THE GENERALIZATION OF VERBAL SPEECH ACROSS MULTIPLE SETTINGS
FOR CHILDREN WITH SELECTIVE MUTISM:
A MULTIPLE-BASELINE DESIGN PILOT STUDY
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ABSTRACT

Selective Mutism (SM) is a childhood psychological disorder characterized by a failure to speak in certain contexts for at least one month, despite speaking in other social contexts. Children diagnosed with SM usually speak without difficulty to family, but experience difficulties during social situations where they are expected to speak outside of the home (e.g., school, community). The purpose of this pilot study was to examine the effects of individualized treatment on the generalization of speech for children with selective mutism. Participants included four children with selective mutism receiving treatment guided by the Totally Anxiety-Free Communication treatment manual (T.A.L.K.; Gallagher, 2002), a child-focused, exposure-based, behavioral therapy approach. Initial treatment sessions were conducted in a university-based clinic. After each child demonstrated consistent speech output, treatment transported to the child’s school. Participants received between 18 to 22 treatment sessions, depending on when treatment was started during the academic school year. A multiple-baseline design was used to track spontaneous and prompted speech at school across three conditions. These three conditions were as follows: (a) child with teacher alone, (b) child with teacher and peers (≤ 3), and (c) child during lunch/snack. Changes in speech occurrence were assessed using direct observations and behavioral rating scales. Each child was observed weekly at the child’s school by trained observers during the three conditions. Teachers completed the School Speech Questionnaire (SSQ; Bergman, 2002) and parents completed the Selective Mutism Questionnaire (SMQ; Bergman, 2001) weekly. Results indicated all participants demonstrated increased speech at school. Two participants achieved verbal speech
generalization. Findings from the observational data indicated an increase in spontaneous and prompted speech at school compared to baseline. Teachers and parents also reported an increase in the frequency of speech at school, home, and public settings. The results of this study support the use of an intensive individualized treatment, such as the T.A.L.K manual, across multiple settings to increase speech for children with SM. Clinical challenges are discussed, including limitations of extended baseline designs, time constraints posed by conducting treatment during the academic year, and the need to train educators in techniques and skills for promoting speech at school for children with SM.
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CHAPTER I
THE PROBLEM

Selective mutism (SM) is a childhood psychological disorder characterized by a failure to speak in certain contexts for at least 1 month, despite speaking in other contexts (American Psychiatric Association [APA], 2000). Children diagnosed with SM usually speak without difficulty with parents and siblings, but experience difficulties during social situations where they are expected to speak outside of the home (e.g., school, community). Their failure to speak is not due to learning a non-native language or a communication disorder. Commonly, children with SM do not speak to familiar adults (e.g., teachers, principal, lunch aides) and peers in school. As a result, initial diagnosis for SM typically does not occur until children attend school, when their failure to speak becomes visible to school staff and begins to impede their social or academic functioning.

Effective treatments for SM found in the literature have primarily focused on behavioral or cognitive–behavioral paradigms, which have been limited to case studies (Cohan, Chavira, & Stein, 2006). While these studies detail specific types of interventions and evaluate their effectiveness in treating SM, relevant information pertaining to the progression and generalization of verbal speech outside of treatment sessions remains undocumented. Information pertaining to the length of time a child with SM is in treatment before speech occurs in settings without the presence of the therapist is unknown. This information could provide a timeline when verbal speech is likely to generalize and progress once treatment has been initiated. Generalization of speech is said to have occurred when a child with SM is able to speak outside of treatment in an
environment where he or she had not spoken before. The aim of treatment for children with SM is to increase speech in environments where speech had not occurred previously (i.e., school). Buchman and Weiss (2006) reported that treatment effects are meaningful when generalization of behavior expands into multiple situations. For children with SM, generalization of verbal speech into meaningful situations may include asking a teacher a question, talking to his or her doctor, or ordering food in a restaurant. Information pertaining to the progression of speech and generalization can help identify children with SM that progress at a slower rate, i.e., are treatment outliers. These children will likely require more intensive behavioral therapeutic services, or combined treatment with pharmacological treatment than the usual treatment provided for most children. Furthermore, knowledge about the generalization of verbal speech across contexts and individuals would be useful in guiding future treatment plans.

The Purpose of the Study

This pilot study examined the progression and generalization of verbal speech (target behavior) across multiple contexts outside of treatment sessions (i.e., one-on-one with a teacher, small groups with a teacher, peer interactions during lunch/snack) for children diagnosed with SM. The examination of generalization in multiple contexts while simultaneously conducting treatment in the clinic and schools will provide longitudinal data for changes in speech of children with SM. The findings will provide information regarding the context in which generalization first occurs and when changes in speech are likely to happen. Additionally, information pertaining to speech generalization can help clinicians develop treatment goals and plans.
The primary aim of this study was to document and evaluate the generalization of verbal speech for four children with SM across school settings with teachers, school staff, and peers. Concurrent to the implementation of biweekly treatment sessions, observations were conducted weekly at school. These observations were conducted outside of treatment sessions without the presence of the therapist. Each child’s verbal speech was tracked to determine if speech generalized in the presence of peers and familiar adults at his or her school.

For each participant, behavioral observations occurred in three conditions: (a) the participant interacting with his or her teacher alone in the classroom, (b) the participant interacting with his or her teacher and a small group of peers (≤ three peers) during a structured learning activity, and (c) the participant interacting with his or her classroom peers during lunch or snack time. The observer was positioned in close proximity (≤ 6 ft. away) to the participant in order to code each occurrence of verbal speech output. The duration of the observation depended on how long it took for the teacher to ask the child the required number of questions (i.e., five yes/no and five forced-choice). NYU Child Study Center (CSC) research assistants, who were unfamiliar to the child, conducted the observations and were trained to use a behavioral coding system to categorize child–teacher and child–peer interactions during activities in the classroom and lunchroom. The coding system categorized child responses to questions posed by his or her teacher and peers as either verbal or nonverbal. The frequency and percentage of each child’s verbal speech were calculated for each observation condition.

In addition to observations, parents and teachers completed questionnaires weekly. Parents completed the Selective Mutism Questionnaire (SMQ; Bergman, Keller,
Wood, Piacentini, & McCracken, 2001), and teachers completed the School Speech Questionnaire (SSQ; Bergman, Piacentini, & McCracken, 2002) to measure the frequency of verbal speech across contexts. These questionnaires also measured the degree to which the child’s failure to speak resulted in distress or impairment across areas of functioning.

A multiple-baseline experimental design was used to evaluate changes in verbal speech observed across the three conditions, as well as changes in parental and teacher reports on the SMQ and SSQ. For this pilot study, verbal speech generalization was thought to have occurred if the child responded and/or initiated speech to peers or familiar adults more than once during the lunch/snack condition.

Participants in this study included four children attending kindergarten or 1st grade who were recently diagnosed with SM (< 1 month) and receiving treatment at the New York University Child Study Center (CSC). The CSC, based in New York City, provides numerous mental health services for children and adolescents. Treatment sessions were comprised of two phases.

Clinic Intervention Phase I: Treatment at the CSC Clinic

Treatment sessions were conducted at the CSC clinic until the child achieved a level of “enough talking” as determined by the Totally Anxiety-Free Communication treatment manual (TALK; Gallagher, 2002). TALK is a cognitive–behavioral treatment manual for children diagnosed with SM. After the participant attained the treatment criterion (i.e., level of enough talking) in Phase I, treatment sessions were transported to the participant’s school. The treatment criterion of “enough talking” was defined as the participant responding to 80% (8 out of 10) of the therapist’s questions.
School Intervention Phase II: Treatment in the School

Treatment sessions were implemented at the school in order to gradually include teachers and peers. Prior to the initial treatment session, teachers were taught child-directed behavioral skills for children with SM. The therapist taught teachers how to (a) follow the child’s lead during play; (b) describe the child’s observable behavior in concrete, measurable terms; and (c) provide specific praise to reinforce target behaviors (e.g., speaking in an audible voice, whispering, playing with the teacher). Additionally, teachers were instructed to avoid questions, commands, and critical statements during treatment sessions. The therapist modeled these skills for teachers and coached them on how to use these skills during treatment sessions. Once the child was speaking consistently to his or her teacher during sessions, peers were then systematically incorporated into treatment sessions.

Statement of the Problem

Research is lacking regarding when and at what point generalization occurs during treatment. To date, there is also no study that examines the effects of including teachers and peers in treatment sessions. This study examines these important aspects of generalization of verbal speech for children with SM. It was hypothesized that generalization and progression of verbal speech at school will occur once children verbally respond to questions posed by teachers in at least two consecutive treatment sessions during the School Intervention Phase II: Teachers period. This occurrence will serve as a springboard to encourage children to verbally respond to teachers and peers during the three observation conditions outside of treatment sessions.
It was also hypothesized that once children began to speak spontaneously during the School Intervention Phase II: Teachers period, children will start to speak spontaneously during one-on-one activities with their teachers in the classroom.

Similarly, in terms of spontaneous speech, once children verbalized spontaneously in the presence of peers during the School Intervention Phase II: Peers treatment sessions, it was hypothesized that children will start to verbally respond and/or spontaneously speak to peers and familiar adults (e.g., teachers, assistant teachers) during the lunch or snack period since children have presumably increased their comfort level in speaking during treatment sessions.

Research Questions

This pilot study attempted to answer the following research questions:

1. Did verbal speech progress and generalize outside of treatment sessions? At what point during treatment did verbal speech generalize to peers in the study?

2. At what point during School Intervention Phase II: Teachers treatment sessions did verbal speech generalize to peers in the lunch/snack condition?

3. In which observational condition (e.g., teacher–participant, teacher–participant–peer, or lunch/snack) did spontaneous verbalizations first occur? In which condition did spontaneous speech last occur?

4. Did spontaneous verbalizations occur more in one condition compared to the other conditions? In which condition did spontaneous verbalizations occur the least?

5. Do teacher and parent ratings accurately align with direct observations?
Statistical Analysis Plan

To answer Research Question 1, visual inspection of graphs for verbal speech across conditions were examined to determine children’s progress during treatment and to determine if and when generalization occurred for participants. Visual inspection of event recording observational data collected weekly during the lunch/snack condition was used to determine if and when the child’s verbal speech generalized in the presence of his or her peers. To answer Research Question 2, visual inspection of the observational data during the lunch/snack condition while School Intervention Phase II: Teachers was implemented indicated when the child’s speech generalized to peers during this phase of treatment. To answer Research Questions 3 and 4, visual inspection of the observational data of spontaneous verbalizations across conditions were evaluated to determine in which condition(s) speech first occurred and in which condition(s) verbal speech initiated last. The data were also used to determine in which condition spontaneous verbalizations occurred the most and in which condition(s) it occurred the least. To answer Research Question 5, visual inspection of the graphs of the weekly SMQ and SSQ scores were compared to the observation graphs to determine if the ratings from the parent-reported SMQ and teacher-reported SSQ simultaneously captured the change in verbal speech output. Additionally, the pre- and posttreatment SMQ scores were compared to findings from the Bergman, Keller, Piacentini, and Bergman (2008) UCLA study with children with and without a diagnosis of SM.
Definition of Terms

*Audible speech.* This is speech heard within the normal volume range (i.e., intelligible) by the observer who was 6 feet away from the child in the classroom or lunchroom. This includes whispering at a volume audible to an observer.

*Generalization.* This is verbal speech that occurred outside of treatment sessions during the lunch/snack condition. Parenthetically, the rationale for the limitation of verbal speech generalization to a single condition (i.e., lunch/snack) was that treatment sessions were not conducted during lunch or snack. Additionally, this was the only condition that teachers were not required to ask questions of the participant; therefore, any speech that occurred was not teacher prompted.

*Verbal speech.* This is any contextual vocalization such as a word, phrase, or sentence at an audible conversational volume in response to questions posed by the clinician, teacher, or peers.

Significance of the Study

A discussion with the directors of the Selective Mutism Program raised questions pertaining to what was known in the literature about the treatment of SM and changes in speech. A review of the literature determined that the scientific knowledge about the generalization of verbal speech for children with SM was undocumented. This study contributes to the limited literature on the treatment of SM by identifying when generalization of verbal speech occurs in multiple school contexts, while treatment is being implemented at the clinic and in schools. Findings of this pilot study will also determine if standardized rating scales of SM capture changes in speech as effectively as direct observations.
Knowledge about the generalization of verbal speech informs clinicians about the initial context in which speech is likely to occur. This information will also be helpful in deciding when to strategically incorporate teachers and peers into sessions once treatment has been transported to the school. Therefore, findings of the study will help and guide clinicians to develop effective treatment plans for children with SM and use school resources more efficiently.
Selective Mutism

Clinical Features of Selective Mutism

Diagnosis. Selective mutism (SM) is a childhood psychological disorder characterized by the failure to speak in certain environments, despite speaking in other contexts. Typically, children with SM are reluctant to speak in school with teachers and peers and in other social situations. As a result, children with SM experience academic and social difficulties. The *Diagnostic and Statistical Manual of Mental Disorders*, fourth edition, text revision (*DSM-IV-TR*; APA, 2000) criteria for SM include (a) a consistent failure to speak in social situations when speech is expected; (b) the disturbance interferes with educational or occupational achievement or with social communication; (c) the disturbance is present for at least 1 month (not limited to the first month of school); (d) failure to speak is not due to a lack of knowledge or discomfort with the spoken language required in social situations; and (e) the disturbance is not better accounted for by a communication disorder and does not occur exclusively during the course of a pervasive developmental disorder, schizophrenia, or other psychiatric disorder.

SM is a condition associated with an array of childhood psychiatric problems such as communication disorders (e.g., phonological disorder, expressive language disorder, or mixed receptive-expressive language disorder) or general medical conditions that cause abnormal articulation. Additionally, mental retardation, hospitalization, and extreme
psychosocial stressors may be associated with the disorder. In clinical settings, children with SM are commonly given an additional diagnosis of anxiety disorder, especially social phobia (APA, 2000; Black & Uhde, 1995; Dummit et al., 1997). Debate over the classification of SM continues to exist since some schools of thought consider SM to be a variant of anxiety disorder and, therefore, it should be classified with other anxiety disorders in the DSM-IV-TR (APA, 2000). SM is currently classified under “Other Disorders of Infancy, Childhood, and Adolescence” in the DSM-IV-TR (APA, 2000). SM literature commonly suggests that there is an overlap with anxiety (Anstendig, 1999).

**Prevalence.** Identification of this disorder dates back to the 19th century (Dummit et al., 1997; Kopp & Gillberg, 1997), and the prevalence rate of SM continues to remain relatively low (0.3% to 0.7%) compared to other childhood disorders (Bergman et al., 2002). Bergman et al. (2002) conducted the first ($N = 2,256$) community-based study that examined the prevalence rate of SM. They found that 0.71% of children attending kindergarten to 2nd grade in Los Angeles met diagnostic criteria for SM. Elizur and Perednik (2003) found a similar prevalence rate of 0.76% in a sample of Israeli children. Researchers have noted that there has been an increase in the prevalence rate among immigrant children. The prevalence of SM was estimated to be 2.2% for immigrant children in the Israeli study (Elizur & Perdik, 2003) and estimated to be 0.55% to 0.78% in a large Canadian study (Bradley & Sloman, 1975). These results indicate that the prevalence of SM is not as rare as previously assumed (Elizur & Peredik, 2003). Differential diagnosis can be difficult in immigrant or minority children when English is not their primary language. However, Toppelberg, Tabors, Coggins, Lum, and Burger
(2005) noted that the diagnosis of SM should be given if mutism is prolonged, severe, pervasive across settings, and occurs in both languages.

SM tends to be diagnosed slightly less frequently in boys than in girls and has a gender ratio of about 1:1.6 (Cunningham, McHolm, Boyle, & Patel, 2004; Dummit et al., 1997; Kristensen, 2000; Steinhausen & Juzi, 1996). SM is usually evident by age 3, although the modal diagnosis and referral does not commonly occur until the child reaches kindergarten or 1st grade when more verbal interactions are expected (Krohn, Weckstein, & Wright, 1992; Wright, Miller, Cook, & Littman, 1985). The early primary school years have the highest prevalence rates compared to later grades (Tancer, 1992).

The low prevalence rate of SM is attributed to the lack of large-scale studies compared to other childhood disorders (Standart & Le Couteur, 2003). Historically, case studies have been the primary method to study SM, which indicated the belief that SM was due to oppositional or defiant behaviors. Recent studies investigating the etiology of SM have shifted to understanding SM as more of an anxiety-related disorder (Bergman et al., 2002; Kristensen, 2002) than as a result of being oppositional or defiant.

Etiology. Despite the documented history of SM, questions about classification and etiology continue to be debated. Historically, early theories regarding the etiology of SM emphasized psychodynamic issues, such as intrapsychic conflict and family neurosis (Hayden, 1980). Some theorists have suggested that SM develops as a response to trauma, psychosocial stressors (e.g., divorce, death of a loved one, frequent relocations), or oppositional and/or controlling behaviors (Hayden, 1980; Kolvin & Fundudis, 1981). Recent literature has shifted away from psychodynamic conceptualizations, preferring to
emphasize similarities between SM and behaviorally inhibited temperament and anxiety disorders (e.g., social phobia; Black & Uhde, 1995). Some researchers have noted that children with SM exhibit higher rates of neurodevelopmental delay/disorder (NDD), which appears to be more common in immigrants. NDD affects motor, linguistic, cognitive, and social development (Andersson & Thomsen, 1998; Anstedig, 1999; Kolvin & Fundis, 1981; Kristensen, 2000; Krohn et al., 1992; Song, 1996; Steinhausen & Juzi, 1996). Since these factors may be important in understanding the etiology of SM, a comprehensive review is recommended to learn about the genetic, temperamental, psychological, developmental, and social/environmental factors associated with SM (Cohen, Price, & Stein, 2006).

Temperament

Some researchers have noted that children with SM share a number of characteristics with children classified as having behaviorally inhibited temperaments (Cohan, Price, & Stein, 2006). Steinhausen and Juzi (1996) reported that the origin of SM in childhood was the result of environmental influences on a temperamental predisposition towards shyness and decreased sociability. Some theorists suggest that SM is a disorder with a biological basis characterized by a behaviorally inhibited temperament and poor social behavior compared to children without the disorder (Dummit et al., 1997). Children with SM are generally reported to be shy, which contributes to the symptom of withholding speech (Steinhausen & Juzi, 1996). Kendall (1994) stated that the deviation from the natural growth of children’s fears and hesitancy in relationships with unknown people interfere with the academic and social development of children with SM. A family history of shyness, SM, or anxiety disorders was identified
as precursors for developing symptoms of mutism in children (Dow et al., 1995; Kolvin & Fundudis, 1982). Theories on the biological origin of SM suggest that SM could be inherited from a shy or anxious parent (Dow et al., 1995).

Children with SM often display behavioral inhibition and are observed to be frozen or inactive (Hill & Scull, 1985; Klin & Volkmar, 1993; Lesser-Katz, 1988; Wright & Cuccaro, 1994). Behavioral theorists view social situations as an intense arousal of the sympathetic nervous system that causes discomfort for children with SM. A child’s experienced arousal of discomfort results in retreating or withdrawing from social situations both behaviorally and vocally. Inhibition functions to help the child defend against his or her fear and may become habitual when the child experiences arousal (Manassis & Bradley, 1994). The conceptualization of SM as a severe and language-based form of behavioral inhibition helps to clarify that SM is not a conscious or motivated behavioral disorder but rather a symptom of anxiety (Anstendig, 1999). The child’s withholding of speech in certain situations and not others can appear to be a form of manipulation and control (Leonard & Topol, 1993) rather than as a defense mechanism in response to arousal during social situations (Lesser-Katz, 1988).

Genetic Factors

A number of studies have found evidence of a genetic component to SM. In 2001, one study reported significantly increased rates of shyness and social anxiety in parents of 54 children diagnosed with SM compared to 108-matched control children (Kristensen & Torgersen, 2001). This study found that 38.9% of mothers and 31.4% of fathers of children with SM indicated a history of shyness and/or social anxiety as compared to control group mothers (3.7%) and fathers (0.9%). In an earlier study of families of 30
children diagnosed with SM, Black and Uhde (1995) found that 15% of parents and 19% of siblings had a history of SM. Research data on the family histories of children with SM also indicate high rates of communication, depressive, and anxiety disorders. Psychopathology of the parents of children with SM found a high rate of depression (Kolvin & Fundis, 1981). Anderson and Thomsen (1998) found a high rate of speech difficulties and shyness in parents (59%) and in one or more siblings (35.1%) of children with SM in social situations. Although high rates of disorders within a family support a strong genetic predisposition to SM, environmental factors often contribute to SM. Clarification of the role of genetic loading and environmental influences are needed in future studies.

*Parent–Child Relationships*

Literature on SM indicates that the development of the disorder is strongly related to overdependence and enmeshment between a parent and child (Meyers, 1984; Tatem & Delcampo, 1995), which impedes the child’s self-efficacy in the social world. This type of parent–child dyad reinforces the message that the presence of the parent is needed for survival (Anstendig, 1999). Therefore, in situations where the parent is absent (e.g., school), the child becomes stressed and withdraws. Reinforcement of this message can evolve into school phobia or SM (Kerney, 1995; Subak et al., 1982).

Theories in family pathology indicate that SM originates from unhealthy parent–child relationships, which result in the underlying symptoms of anxiety, which is often a possible origin of pathology (Meyers, 1984). Parental anxiety and shyness influence their parenting style. A parent’s fear of the outside world is modeled for the child with SM. Fear affects the child’s process of individuation, which results in the child developing an
insecure attachment to the social environment and withdrawal from social situations (Manassiss & Bradley, 1994).

Treatment of Selective Mutism

Psychosocial Treatment

Since the SM literature is relatively sparse compared to other psychiatric disorders, it is difficult to determine the types of treatment children receive from the community. Findings of past descriptive studies suggest only 60% of children with SM receive treatment (Black & Uhde, 1995; Dummit et al., 1997; Kumpulainen Rasanen, Raaska, & Somppi, 1998). These studies have found individual psychotherapy as the most common psychosocial treatment modality employed, followed by family therapy (Kumpulainen et al., 1998; Steinhausen & Juzi, 1996). However, the types of treatment approaches utilized in these studies were difficult to ascertain. In 2006, Schwartz, Freedy, and Sheridan concluded that the majority of children with SM in primary care settings do not receive appropriate diagnosis or treatment referrals. Schwartz et al. (2006) found that the two most common psychosocial treatments reported were behavior modification and speech therapy.

Behavioral and Cognitive-Behavioral Interventions

Early behavioral conceptualizations view SM as a learned behavior that develops, as a means to escape from anxiety, and the removal of the anxiety-provoking stimulus negatively reinforces not talking. Another conceptualization view is that SM is a learned behavior that develops as a way to get attention from others. The models views SM as a product of a series of conditioned events regardless of the original cause of the behavior (Chavira & Stein, 2006; Labbe & Williamson, 1984). According to this model, symptoms
of SM are maintained by secondary gains obtained by not talking. Behavioral treatment utilizes techniques to increase a child’s verbalizations in settings where the child previously did not speak. These techniques include contingency management, shaping of verbal speech (e.g., whispering to normal audible speech), stimulus fading, exposure, and systematic desensitization. Social skills training and modeling by a therapist are used to encourage positive interactions in these settings to increase verbalizations. Contingency management includes the use of reinforcement for nonverbal communication with the goal that responses will be shaped into verbal communication (Amari, Slifer, Gerson, Schenck, & Kane, 1999; Porjes, 1992) in difficult settings.

Interventions using contingency management and shaping techniques typically involve interviewing the child to identify possible reinforcers. A hierarchy of items is created, and reinforcement is provided contingent on successive approximations of verbal behavior (e.g., mouthing words, whispering). Eventually, reinforcement is only obtained for audible verbal speech. These types of interventions have been used in single-case experimental designs and case studies resulting in positive outcomes. Data, however, are lacking on the maintenance of verbal behavior once contingency management is removed (Amari et al., 1999; Porjes, 1992). Additionally, despite the positive outcomes for using contingency management and shaping, generalization of verbal speech may require additional interventions.

Stimulus-fading procedures are often added to contingency management and shaping in order to build upon the success of increasing verbal speech (Masten, Stacks, Caldwell-Colbert, & Jackson, 1996; Watson & Kramer, 1992) across people and settings. Gradually, new people are introduced into the group until the child speaks in the presence
of a larger group. Stimulus fading may also be used in different settings where the child has difficulty speaking (e.g., doctor’s office, restaurants, libraries, school).

Systematic desensitization, a type of behavioral intervention, is used when other interventions have been unsuccessful (Rye & Ullman, 1999). Systematic desensitization involves the child utilizing relaxation techniques that in problematic settings. Typically, a hierarchy of anxiety-provoking situations is created for the child. Therapy consists of a series of mocked and in vivo exposures to his or her feared situations. Over time, the child acclimates to the feared situation, thus reducing his or her anxiety. To increase positive social interactions with peers, social skills training may be utilized to reduce anxiety while improving prosocial skills. Systematic desensitization has been reported to be successful in reducing speech-related anxiety and increasing speech with familiar adults and peers. This is particularly true for older children with SM who typically have less difficulty learning and implementing progressive muscle relaxation and imagery exercises (Compton et al. 2004).

An example of a cognitive–behavioral approach is called totally anxiety-free communication (TALK; Gallagher, 2002). TALK is a treatment for children diagnosed with SM. The manual provides therapists with detailed steps for starting treatment with a child with SM. The TALK manual combines behavioral approaches such as gradual exposure, systematic desensitization, stimulus fading, rewards for completing talking tasks, and consequences (e.g., time-out) for overt refusal to cooperate with a caregiver or failure to answer questions during treatment sessions. The TALK manual includes a preparation stage prior to the start of treatment. In the preparation stage, relaxation strategies and homework, such as videotaped conversations of the child talking at home,
are required. The TALK manual has not been published or empirically tested. However, the techniques incorporated in TALK, such as systematic desensitization and contingency management, are empirically supported as effective treatments for SM (Vecchio & Kearney, 2009).

**Psychopharmacological Treatment**

Research in anxiety often considers SM as a subtype of social phobia (Black & Uhde, 1994). Therefore, medications prescribed to children with SM are also used to treat children diagnosed with anxiety (Black & Uhde, 1992; Dummit, Klein, Tancer, Asche, & Martin, 1996). Selective serotonin reuptake inhibitors (SSRIs) appear to be helpful in the treatment of anxiety disorders in children (Simeon & Wiggins, 1995). Controlled studies depict SSRIs and the drug clomipramine as useful in treating these disorders, compared to a placebo (Birmaher et al., 1994; Campbell & Cueva, 1995). Published studies specifically focused on the treatment of SM have shown SSRIs (e.g., fluoxetine and phenelzine) to be an effective treatment (Black & Uhde, 1994; Dummit et al., 1997; Golwyn & Weinstock, 1990; Wright et al., 1995). Case studies and small-scale studies have demonstrated the usefulness of fluoxetine as an essential component to interventions for children with SM (Black & Uhde, 1992; Boon, 1994; Motavelli, 1995; Wright et al., 1995).

Dummit et al. (1996) conducted a study with 21 children involved in psychotherapy prior to an open trial of fluoxetine. These children were administered gradual doses of fluoxetine over a 9-week period. None of the children responded adequately to psychotherapeutic treatment alone. After fluoxetine was added to the
intervention, 76% of the participants experienced a marked improvement in symptoms of SM and anxiety.

*Generalization of Verbal Speech*

Historically, behavioral approaches were criticized on the basis that treatment effects were not maintained over time and did not transfer across settings (Stokes & Baer, 1977). A behavior change may only be said to have generality if it proves durable over time, appears in a wide variety of possible environments, or spreads to a wide variety of behaviors (Baer, Wolf, & Risley, 1968). The term *generalization* was later defined as the occurrence of behavior under different nontraining conditions (i.e., across participants, settings, people) without scheduling of the same events in those conditions (Stokes & Baer, 1977). The importance of generalization is integral in evaluating treatment effects in environments where treatment has not yet been programmed. This has real world implications for children with SM, who receive treatment across limited environments and people. The treatment for SM emphasizes behavioral analytic principles such as systematic fading, shaping, and the use of reinforcement to increase generalization. To date, research that examines the generalization of verbal speech in children with SM is lacking.

*Research Methodology in Studying Selective Mutism*

Single-case experimental research designs have been utilized in behavioral analytic research since the mid-60s (Kazdin, 2011). The quality and attributes associated with single-case designs continue to make it popular for school-based research (Barger-Anderson, Domaracki, Kearney-Vakulick, & Kubina, 2004; Dermer & Hoch, 1999). Research in school settings can be challenging due to the lack of access to a large number
of participants (Wolery & Gast, 2000). Furthermore, approximately one third of all data-based interventions conducted with students with learning disabilities use single-case designs (Swanson & Sachs-Lee, 2000).

Single-case or single-subject design can personalize data collection and can be individually analyzed (Barger-Anderson et al., 2004). One of the most widely used single-case experimental designs is the multiple-baseline design. This design provides a means for collecting multiple sets of data for a single case (Neuman & McCormick, 1995). Multiple-baseline design involves the sequential application of the independent variable across two or more different settings, behaviors, or participants (Cooper, Heron, & Heward, 2007). This is the design of choice when it is not possible for subjects to return to original baseline (Gay, 1987; Gay & Airasian, 2000; Barlow, Nock, & Hersen, 2009; McReynolds & Kearns, 1983).

For example, once a person has learned a new strategy to facilitate behavioral change, it is not desirable to have the person unlearn the new skill (Barger-Anderson et al., 2004). The goal for the treatment is to increase verbal speech across environments (e.g., school and community) and across people (e.g., teachers and peers) for children with SM. Using multiple-baseline design can aid in demonstrating generalization of verbal speech after the implementation of treatment and pinpoint when these changes occurred over time. Additionally, the advantages of using a multiple-baseline design are as follow: (a) it does not require the reversal of treatment, (b) it requires only one target behavior, and (c) it provides a strong demonstration of efficacy when the target behavior reaches the criterion level.
CHAPTER III

RESEARCH DESIGN AND METHODOLOGY

Participants

Participants in the study were four children ages 6 to 7 years old ($M = 6.25$, $SD = 0.5$) with a primary diagnosis of selective mutism (SM; see Table 1). Participants were receiving treatment at the CSC. Criteria for participation in the pilot study were as follow: (a) the child was enrolled in school (Kindergarten to 1st grade), (b) the child met DSM-IV-TR (APA, 2000) criteria for the diagnosis of SM, (c) the child evidenced a failure to speak at school with teachers or peers, and (d) the child and parents demonstrated proficiency in English. Participants were excluded if: (a) the child met criteria for a communication disorder; (b) the child was diagnosed with mental retardation, psychosis, or some condition other than SM that precluded developmentally appropriate speech; (c) English was not the child’s primary language spoken; and (d) the child’s school or teacher were unwilling to participate in treatment sessions.

Table 1

<table>
<thead>
<tr>
<th>Participants</th>
<th>Age</th>
<th>Grade</th>
<th>Gender</th>
<th>Ethnicity</th>
<th>School</th>
</tr>
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<tr>
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<td>Kindergarten</td>
<td>Female</td>
<td>White</td>
<td>Orthodox Jewish Private All Girls</td>
</tr>
<tr>
<td>TW</td>
<td>7</td>
<td>1st grade</td>
<td>Male</td>
<td>Asian</td>
<td>Public</td>
</tr>
<tr>
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<td>Kindergarten</td>
<td>Female</td>
<td>Hispanic</td>
<td>Public</td>
</tr>
<tr>
<td>EV</td>
<td>6</td>
<td>Kindergarten</td>
<td>Male</td>
<td>White</td>
<td>Public</td>
</tr>
</tbody>
</table>
Setting

NYU Child Study Center Clinic

The Selective Mutism Program was based at the New York University Child Study Center located in New York, New York. The Selective Mutism Program staff included two co-directors, two postdoctoral fellows, two predoctoral psychology externs, three clinical psychology interns, a pediatric neuropsychologist, and a senior learning disabilities specialist. The SM Program directors each had over 10 years of experience with children diagnosed with SM and utilized the Totally Anxiety-free Language K(c)ommunication (TALK) cognitive behavioral treatment manual for SM (Gallagher, 2002; see Appendix A) as a model for treatment.

Participants’ Schools

Participants attended different elementary schools throughout New York. Three participants attended large urban public schools located in or near New York City. To maintain confidentiality, participants were assigned a two-initial designation. TW attended 1st grade at a public school in lower Manhattan with two teachers and 23 students. CR attended a Queens public school for kindergarten in a class with 24 students and two teachers. EV was enrolled in kindergarten at a public school in Brooklyn. EV’s class had one primary teacher, one assistant teacher, and 22 students. MD attended kindergarten at an all-female religious private school in a suburb of New York. MD’s classroom had one primary teacher, two assistant teachers, and 25 students.
Measures

Direct observations and behavioral rating scales were used to assess changes in verbal speech that occurred outside of treatment sessions. Parents of participants completed the Selective Mutism Questionnaire (SMQ) once a week. Teachers of the participants completed the School Speech Questionnaire (SSQ) weekly. Trained observers who were blind to the treatment condition conducted direct observations once a week at the participants’ schools.

Selective Mutism Questionnaire (SMQ)

The SMQ is a standardized 17-item parent-report rating scale specifically designed to measure the core symptoms associated with SM (Bergman et al., 2001). The SMQ assesses the frequency of a child’s verbal speech across the functional domains of childhood (see Appendix B) and the impairment associated with mutism across several situations (Langley, Bergman, & Piacentini, 2007). Recent studies have demonstrated the clinical utility of the SMQ in distinguishing children with SM from those with social phobia and other anxiety disorders (Chavira, Shipon-Blum, Hitchcock, Cohan, & Stein, 2007; Manassis, Fung, et al., 2003; Manassis, Tannock, et al., 2007). Factor analysis of ratings from 589 parents indicated that the SMQ is a three-factor instrument (Bergman et al., 2008). The SMQ yields the following subscales: (a) school, (b) home and family, and (c) social situations outside of school.

The SMQ total scale and three subscales demonstrated good internal consistency reliability (Cronbach’s $\alpha = .842$; Bergman et al., 2001). Examples of SMQ items include (a) “when appropriate, my child speaks with other children s/he does not know” and (b) “when appropriate, my child talks to family members living at home when other people
are present.” The SMQ requires respondents (e.g., parents or caregivers) to use a 4-point scale to rate verbalizations of average loudness (0 = Never, 1 = Seldom, 2 = Often, 3 = Always). Lower scores on the SMQ indicate lower frequencies of speaking behavior. For this pilot study, parents completed the SMQ weekly to assess the changes they observed in the child’s verbal speech across settings (see Appendix B).

**School Speech Questionnaire (SSQ)**

Teachers of the participants completed the SSQ weekly. The SSQ is a modified version of the SMQ (Bergman et al., 2001), adapted for teachers to collect information regarding speech at school. Six items from the SMQ were identified to assess speaking behavior in school and were modified to create the SSQ. The SSQ demonstrated good internal consistency reliability (Cronbach’s $\alpha = .96$) and validity (Bergman et al., 2002). Examples of items of the SSQ include (a) “when appropriate, the student talks to most peers at school” and (b) “when the student is asked a question by his/her teacher, s/he answers.” The SSQ uses a 4-point scale to rate verbal behavior (0 = Never, 1 = Sometimes, 2 = Often, 3 = Always). Consistent with the SMQ, lower scores on the SSQ reflect a lower frequency of verbal speech (see Appendix C).

**Assessment Procedures**

**Initial Participant Screening**

Parents interested in treatment for their child contacted the clinic and participated in an initial telephone screening. Parents were asked to identify the primary concerns for their child. The screener scheduled an appointment for an intake evaluation to determine if the child met diagnostic criteria for SM. If the initial screening indicated a child met
diagnostic criteria for SM, then the family participated in the SM behavioral observation task.

**Behavioral Observation Task**

Children and parents participated in the SM behavioral observation task, a video-recorded behavioral assessment, designed by Dr. Kurtz and colleagues at the CSC (see Appendix D). The task is a reversal design experiment (i.e., A-B-A-B) that provides baseline qualitative and quantitative information regarding verbal interactions between a child and his or her parents, alternating with and without the presence of a stranger in the room. The task allowed the clinician to observe parent–child verbal interactions prior to obtaining written consent to participate in the study. The reversal design of the task provided information regarding a child’s percentage of verbal speech in a fixed interval when a stranger was present in the room and when the child is alone with their parent. Marked changes in a child’s verbal speech, with and without the presence of a stranger in the room, was considered a proxy for the severity of the symptoms of SM. Examples of changes in a child’s verbal speech included decreased spontaneous speech, increased nonverbal communication, going from voicing to whispering, and decreased verbal responses to his or her parent’s questions.

**Observation Coding System Training**

The pilot study coding team consisted of the author and five clinical research assistants from the CSC. Dr. Kurtz, the co-director of the Selective Mutism Service at the CSC, supervised the author. The author supervised the research assistants. The coding team participated in multiple training sessions to master the coding protocol.
First, the coding team read the manuals for the Dyadic Parent–Child Interaction Coding System (DPICS; Eyberg et al., 2004) and the SM behavioral observation coding system. Next, a session was conducted to explain the coding system, discuss rationales for the codes, and practice with written examples. Following these discussions, coders practiced by coding archived SM treatment sessions, SM baseline observation tasks, and classroom treatment session videos. The coders practiced as a group initially so that each code could be discussed. When coders felt confident in utilizing the coding system and postpractice discussions indicated that codes matched across observers, coders independently scored SM behavioral observation tasks. These were used to calculate interobserver reliability. It was expected that the interclass correlation coefficient (kappa) would be at or above .80 (considered excellent by Fleiss, 1981). If reliability was not acceptable, coders continued practicing with SM treatment session videos until kappa reached .80. The training period consisted of four 3-hour group sessions, in addition to private video coding and in vivo coding of SM baseline behavioral observations of nonparticipants.

Observation Coding System to Categorize Data From the Observations

A newly developed coding system was used. The SM behavioral observation coding system was derived from Robinson and Eyberg’s (1981) dyadic parent–child interaction coding system (DPICS; for the most updated version, see Eyberg, McDiarmid, Duke, & Boggs, 2004) for characterizing parent-child interactions for oppositional and noncompliant behavior. The DPICS was developed to guide treatment and evaluate treatment progress in parent–child interaction therapy (PCIT). Like the DPICS, the selective mutism interaction coding system (SMICS) provides codes for discrete verbal
and nonverbal interactions between child, parent, and teacher. However, because the DPICS codes centered on how the parent–child interaction impacted child compliance, it did not contain the specific codes that focused on the types of verbalizations needed to examine interactions for a child with SM. Therefore, to examine how teacher–child, peer–child, and teacher–child–peer interactions impacted verbalizations in children with SM, many of the DPICS categories were modified in the SMICS to describe specific verbal behaviors in a child’s school.

For example, the SMICS child code for compliance to speak was divided into many forms (e.g., nonverbal response, barely audible verbal response, audible verbal response, no response). Previous research studies similarly modified the DPICS manual codes to address behavioral problems other than oppositionality, such as separation anxiety disorder (Pincus, Eyberg, & Choate, 2005).

In the SMICS, codes for the adults included the different types of questions (e.g., forced-choice, open-ended) and whether the adult provided the child with a reasonable opportunity to respond (≥ 5 seconds). For children, the SMICS includes codes for spontaneous verbalizations, verbal responses, nonverbal responses (e.g., nodding, pointing), and nonresponding. The quality of child verbalizations was also coded in terms of whether the verbalization was audible or inaudible to the responder. Participants’ latencies to respond (e.g., ≥ 5 seconds, ≤ 5 seconds) were also coded. A coding sheet was developed specifically for the study and included abbreviated codes to capture the participants’ utterances (see Appendix E).

The SMICS behavioral observation coding system is unpublished. The coding system was piloted in clinical exercises with video-recorded SM treatment sessions of
children with parents and clinicians at the CSC. The coding system was easy to use and demonstrated face validity. It has been utilized to study communication patterns between parents and children with SM or other anxiety disorders. During the early phases of training, coders using the SMICS had a high rate of interrater consistency (0.80). For the purpose of this study, the coding system was used for direct observations instead of videotaped sessions.

**Formal Assessment and Consultation**

Formal assessments (initial screenings and SM observation task) were conducted at the clinic. Parents provided written consent, and children provided nonverbal assent prior to data collection. Parents also completed a life history questionnaire and diagnostic interview. During the formal assessment feedback session, eligible families were informed about the pilot study. All four families provided consent to contact their child’s teacher after the school consented to have treatment sessions and observations there. Families were informed about the time commitment involved for participating in the study, number of required weekly treatment sessions (two or three), completion of weekly rating scales, and permission from the schools to conduct weekly observations and treatment sessions.

No child was excluded from the study during the formal assessment and SM observation task process. Children who participated in the study attended 20 to 30 sessions. Treatment sessions increased from twice per week to three times per week as the end of the school year approached. The basic principles and goals of the treatment were described to the parents. After a parent provided consent to participate in the pilot study, the first treatment session and school observation were scheduled. The first school
observation constituted the baseline data for this study. Weekly school observations and rating scales were collected from baseline until the end of treatment.

Treatment Procedures

Cognitive–behavioral therapy treatment sessions were scheduled for a minimum of two sessions per week with the clinician. Treatment intervention was comprised of two phases.

**Clinic Intervention Phase I**

Clinic Intervention Phase I consisted of child-focused, exposure-based practices that involved using behavioral descriptions, systematic desensitization, fading, shaping, modeling, prompting, contingent and specified verbal praise, and in vivo exposures. Clinic Intervention Phase I required the child to consistently speak to the clinician without the presence of a caregiver in the room at the clinic. This was achieved in a stepwise gradual inclusion of the clinician into the room with the parent and child, followed by the clinician’s inclusion in an activity (e.g., playing Go Fish, building with Legos®), and, finally, the clinician’s participation in verbal interactions with the child.

The first step required the child to speak to a parent with the clinician present in the room. Next, the clinician described the activity in which the parent and child were engaged. To acclimate the child to the presence of the clinician in the room, the clinician provided behavioral descriptions about the activity and verbal praise when the child spoke. The clinician’s skills served as a model for the parent on how to provide specific praise to the child for verbal speech. The next step required the clinician to integrate herself or himself into the activity with the parent and child. Initially, when the clinician participated in the chosen activity, he or she directed questions only to the parent. As
sessions progressed, the clinician directed questions to the child. The clinician’s initial verbal exchanges were comprised of forced-choice questions, reflections of what the child said to his or her parent, and verbal praise for talking in the presence of the clinician.

As sessions progressed and the child spoke directly to the clinician (e.g., answered questions, spontaneously spoke), the parent was systematically faded out of the room. Gradual systematic fading began when the parent left the room for 5 to 15 minutes towards the end of session. As sessions progressed, the amount of time a parent spent outside the room was incrementally increased. The goal was to increase the duration of time a parent spent outside the room until the parent no longer participated in treatment sessions and the child continued to speak consistently to the clinician. The separation of the parent and child was gradual in order to probe for changes in the child’s verbal speech after his or her parent left the room. The systematic fading out of the parent in treatment sessions continued until the child comfortably left his or her parent in the waiting room upon arrival at the clinic and consistently spoke to the clinician throughout the session. This ensured that the child was not overly dependent on the presence of his or her parent as a discriminative stimulus ($S^D$) when verbally responding in new situations and with new people. Techniques used to accomplish this goal were (a) exposure to the presence of the clinician as the child spoke to his or her parent, (b) the use of small rewards and verbal praise for completion of specified talking tasks, and (c) games and activities that facilitated verbal exchanges.

Clinic Intervention Phase I consisted of eight steps to fully integrate the clinician into the parent–child conversation and play. The amount of sessions needed for a child to
consistently speak to the clinician varied. A comprehensive summary of the steps from
the Totally Anxiety-free K(c)ommunication manual utilized in Clinic Intervention Phase
I can be found in Appendix A. The completion of Clinic Intervention Phase I was
determined by the child’s percentage of verbal responses emitted during a single session.
Once the child responded to 80% of the clinician’s questions during the Clinic
Intervention Phase I, treatment was transported to the school for School Intervention
Phase II: Teachers.

*School Intervention Phase II*

In School Intervention Phase II: Teachers, treatment sessions were implemented
at the child’s school. The clinician worked with the child alone until he or she spoke to
the clinician consistently at school. Once the child spoke to the clinician consistently at
school, additional people were systematically integrated into the sessions. The clinician
used techniques such as modeling, prompting, role-playing, scripting, and in vivo
exposures. The child role-played and created scripts with the clinician to practice what to
say when talking to new people. Both the clinician and child role-played his or her
answers to questions. The clinician used modeling and prompting during the role-play to
increase the child’s speech volume and intelligibility. The clinician helped the child set
verbal speech goals to earn prizes for completing the in vivo exposures. The child was
required to achieve his or her verbal speech goals each treatment session with the
clinician.

Examples of tasks for a child at school during treatment sessions included asking
a teacher questions, playing games that required verbal exchanges, answering questions
from different people at or around the school, and self-reporting on achievements.
Teachers were gradually faded into treatment sessions. Gradual fading consisted of the teacher joining the child and clinician for a few minutes of the session and slowly increasing the teacher’s time in the session until he or she was included into the entire session. Initially, this was achieved through scripted questions the child asked the teacher and then through games that required unrehearsed verbal exchanges.

Once the child spoke consistently to his or her teacher, the next treatment phase—School Intervention Phase II: Peers—was implemented and peers were incorporated into the therapist-teacher-child treatment sessions. Once the child consistently spoke to his or her peers during sessions, more people (e.g., cafeteria workers, assistant teachers, school personnel) were included in the in vivo exposures treatment sessions. The goal of School Intervention Phase II: Peers was to have peers, teachers, and familiar adults simultaneously included in treatment sessions. Three to four peers at a time were included in treatment sessions and varied weekly to increase the number of people the child spoke to in the presence of the clinician. The study concluded when the academic year ended.

Direct Observation Procedures

Data from direct, blind observations were collected weekly at the participants’ schools. As noted above, the first observation occurred in school prior to the first treatment session at the clinic served as the baseline. Trained observers went into the participants’ schools and observed the participants in three separate observational conditions each week. The observations included the participant (a) working one-on-one with a teacher, (b) working a teacher and a small group of peers (≤ 3 peers), and (c) interacting with peers during lunch or snack. During the observations, the observer was
positioned in close proximity ($\leq 6$ ft. away) to the participant in order to code occurrences of verbal speech (i.e., verbal responses, spontaneous speech) using the SMICS coding system.

*Teacher–Participant Observational Condition*

Participants were observed working one-on-one with a teacher. The purpose of the task was to observe the participant’s verbalizations that occurred when engaged with a teacher alone. Before the task started, the observer reviewed the instructions with the teacher and provided a list of sample questions (see Appendices F, G, and H). The observer placed a table and chairs in an area either in the classroom or hallway for the teacher, participant, and observer for the observation. The observer was positioned in close proximity to the teacher and participant ($\leq 6$ ft. away) within an audible listening range. The teacher was provided with a 2-minute warm-up period to introduce the task to the participant before the timer started. The observer signaled the teacher (e.g., gave a thumbs-up) that the session timer started and questioning could begin.

The teacher asked the participant a minimum of five forced-choice questions (e.g., Do you like red or blue?) and five open-ended questions (e.g., What is your favorite color?) The teacher was required to ask a total of 10 questions before the observation was completed. The duration of each session varied as a function of how long it took the teacher to ask the required questions. Additionally, the teacher was encouraged to intersperse questions with comments and statements throughout the observation. The observer recorded each audible vocalization and response to questions spoken by the teacher and participant on the data-recording sheet. When the teacher asked the required
number of forced-choice and open-ended questions, the observer signaled the teacher that
the task was complete and the timer stopped.

*Teacher–Participant–Peer Observation*

For this observation, the participant was observed while working in a small group
(i.e., ≤ 3 peers) and a teacher. The small group observational task provided clinical
information regarding a participant’s verbalizations while engaged in an activity with
peers and his or her teacher.

Before the observation started, the observer reviewed the purpose of the task and
observation procedures and provided a list of sample questions (see Appendix F, G, and
H) to the teacher. A table and chairs were set up for the observation either in the corner of
the classroom or in the hallway. The observer was positioned in close proximity to the
teacher and children (≤ 6 ft. away) to remain within audible listening range. The teacher
was provided with a 2-minute warm-up period to introduce the task to the children before
the observation timer started. The observer signaled the teacher when the warm-up period
ended and to start asking the requisite questions (i.e., five forced-choice, five open-
ended).

The teacher stated a specific child’s name before asking a question to ensure that
the children knew to whom the question was directed (e.g., Jesse, is this crayon blue or
green?) The participant was provided with 5 s to respond to the question before the
teacher moved on to the next question for a peer. The teacher interspersed questions to
the participant with questions directed towards the peers. If a peer responded out of turn,
the teacher ignored the peer’s response and restated the question to the participant. The
observer recorded the teacher’s questions directed at the participant on a data sheet, in
addition to the participant’s responses. The observer signaled the teacher when the observation ended. The duration of the observations was dependent on how long it took the teacher to complete asking questions to the participant; therefore, the length of observations varied.

Assessment for Generalization of Treatment—Lunch/Snack Observation

To assess the generalization of verbal speech, direct observational data of audible verbalizations (i.e., responses to questions and spontaneous speech) that occurred in the presence of peers during an unstructured daily activity, lunch, or snack were collected. Lunch and snack were identified as unstructured periods of time during school when verbal exchanges occurred without guidance from teachers. The observer was positioned within an audible listening range from the participant and his or her peers (≤ 6 ft. away) during lunch or snack. The observer recorded any verbalizations (prompted and unprompted) that occurred during this time, and the frequency count was graphed. Lunch or snack observations were for approximately 30 min.

Study Design

Due to differing lengths of treatment for participants and duration in each phase, the total number of observations differed across participants, thus creating a multiple baseline. The different range in the number of sessions across participants in each phase allowed the author to evaluate treatment effects using the principles of baseline logic, such as violation of prediction, replication, and validation. The utilization of a multiple-baseline design was beneficial for this population since the reversal of treatment was neither required nor possible. The reversal of speech for children diagnosed with SM
would have been unethical and undesirable, especially with participants’ extensive histories of not talking across multiple environments prior to the initiation of treatment.

Data Interpretation

The target behavior was a child’s audible, verbal speech. Verbalizations were measured in two ways for the observational conditions: (a) occurrences of audible verbalizations (e.g., spontaneous and prompted responses to questions) and (b) percentage of audible verbal responses to questions during observations with adequate opportunity to respond. Occurrences of verbalizations were tallied after each observational condition. Verbal speech consisted of words, phrases, or sentences that were spontaneous or in response to questions posed by the teacher and peers that were audible and intelligible to the observer. The percentage of verbal responses (i.e., answers to questions) was also calculated. Verbal responses were defined as any audible contextual vocalization to a teacher’s question with an opportunity to respond (i.e., within 5 seconds) that occurred during the observational conditions. The total prompted verbal responses were divided by the total questions asked with adequate opportunity to respond.

\[
(1) \quad \frac{\text{% of Verbal Responses}}{\text{Total of Teacher Questions w/ Opportunity to Respond}} = \frac{\text{Participant Verbal Responses to Questions}}{\times 100}
\]

Interobserver Agreement

Trained observers recorded the occurrences of verbal responses and spontaneous speech during the direct observations. During reliability analyses, a second observer independently collected data on a participant’s behaviors during 25% of observations.
across participants (Cooper, Heron, & Heward, 2007). Exact agreement coefficients for
the five observers averaged 85% for verbalizations (range 52 to 100). The goal criterion
for reliability data was to maintain an average of 90% exact agreement for the occurrence
of the target behavior (Hersen & Barlow, 1976). The observers were retrained on
observational techniques to improve their reliability scores as the study progressed and
differences in data collection were discussed after the observations were complete.
Additionally, any challenges during the observations were addressed and adjustments
were made, as long as the adjustments did not interfere with the goal of the observation.

The observers were undergraduate students who received course credit in
conducting psychological research. Coursework included training on the SMICS
behavioral coding system and observations in the school and at the CSC. Data collection
began after the observers completed the interobserver agreement training on three
consecutive coding practice videotapes reaching a minimum criterion of 90% on all of
the measures. Periodic retraining or feedback sessions were held when necessary to
ensure that consistency was maintained across coders over time. Codes were recorded on
coding sheets and entered into a computerized database for storage and analysis. Two
observers conducted the interobserver agreement observations at school. Audible
verbalizations by a participant were recorded on a data sheet during the observational
conditions.
CHAPTER IV

RESULTS

Due to the small sample size and nonconcurrent multiple-baseline design across paired phases, visual analyses were used to evaluate the following: (a) generalization of verbal speech; (b) the percent of verbal responses to prompted questions; (c) the frequency of spontaneous speech; and (d) SMQ and SSQ behavioral rating assessment scores. Participants varied in the number of treatment sessions across phases (i.e., clinic intervention, school intervention: teachers, school intervention: peers). When visual analyses of data are used, changes in means (i.e., the average) between phases may indicate differences in the target behavior between phases. A change in level, meaning an abrupt shift in level of the dependent variable when phases shift (e.g., treatment sessions in the clinic to treatment sessions in school), may also indicate a change in the dependent variable due to a change in the independent variable (i.e., treatment sessions in school).

Moreover, a change in the slope of the line during a shift to the next treatment phase suggests a change in the clinical effect. For instance, an immediate change in slope after treatment implementation would indicate an intervention effect rather than some other variable (i.e., maturation effect). Visual inspection techniques were also used to indicate the latency of change, defined as the speed with which change occurred over the weeks of treatment. According to Kazdin (2011), the earlier a change occurs in the next phase, the greater confidence one can have that the change was due to a phase shift as opposed to other factors (e.g., maturation). For a more detailed discussion of visual inspection criteria, refer to Kazdin (2011).
General Findings from Direct Observations

Changes in the participants’ verbal speech were observed throughout treatment. The amount of change in verbal speech varied across conditions and participants. Increases were observed in the participants’ responses to questions and spontaneous speech. Participants who exhibited speech at baseline demonstrated the most change in verbal output compared to children who did not speak at baseline. When treatment was transported to the school, increases in verbal responses and spontaneous speech occurred for all participants. The following paragraphs summarize the findings for each participant according to each condition.

Teacher–Participant Condition

In the teacher–participant condition, only one participant (CR) initially spoke during the baseline observation. However, as treatment progressed, the frequency of verbal speech during the teacher–participant condition increased for all participants relative to their baseline score.

MD. The percentage of verbal responses for MD in the teacher-participant observation varied, ranging from 0% to 43% (see Figure 1, top panel). Visual analyses did not indicate a definitive pattern (i.e., positive or negative slope or trend) of response occurrences across the observations. Towards the end of the study, MD’s highest percentage of verbal responses occurred in Session 10. In contrast to MD’s verbal responding, spontaneous speech was not observed during the teacher–participant observation until School Intervention Phase II: Teachers was implemented (see Figure 2, first panel). On the ninth observation, MD had the highest occurrence of spontaneous speech in a single session. Overall, despite the variability observed, MD’s verbal
response increased from 0% at baseline to 43%, with an average of 18%. MD’s frequency of spontaneous speech ranged from 0 to 6, with an average of 0.75 during this condition.

Figure 1. Percentage of verbal responses in the teacher–participant observation from baseline to the end of treatment across participants.
TW. Observations of TW indicated that his verbal speech did not occur until School Intervention: Teachers was implemented and teachers were introduced in the treatment sessions. TW’s verbal response increased from 7% during the fifth observation to 76% in the 14th observation (see Figure 1, second panel). When compared to other participants, he had the longest latency period before responding verbally during the teacher–participant observation. In this condition, TW responded to questions but was not observed to speak spontaneously in this condition throughout the duration of the study (see Figure 2, second panel).

CR. The observed verbal responses for CR in the teacher-participant condition differed from the other participants (see Figure 1, third panel). CR responded to questions initially during baseline (36 %) and throughout the teacher-participant condition. CR’s average verbal response for this condition was 50%. In contrast, CR’s spontaneous speech occurred during the 5th, 6th, and 8th observations (see Figure 2, third panel). It is important to note that CR’s spontaneous speech occurred in the teacher-participant condition once the School Intervention Phase II: Teachers was implemented. The frequency of CR’s spontaneous speech ranged from 0 to 2. Overall, CR responded consistently to prompted questions, while her spontaneous speech was limited to two occurrences toward the end of treatment.

EV. Observations of EV indicated that verbal responses did not occur in the teacher-participant condition until School Intervention Phase II: Teachers was implemented (see Figure 1, last panel). Once EV spoke in the teacher-participant condition, he responded to 40% of the teacher’s questions during the last observation. In
contrast, his spontaneous speech was observed twice in consecutive observations towards the end of treatment, with a frequency of one occurrence (see Figure 2, last panel).

Teacher–Participant–Peer Observation

The percentage of verbal responses among participants was similar in both the teacher–participant–peer and teacher–participant conditions. Three of the four participants did not verbally respond at baseline. Two participants did not verbally respond until School Intervention Phase II: Teachers was implemented (see Figure 3). In this condition, three of the four participants did not exhibit spontaneous speech at baseline and throughout the first treatment phase (see Figure 4). When School Intervention Phase II: Teachers was implemented, increases in verbal responses were observed. Verbal responses were higher relative to the baseline among participants in the teacher–participant–peer condition. For verbal responses, the average responses were 14% for MD, 10% for TW, 64% for CR, and 8% for EV throughout observations. With the exception of EV who never spoke spontaneously, average frequencies of spontaneous speech during the last observations in Phase II: Peers were 3.3 for MD, 3.0 for TW, and 1.3 for CR.
Figure 2. Frequency of spontaneous speech occurrences in the teacher–participant observation from baseline to the end of treatment across participants.
Figure 3. Percentage of verbal responses in the teacher–participant–peer observation from baseline to the end of treatment across participants.
Figure 4. Frequency of spontaneous speech occurrences in the teacher–participant–peer observation from baseline to the end of treatment across participants.

MD. MD did not exhibit verbal responses in the teacher–participant–peer condition until the fourth session in the clinic (see Figure 3, top panel). Subsequently, after the fourth session, no verbal speech was observed until the eighth session when School Intervention Phase II: Teachers was implemented. The frequency of MD’s speech varied from the eighth session through the final observation (VR Average = 14%). MD
did not spontaneously speak until the 10th and 11th observations (see Figure 4, top panel). After the 11th observation, no spontaneous speech was observed in the last observation.

**TW.** For TW, verbal responses did not occur until the 10th observation, and spontaneous speech occurred only in the final teacher–participant–peer observation (see Figures 3 and 4, second panel). TW did not verbally respond to prompted questions for the majority of the observations in the teacher–participant–peer condition until School Intervention Phase II: Peers was implemented. Despite inconsistencies in the percentage of TW’s responses (VR Average = 10%), he demonstrated an increase in his percentage of responding in observations during the final phase of treatment (see Figure 3, second panel). Additionally, TW had 12 occurrences of spontaneous speech during the final teacher–participant–peer observation (see Figure 4, second panel).

**CR.** The percent of verbal responses for CR in the teacher–participant–peer condition were variable (see Figure 3, third panel). Although CR’s percentages of verbal response varied, she responded to questions in each observation (VR Average = 64%). In the School Intervention Phase II: Teachers, CR had a total of five occurrences of spontaneous speech during the teacher–participant–peer condition (see Figure 4, third panel).

**EV.** Participant EV did not verbally respond to prompted questions until the last two observations (see Figure 3, last panel). EV did not speak spontaneously during the teacher–participant–peer condition (see Figure 4, last panel). EV verbally responded during observations five and six (VR Average = 8%).

*Assessment for Generalization—Lunch/Snack Condition*
Participants were observed for 30 minutes during each lunch/snack observation. Since it was impossible to control teachers’ questions during lunch/snack, only spontaneous speech was measured in this condition, which also included any verbal responses to questions. Figure 5 depicts the total speech occurrences for participants during lunch/snack, while Figure 6 depicts only spontaneous speech occurrences observed. The opportunity to verbally respond to questions varied among participants; however, all speech (i.e., verbal responses or spontaneous speech) during lunch/snack indicated whether generalization occurred in the presence of peers.

**MD.** Participant MD exhibited two verbal responses and one occurrence of spontaneous speech during the lunch/snack condition (see Figure 5, top panel). The observer recorded a total of 41 questions directed to MD during the lunch/snack observation throughout the study. MD responded to 5% of the questions during the lunch/snack condition. The instance of spontaneous speech was an isolated occurrence (see Figure 6, top panel).

**TW.** TW had four occurrences of verbal responses observed in the lunch/snack condition while School Intervention Phase II: Peers was implemented (see Figure 5, second panel). In total, TW was asked 70 questions and responded four times. Therefore, he only responded to 6% of questions. TW was not observed to speak spontaneously during the lunch/snack condition throughout the study (see Figure 6, second panel).

**CR.** CR spoke consistently in the lunch/snack condition from baseline. The frequency of CR’s speech varied from 3 to 29 throughout the observations (see Figure 5, third panel). In total, 54 questions were directed to CR during lunch/snack, and she was observed to respond to 25 questions (VR Average = 46%). CR’s spontaneous speech in
the lunch/snack condition was the highest compared to her spontaneous speech in the other two conditions (see Figure 6, third panel).

EV. EV spoke spontaneously from baseline in the lunch/snack condition (see Figure 5 and 6, last panel). However, EV only exhibited spontaneous speech during lunch/snack condition and did not verbally respond to questions. EV spoke spontaneously to select peers during lunch/snack (see Figure 6, last panel). In total, EV was asked 25 questions, none of which were answered. In contrast, EV had a total of 58 occurrences of spontaneous speech during the lunch/snack condition.
Figure 5. Frequency of speech occurrences (verbal response and spontaneous speech) in the lunch/snack observation from baseline to the end of treatment across participants.
Research Question 1: Generalization of Verbal Speech

Verbal responses and spontaneous speech observed among participants differed in the lunch/snack condition. Figure 5 depicts the sum of the participants’ verbal responses and spontaneous speech during the lunch/snack observation. Figure 6 depicts each participant’s spontaneous speech during lunch/snack. Before treatment commenced, two of the four participants exhibited spontaneous speech during the baseline observation (see Figures 5 and 6). Participant MD exhibited a total of four occurrences of verbal speech during the lunch/snack condition. The majority of MD’s verbal speech occurrences were responses to questions and not spontaneous speech (see Figures 5 and 6, top panel).

Participant TW exhibited limited verbal responses and no spontaneous speech throughout the observations in the lunch/snack condition. A total of three verbal responses occurred in the 12th and 13th observations (see Figure 5, second panel). In contrast, observations of participant CR indicated verbal speech was observed throughout the lunch/snack condition. Across the eight observations of CR, the frequency of verbal speech was varied from 3 to 29. CR exhibited spontaneous speech with peers and teachers. The highest frequency of CR’s spontaneous speech occurred during the second observation (see Figure 6, third panel). Participant EV also exhibited verbal speech consistently across observations in the lunch/snack condition (see Figure 6, last panel). However, EV’s verbal speech was limited to spontaneous speech to peers. The frequency of EV’s verbal speech during Lunch/Snack condition was varied from 4 to 17 and visual inspection indicated an upward trend across observations. EV’s greatest frequency of spontaneous speech was observed during the seventh lunch/snack observation (SS = 17).
In summary, all participants evidenced verbal speech outside of treatment but the specific point in treatment when this occurred differed. Each participant was observed to speak in the lunch/snack condition; however, two participants spoke consistently throughout observations in Lunch/Snack condition, and the other two participants had limited speech that occurred over two observations during Lunch/Snack. Therefore, there was no identifiable specific point or phase of treatment when verbal speech occurred during the lunch/snack condition among participants.

Figure 6. Generalization of verbal speech during the lunch/snack condition from baseline to the end of treatment across participants.
Research Question 2: Generalization of Verbal Speech to Peers During Phase II: Teachers Only Included

Figure 7 depicts observations during lunch/snack while School Intervention Phase II: Teachers was implemented. In School Intervention Phase II: Teachers, treatment was transported from the clinic to the school. Treatment sessions at school incorporated teachers in the sessions and occurred academic subjects rather than during unstructured activities (e.g., lunch or snack). Visual inspection techniques were used to evaluate whether speech generalized in the presence of peers during lunch/snack during School Intervention Phase II: Teachers (see Figure 7). Overall, verbal speech generalized in the presence of peers for one participant during the lunch/snack condition while School Intervention Phase II: Teachers was implemented.

Participants CR and EV exhibited verbal speech in the presence of peers in the lunch/snack condition from baseline. Verbal responses for CR were stable (2) across observations, while her spontaneous speech decreased from 3 to 1 (see Figure 7, third panel). For participant EV, the frequency of spontaneous speech increased by 2 occurrences during the lunch/snack condition. Initially, when School Intervention Phase II: Teachers was implemented, his spontaneous speech decreased (see Figure 7, last panel). Overall, visual inspection techniques indicated that the slope and trend of EV’s spontaneous speech were both in a positive direction, while verbal responses did not occur. MD’s speech was inconsistent during the lunch/snack condition when School Intervention Phase II: Teachers was implemented. MD verbally responded a total of three times and exhibited spontaneous speech once during the lunch/snack condition. Although these occurrences were limited, MD’s verbal speech generalized to peers during the
lunch/snack condition. TW did not exhibit spontaneous speech or verbal responses during the lunch/snack condition of the School Intervention Phase II: Teachers (see Figure 7, second panel).

![Graph showing frequency of speech occurrences across lunch/snack condition in intervention phase II: Teachers]

*Figure 7.* Generalization of verbal speech in the lunch/snack condition with peers when School Intervention Phase II: Teachers was implemented (no peers).

**Research Question 3: Occurrence of Spontaneous Speech Across Conditions**

To answer the research question regarding when spontaneous speech first occurred in each condition, Table 2 presents in which session participants exhibited spontaneous speech across the three conditions. Three of the four participants (i.e., MD,
EV, and CR) exhibited spontaneous speech first during the lunch/snack condition; however, MD had a longer latency before she exhibited spontaneous speech compared to EV and CR. The subsequent condition wherein the three participants were observed to exhibit spontaneous speech was the teacher–participant condition. In contrast, TW was observed to speak spontaneously only at the teacher–participant–peer condition. Although CR and MD exhibited spontaneous speech last during the teacher–participant–peer condition, EV did not exhibit spontaneous speech in this condition throughout treatment.

Table 2

<table>
<thead>
<tr>
<th>Participant</th>
<th>Teacher-Participant</th>
<th>Teacher-Participant-Peer</th>
<th>Lunch/Snack</th>
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<tbody>
<tr>
<td>MD</td>
<td>9</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>TW</td>
<td>-</td>
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<td>5</td>
<td>1</td>
</tr>
<tr>
<td>EV</td>
<td>5</td>
<td>-</td>
<td>1</td>
</tr>
</tbody>
</table>

Research Question 4: Condition With Greatest Occurrence of Spontaneous Speech

Table 3 depicts the participants’ total spontaneous speech throughout the study across conditions. Spontaneous speech occurred most frequently during the lunch/snack condition and the teacher–participant–peer conditions. Two participants (i.e., CR and EV) exhibited the greatest amount of spontaneous speech during the lunch/snack condition (see Table 3), which was also the first condition in which they both spoke. Both MD and
TW exhibited the most spontaneous speech during the teacher–participant–peer condition. For TW, this was the only condition where he spoke spontaneously.

Findings varied across participants in regards to which condition spontaneous speech occurred the least. EV did not speak spontaneously during the teacher–participant–peer and exhibited only two occurrences of spontaneous speech in the teacher–participant condition compared to lunch/snack. CR’s spontaneous speech was also significantly less frequent in the teacher–participant and teacher–participant–peer condition compared to lunch/snack. TW did not speak at all during the teacher-participant and lunch/snack conditions, while MD spoke the least during lunch/snack.

<table>
<thead>
<tr>
<th>Participants</th>
<th>Teacher-Participant</th>
<th>Teacher-Participant-Peer</th>
<th>Lunch/ Snack</th>
<th>Total SS Observed</th>
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<td>20</td>
</tr>
<tr>
<td>TW</td>
<td>0</td>
<td>12</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>CR</td>
<td>3</td>
<td>5</td>
<td>39</td>
<td>47</td>
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<tr>
<td>EV</td>
<td>2</td>
<td>0</td>
<td>62</td>
<td>64</td>
</tr>
</tbody>
</table>

*Research Question 5: Parent-Rated SMQ and Teacher-Rated SSQ Behavioral Ratings*

Evaluation of treatment effects on participants’ verbal responses and spontaneous speech was assessed using results from the parent-rated Selective Mutism Questionnaire (SMQ) and teacher-rated School Speech Questionnaire (SSQ). As treatment progressed, SMQ and SSQ scores increased among participants. A positive change in scores on the SMQ and SSQ questionnaires suggested parents and teachers observed an increase in verbalizations across participants. However, the amount of change in scores on the SMQ
and SSQ varied among participants. Two participants had a greater increase in scores on
the parent SMQ compared to teacher SSQ, while two participants had a greater increase
on the teacher SSQ compared to parent SMQ scores.

This difference in scores among the measures was likely due to the context of the
SMQ and SSQ questionnaires. As noted earlier, the SMQ parent-report questionnaire is
comprised of three factors—home/family, school, and community—while the SSQ
focuses on how a child with SM functions within the school context. Therefore, parents
(SMQ) reported changes in behavior across multiple settings, while teachers (SSQ) were
restricted to changes in verbalizations that occurred at school. It is important to note that
most of the participants did not speak in school until much later in the treatment process
(e.g., MD, TW, and EV). For these participants, changes in their SSQ scores occurred in
Phase II when treatment was transported to the school.

The participants’ SMQ scores in this study were compared to the results from the
Bergman et al. (2008) study, which documented SMQ means and standard deviations for
two groups—individuals with SM and individuals without SM (see Figures 8 and 9).
Based on the findings for individuals with SM from the Bergman et al. study, the mean
baseline SMQ raw score was 15.75 among participants, which fell within 1 SD of the SM
group (see Table 4). At the end of treatment, the mean SMQ raw score across participants
($M = 33.5, SD = 12.66$) increased and was similar to the individuals with SM SMQ
mean score ($M = 31.07, SD = 7.01$) from the Bergman et al. study who underwent 28
sessions of behavior therapy (Bergman et al., 2008). Changes in the SMQ parent-report
measure indicated that participants verbalized more as treatment progressed (see Figure
10).
Note. Lower scores represent less frequent speaking behavior (more severe SM symptoms) SM $M$ (12.99) and $SD$ (7.23) and non-SM $M$ (46.00) and $SD$ (5.94) comparison group data obtained from Bergman et al. (2008) UCLA study. Adapted from “The Development and Psychometric Properties of the Selective Mutism Questionnaire” by Bergman et al. (2008), *Journal of Child and Adolescent Psychology, 37*(2), p. 461. Copyright 2008 by the American Psychological Association.

In terms of SMQ factors (home/family, school, and community), the greatest change in verbalizations occurred in the community for all participants (see Figure 11). For example, the community factor mean score for TW and EV at baseline was 0.6, which was consistent with scores from the SM group from the Bergman et al. (2008) study. At the end of treatment, community mean factor scores for EV (2.0) and TW (3.0) were within 1 $SD$ of the individuals in the non-SM group ($M = 2.50; SD = 0.53$) from the Bergman et al. study. Among the participants, TW had greatest increase across factors scores between mid-treatment through the end of treatment (see Figure 10). CR had the greatest mean change in verbal speech on the community factor, increasing from a

<table>
<thead>
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<th>Participants</th>
<th>Baseline SMQ</th>
<th>Post-Treatment SMQ</th>
<th>Increase</th>
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<tr>
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<td>16</td>
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</tr>
<tr>
<td>TW</td>
<td>13</td>
<td>51</td>
<td>+38</td>
</tr>
<tr>
<td>CR</td>
<td>15</td>
<td>26</td>
<td>+11</td>
</tr>
<tr>
<td>EV</td>
<td>16</td>
<td>34</td>
<td>+18</td>
</tr>
</tbody>
</table>

Table 4

*Pre- and PostTreatment SMQ Total Scores and Mean*
baseline score similar to the SM group in the Bergman et al. study to an end of the
treatment closer to the non-SM group (see Figures 8 and 9).

Figure 10. Weekly SMQ parent report of verbalizations for participants.
Figure 11. Pre- and post-SMQ scores across contexts.

*MD.* Visual inspection of the SMQ mean factor scores for MD indicate changes in the level and slope of the line as treatment progressed (see Figure 12). The mean community factor score increased from 0.2 to 1.0. At the end of treatment, MD’s community factor score remained within 1.5 $SD$ of the Bergman et al. (2008) SM group, MD’s score increased 80% from baseline. Figures 11 and 12 indicate that the SMQ total and mean factor scores improved at various points during treatment. MD’s home/family factor score increased from baseline (1.5) to the end of treatment (1.83) by 22% (see
Figure 12. MD’s school factor scores indicated no discernable treatment effect; baseline and end of treatment factor scores were equal (1.0).

*Figure 12. SMQ mean factor scores graph for MD from baseline to posttreatment.*

*TW.* In contrast to other participants, TW’s SMQ scores indicated marked changes in verbal speech within a short latency (i.e., changes began shortly after School Intervention Phase II: Peers was implemented; see Figure 13). His SMQ mean factor scores across all domains (school, home/family, community) increased as treatment progressed in School Intervention Phase II: Peers, with rapid changes in verbal speech indicated at the end of treatment. TW’s SMQ mean community factor score increased from 0.6 to 3, while the mean home/family factor score increased from 1.5 to 3, an 100% increase at the end of treatment compared to baseline (see Figure 13). TW’s mean school
factor score increased from 0.17 to 3. Based on the findings from the Bergman et al. (2008) study, TW’s scores were closer to the non-SM group range at the end of treatment (see Figure 9).

Figure 13. SMQ mean factor scores for TW.

CR. SMQ mean factor scores for CR indicated an increase (i.e., change in level and slope) in the community factor as treatment progressed, ranging from 0 to 1 (see Figure 14). CR’s home/family mean factor scores ranged from 1.5 to 2.0 throughout treatment. Additionally, there was increased variability in her school mean factor scores as treatment progressed, ranging from 0.33 to 2.0. For example, when the Clinic Intervention Phase I was implemented, CR’s SMQ mean home and school factor score
dropped initially before scores increased. Overall, CR’s verbal speech demonstrated the most improvement in the community factor ratings from baseline to the end of treatment.

EV. EV’s scores increased across all factors on the SMQ relative to baseline once treatment was transported to the school (see Figures 10 and 15). The most significant increase was in the community factor from a low baseline mean factor score of 0.60 to 2.40 (see Figure 15). The home/family mean factor score increased throughout treatment, and visual inspection indicated an upward trend (i.e., positive slope) with moderate variability. Also, a spike occurred early in treatment on the third SMQ administration. EV’s school mean factor scores ranged from 0.67 to 1.5 throughout treatment. Visual inspection indicated an increase in trend from baseline mean factor scores through the end of treatment. Although, EV’s factor scores all increased, treatment effects were more apparent in the community.

Figure 14. SMQ factor scores for CR.
Figure 15. SMQ mean factor scores for EV.

School Speech Questionnaire

On the SSQ teacher report, three participants demonstrated increases between baseline and the end of treatment (see Table 5 and Figure 16). For example, TW’s teacher-rated SSQ increased by 13 points and EV’s score increased by 8 points. MD’s SSQ scores ranged from 6 to 8 points (see Figure 16, top panel). CR’s SSQ raw score increased throughout treatment and ranged from 9 to 11 (see Figure 16, third panel). Treatment effects were not apparent based on the minimal change in the SSQ scores for MD and CR.

On the SSQ, TW’s teacher reported that his verbal speech in school steadily increased towards the end of treatment (see Figure 16, second panel). TW’s SSQ scores indicated that his verbal exchanges increased with peers and teachers. TW’s teacher also indicated that TW inconsistently spoke in small groups or with other school staff on the SSQ. However, TW demonstrated the greatest increase on the teacher-reported SSQ.
throughout treatment compared to the other participants. TW’s verbal speech increased from a single occurrence to consistently speaking to peers, school staff, and teachers at posttreatment.

For EV, when treatment was initiated, his teacher reported that he spoke to some peers. Upon clarification with the teacher, she reported that he actually was whispering to select peers and not speaking aloud in class or to her. On the SSQ, his teacher indicated EV’s verbal responding to questions increased; there were no improvements indicated in regards to asking questions or speaking spontaneously. However, EV’s data indicate an upward trend on the SSQ (see Figure 16, last panel).

Evaluation of the accurate alignment of the teacher and parent ratings and the direct observations across the teacher-participant, teacher-participant-peer, and lunch/snack was assessed using the multiple-baseline graphs for the three conditions and the parent-rated SMQ and teacher-rated SSQ graphs. Because the parent-rated SMQ compares speech at home, school, and in the community, two of the factors (e.g., home, community) were omitted. The school mean factor was used for the analyses because of its high correlation with the SSQ. The hypothesis that the parent and teacher ratings and direct observations would align was not supported for all participants. The majority of participants (75%) had teacher-rated SSQ graphs and SMQ school mean factor graphs that accurately aligned. When these graphs were compared to the graphs of three observations visual inspection indicated some alignment in the teacher-participant, teacher-participant-peer, and lunch/snack observation conditions; however, the accuracy of alignment across graphs differed among participants and the variability in participants’ verbal speech.
**MD.** For MD, the SMQ school factor and SSQ graphs aligned in treatment phases, with the exception of the School Intervention Phase II: Peers. The SMQ school factor graph and SSQ graph were compared to the three observation conditions. Both the SMQ school factor graph and the SSQ did not align with teacher-participant and teacher-participant-peer graph; however, when compared with the lunch/snack graph the data was more closely aligned. The treatment phase that did not align closely was School Intervention Phase II: Peers on the SSQ, SMQ school mean factor, and lunch/snack verbal occurrences graphs.

**TW.** The SMQ school factor and SSQ graphs for TW accurately aligned across the treatment phases. As verbal speech increased at school, based on the teacher-rated SSQ, increases were noted on the SMQ school factor graph. The graphs of the three observations aligned for two of the conditions, with the exception of lunch/snack. The teacher-participant and teacher-participant-peer graphs were not identical; however, changes in speech occurred during School Intervention Phase II: Peers, and aligned with the findings from the SMQ school mean factor graph and SSQ graph.

**CR.** Participant CR had differences in verbal speech across conditions. The variability in the exhibition of verbal speech was evident upon visual inspection of the graphs of the three conditions and teacher and parent ratings. The SMQ school factor graph indicated variability in her verbal speech; however, the trend was upward. In contrast, the teacher-rated SSQ was stable and did not indicate a treatment effect. These graphs did not accurately align with the graphs of the direct observations.

**EV.** Visual inspection of the direct observations and teacher and parent rating for EV indicated an increase in trend for the exhibition of verbal speech. The SMQ school
factor, SSQ, and lunch/snack graphs indicated an upward trend from baseline through the end of treatment. However, the direct observations graphs for the teacher-participant and teacher-participant-peer graph did not increase in trend until further in treatment. Despite the differences in EV’s exhibition of speech, based on the ratings and direct observation graphs, sudden increases in speech between observations were indicated across all of the graphs, and therefore the results accurately aligned.

<table>
<thead>
<tr>
<th>TABLE 5</th>
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<tbody>
<tr>
<td>Teachers SSQ Raw Scores</td>
</tr>
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<td>Participants</td>
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<td>TW</td>
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<tr>
<td>CR</td>
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<td>EV</td>
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</table>
Figure 16. SSQ total scores across participants.
CHAPTER V
DISCUSSION

This multiple baseline design study examines the generalization of speech of four children with selective mutism in the school setting. The multiple baseline across settings design demonstrated a functional relationship between the treatment and change in verbal speech. The treatment phases were staggered across the four participants and progression to the next phase depended on the frequency and percentage of a participants’ increased speech. Past research indicated the use of single-case designs as relatively simple, yet powerful tools for examining treatment effects (Kazdin, 2011), and are ideal for conducting research with low-incidence populations such as individuals with selective mutism (O’Reilly et al., 2008). Findings indicated that all of the children exhibited verbal speech throughout the study; however, based on the study criterion that speech must be exhibited during Lunch/Snack once treatment was initiated, only two participants (TW, MD) met criteria for generalized speech. Generalized speech could not be accurately assessed because the other two participants (i.e., CR, EV) were speaking at baseline. The aim of the current study was to identify a specific time period when verbal speech generalization occurred for participants. Verbal responses to questions and spontaneous speech were measured during teacher-child activities, teacher-child-peer activities, and lunch/snack by a trained observer. Contrary to expectations that generalized speech would occur after the implementation of School Intervention Phase II: Teachers, treatment gains evidenced for this group of participants occurred at different times throughout the study. Participants who exhibited speech at baseline demonstrated the
most change in speech compared to participants who did not speak at baseline. There were also differences noted between the conditions pertaining to the occurrence of verbal responses and spontaneous speech. Participants who exhibited spontaneous speech at baseline had more occurrences of speech compared to the participants who had less than five occurrences of speech in the lunch/snack condition. The teacher-rated School Speech Questionnaire (SSQ) and parent-rated Selective Mutism Questionnaire (SMQ) were administered weekly and aligned with direct observations for the majority of participants (Bergman et al., 2008). The SMQ was the first assessment tool created to detect change in symptoms specific to SM (Bergman et al., 2008), and the results of the study regarding increased speech matched those of several previously published case reports for children with SM (Baskind, 2007; Fisak et al., 2006; Vecchio & Kearney, 2009). These results indicate positive outcomes for increased verbal speech from a therapeutic or training situation to other environments for children with SM treated with behavior therapy (Kale, Kaye, Whelan, & Hopkins, 1968; Wahler, 1969; Walker & Buckley, 1972).

Contrary to expectations that generalization would occur at a universal time point during treatment among participants, participants generalized speech at different time points. Findings suggest that children with SM progress in treatment at an individual rate, and movement through the treatment phases was ultimately dependent on when increases in the percentage and frequency of the participants’ verbal speech occurred during treatment sessions. Therefore, the hypotheses that verbal speech generalization would occur specifically after School Intervention Phase II: Teachers was implemented was not supported and generalized verbal speech occurred appeared independent of treatment.
In adherence with the study’s criterion for speech generalization (i.e., the exhibition of spontaneous or prompted speech during lunch/snack), participants EV and CR evidenced speech during lunch/snack at baseline. This was an unexpected finding and raised questions about whether these two participants could be accurately assessed for the generalized verbal speech. One explanation for their exhibited speech prior to treatment may be due, in part, to a positive self-perception of acceptance by peers and may help explain the finding that two of the four participants demonstrated speech during lunch/snack prior to treatment implementation (Cunningham et al., 2006). Parent and teacher reports from the intake evaluation indicated that the children were well liked in class and had friends. A positive self-perception may have facilitated the exhibition of speech to peers. This explanation is consistent with past research, which indicates children with selective mutism did not rate themselves as less accepted of peers (Cunningham et al., 2006), despite ratings from teachers and parents indicating they had social skill deficits and were less socially competent compared to their peers. Another explanation may be that there were variations in the severity of mutism among participants. Two participants had specific selective mutism, thereby enabling speech in a wider range of situations (i.e., lunch/snack). In contrast, the other two participants presented with a severe variant of selective mutism, or generalized mutism, were behaviorally inhibited, and had more anxiety at school (Cunningham et al., 2006). Cunningham et al. (2006) points out that are ranges in the severity of selective mutism, and children with SM are not a homogenous diagnostic group.

The hypotheses that verbal speech would consistently progress during the lunch/snack condition after a child verbally responded in two consecutive treatment
sessions to questions posed by a teacher was not supported. Two participants did not
demonstrate increased verbal speech (e.g., spontaneous or verbal response) during
lunch/snack observations after the School Intervention Phase II: Teachers was
implemented, despite answering questions posed by the teacher during treatment
sessions. Although the hypothesized change in speech was not supported, increased
verbal responding was observed in conditions. Therefore, participants who consistently
responded to questions (i.e., 80% of questions) posed by a teacher in consecutive
treatment sessions when the clinician was present resulted in increased verbal responding
to teachers’ questions in both the teacher–participant and teacher–participant–peer
condition outside of treatment sessions, but not during the lunch/snack observation.
Because the clinician was not present during the observation conditions this finding
indicates that stimulus generalization occurred in the two conditions where teachers
asked questions to participants. Cooper et al. (2007) states that stimulus generalization is
the act or process of a target behavior (e.g., speech) emitted to a stimulus similar to (e.g.,
during teacher-participant observation) but distinct from the conditioned stimulus (e.g.,
treatment sessions with teacher and clinician) other than those in which it was trained.
This finding led to the conclusion that children with SM are likely to increase verbal
responding to teachers either working one-on-one or in the presence of peers without the
clinician present after they responded to the teacher in consecutive treatment sessions.

All of the participants had pretreatment scores on the Selective Mutism
Questionnaire (SMQ) that were similar to the SM participants in the UCLA study
(Bergman et al., 2008). Findings of this study indicated that children’s verbal responses
and spontaneous speech increased after behavioral treatment was implemented in the
school. This finding was consistent with research that has documented the treatment effects of behavior therapy (Amari, Silfer, Gerson, Schenck, & Kane, 1999; Fisak, Oliveros, & Ehrenreich, 2006; Vecchio & Kearney, 2007; Masten, Stacks, Caldwell-Colbert, & Jackson, 1996; Porjes, 1992; Watson & Kramer, 1992). The results of this study provide further empirical evidence that behavioral treatment procedures for SM produce positive changes by increasing verbal communication with peers and school staff (Cohan et al., 2006).

Pre- and posttreatment scores in the SMQ composite scores were compared to determine if the instrument was sensitive enough to capture changes in speech. Findings indicate an increase in the total SMQ scores for participants from pre-treatment to posttreatment, demonstrating an increase in speech following the implementation of treatment. The children evidenced small (+6) to large increases (+38) from pre- to posttreatment ($M = +18.25$). These results were consistent with Bergman et al.’s (2008) findings of SM children who demonstrated a mean 16-point increase. ($M$ length of treatment = 28 sessions).

While the majority of children in this study evidenced a similar or greater increase in the SMQ total score at posttreatment, one participant demonstrated only a small increase. Specifically, MD evidenced the least change in her pre- to posttreatment SMQ total score. When assessing the minimal change in MD’s SMQ scores compared to the other participants, a few explanations may be considered. Notably, the majority of participants demonstrated a rapid response to treatment in the clinic and transitioned into the next treatment phase with fewer sessions, with the exception of MD. Past researchers reported that a slow response to treatment indicated a more severe symptom presentation
and the requirement of additional sessions in the clinic (Southham-Gerow, Kendall, & Weersing, 2001). Another explanation may be related to the severity of mutism, or generalized mutism, which is considered a more severe variant of selective mutism. The classification of generalized mutism results when a child does not speak in a wider range of situations (Cunningham et al., 2006). Children with generalized mutism frequently have comorbid internalizing problems (e.g., anxiety, depression), and present as more anxious at school (Cunningham et al., 2006). After the study ended, MD’s treatment was supplemented with psychopharmological treatment due to her minimal progress. Past research indicates that medical professionals who treat SM believe it is directly linked to childhood anxiety, and recommend prescribing medications to treat anxiety (Black & Uhde, 1992; Dummit et al., 1996). Her post-treatment follow-up parent report indicated that the combined treatment approach showed marked improvement in MD’s speech.

Despite the limited sample size in this study, the findings were of similar magnitude to Bergman et al. (2008) for the majority of the participants. However, because of the limited sample size and length in treatment ($M = 18-22$ sessions), the results should be interpreted with caution. The comparison of participants’ scores on the SMQ and SSQ accurately reflected the changes in verbal speech in the observations. The participants’ who had more sessions in each treatment phase had lower parent ratings on the SMQ. For example, the last SMQ administered for one participant (TW) greatly increased compared to his previous scores. The increased SMQ score correlated with the participant’s (TW) sudden increase in spontaneous speech (+12) that occurred during the final observation. This unexpected increase in speech and the changes in teacher and parent ratings may be due to a reduction of the child’s anxiety, additional reinforcement.
contingencies, and the multiple *in vivo* exposures at school (Hofmann, 2008).

Additionally, for the majority of sessions TW spoke to the clinician in an audible whisper. During the last three sessions at school, TW spoke in a louder voice. The increase in speech loudness and additional reinforcement indicates a causal link between increased speech, the reinforcement contingencies, and *in vivo* exposures (Facon, Sahiri, & Riviere, 2008). The sudden increase in teacher and parent ratings and spontaneous speech may be due, in part, to the increased reinforcement for speaking to people who a child had not previously spoken to. Throughout treatment verbalizations from participants were positively reinforced with verbal praise and tangible items. Reinforcement contingencies may have increased the likelihood that a child would continue to speak at school in an audible voice (Facon et al., 2008). Teacher reports also indicated that TW spoke for the first time to his speech therapist and school psychologist. At the end of the study, TW spoke at school to familiar adults, who had not been included in treatment sessions.

The children in this study had two distinctive symptom presentations prior to the start of treatment—either they spoke in school in at least one specific setting (i.e., lunch) or were reported to have spoken less than a total of five times in school prior to the implementation of treatment. Past research indicates that children with selective mutism are not a homogenous diagnostic group, in actuality; there are ranges in the severity of selective mutism (Cunningham et al., 2006). For example, two participants spoke in school to peers during lunch before treatment was implemented, however, these two participants refused to speak to their parents on the phone or in community situations. One participant (CR) was reported to speak at school a few times to a teacher before
treatment began. Therefore, based on the study’s criterion for generalization of speech—
verbal speech occurrences exhibited in the lunch/snack condition—two of the four participants already exhibited verbal speech at baseline in the lunch/snack observation.

It is possible that the severity of SM for these two children were mild or that these children were no longer selectively mute.

Another possible explanation for the variability found across generalization of speech for participants is the severity of anxiety. Past research indicates that children with selective mutism are more anxious than controls (Cunningham et al, 2006), however, the level of anxiety observed varies (Yeganeh, Beidel, Turner, Pina, & Silverman, 2003; as cited in Cunningham et al., 2006). Therefore, two of the participants of the study (i.e., TW, MD) may have been more anxious than the other two participants, which may have contributed to the lack of generalization of speech.

**Spontaneous Speech**

A finding that deserves considerable emphasis is the difference in spontaneous speech across conditions among participants in the current study. For three of the four participants, the lunch/snack condition was where spontaneous speech was first observed. The next condition where spontaneous speech occurred was the teacher-participant condition. Two participants exhibited spontaneous speech in all three conditions. This unexpected finding may be due, in part, to the increased social comfort (Shipon-Blum, 2010) with peers during lunch/snack, an unstructured social situation. Shipon-Blum (2010) reported that children with SM adjust their level of social communication according to the setting and expectations of others. Therefore, social comfort with peers may be the necessary precursor for the exhibition of speech to occur at school and the
unstructured lunch/snack-facilitated spontaneous speech. Shipon-Blum (2010) pointed out that social engagement is a precursor to social communication.

The structure of the teacher–participant and teacher–participant–peer condition may explain the study’s finding that participants exhibited spontaneous speech during lunch/snack. The teacher–participant and teacher–participant–peer condition involved an activity for the participant to engage in with a teacher. Questions pertaining to the activity (e.g., games, toys) were directed to the participant. Despite participants’ verbal responding in these conditions, spontaneous speech occurred at a lower frequency and after a number of weeks for most participants. Therefore, a structured activity promoted responding, but not spontaneous verbalizations. Another reason may be because lunch/snack has fewer demands placed on the participant to speak and socialization or talking is permitted during meals. Cunningham et al. (2006) suggest that classrooms inhibit a complex repertoire of verbally mediated social skills (e.g., greeting others, initiating conversations) for children with selective mutism. In the classroom, speech typically occurs after a teacher prompts a child to talk or answer a question. Furthermore, in didactic situations, spontaneous speech may be viewed as a negative behavior and children are instead taught or “shaped” by teachers to raise their hands and wait to be called on before speaking. This may explain why three of the four participants first exhibited spontaneous speech during the social and less-structured lunch/snack observation rather than in treatment sessions.

The results of the study suggest that spontaneous speech occurrences occurred more in the unstructured situation. It was hypothesized that spontaneous speech would be the most difficult verbal output for a participant to exhibit and, therefore, would likely
present after verbal responses were observed. Spontaneous speech, however, was observed for two participants before verbal responses were observed during lunch/snack. Based on the observation conditions, unstructured situations may facilitate spontaneous verbal output compared to structured situations.

The second condition in which spontaneous speech was observed for three of the four participants was the teacher–peer observation. One reason for this finding may be that the participant and teacher had prior experience working together and the individualized attention may have facilitated speech in this setting. The participants may have habituated to the exposure of interacting one-on-one with a teacher, and as observations progressed the participant’s comfort level increased, which facilitated verbalizations (Shipon-Blum, 2010). This condition also resembles the early treatment sessions when the child had one-on-one attention from the clinician. Another reason for spontaneous speech to occur in the teacher–participant observation may have been due to the absence of peers to compete for teacher attention. The participants received higher rates of praise from the teacher while engaged in a one-on-one activity as opposed to a group activity with peers. The positive reinforcement from the teacher may have increased a child’s speech rather than rely on peers to ask questions, convey to others what they are thinking, or provide answers on their behalf (Vecchio & Kearney, 2005).

Although two participants spoke at school to peers during lunch shortly before treatment implementation (i.e., within two months), their parents reported that they had limited speech in multiple contexts (e.g., extracurricular activities, restaurants, extended family members, pediatrician). Cunningham et al. (2006) point out that severity of selective mutism ranges from children who speak only to immediate family to those who
speak to peers on the playground, but not to teachers. Participants in this study may represent functionally different subtypes of selective mutism.

When assessing the differences of the exhibition of spontaneous speech among participants, a few explanations may be considered. Notably, half of the participants did not exhibit spontaneous speech until after a number of weeks of treatment, possibly indicating that it took these participants longer to increase social comfort. Therefore, as treatment sessions continued and School Intervention Phase II: Teachers commenced, social comfort with teachers increased (Shipon-Blum, 2010), which resulted in the exhibition of spontaneous speech in another setting (i.e., teacher-peer condition). The participants who exhibited spontaneous speech in all of the conditions, likely increased their social comfort in front of peers and teachers. Participants who were not observed to speak spontaneously in the three conditions may not have had a sufficient number of exposures during treatment sessions to increase their social comfort to the level needed to communicate in all settings.

Other factors that may explain the variability of spontaneous speech may be related to the setting, such as the number of peers in the group, the number of people in the room, the structure of activity, or level of anxiety. For the treatment of selective mutism, a hierarchy is created to incorporate people in treatment sessions to gradually expose participants to speaking to more people, one-by-one. Speaking in front of a group is targeted later in treatment, and only after the participant has been successful speaking in one-on-one situations, then in groups of two, and then three, etc. Peers were not incorporated into sessions until the final phase (i.e., School Intervention Phase II: Peers) and participants may not have had “enough” exposure of speaking in the presence of
peers to reduce anxiety and facilitate speaking spontaneously. Another factor may have been the number of people in the room or people who were in close proximity of the group activity. The participants may have used mute behavior to defend against the anxiety of interacting with the social environment (Anstendig, 1999). Long-term treatment follow-up is necessary to fully understand the time needed for children with SM to experience social comfort and communication in multiple settings (Shipon-Blum, 2010).

Participant TW exhibited spontaneous speech only in the teacher–participant–peer condition on the last observation day. The number of in vivo exposures completed at school may explain the sudden change in TW’s speech. Past research indicates that exposure therapy alleviates specific anxiety symptoms, and is associated with improvements in general functioning and cognitive changes (Hofmann, 2008). Barlow, Raffa, and Cohen (2002) indicated that anxiety is a cognitive association that connects basic emotions (i.e., fear) to events, meanings and responses. The in vivo exposures at school may have changed the child’s perception of speaking in school and facilitated spontaneous speaking (Hofmann, 2008). The severity of TW’s selective mutism may explain the sudden change in speech. TW had the longest latency among participants before changes in speech were observed. Contingency management, graduated exposure in treatment sessions, and teacher training may have facilitated stimulus generalization to the teacher and the exhibition of spontaneous in the presence of his teachers and peers (Walker & Buckley, 1972). Past research indicates the combination of these factors programs generalization and maintenance of treatment effects across settings (Walker & Buckley, 1972).
Additionally, participant TW’s spontaneous speech greatly increased from 0 to 12 occurrences in a single session. This was consistent with research findings from two cognitive behavioral therapy studies for patients with depression, which indicated sudden and large symptom improvement during a single session occurred indicating “sudden gains” (Tang, DeRubeis, Beberman, & Pham, 1999). Tang et al. (1999) found that patients who experienced sudden gains in symptom reversal showed better long-term outcomes than patients who did not experience sudden gains. Tang and DeRubeis (2005) replicated their study of “sudden gains” using two different treatment approaches for depression. Another study examining brief psychodynamic therapy for patients diagnosed with generalized anxiety disorder reported the prevalence of sudden gains in 34.5% of their participants (Present et al., 2008). However, 36% of participants in the study did not maintain the sudden gains. Due to the time constraints of the current study and the point in treatment when the sudden gains occurred during the pilot study (e.g., final observation of the study), maintenance of the gains could not be further investigated.

For participants, a slow response to treatment resulted in a longer latency before the exhibition of verbal responses or spontaneous speech. A slow response to treatment also resulted in additional sessions throughout each treatment phase. Past research indicates that a slower response to treatment requires additional sessions, and therefore suggests a more severe symptom presentation at baseline compared to participants who were early treatment responders (Southham-Gerow et al., 2001). Research on predictors of treatment response for children and adolescents with anxiety disorders found that for more severe cases treatment modifications are likely needed (Southham-Gerow et al., 2001). Treatment modifications increased the likelihood of a positive treatment outcome.
The treatment modifications suggested were to provide additional sessions, more booster sessions, and additional adjunctive interventions. For this study, treatment modifications were limited to additional sessions in treatment phases until participants met verbal speech criteria—responding to 80% of questions posed by the clinician during treatment sessions—in order to progress to the next phase.

Reinforcement of Verbal Speech

Baseline data from the parent-rated SMQ indicated that participants did not consistently respond to questions to teachers, peers, or in other situations outside of the home. Therefore, based on the information from the parent report, the child was negatively reinforced for not responding to questions or for speaking in school. Nonresponding is considered negative reinforcement since the behavior (e.g., not speaking) removes a stimulus (questions or the expectation to speak) rather than producing one (Ferster, Culbertson, & Boren, 1975, as cited in Cooper et al., 2007). Parents and teachers inadvertently negatively reinforced not speaking by their acceptance of the participants’ failure to respond. Thus, the removal of the expectation to verbally respond by parents and teachers increased the likelihood that a child with SM would not speak by insinuating that the expectation to speak is no longer present. The cycle is further reinforced each time a child with SM does not speak.

Operant conditioning strategies were included in treatment to change the reinforcement paradigm (e.g., stimulus—response—positive reinforcement). Praise and reinforcement were consistently presented to the child for verbal responses, thereby increasing the likelihood to verbally respond. In this study, parents and teachers were taught operant conditioning strategies and were coached to praise (e.g., what to say and
what to give) and provide positive reinforcement. Past research indicates a changing criterion design (e.g., speaking to more people, increasing volume) demonstrated the effect of the reinforcement contingencies on verbal speech (Facon et al., 2008).

For participants with generalized mutism at school (e.g., teachers, assistants, therapists, and peers), the reinforcement pattern changed from negative to positive with the addition of verbal praise paired with tangible reinforcements (e.g., stickers and candy) for verbal responses to the clinician at school. Once the pattern changed in the school, teachers and peers were incorporated to continue expanding speech in front of more people. The repeated exposure of speech in the presence of others during treatment sessions likely facilitated generalization of speech to peers and adults with whom they had frequent contact with at school (Walker & Buckley, 1972). The participants with generalized speech in the presence of peers during lunch/snack prior to the start of treatment had little to no verbal responses or spontaneous speech observed initially in the other conditions (Cunningham et al., 2006). Despite exhibiting speech at school in one situation (i.e., lunch/snack), they did not respond to questions posed by teachers and the negative reinforcement paradigm was maintained (Facon et al., 2008). The SMQ factor scores reflect the severity of symptoms of SM across multiple environments (i.e., school, home, and community) and have good internal consistency reliability (Bergman et al., 2008). Changes in the participants’ symptom presentation were indicated across the three factor scores. Previous research that utilized the SMQ to assess severity of symptoms was administered as a monthly measure, not as a weekly measure (Bergman et al., 2002). The increase in the administration of the SMQ may have impacted the SMQ parent ratings in this study in various ways. One explanation may be that parents were more attuned to the
changes observed in their child’s verbal speech outside of treatment sessions (i.e., community situations). Past research findings on memory and recollection indicate that speech sounds from familiar stimuli (e.g., child’s voice in situation where they have not spoken previously) affect the level of recall, defined as a recency effect (Craik & Lockhart, 1972; Surprenant, Pitt, & Crowder, 1993). Therefore, the parent ratings may have accurately reflected their child’s behavior change on the SMQ and a recency effect. The variability between administrations supports Bergman et al.’s (2008) findings that the SMQ is an assessment tool that is responsive to changes in the clinical picture.

The discrepancy between the SMQ and SSQ measures suggest a teacher rather than a parent was more likely to accurately assess verbal speech at school. Teachers observed participants throughout the school day—in daily interactions with peers and during structured and unstructured activities. Therefore, teachers were reporting their observations, as opposed to parents who received information about their child’s speech at school secondhand. Another explanation why teachers may have been better at assessing changes in speech at school is related to the involvement teachers had in treatment. When School Intervention Phase II: Teachers was implemented, the teachers were taught techniques to promote speech in children with SM and eventually participated in treatment sessions. Weekly contact with the clinician and feedback about the child’s progress may have attuned teachers to changes in speech that occurred when the clinician was not present.

Study Limitations

Limitations of the study should be considered when interpreting results. First, the sample size was low due to the high frequency of treatment sessions required per week
and limited therapist availability. Second, recruitment for the study began in early spring, which left a limited the number of weeks for participation in the study since the criteria stated that the child must be in school in order for the observations and treatment sessions to occur there. Enrollment in the study earlier in the year may have yielded more gains in verbal speech if participants had additional weeks of treatment.

A third limitation of the study was that there was only one data point at baseline before treatment was implemented. Multiple baseline observations would have provided stronger evidence of pretreatment functioning at school and ensured that the scores were consistent or stable. Furthermore, two participants had only two data points in some of the treatment phases. Therefore, limited data in a phase ($\geq 3$ observations) make inferences regarding stability of scores or verbal speech patterns difficult. Again, due to the time limitations of the academic year and the therapist’s ethical responsibility to provide treatment, multiple baseline observations were not always possible. A fourth weakness of the study is the lack of analyses to determine the effectiveness of each component such as stimulus fading, shaping, and number of in vivo exposures (Facon et al., 2008). In particular, the findings in this study did not differentiate the benefits of each component for participants and if differences in the symptom presentation resulted in the use of one component over another. It is possible that some components did not have a therapeutic effect on each participant. Thus, future studies are needed to examine the use of these components based on differences in the symptom presentation for children with SM.
Significance of Study

Despite the limitations of this study, findings provide new preliminary evidence regarding the changes in verbal speech for children with SM once treatment has initiated, and additional evidence for the effectiveness of using intensive behavioral treatment that incorporates contingency management and gradual *in vivo* exposure for children with SM (Cohan, Chavira, et al., 2006; Vecchio & Kearney, 2009). Individualized behavioral interventions were tailored specifically to help meet the needs of participants. Progress made through the treatment phases was dependent on the percentage of change in a child’s verbal speech during therapy sessions, and was independent from the observational data. It is important to note that data points constitute one observation; however, participants received two to three treatment sessions each week. As with any type of exposure or behavior therapy, treatment included frequent check-ins and assessments with participants (Hofmann, 2008; Massad & Hulsey, 2006).

This study may provide additional support for the conceptualization of SM as an anxiety disorder, based on the effectiveness of using exposure-based practices with contingency management with this population (Cohan, Chavira, & Stein, 2006; Vecchio & Kearney, 2009). These practices are commonly and effectively used for other anxiety disorders, such as panic disorder, social phobia, and generalized anxiety disorder (Compton et al., 2004; In-Albon & Schneider, 2007; James, Solar, & Weatherall, 2005, as cited in Vechhio & Kearney, 2009).

Implications for Future Research

Although this study was designed as a pilot study, the results are encouraging, as selective mutism is difficult to treat (Kolvin & Fundudis, 1981; Standart & La Couteur,
2003; Stone et al., 2002). Replication of the study with more participants is needed to strengthen the impact of the findings and would be beneficial for research on SM. The findings indicate that changes in verbal speech differed among participants and therefore treatment interventions need to be tailored to meet individual differences. Further examination of the number of sessions and the benefits of intensive therapeutic dosing are needed to gauge progress before treatment modifications could be considered, such as medication consultation or treatment of comorbid disorders. Establishing ranges for benchmarks for progress may help guide clinicians in the development of treatment plans.

Additional information pertaining to the types of questions more likely to elicit verbal responses from participants would have been useful for treatment planning. Providing teachers with knowledge and training on how to work with children diagnosed with SM prior to treatment implementation or during the clinic phase may also yield faster improvements in speech occurrences and generalization at school. Historically, in the behavioral literature on various disorders, generalization is cited as difficult to achieve; however, the dissemination of information and skills training to individuals who encounter children either diagnosed with SM or other anxiety disorders could increase the likelihood of speech in more settings.
REFERENCES


