years in Previous Treatment	Treatment Type	Treatment Schedule	Repeated speech evaluation	Speech evaluation beyond clinic setting	Below 5%SS at post treatment and 6 month follow-up	Normal or improvement on SEC
Hasbrock et al., 1987	15	5-16, mean 13.2 years	4.3 - 18.2 % stuttered words	X	Airflow, tension and relaxation, EMG biofeedback	2-4 hours, 5x/week for 1 month	No	No	after: .04-.72 f/u: .53-9.91	X
Mallard, & Westbrook, 1988	20	Not given, all elementary aged	12% SS	X	Van Riper and Monterey Fluency Program	30 minutes twice/week	No	No	11% SS and 9% SS	X
Runyan, & Runyan, 1986	9	3-7, mean 5.73 years	Mean of 41.5 words stuttered in 5 minute sample	X	FRP - Fluency Rules Program	2-3 20-30 minute sessions/week	No	No	2.1 after 1st year and 2.0 after 2nd year	X
Ryan, & Ryan, 1983	16	7-18 years	6.7 SWM	X	Programmed Traditional, cancellations, pullout, prolongations, fluency speech	Not given	Yes	Yes	.5 SW/M	X
Ryan, & Ryan, 1995	12	7-17, mean 11.8 years	6.7 SWM	X	DAF	30 minutes twice/week	Yes	Yes	After: some under 5%SS f/u:.3 SW/M	X

TuTurnbaugh, & Guitar, 1981	1	12 years	10.5% SS pretreatment and 5.6% SS pre-intensive treatment	X	Pause (RC)	2-3 20 minutes sessions/week and intensive 5.5 hours on 2 consecutive days	No	Yes	Post intensive: .28% SS, post treatment: .80% SS, f/u: 2.2% SS	Yes, Erickson Scale

Note. SS = syllables stuttered; SWM = stuttered words per minute; f/u = follow-

Table 2

Systematic Review, Part Two: Details from Studies Addressing Treatment Scheduling for Other Speech Disorders in School-Aged Children

Study	Sample Size	Age	Frequency and Duration or Intensity Changes	Setting	Treatment Type	Treatment Schedule	Outcomes	Other
Fey, Yoder, Warren, & Bredin Oja, 2013	64, intellectual and communicatio n delays	18 to 27 month olds	X	Vanderbilt University and University of Kansas Medical Center	MCT Milieu Communication Teaching	Half were assigned to 60 minutes one time a week or 60 minutes five times a week, both for nine months	Moderate enhancement of outcomes if the child has high interest in objects	
Guitar, Kazenski, Howard, Cousins, Fader, & Haskell, 2015	29 children, 2 groups of pre-schoolers	Pre-school age	X	Clinic	Lidcombe Program	3 consecutive weeks, 2 week intervals, 4 week intervals, 8 week intervals, 16 week intervals	Reduced stuttering more than natural recovery alone	
Neil & Jones, 2015	2 children	Ages 6 and 8 years	X	One child in a developme ntal disabilities lab playroom, and the other child was at home	ABA therapy (down syndrome)	Child one, five hours a week, Child two, ten hours a week	In study 1, they presented two doses of the number of opportunities (20 & 5 opportunities) and that's when higher intensity intervention produced faster acquisition. In study 2, it was 5 doses of the number of opportunities (meaning 1 to 20 opportunities) and that results in when session	

							inter-stimulus was held constant, low intensity levels produced faster rates of acquisition. Higher doses resulted in fewer minutes to mastery.
Ross & Begeny, 2015	4	Second grade	X	Three classrooms, one rural class in the southeast	Reading passages (Struggling readers)	Different student teacher ratios, which were small group and 1:1, 7 versus 14 minute per intervention session	There were clear patterns for effectiveness and they differed per student, all students benefitted from at least one treatment condition
Yoder & Woynaroski,2015	* review of past research						
Yoder, Woynaroski, Fey, & Warren, 2014	64 children, 31 in one group, 33 in the other	18 and 27 months	X	In participant's home or child care centers	MCT Milieu Communication Teaching (intellectual disabilities including down syndrome)	One hour per week, or five one hour sessions per week	High dose frequency group yielded higher vocabulary production
Yoder, Fey, &Warren, 2012	*commentary						
Warren, Fey, & Yoder, 2007	*review of literature						

Table 3

Literature Review, Part Three: Details from Studies of the Effectiveness of Stuttering Treatment in Other Settings

Study	Sample Size	Age	Treatment Type	Treatment Schedule	Below 5%SS at post treatment	Below 5%SS at 6 month follow-up	Normal or improvement on SEC Post-tx	Normal or improvement on SEC At 6 month follow-up
Costello, 1975	3	16-20	Yes	Yes	Yes	Yes	X	X
Druce, Debney, & Byrt, 1997	15	6-8	Yes	Yes	Yes	Yes	X	X
Koushik, Shenker, & Onslow, 2009	12	6-10	Yes	Yes	Yes	Yes	X	X
Martin, Kuhl, & Haroldson, 1972	2	3.5-4.5	Yes	Yes	Yes	Yes	X	X
O'Brian et al., 2003	16/30	17-58	Yes	Yes	Yes	Yes	X	X

Riley & Ingham, J. 2000	12	3.0-9.5	Yes	Yes	Yes	Yes	X	X
Ryan, & Ryan, 995	6/12	7-17, mean 11.8 years	Yes	Yes	Yes	Yes	X	X

Table 4

Self-Reported Highest Degree Earned and Total Years of Practice, for SLPs who Completed Preliminary Study 1

	Master's		Ed.S	
Total Years Practiced	Full	+Other	Full	+Other
<1	4	1	0	0
1-5	5	0	3	0
6-10	5	1	5	1
11-15	3	1	2	0
16-20	4	1	4	1
Total	21	4	14	2

Table 5

Self-Reported Usage of Direct Therapy by Total Years Practiced, from the SLPs who Completed Preliminary Study 1

Total Years Practiced	Number using direct therapy
<1	1 (20%)
1-5	1 (13%)
6-10	1 (8%)
11-15	2 (33%)
16-20	2 (18%)

Note. Percentages are within group percentages. For example, 20% (1/5) of SLPs with <1-year experience reported using direct therapy.

Table 6

Self-Reported Knowledge and Use of Treatment Techniques, from the SLPs who Completed Preliminary Study 1

	I learned about this in my master's program	I learned about this at a continuing education event	I have used this with a child who stutters	I am using this this year
Gradual Increase in Length and Complexity of Utterance (GILCU)	53.5	20.9	53.5	30.2
Extended Length of Utterance (ELU)	51.2	14	32.6	23.3
Lidcombe program	32.6	18.6	16.3	2.3
Response contingencies (reinforcers and corrections)	58.1	37.2	51.2	25.6
smooth or prolonged speech; fluency shaping	86.0	53.5	93.0	65.1
change parents' speech or behaviors; indirect treatment	67.4	55.8	69.8	30.2
change child's attitudes about speech/stuttering	72.1	48.8	76.7	53.5

Note. Observation #2 had "N/A", which was coded separately.

Table 7

Self-Reported Comfort Level by Degree Held, from the SLPs who Completed Preliminary Study 1

Comfort Level	Master's	Ed.S
Very Comfortable	3 (11.5%)	3 (18.8%)
Somewhat Comfortable	14 (53.8%)	5 (31.3%)
Not Comfortable	8 (30.8%)	7 (43.8%)
Very Uncomfortable	1 (3.8%)	1 (6.3%)

Note. Percentages are within group percentages. For example, 11.5% (3/26) of SLPs with Master's degrees reported feeling very comfortable in treating children who stutter.

Table 8

Self-Reported Comfort Level by Experience Level, from the SLPs who Completed Preliminary Study 1

	Experience	
Comfort Level	Low	High
Very Comfortable	4 (15.4%)	3 (17.6%)
Somewhat Comfortable	11 (42.3%)	8 (47.1%)
Not Comfortable	10 (38.5%)	5 (29.4%)
Very Uncomfortable	1 (3.8%)	1 (5.9%)

Note. Percentages are within group percentages. For example, 15.4% (4/26) of SLPs with low experience level reported feeling very comfortable in treating children who stutter. Low experience level SLPs are those with 0-10 total years practiced. High experience SLPs are those with more than 10 total years practiced.

Table 9

Reported Percentage of Student Goals Met by Therapy Treatment Usage, from the SLPs who Completed Preliminary Study 1

Therapy/Usage	80% or higher	50-75%	<50%
GILCU/ELU Used	6	17	3
GILCU/ELU Not Used	3	7	5
Lidcombe Used	0	6	1
Lidcombe Not Used	9	18	7

Table 10

In-class Training Schedule and Topics for the Research Assistants Who Participated in the Intervention Study

Date	To read/prepare/do beforehand	Activity/topics in class
August 19th	Background Check Liability Insurance Authorization of Release of Information	Syllabus Overall Plan for the class Q &A
August 26th	Bring back completed CITI training and read ASHA code of ethics	ASHA Code of Ethics FERPA Stuttering Introduction: definition, history, types of dysfluencies
September 2nd	Download SMS	Stuttering Therapy Protocols Naturalness Rating Scale Syllables Per Minute (SPM) Disperse audio-recorders
September 9th	Complete SMS initial training	Practice with Data Collection Sheet using therapy videos
September 16th	Bring your completed SMS training printouts/worksheets	Was that a stutter?? Getting comfortable with counting today! Continue Practice with Data Collection Sheet using SMS **SLP/student assignments today
September 23rd	Touch base with your assigned SLP by today and confirm with me via email that you all have spoken.	More practice counting and analyzing speech samples using SMS.
September 30th	Check out your school's website!	SMS Practice Continued **Head to your assigned school for 2 weeks of preliminary data starting on October 5th!
October 7th and following	Preliminary Phases end…. continue data collection for the next 6 weeks.	Meetings as needed to analyze data, etc. Turn in all data WEEKLY to me by FRIDAYS at MIDNIGHT
October 14th		Midterm Conferences as needed.
December 2nd		One last large group gathering. Everyone together to share results; talk about the semester, and Q&A time.

Table 11

Intraobserver and Interobserver Agreement for the Intervention Study, as Percent of Pairs of Sessions for Which Percent Syllables Stuttered Scores Were Within 1 Percentage Point

	DI4		AM5		LY1		RP3	
Week	Intra[1]	Inter[2]	Intra	Inter	Intra	Inter	Intra	Inter
1-6	93.15	69.23	87.6	75	100	92	87.31	85
7-26	100	83.33	88.9	85	100	87	100	100
Re-check by NMS		86		88				

[1] Intraobserver agreement: Comparison between the primary rater's two ratings of the same session

[2] Interobserver agreement: Comparison between the primary rater and the secondary rater

Table 12

Participant DI4: Descriptive Statistics for Speech Variables, by Session

Session	Average Syllables/Session	Total Stuttering Events	Percentage Syllables Stuttered	Naturalness	Stutterfree SPM	SPM
1	717	25.5	3.56	4.5	96.78	109.17
2	947.5	44	4.64	4.58	103.31	107.19
3	651	21	3.23	4.63	100.31	104.25
4	884.5	44.5	5.03	4.88	96.08	100.65
5	929.5	25.5	2.74	3.79	81.14	93.99
6	407	21	5.16	6.67	88.85	94.53
7	610	20.5	3.36	4.83	88.37	94.43
8	766.5	28.5	3.7	5.33	94.14	99.97
9	565.5	20	3.54	5.10	71.57	83.60
10	871.5	20.5	2.39	4.86	95.02	101.82
11	615	15	2.44	4.80	93.94	100.46
12	902.5	22	2.44	5.19	88.58	99.49
13	925.5	40.5	4.38	6.88	92.46	96.95
Average	753.31	26.81	3.59	5.08	91.58	98.96
Week 26	803.5	16	1.99	4.75	94.11	104.36

Table 13

All Participants: Attendance, Treatment Time, and Syllables Spoken per Session

Participant	Session Statistic			
	Attendance[1]	Treatment Time[2]	Average Syllables/Session	Average Group Size
DI4	13/16 (81.3%)	287/334 (86.47%)	753.31	2.62
AM5	19/24 (79.2%)	371/492 (75.56%)	677	2.68
LY1	13/16 (81.3%)	335/354 (94.60%)	505.65	4.15
RP3	28/32 (87.5%)	281/368 (70.73%)	875.48	1

[1] as number and percent of scheduled sessions attended during Weeks 1-8
[2] as number and percent of minutes of therapy judged to be "treatment" conditions (versus opening, transition, or closing; see text)

Table 14

Participant DI4: Detailed Games and Activities Used in Therapy Sessions

Games	Card Decks
Would You Rather	Auditory Memory
Guessing Game	Articulation
Go Fish	Social Engagement
Sorry	Would You Rather
Trouble	

Table 15

Participant DI4: Overall Percentage of Syllables Stuttered per Week, Summarized across Two 30-min Sessions per Week

Week	DI4
1	4.18
2	4.27
3	3.48
4	3.56
5	3.54
6	2.39
7	2.44
8	4.38
26	1.99

Table 16

All Participants: Overall Percentage of Syllables Stuttered (%SS) per Week, Summarized Across All Sessions (Two to Four Sessions per Week)

Week	DI4	AM5	LY1	RP3
1	4.18	5.72	1.61	1.44
2	4.27	4.28	2.10	1.10
3	3.48	3.60	2.82	1.84
4	3.56	4.25	2.13	1.04
5	3.54	2.90	2.08	1.52
6	2.39	3.10	1.71	2.47
7	2.44	2.48	0	1.43
8	4.38	4.71	1.34	1.55
Week 26	1.99	3.90	1.53	1.85
8 week change	+0.20	-1.01	-0.27	+0.11
26 week change	-2.19	-1.82	-0.08	+0.41

Table 17

Participant DI4: SLP's Perceptions of Stuttering and of Academic, Social, and Emotional Functioning, with SLP Self-Reported Comfort

Administered	Question 1 How much	Question 2 Academic Interference	Question 3 Social Difficulty	Question 4 Emotional Difficulty	Question 5 Comfort
Pre (Before Week 1)	5	5	5	4	5
Week 3	5	4	5	6	3
Week 6	7	3	2	4	3
Post (Conclusion of Week 8)	7	3	3	4	3
Week 26	3	3	3	4	2

Note. All ratings were completed on a scale from 1, which was the positive response (very little stuttering, very little interference, very little difficulty, high comfort) to 10, which was the negative response

Table 18

Participant DI4: Parent's Perceptions of Stuttering and of Academic, Social, and Emotional Functioning

Administered	Question 1 How much	Question 2 Academic Interference	Question 3 Social Difficulty	Question 4 Emotional Difficulty
Pre (Before Week 1)	5	3	5	2
Week 3	3	2	2	2
Week 6	2	1	1	1
Post (Conclusion of Week 8)	1	1	1	1
Week 26	2	1	2	2

Note. All ratings were completed on a scale from 1, which was the positive response (very little stuttering, very little interference, very little difficulty) to 10, which was the negative response

Table 19

Participant DI4: Three Teachers' Perceptions of Stuttering and of Academic, Social, and Emotional Functioning

Administered	Question 1 How much	Question 2 Academic Interference	Question 3 Social Difficulty	Question 4 Emotional Difficulty
Pre (Before Week 1)	8,8,7	1,1,2	1,2,3	1,1,5
Week 3	8,6,6	1,2,2	1,2,3	1,2,2
Week 6	9,4,6	1,1,1	1,1,2	1,1,2
Post (Conclusion of Week 8)	5,6,9	1,2,1	1,2,1	1,2,1
Week 26	8,7,4	1,1,1	1,1,2	1,1,3

Note. All ratings were completed on a scale from 1, which was the positive response (very little stuttering, very little interference, very little difficulty) to 10, which was the negative response

Table 20

Participant AM5: Detailed Games and Activities Used in Therapy Sessions

Games	Card Decks
Hedbanz	Multiple Meaning
Connect Four Launchers	Deck for /k/
Hi Ho! Cherry-O	Deck for /g/
Monkey Around	Would You Rather
UNO	
Crosswords	
Old Maid	
Honey Bees	
Jenga	
Jeepers Beepers	
Qwirkle	

Table 21

Participant AM5: Overall Percentage of Syllables Stuttered per Week, Summarized across Three 30-min Sessions per Week

Week	AM5
1	5.72
2	4.28
3	3.60
4	4.25
5	2.90
6	3.10
7	2.48
8	4.71
26	3.90

Table 22

Participant AM5: Descriptive Statistics for Speech Variables, by Session

Session	Average Syllables/Session	Total Stuttering Events	Percentage Syllables Stuttered	Naturalness	Stutterfree SPM	SPM
1	1439	82	5.7	6.44	119.16	113.65
2	700.5	46.5	6.64	5.08	107.61	102.94
3	561.5	26	4.63	5	88.58	96.3
4	583.5	25	4.28	4	108.78	110.23
5	959	28.5	2.97	4.29	102.44	110.94
6	603	26	4.31	5	98.03	98.53
7	396	16	4.04	4.60	58.43	79.62
8	939	53.5	5.70	4.86	79.82	84.5
9	646.5	29.5	4.56	5.90	102.55	101.54
10	534.5	7	1.31	3.17	74.22	83.12
11	607	14.5	2.39	5	91.74	93.73
12	549	19	3.46	6	92.78	93.20
13	726.5	18	2.48	4.17	89.33	95.48
14	666	24	3.60	6.40	81.29	87.04
15	871.5	26	2.98	4.23	89.15	86.57
16	499.5	8	1.60	2.60	82.7	89.84
17	769	31	4.42	5.23	76.85	79.37
18	437	18.5	4.23	6.5	64.19	82.59
19	375	22	5.87	5.75	81.68	87.85
Average	677	27.42	3.96	4.96	88.91	93.53
Week 26	735.5	35	3.90	4.69	80.56	80.46

Table 23

Participant AM5: SLP's Perceptions of Stuttering and of Academic, Social, and Emotional Functioning, with SLP Self-Reported Comfort

Administered	Question 1 How much	Question 2 Academic Interference	Question 3 Social Difficulty	Question 4 Emotional Difficulty	Question 5 Comfort
Pre (Before Week 1)	9	2	2	1	4
Week 3	7	2	2	4	3
Week 6	5	4	4	6	3
Post (Conclusion of Week 8)	5	4	4	6	3
Week 26	6	5	3	3	8

Note. All ratings were completed on a scale from 1, which was the positive response (very little stuttering, very little interference, very little difficulty, high comfort) to 10, which was the negative response

Table 24

Participant AM5: Parent's Perceptions of Stuttering and of Academic, Social, and Emotional Functioning

Administered	Question 1 How much	Question 2 Academic Interference	Question 3 Social Difficulty	Question 4 Emotional Difficulty
Pre (Before Week 1)	9	2	1	1
Week 3	8	1	1	1
Week 6	8	3	2	2
Post (Conclusion of Week 8)	8	3	2	2
Week 26	8	3	3	4

Note. All ratings were completed on a scale from 1, which was the positive response (very little stuttering, very little interference, very little difficulty) to 10, which was the negative response

Table 25

Participant AM5: Teacher's Perceptions of Stuttering and of Academic, Social, and Emotional Functioning

Administered	Question 1 How much	Question 2 Academic Interference	Question 3 Social Difficulty	Question 4 Emotional Difficulty
Pre (Before Week 1)	10	8	8	6
Week 3	10	6	4	1
Week 6	10	10	3	6
Post (Conclusion of Week 8)	10	10	3	6
Week 26	9	8	8	6

Note. All ratings were completed on a scale from 1, which was the positive response (very little stuttering, very little interference, very little difficulty) to 10, which was the negative response

Table 26

Participant LY1: Detailed Games and Activities Used in Therapy Sessions

Games	Card Decks	Books
Slamwich	Story Telling	The Very Hungry Caterpillar
School Days	All About Me	Charlie the Ranch Dog
Hedbandz	Drawing Inferences	The Little Pilgrim
Blunt		
Gumball		
Spot It		
Bingo		

Table 27

Participant LY1: Overall Percentage of Syllables Stuttered per Week, Summarized across Two 30-min Sessions per Week

Week	LY1
1	1.61
2	2.10
3	2.82
4	2.13
5	2.08
6	1.71
7	0
8	1.34
26	1.53

Table 28

Participant LY1: Descriptive Statistics for Speech Variables, by Session

Session	Average Syllables/Session	Total Stuttering Events	Percentage Syllables Stuttered	Naturalness	Stutterfree SPM	SPM
1	518	9	1.74	3.29	139.25	146.42
2	227	3	1.32	2.50	109.31	111.31
3	604	7	1.16	3.13	124.04	146.19
4	1203	31	2.58	4.57	160.11	164.32
5	312.5	4	1.28	3	110.03	117.99
6	220	11	5	5.50	93.90	91.39
7	441	8	1.81	3.50	129.14	136.15
8	264.5	7	2.65	3.5	115.21	117.18
9	4778	9	1.88	2.25	127.62	124.77
10	220.5	5.5	2.49	2.08	71.16	71.16
11	738.5	12.7	1.72	3.25	140.76	138.84
12	677	11.5	1.70	3.75	127.08	127.78
13	669.5	9	1.34	3.11	128.77	128.82
Average	505.65	9.8	2.05	3.34	121.26	129.75
Week 26	195.5	3	1.53	2	96.9	101.1

Table 29

Participant LY1: SLP's Perceptions of Stuttering and of Academic, Social, and Emotional Functioning, with SLP Self-Reported Comfort

Administered	Question 1 How much	Question 2 Academic Interference	Question 3 Social Difficulty	Question 4 Emotional Difficulty	Question 5 Comfort
Pre (Before Week 1)	3	2	5	5	3
Week 3	2	2	3	3	3
Week 6	7	2	6	7	5
Post (Conclusion of Week 8)	7	4	6	7	5
Week 26	2	2	2	2	2

Note. All ratings were completed on a scale from 1, which was the positive response (very little stuttering, very little interference, very little difficulty, high comfort) to 10, which was the negative response

Table 30

Participant LY1: Parent's Perceptions of Stuttering and of Academic, Social, and Emotional Functioning

Administered	Question 1 How much	Question 2 Academic Interference	Question 3 Social Difficulty	Question 4 Emotional Difficulty
Pre (Before Week 1)	4	2	3	1
Week 3	7	2	5	3
Week 6	7	2	4	1
Post (Conclusion of Week 8)	6	2	4	1
Week 26	6	2	3	2

Note. All ratings were completed on a scale from 1, which was the positive response (very little stuttering, very little interference, very little difficulty) to 10, which was the negative response

Table 31

Participant LY1: Teacher's Perceptions of Stuttering and of Academic, Social, and Emotional Functioning

Administered	Question 1 How much	Question 2 Academic Interference	Question 3 Social Difficulty	Question 4 Emotional Difficulty
Pre (Before Week 1)	5	1	4	3
Week 3	7	1	2	2
Week 6	10	10	3	6
Post (Conclusion of Week 8)	7	5	2	2
Week 26	5	3	2	2

Note. All ratings were completed on a scale from 1, which was the positive response (very little stuttering, very little interference, very little difficulty) to 10, which was the negative response

Table 32

Participant RP3: Detailed Games and Activities Used in Therapy Sessions

Games	Card Decks	Books
Spotted	Tell Me About Yourself	Blue Nail Polish
Sorry	Story Starters	Clark the Shark
Ants in Pants	Would You Rather	A Bit About Buttons
Slamwich		Charlie and the Chocolate Factory
Trouble		Halloween Pumpkin
Hedbandz		Bear Give Thanks
Blurt		Ginger Bread Bear

Table 33

Participant RP3: Overall Percentage of Syllables Stuttered per Week, Summarized across Four 15-min Sessions per Week

Week	RP3
1	1.44
2	1.10
3	1.84
4	1.04
5	1.52
6	2.47
7	1.43
8	1.55
26	1.85

Table 34

Participant RP3: Descriptive Statistics for Speech Variables, by Session

Session	Average Syllables/Session	Total Stuttering Events	Percentage Syllables Stuttered	Naturalness	Stutterfree SPM	SPM
1	697	15.5	2.22	3.25	163.45	147.03
2	627	2	.32	2	154.16	159.04
3	1,127.5	17.5	1.55	3	150.05	148.69
4	396.5	6	1.51	2	171.4	168.23
5	858	14	1.63	2	167.04	170.51
6	1,369	10.5	.77	2	121.47	123.07
7	743.5	20	2.69	3	147.84	143.94
8	1442	19.5	1.35	2.56	160.28	164.77
9	448.5	13.5	3.01	3	124.75	130.55
10	847	11	1.30	2	150.73	155.33
11	341.5	6	1.76	3	139.55	138.13
12	418.5	3	.72	2	142.78	154.38
13	680.5	6	.88	2	151.7	154.93
14	1131	19.5	1.72	2	125.53	125.20
15	1,090.5	14	1.28	2	124.13	129.01
16	1,303	21	1.61	2	122.91	126.89
17	1,004.5	14.5	1.44	2	120.31	127.23
18	1,270.5	34.5	2.72	2	112.33	115.75
19	639	20	3.13	2	100.9	106.67
20	1,105.5	26.5	2.40	2	111.52	112.18
21	1,325	26	1.96	2	134.89	141.1
22	769.5	12	1.56	3	154.16	154.16
23	666.5	4.5	.68	2.75	157.98	164.04
24	977.5	19	1.84	3.27	170.13	179.11
25	372.5	5.5	1.48	3	145.13	145.93

26	997	18.5	1.86	3.4	177.81	180.24
27	500	4	.80	1.33	158.8	159.87
28	1365	22	1.61	2.87	175.19	179.19
Average	875.48	14.46	1.64	2.41	144.17	146.61
Week 26	539.5	10	1.85	2	159.8	157.4

Table 35

Participant RP3: SLP's Perceptions of Stuttering and of Academic, Social, and Emotional Functioning, with SLP Self-Reported Comfort

Administered	Question 1 How much	Question 2 Academic Interference	Question 3 Social Difficulty	Question 4 Emotional Difficulty	Question 5 Comfort
Pre (Before Week 1)	7	2	5	4	3
Week 3	3	1	3	4	3
Week 6	3	1	3	4	3
Post (Conclusion of Week 8)	7	4	7	8	5
Week 26	4	1	4	3	3

Note. All ratings were completed on a scale from 1, which was the positive response (very little stuttering, very little interference, very little difficulty, high comfort) to 10, which was the negative response

Table 36

Participant RP3: Parent's Perceptions of Stuttering and of Academic, Social, and Emotional Functioning

Administered	Question 1 How much	Question 2 Academic Interference	Question 3 Social Difficulty	Question 4 Emotional Difficulty
Pre (Before Week 1)	6	4	8	9
Week 3	6	7	9	7
Week 6	2	2	3	2
Post (Conclusion of Week 8)	2	2	2	2
Week 26	2	2	2	2

Note. All ratings were completed on a scale from 1, which was the positive response (very little stuttering, very little interference, very little difficulty) to 10, which was the negative response

Table 37

Participant RP3: Teacher's Perceptions of Stuttering and of Academic, Social, and Emotional Functioning

Administered	Question 1 How much	Question 2 Academic Interference	Question 3 Social Difficulty	Question 4 Emotional Difficulty
Pre (Before Week 1)	8	1	2	2
Week 3	8	4	4	7
Week 6	7	1	3	3
Post (Conclusion of Week 8)	7	1	3	3
Week 26	6	2	2	2

Note. All ratings were completed on a scale from 1, which was the positive response (very little stuttering, very little interference, very little difficulty) to 10, which was the negative response

Table 38

Summarized Treatment Intensity Variables/Treatment Outcome Variables, for Four Children

	DI4	AM5	LY1	RP3
Assigned Treatment Schedule, per Week	Two 30-min sessions	Three 30-min sessions	Two 30-min sessions	Four 15-min sessions
Percent of Treatment Sessions Attended	81.3	79.2	81.3	87.5
Total Number of Minutes Judged as Treatment Time, Combining 8 Study Weeks	287	371	335	281
Mean Number of Syllables Produced per Session (and per Week)	753 (1506)	677 (2031)	505 (1010)	875 (3500)
Mean Stuttering Frequency, Week 1	4.18	5.72	1.61	1.44
Mean Stuttering Frequency, Week 26	1.99	3.90	1.53	1.85
Mean Ratings of Academic, Social, and Emotional Impact Across All Adult Raters, Week 1	3.30	3.44	2.88	4.11
Mean Ratings of Academic, Social, and Emotional Impact Across All Adult Raters, Week 26	2.11	4.78	2.22	2.33

Table 39

Mean Percent of Session Spent in Four Types of Activities

Participant	Session Segment Parts			
	Pre-treatment	Treatment	Transition	Closing
DI4	9.06	86.47	2.04	2.43
AM5	10.40	75.56	5.32	8.72
LY1	5.40	94.60	0.0	0.0
RP3	18.21	70.73	2.27	8.79
Average	10.90	81.84	2.41	4.99

FIGURES

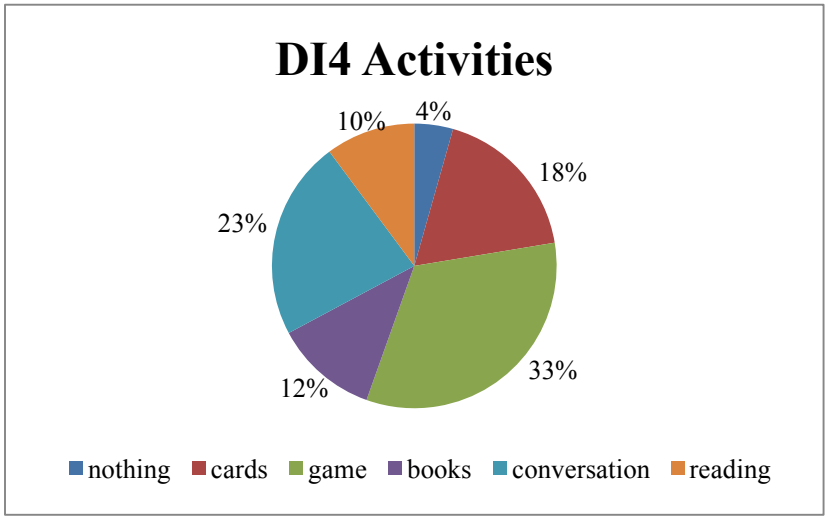

Figure 1. Participant DI4: Detailed Games and Activities Used in Therapy Sessions

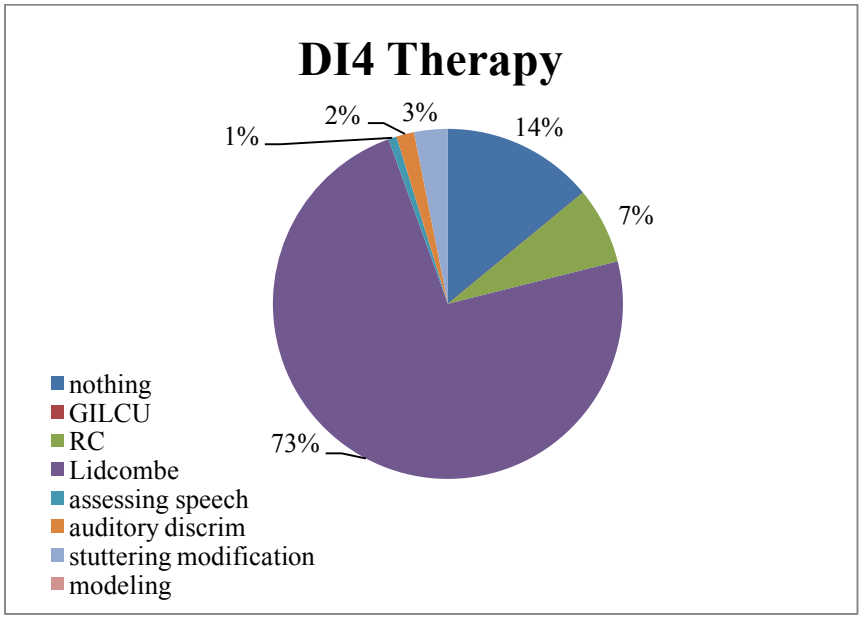

Figure 2. Participant DI4: Therapy Protocols Utilized During Treatment Sessions

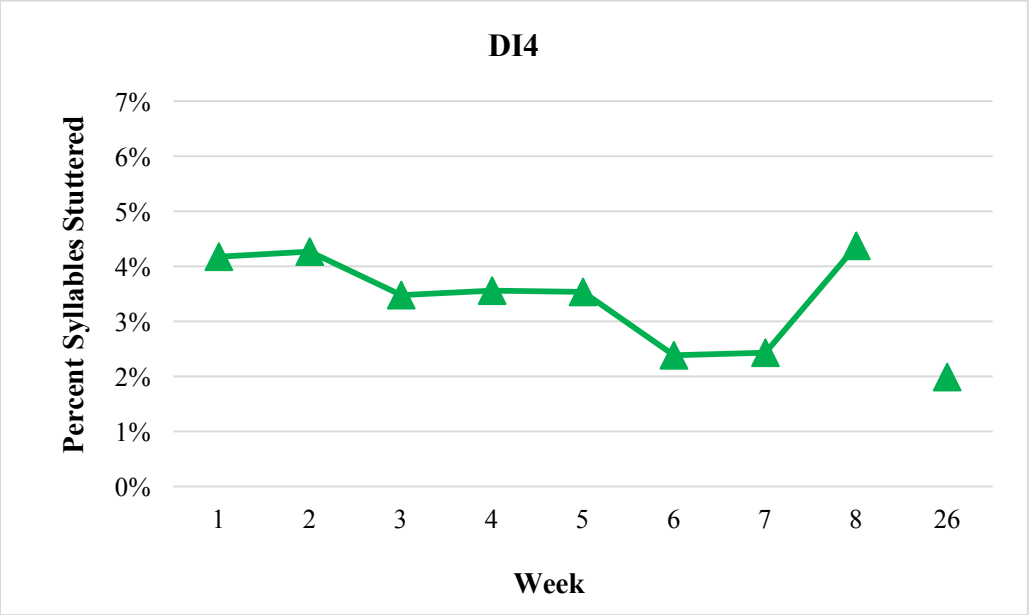

Figure 3. Participant DI4: Overall Percentage of Syllables Stuttered per Week

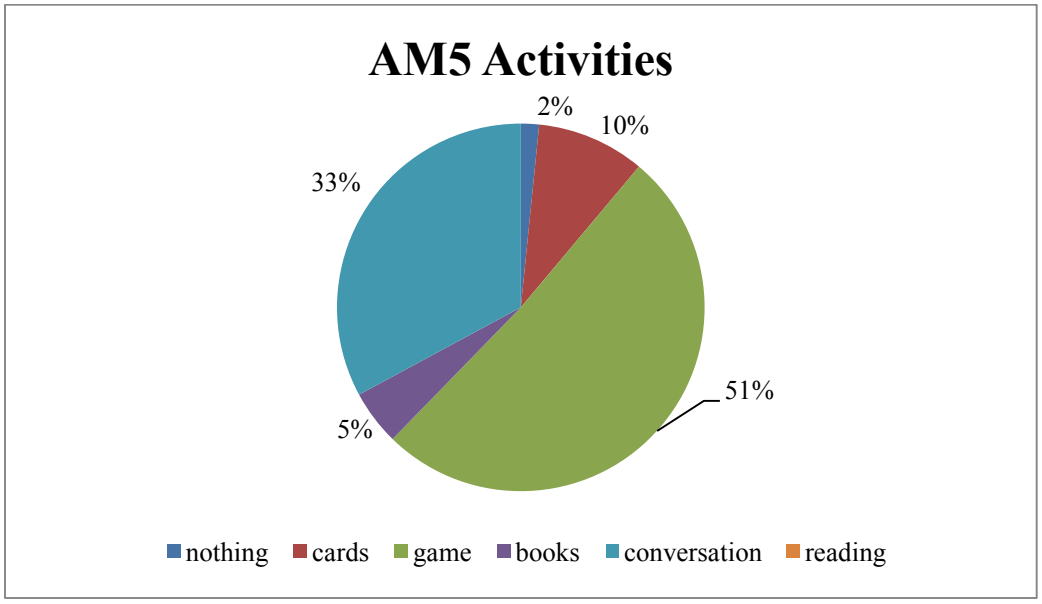

Figure 4. Participant AM5: Detailed Games and Activities Used in Therapy Sessions

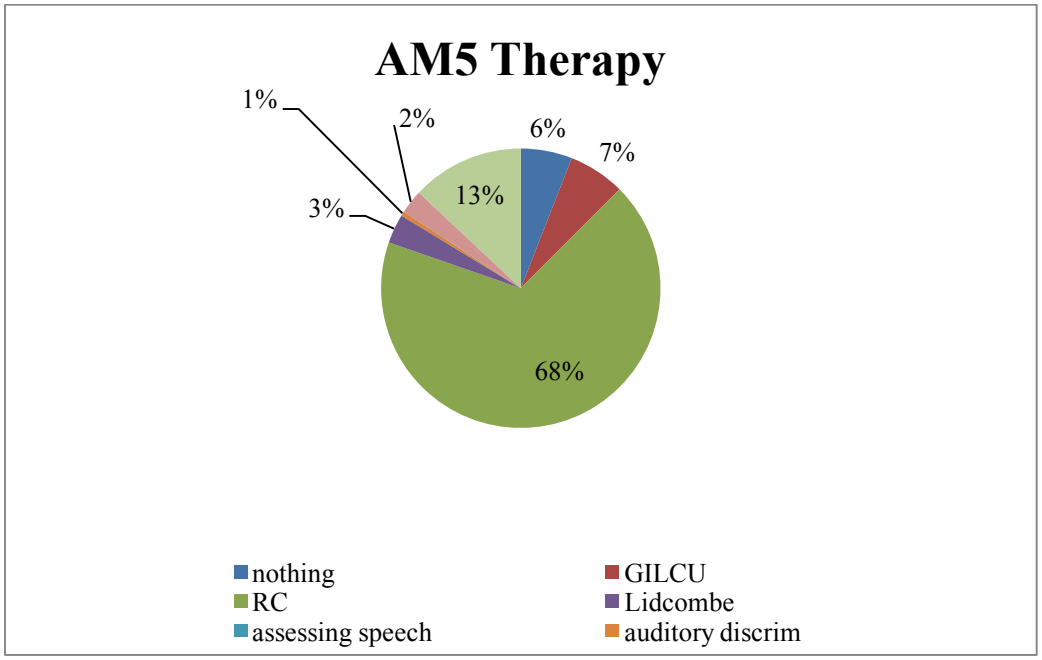

Figure 5. Participant AM5: Therapy Protocols Utilized During Treatment Sessions

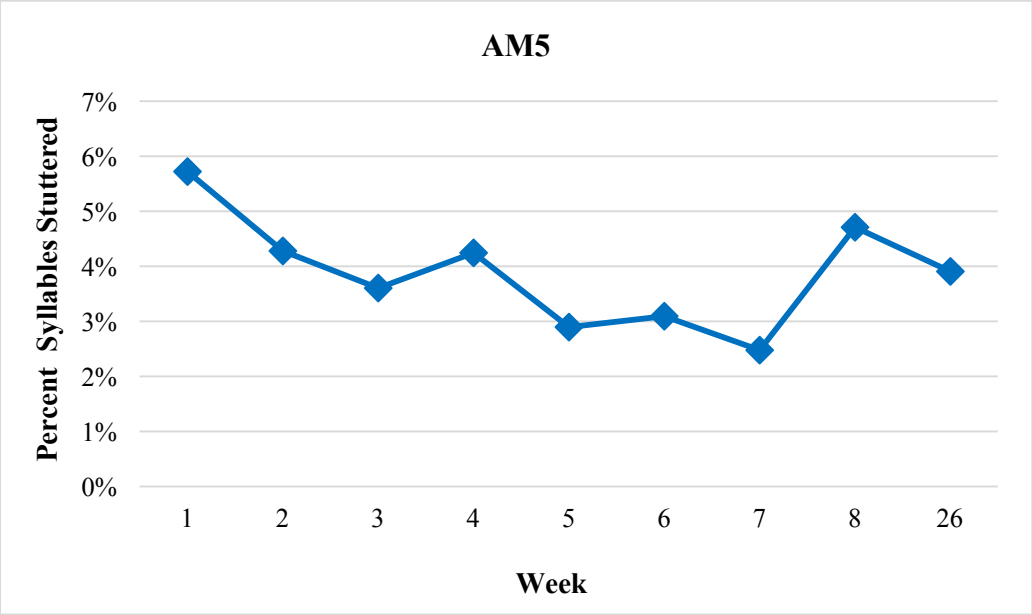

Figure 6. Participant AM5: Overall Percentage of Syllables Stuttered per Week

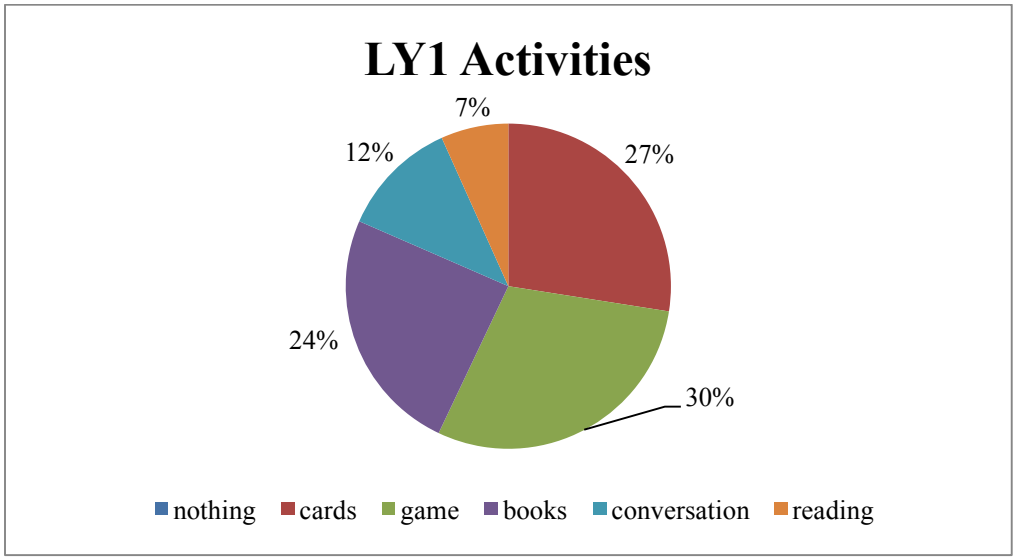

Figure 7. Participant LY1: Detailed Games and Activities Used in Therapy Sessions

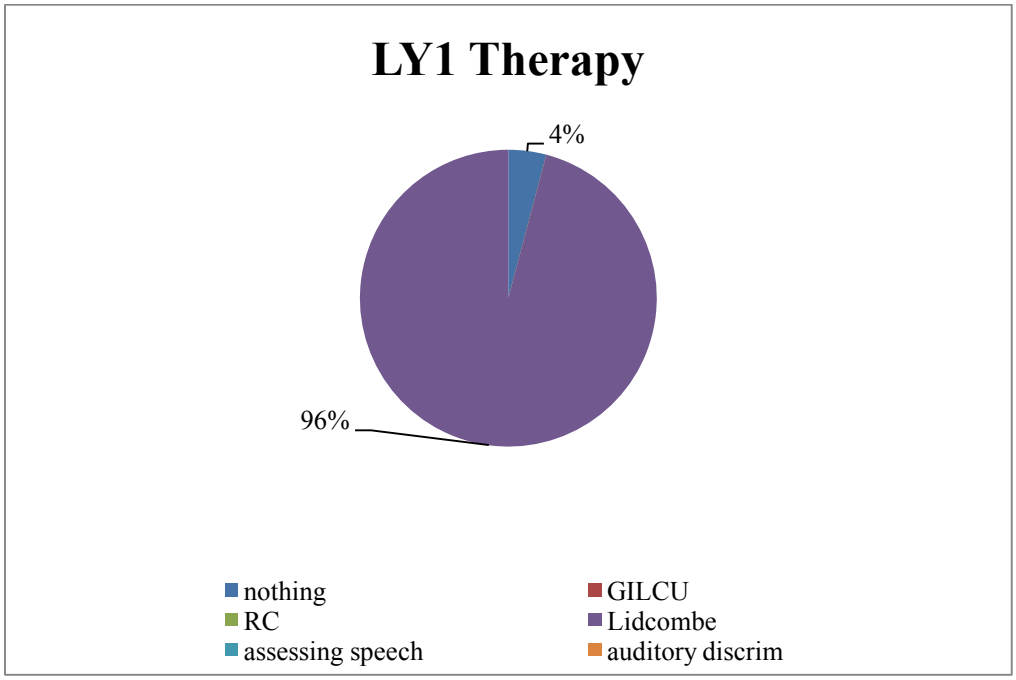

Figure 8. Participant LY1: Therapies Protocols Utilized During Treatment Sessions

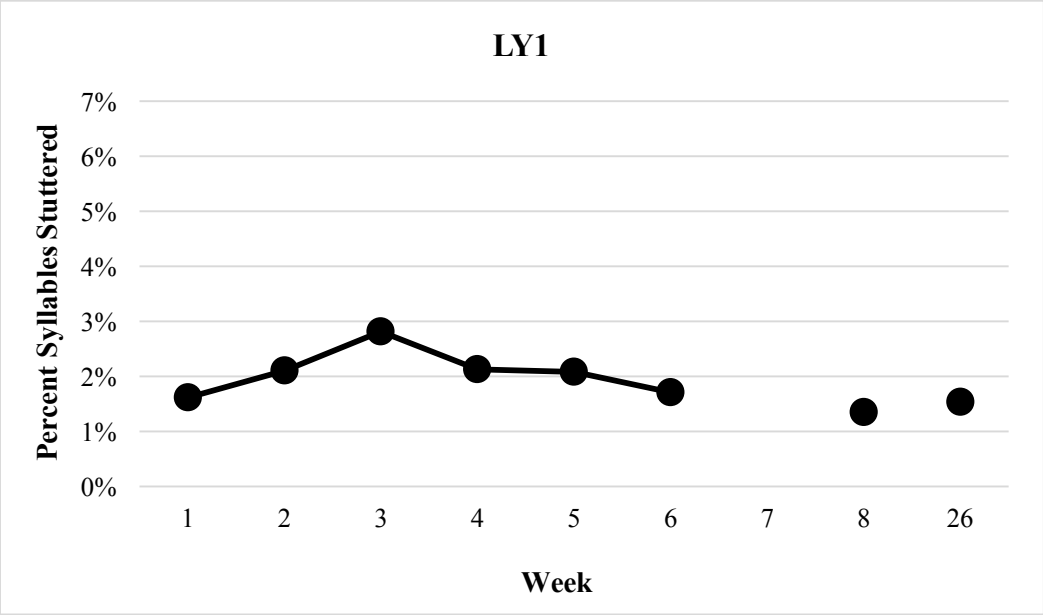

Figure 9. Participant LY1: Overall Percentage of Syllables Stuttered per Week

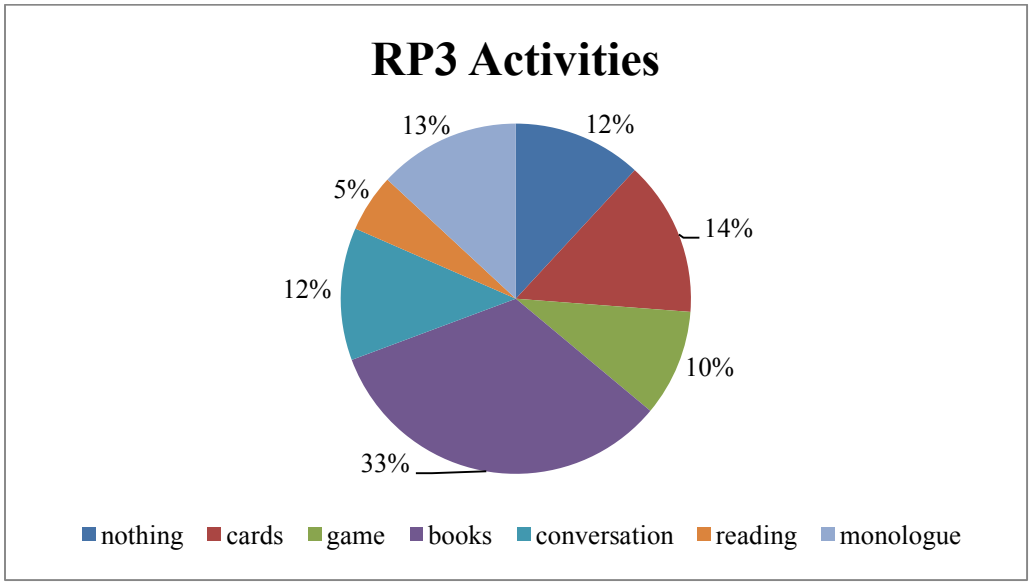

Figure 10. Participant RP3: Detailed Games and Activities Used in Therapy Sessions

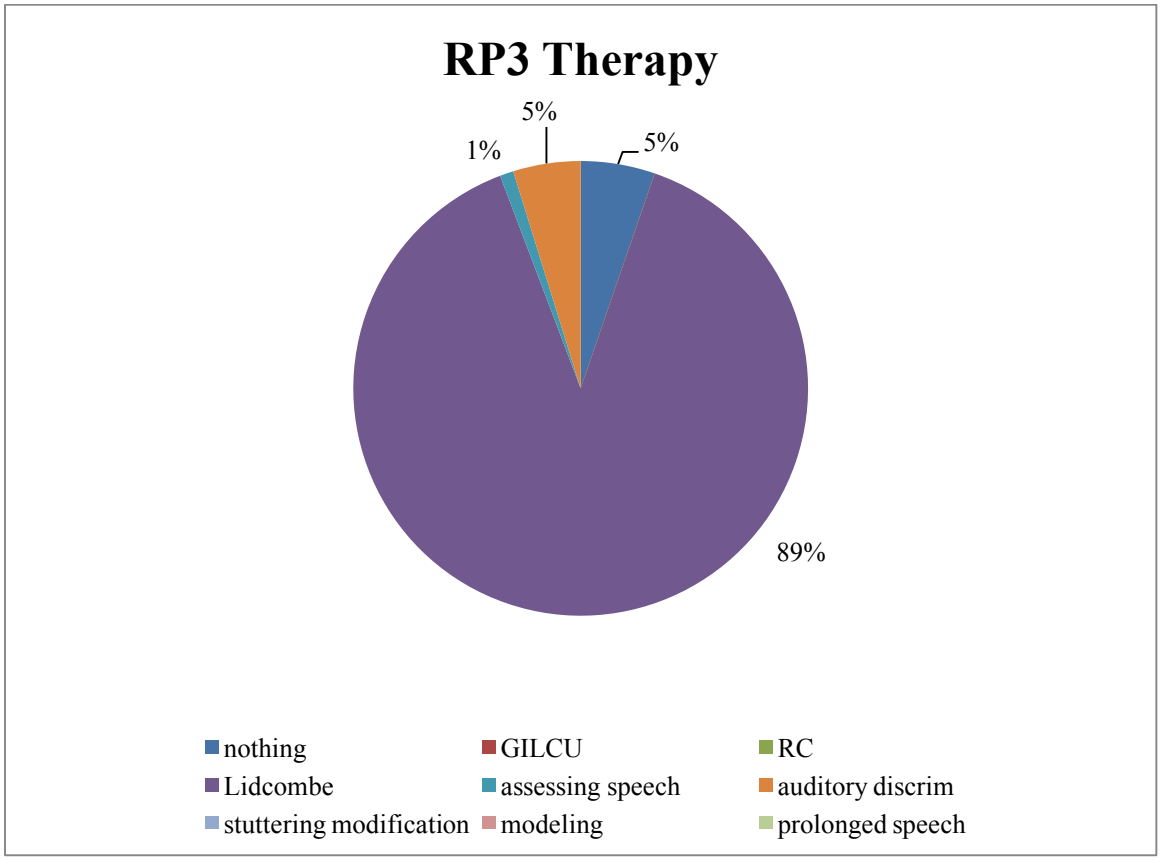

Figure 11. Participant RP3: Therapy Protocols Utilized During Treatment Sessions

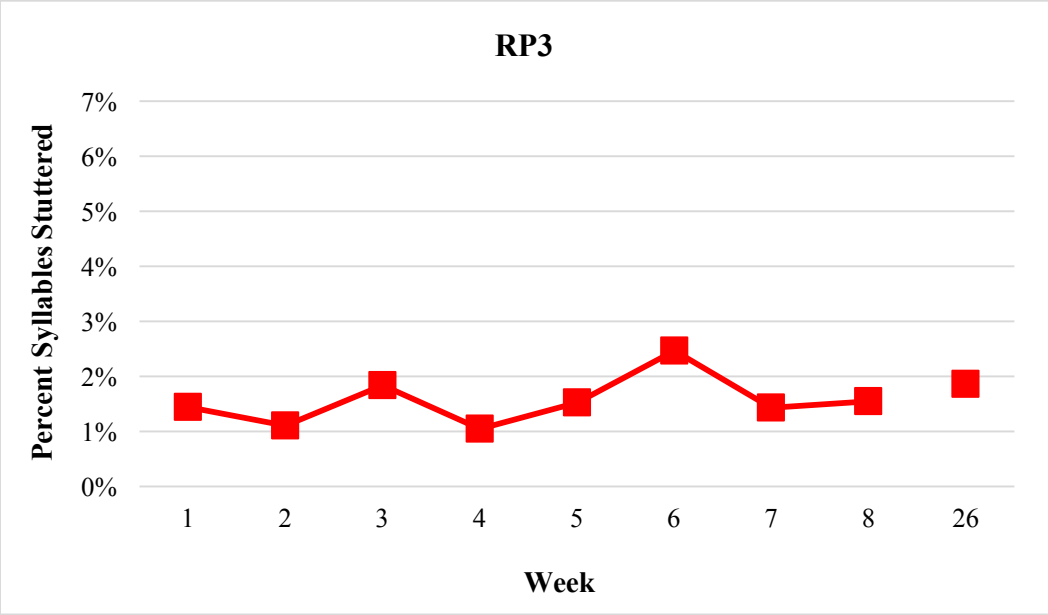

Figure 12. Participant RP3: Overall Percentage of Syllables Stuttered per Week

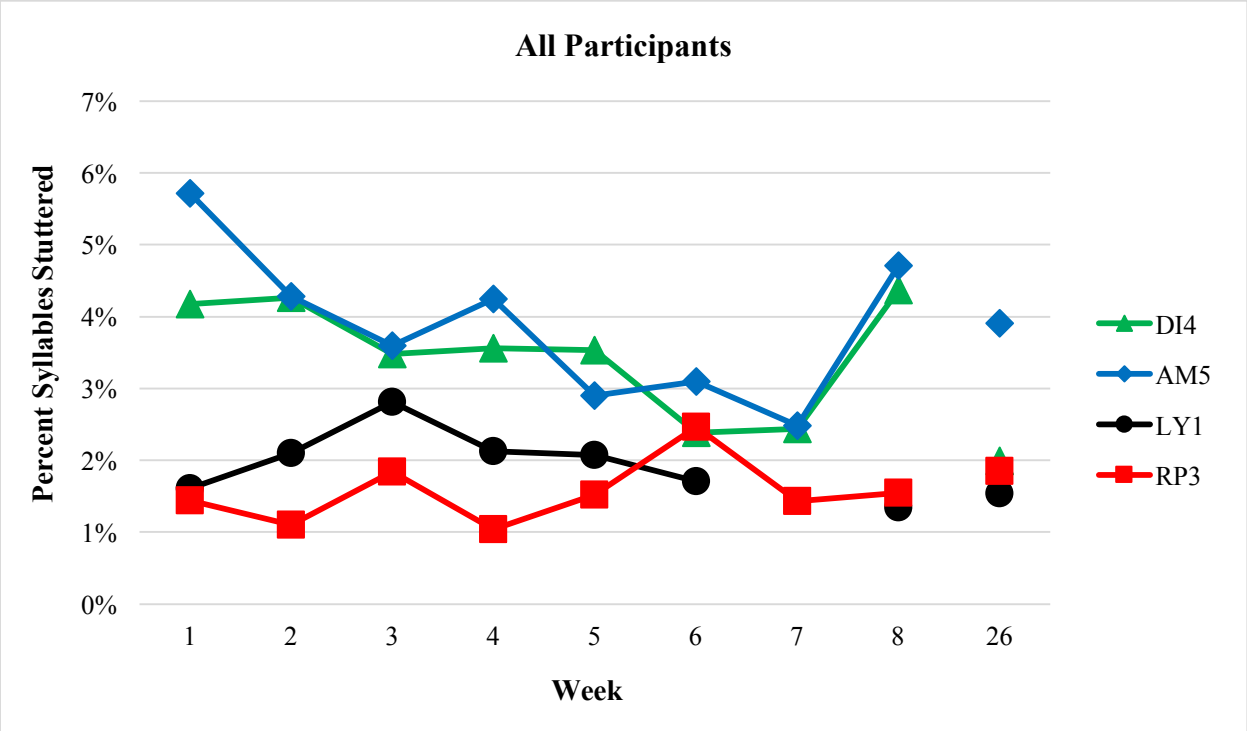

Figure 13. All Participants: Overall Percentage of Syllables Stuttered per Week

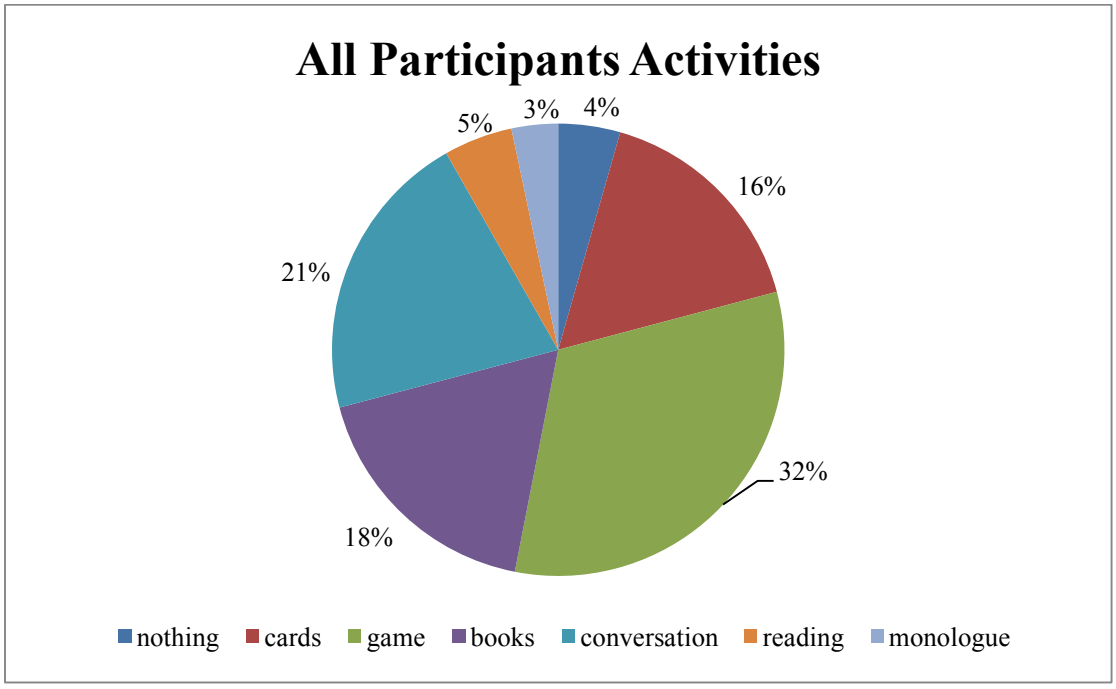

Figure 14. All Participants: Detailed Games and Activities Used in Therapy Sessions

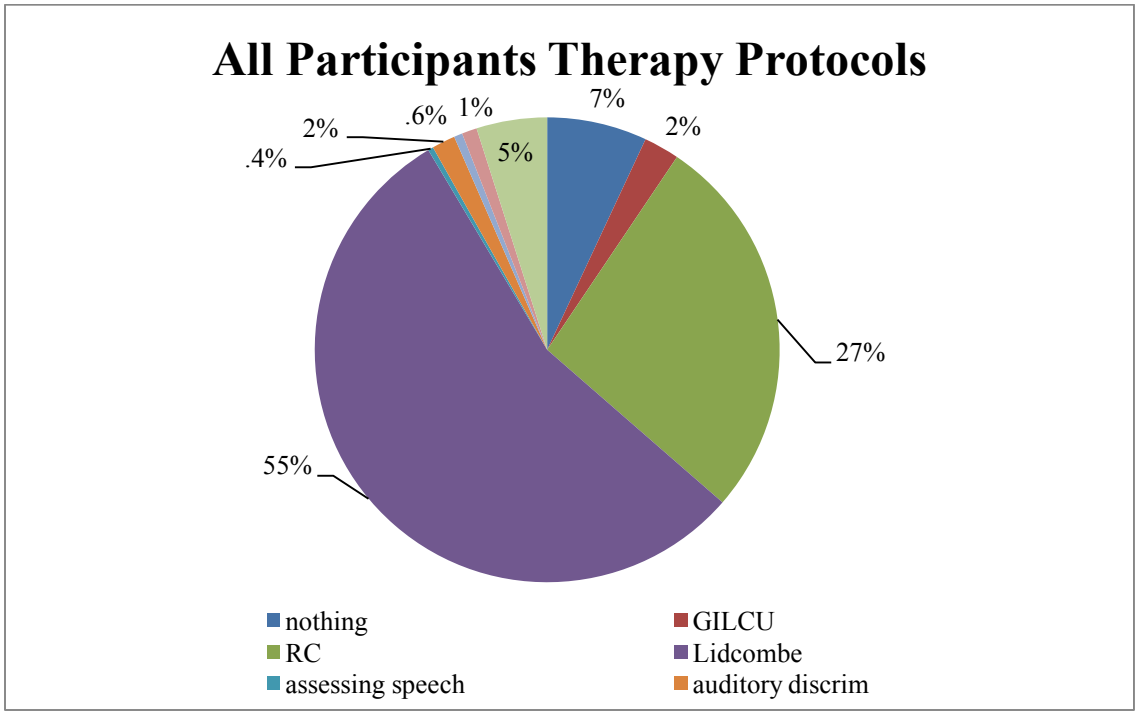

Figure 15. All Participants: Protocols Used in Therapy Sessions