

Social Communication Anxiety Treatment (S-CAT) for children and families with selective mutism: A pilot study

*Clinical Child Psychology
and Psychiatry*
1–19

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DOI: 10.1177/1359104516633497
ccp.sagepub.com



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Abstract

This research assessed the feasibility of Social Communication Anxiety Treatment (S-CAT) developed by Elisa Shipon-Blum, a brief multimodal approach, to increase social communication in 40 children aged 5–12 years with selective mutism (SM). SM is a disorder in which children consistently fail to speak in specific situations although they have the ability to do so. Key features of this approach are the SM-Social Communication Comfort Scale (SCCS), transfer of control (ToC), a nonchalant therapeutic style, and cognitive-behavioral strategies over a brief time frame. Following 9 weeks of treatment, children showed significant gains in speaking frequency on all 17 items from the Selective Mutism Questionnaire (SMQ), a standardized measure of SM severity. Children also showed decreased levels of anxiety and withdrawal as reported by parents on the Child Behavior Checklist (CBCL). SM initial symptom severity and family therapy compliance, but not duration of SM, contributed to treatment outcomes.

Keywords

Selective mutism, communication, anxiety, treatment, children

Selective mutism (SM) is an anxiety disorder in the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* (DSM-5) (American Psychiatric Association, 2013). Individuals with SM demonstrate a consistent failure to speak in specific social situations (at school) despite speaking in others (at home). This rare disorder affects approximately 1 in 143 children in the United States (Bergman, Piacentini, & McCracken, 2002; Elizur & Perednik, 2003) and may result in social impairment as children become too anxious to socially interact. According to Young, Bunnell, and Beidel (2012), “Rather than being overwhelmed by anxious distress and therefore being unable to

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produce words, SM may be an effective avoidance strategy by which to decrease emotional and physiological distress” (p. 540).

Although there are more than 90 published treatment studies, most are single-case designs (Cohan, Chavira, & Stein, 2006; Viana, Beidel, & Rabian, 2009). Remaining studies have small samples, and to date, only two published studies use randomized controlled trial (RCT) methodologies but also have small samples (Bergman, Gonzalez, Piacentini, & Keller, 2013; Oerbeck, Stein, Wentzel-Larsen, Langsrud, & Kristensen, 2014). In the Bergman et al. (2013) study, investigators evaluated preliminary efficacy of a new behavioral intervention to increase functional speech and decrease SM symptoms. A total of 21 children aged 4–8 years were randomly assigned to a treatment group receiving Integrated Behavior Therapy for Selective Mutism (IBTSM) for 20 sessions (24 weeks) or a waitlist control group (12 weeks). Outcomes were assessed using blind independent evaluators and parent/teacher reports. Follow-up results showed increased functional speech, maintained at 3 months. Social anxiety ratings also decreased. Children on the waitlist did not increase speaking frequency. In Oerbeck et al. (2014), a psychosocial intervention model was used with 24 children aged 3–9 years. Children were randomized to a 3-month treatment group or waitlist. Investigators found a significant time-by-group interaction with increased frequency of speech for treatment group and no change for control group. There was a significant age-by-treatment interaction with younger children receiving treatment showing greater speaking frequency.

A picture is emerging that some variant of cognitive-behavioral therapy, often accompanied by other strategies (e.g., audio/video self-modeling, play-therapy, role-playing, pharmacotherapy) is often the treatment of choice (Bergman et al., 2013; Busse & Downey, 2011; Hung, Spencer, & Dronamraju, 2012; Kehle, Bray, Byer-Alcorace, Theodore, & Kovac, 2012; Oerbeck et al., 2014; Shriver, Segool, & Gortmaker, 2011). These therapies generally take many weeks (16–30), spanning months (Jackson, Allen, Boothe, Nava, & Coates, 2005) or years (Watson & Kramer, 1992).

As researchers investigating treatments for SM, we became interested in Social Communication Anxiety Treatment (S-CAT; Shipon-Blum, 2002b, 2015) because of its potential for delivering therapy in a shorter time frame compared to previous therapies found to be effective (Beidel & Alfano, 2011). S-CAT was developed by Elisa Shipon-Blum, a physician with more than 17 years’ experience, who has treated more than 5000 children with SM. The purpose of our study was to determine the impact of this intensive, integrative treatment on symptomatology of SM. We also examined the contribution of (1) SM symptom severity, (2) related anxiety and withdrawal, (3) S-CAT family compliance, and (4) duration of SM to therapy outcomes as these have been predictive in previous research (Bergman et al., 2013; Stone, Kratochwill, Sladeczek, & Serlin, 2002). Additionally, we explored speech–language delays/impairments in children with SM, previously identified as risk factors for precipitating or sustaining the disorder (Cunningham, McHolm, & Boyle, 2006; Klein, Armstrong, & Shipon-Blum, 2013; McInnes, Fung, Manassis, Fiksenbaum, & Tannock, 2004; Steinhausen & Juzi, 1996; Wong, 2010; Yeganeh, Beidel, & Turner, 2006).

Our study makes an important contribution to the research as a short-term, longitudinal, open clinical trial with a relatively large sample size for the SM population. It incorporates measures of treatment fidelity, patient–family homework compliance, and standardized measures, thus meeting the rigorous standards of TREND (Transparent Reporting of Evaluations With Nonrandomized Designs) guidelines for treatment (Des Jarlais, Lyles, & Crepaz, 2004) (see Figure 1). This study is a necessary first step toward investigating S-CAT as an evidence-based intervention. Within this pilot study, we addressed four questions: (1) Do children speak to more people in more settings after S-CAT? (2) What are some factors that predict therapeutic outcomes? (3) Do children show less anxiety and withdrawal after treatment? (4) Do children improve in language comprehension and expression after S-CAT?

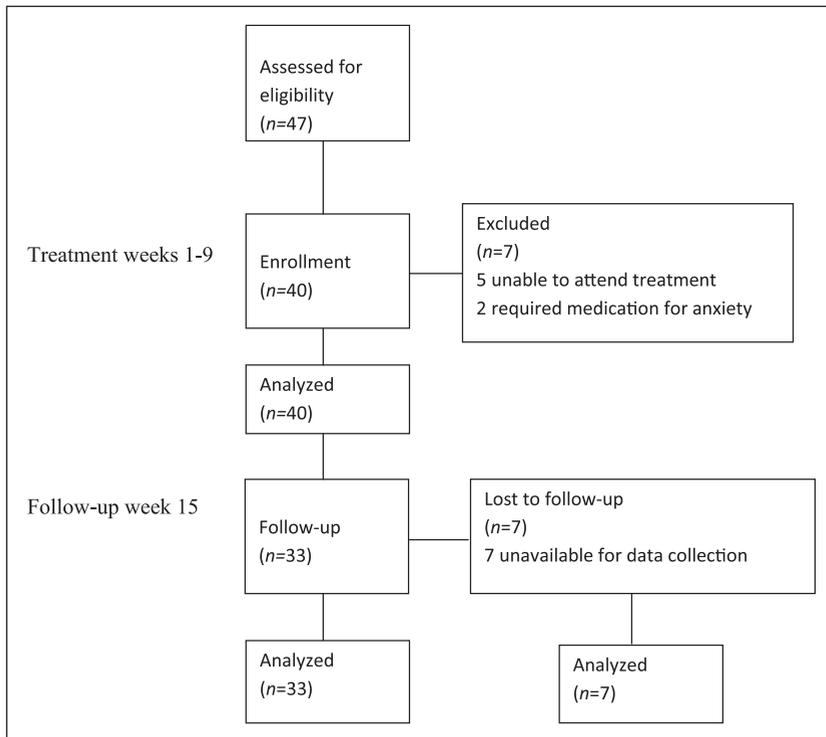


Figure 1. Study enrollment and retention with S-CAT.

Method

Participants

A total of 40 children were recruited from families who contacted a specialty practice for SM. Parents learned about this grant-funded study from Internet searches and conferences. Evaluations and treatment were provided free of charge. A total of 47 families met criteria. Inclusion criteria were fluency in English, normal receptive vocabulary, and ability to follow instructions. Exclusion criteria were receiving other therapies or medications, concomitant diagnoses of autism or intellectual disability, uncorrected hearing or vision acuity, living more than 100 miles from the practice, or previously receiving S-CAT. In total, seven families were excluded (five couldn't attend and two received anxiety medication). See Table 1 for participant demographics.

See Figure 1 for flow diagram of the study enrollment and retention.

All children received a prior diagnosis of SM from a physician or psychologist as reported by parents. The diagnosis was confirmed by the treating therapist and licensed psychologist, based on (1) meeting *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision* (DSM-IV-TR) (and DSM-5) criteria, (2) obtaining an interference score of at least 4 on the Anxiety Disorders Interview Schedule (ADIS; Silverman & Albano, 1996), (3) receiving scores within the SM range on the Selective Mutism Questionnaire (SMQ; Bergman, Keller, Piacentini, & Bergman, 2008) corroborated by interviews from the (4) Behavior Assessment System for Children (second edition), Structured Developmental History (BASC-2-SDH; Reynolds & Kamphaus, 2004), and Selective Mutism Comprehensive Diagnostic Questionnaire (SM-CDQ; Shipon-Blum, 2002a).

Table 1. Participant characteristics at start of treatment and comparisons between families who completed the follow-up measures and those who did not.

Characteristics	All children at start (N=40)	Completed follow-up (N=33)	Not completed follow-up (N=7)			
Comparing the means of Columns 2 and 3						
	M (SD)	M (SD)	M (SD)	df	t	p
Age in years	6.78 (1.58)	6.68 (1.41)	7.23 (2.32)	38	0.83	.413
Age of SM onset in years	2.81 (0.91)	2.86 (0.86)	2.57 (1.13)	38	0.75	.458
SM duration in years	3.96 (1.88)	3.81 (1.72)	4.68 (2.54)	38	1.12	.272
Expressive vocabulary (EVT-2) Standard scores (M=100, SD=15)	108.70 (12.36)	109.55 (9.90)	104.71 (21.16)	38	0.59	.575
Receptive vocabulary (PPVT-4) Standard scores (M=100, SD=15)	106.50 (12.36)	109.55 (9.90)	101.57 (19.03)	38	0.80	.448
SMQ total at start of treatment Average scores for SM=0.41–1.28	0.97 (0.40)	0.98 (0.39)	0.97 (0.46)	38	0.09	.931
SMQ total at end of treatment Average scores for SM=0.41–1.28	1.38 (0.55)	1.44 (0.53)	1.12 (0.61)	38	1.53	.134
Comparing the distributions of percentages in Columns 2 and 3						
	Percentages	Percentages	Percentages	df	χ^2	p
Sex	F=62, M=38	F=60, M=40	F=71, M=29	1	0.29	.591
% Mother's level of education	HS=15.0 A=10.0 U=47.5 G=20.0	HS=18.2 A=9.1 U=45.5 G=21.2	A=14.3 U=57.1 G=14.3	n.a.	n.a.	n.a.
% Parent anxiety	Both=10.0 One=22.5	Both=9.1 One=24.2	Both=14.3 One=14.3	n.a.	n.a.	n.a.
% Ethnicity	C=72.5 AA=2.5 A=15.0 H=5.0 B=5.0	C=75.8 AA=3.0 A=18.2 B=3.0	C=57.1 H=28.6 B=14.3	n.a.	n.a.	n.a.

SD: standard deviation; C: Caucasian; AA: African American; A: Asian; H: Hispanic; B: Biracial; HS: high school; A: associate degree/some college; U: undergraduate degree; G: graduate school; PPVT: Peabody Picture Vocabulary Test; EVT: Expressive Vocabulary Test; SMQ: Selective Mutism Questionnaire; n.a.: Chi-square test not applicable due to low cell counts (<5).

Measures

The *BASC-2-SDH* (Reynolds & Kamphaus, 2004) provides case history information. This open-ended questionnaire has good internal consistency in the .90s. Areas included information regarding the child's family, medical, educational, and developmental histories.

The *Child Behavior Checklist* (CBCL; Achenbach & Rescorla, 2001), a norm-referenced checklist completed by parents and teachers, assesses psychological problems and social competencies indicating how often the behavior occurs using a 3-point scale (*often/always true, sometimes true,*

not true). *T* scores below 40 and above 60 are concerning. Internal consistency ranged from .78 to .97, with interrater reliability from .93 to .96 (Achenbach & Rescorla, 2001).

The *SMQ* (Bergman et al., 2008), a 17-item parent questionnaire, determines the likelihood of a child having SM. Parents rate the frequency of their child's speaking on a 4-point Likert scale: 0 (*never*), 1 (*seldom*), 2 (*often*), and 3 (*always*). Three subscales include school (6 items), home/family (6 items), and public/social (5 items), each with means from 0 to 3. Bergman et al. (2008) reported that for 6- to 8-year-olds with SM, average school scores ranged from 0 to 1.08 ($M=0.54$), average home/family scores ranged from 0.90 to 2.14 ($M=1.52$), and public/social average scores ranged from -0.07 to 0.87 ($M=0.40$). Internal consistency indicated good reliability ($r=.65-.91$) with total scale reliability ($r=.78$). Convergent validity was supported with a clinician severity rating index (Letamendi et al., 2008).

The *ADIS* for *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV): Child/Parent Versions* (Silverman & Albano, 1996) provides a semi-structured interview meeting DSM criteria for SM and degree of interference in the child's life from 0 to 8, where 4 indicates clinical significance. Overall, ADIS has good test-retest reliability ($r=.61-1.00$).

Therapist treatment fidelity was obtained by comparing S-CAT treatment protocol with therapist notes for each taped session. Activity logs documented therapist interactions with parents, children, and school personnel and also support counselor interactions with parents.

Family compliance ratings were obtained at each therapy session. An average composite score ranged from 1 to 10 (*poor to excellent*), based on a mean of four ratings: (1) children's compliance with therapy as rated by therapist, support counselor, and research assistant; (2) parental compliance directing children's homework assignments as rated by parent and therapist; (3) school's adherence to therapy goals as rated by therapist; and (4) therapist review of parent-child completion charts.

The *Peabody Picture Vocabulary Test, fourth edition (PPVT-4)* (Dunn & Dunn, 2007) assesses receptive vocabulary. The experimenter says a word and the child points to one of four pictures. Words represent 20 content areas and parts of speech. Internal consistency ranged from .94 to .97 ($M=0.93$). Convergent validity for PPVT-4 with EVT-2 ranged from .80 to .84 (Dunn & Dunn, 2007).

The *Expressive Vocabulary Test, second edition (EVT-2)* (Williams, 2007) assesses expressive vocabulary and word retrieval. Children name pictures given a verbal prompt. Internal consistency ranged from .88 to .97. Alternate-form reliability scores ranged from .83 to .91. Test-retest reliability ranged from .94 to .97.

The *Test of Narrative Language (TNL)* (Gillam & Pearson, 2004) assesses narrative comprehension (TNL-C) and oral narration (TNL-O). The child answers questions about stories, retells a story, and generates stories from pictures. Subtest mean is 10 ($SD=3$). Internal consistency is .76 for TNL-C and .87 for TNL-O. Criterion-related validity (TNL-O subtest score with language sample analysis) ranged from .66 to .79.

Procedure

The authors of this article were the study investigators and were not involved in treatment development or therapeutic delivery, acting as blind reviewers during data collection, analyses, and interpretation. This university institutional review board (IRB)-approved study required informed consent, participation contract, and taping release with parental knowledge of use of a hidden camera.

Prior to initial treatment, the following assessments were given: BASC-2-SDH, CBCL (parent/teacher), SMQ, ADIS, PPVT-4, EVT-2, and TNL-C/TNL-O. The CBCL and TNL-C/TNL-O were

also administered at the last session (after 9 weeks). The SMQ was completed before each therapy session and at follow-up. Family compliance ratings were also recorded at each session.

Overview of treatment. A main goal of S-CAT is to reduce children's anxiety about speaking. Important to the therapist's technique during initial interactions with the child is to be *nonchalant*, by reducing pressure to speak and increasing comfort by not expecting the child to look at the therapist. While this might seem to go against the ultimate goal of increasing talking and interacting, this paradoxical approach actually sets the stage for children with SM to communicate.

Another important goal of S-CAT is to reduce enabling behaviors on the part of parents and to reduce avoidance behaviors on the part of children. Parents learn that the more children avoid, the more entrenched the mutism often becomes. Parents are encouraged to refrain from communicating for their children but instead to provide opportunities for them to engage in low-anxiety communicative acts as described within the treatment sessions.

Extensive transfer of control (ToC) is initiated at the first therapy session to promote generalization of gains with the therapist to more people in more settings rather than waiting until a number of treatment sessions have elapsed (Bergman et al., 2013; Silverman & Kurtines, 1996). The therapist teaches parents how to implement goals by taking activities from therapy sessions into public places such as ordering in restaurants, interviewing friends/family, and responding to requests of others. Parents then teach children to chart progress in increasing frequency of speaking rather than waiting until a number of treatment sessions have elapsed.

S-CAT also incorporates behavioral and cognitive strategies to help children communicate socially within a framework of verbalization levels that become increasingly demanding. The therapist uses the *SM-Social Communication Comfort Scale* (SM-SCCS; the *Bridge*) (Shipon-Blum, 2012) to identify children's verbalization levels. The Bridge includes four stages of communicative performance that increase in verbal complexity: *Stage 0*—child does not respond or initiate (seems frozen); *Stage 1*—child communicates using nonverbal (non-spoken) communication and responds or initiates by pointing, nodding, gesturing, writing, or making non-speech noises; *Stage 2*—child is transitioning into verbal (spoken) communication and responds or initiates by making sounds or using a *verbal intermediary* that may include whispering or using a recording device; *Stage 3*—child communicates by speaking and responds or initiates using words in their typical, quiet, or altered voice from a rehearsed script or spontaneous speech. An underlying assumption of the SM-SCCS is that cognitive demands increase with increasing language complexity. As tasks become more challenging, moving from responding to initiating at each verbal level on the scale, children become more reluctant to speak.

In this study, direct therapeutic sessions occurred in a treatment playroom with toys, child-sized furniture, and a hidden camera for video-recording sessions. Sessions were held once every 3 weeks with SMQ data recorded immediately beforehand. As part of these sessions, parents were educated about the nature of SM and the need to do homework activities to extend treatment progress to more people and places. Time between office visits permitted extended opportunities for parents (and teachers) to monitor and chart assignments. Weekly phone consultations and emails took place between an SM support counselor and parent(s) for reviewing procedures for conducting assignments and setting up goal charts to track the people and situations in which the child communicated. The SM-SCCS (Shipon-Blum, 2012) guided treatment progression. Children moved forward from one therapeutic task to the next when they achieved communication goals with greater ease, monitored with the *How Scary Is It Scale*. Following is a brief overview of each therapy session. For a more complete description of S-CAT therapy and treatment sessions, visit <http://www.selectivemutismcenter.org/aboutus/SelectiveMutism.Treatment.ShiponBlum>

Pre-session. The therapist greeted the family in a friendly manner, paying little attention to the child initially to reduce anxiety. To foster the therapeutic alliance and increase comfort and trust, the therapist let the parents and child know she had helped many children. She also avoided the term *talk* to reduce perceived pressure. As the child began to demonstrate signs of becoming more comfortable (e.g. increased eye contact, relaxed posture), the therapist separated the child from family and transitioned to the therapy room.

Session 1. The main focus during this session was on comfort, social engagement, sharing, and rapport building. The therapist assessed the child's verbalization level on the SM-SCCS (visualized by the *Bridge*) and helped the child begin to feel a sense of control over their anxiety through rating how they felt about possible speaking activities. Younger children identified how scared they felt by selecting one of several emoticons exhibiting smiling to frowning faces. Older children used bar charts depicting various levels of speaking difficulty.

During this session, the therapist *mirrored the child's behavior*. If a child was hesitant and slow to engage with the therapist, she acted similarly. The therapist avoided direct eye contact, speaking quietly and at a slower pace. In addition, for children who were non-communicative (frozen), the focus was on comfort and rapport building through playful activities such as give-and-take exchanges with toys and games without expecting speech. For children who were nonverbal and did not vocalize with or near the therapist, treatment included subtle, fun ways of making sounds, blending them into words (known as the *Ritual Sound Approach™* or *RSA*, described below). If the child spoke to the parent in front of the therapist (even with a close-up whisper), she acknowledged what the child said by making general comments to let the child know she was heard (without eye contact). At the end of the therapy session, the therapist explained and modeled homework games and introduced charting of these activities to parents to increase motivation and foster ToC.

Session 2. During this session, the therapist expanded the RSA to help children produce sounds in therapy and public/social settings. RSA incorporates shaping and exposure techniques applied to a stimulus hierarchy of phonemes (speech sounds). Children progressed from saying easy-to-produce phonemes to more complex linguistic units (Brumbaugh & Smit, 2013). Voiceless phonemes were introduced first—/h/, /f/, /s/, /p/, /t/—followed by voiced phonemes such as /n/, /m/, /b/, /d/, /z/, then consonant-vowel (CV) and consonant-vowel-consonant (CVC) syllables, and words. Props and toys helped children produce various phonemes in novel ways (e.g. making a blowing sound to move a feather across the table or making a /p/ sound when popping cheeks). The therapist introduced the sounds of /s/ and /n/ as replacements for children to answer yes–no questions while playing interview games. Once children produced simple words, the therapist introduced questions that required one-word responses (e.g. “What’s your favorite color?” “What’s your favorite food?”). As part of the ToC process, parents were taught to generalize interview games at home and school by having others ask the child questions. All interactions were charted.

In school, a key worker, usually the teacher, helped children form a club starting with one child selected from the classroom to meet the child in a designated spot. The two children engaged in pre-planned activities that required responses from the child with SM at his or her verbalization level on the *Bridge*. They gradually invited additional children to join the club.

The therapist continued to work on social engagement activities such as write-or-draw to read-or-say, labeling items in a toy box, answering–asking common questions, and playing board games appropriate to the child's age/development. The therapist and child role-played common questions people might ask in a targeted setting using scripts to minimize the child's need to process questions when anxiety was elevated. Plan-it/Do-it charts were presented to parents to help them prepare for selected social encounters with their children.

Session 3. By this time, school staff had been educated in-person, via web, or by phone. The session began with a review of accomplishments thus far. The use of a verbal intermediary was introduced to help children use direct scripted speech. A *Verbal Intermediary*TM is someone/something with whom the child vocalizes (such as a parent or a friend who repeats what the child says or a recording device) within an earshot of another person. This often helps the child become desensitized to knowing they were heard.

The therapist introduced gradual exposure activities to help the child incrementally tolerate feared or stressful social communication situations with more people in a variety of settings beyond the therapy office. Thus, *conversation starter* questions (i.e. “What’s your favorite *xyz*?”) were rehearsed for use with relatives, store clerks, and others. Language complexity was slowly increased from simple rote responses to conversational scripts.

After this session, parents engaged in ToC to further generalize therapy goals by helping their children interact with friends during play dates, relatives outside the home, and service people in public settings. (These tasks required parents and teachers to learn how to adjust to the child’s level of vocalization in each context.) Parents also helped their children acquire ToC through joint completion of homework activity logs, leading to earned stickers, stars, and rewards. At this point, children often spoke to family in unfamiliar places, store clerks, and food servers in public and answered teachers and selected peers in school.

Treatment fidelity. The therapist recorded progress notes for each client at each session. Each session was videotaped. A research assistant reviewed all progress notes and created a treatment chronicle spreadsheet documenting the therapeutic process for every child. One-third of the videotapes were then randomly selected and reviewed by two research assistants. They systematically compared 48 treatment elements from the spreadsheet against the contents of the videotapes and found that the therapist followed treatment at the same rate for 80% of cases with others moving faster or slower as needed.

Results

Table 1 presents demographic data for all 40 children in the study, separately for the 33 who completed S-CAT and were available for follow-up interviews, and 7 children who were not available. There were no statistically significant differences between the 33 children and the 7 who were unavailable at follow-up.

Do children with SM speak more often in more settings after S-CAT?

Table 2 presents means, *SDs*, and statistics from repeated-measures analyses of variance (ANOVAs) conducted on SMQ mean scores. SMQ mean total scores and all subscale scores showed significant improvement in speaking frequency from pretest to follow-up with large effect sizes. Children’s speaking frequency showed a significant increase after the first 3 weeks for each subscale—School (Wilks’ Lambda = .44, $F(1, 32) = 9.28, p < .001$), Family (Wilks’ Lambda = .42, $F(1, 32) = 9.96, p < .001$), and Public/Social (Wilks’ Lambda = .35, $F(1, 32) = 13.52, p < .001$) and Total SMQ (Wilks’ Lambda = .25, $F(1, 32) = 22.02, p < .001$)—and continued to increase at each treatment. Subsequent upward linear trend analyses were all significant, indicating consistent improvement in all SMQ scores over treatment. Furthermore, 95% of children exhibited increased speaking frequencies at the end of treatment as measured by SMQ mean total scores (Sign Test, $p < .001$).

In the SMQ validation study, conducted by Bergman et al. (2008), the article describes norms based on means and *SDs* of children who have been diagnosed with SM and those who have not.

Table 2. Repeated-measures ANOVA with means and standard deviations (SDs) for SMQ Total and subscales ($n = 33$).

	Pre-Tx (before pre-session at Week 0), M (SD)	Post 1 (at Week 3), M (SD)	Post 2 (at Week 6), M (SD)	Post 3, (at Week 9 - end of Tx), M (SD)	Follow-up (at Week 15, 6 weeks after last office visit), M (SD)	F (df)	p	η^2p	Linear trend
SMQ Total (0-3)	0.98 (0.39)	1.20 (0.45)	1.30 (0.50)	1.44 (0.53)	1.53 (0.60)	37.32 ^a (2.74, 87.74)	<.001	.54	$F(1, 32) = 78.26$, $p < .001$; $\eta^2p = .71$
SMQ School (0-3)	0.53 (0.68)	0.74 (0.76)	0.82 (0.84)	1.04 (0.90)	1.08 (0.94)	16.27 ^a (3.00, 95.90)	.53 (.68)	.34	$F(1, 32) = 36.21$, $p < .001$; $\eta^2p = .53$
SMQ Family (0-3)	2.04 (0.46)	2.16 (0.41)	2.23 (0.48)	2.32 (0.53)	2.37 (0.53)	10.89 (4, 128)	<.001	.25	$F(1, 32) = 35.01$, $p < .001$; $\eta^2p = .52$
SMQ Public/Social (0-3)	0.33 (0.37)	0.64 (0.53)	0.82 (0.58)	0.95 (0.59)	1.12 (0.71)	22.15 (4, 128)	<.001	.41	$F(1, 32) = 54.32$, $p < .001$; $\eta^2p = .63$

ANOVA: analysis of variance; SMQ: Selective Mutism Questionnaire; Tx: Therapy.

SMQ mean scores range from 0 to 3 for each subscale and 0 to 3 for total scale.

^aF statistics are Greenhouse-Geisser corrections where sphericity assumptions were not met.

In our study, Table 2 indicates that the mean speaking frequency of our participants on the SMQ in family and school settings moved to the upper limit (2.14 and 1.08, respectively) of Bergman et al. (2008) for children with SM. Our participants' mean speaking frequency in the public/social setting increased to 1.12 at follow-up, moving beyond the upper limit (.87) of Bergman et al. (2008) for children with SM. (Note that scores on the original scale ranged from 0 to 3 points.)

Table 3 presents mean percentages of speaking for all 17 items on the SMQ over the course of the study, organized by situations. The percentages of speaking *often* or *always* were maintained or increased on 16 of the 17 items by the end of S-CAT. *Speaking to family living at home* consistently produced frequencies of 100%. The largest gains were in social situations outside of school, *speaking to store clerks and waiters*, which increased from 6% to 64%. Similarly, *speaking with children they didn't know outside school* increased from 6% to 30%. Children's ability to *ask teachers questions*, *speaking to the class*, and *speaking to other staff* all quadrupled. Even at home where speaking was already prevalent, speaking increased from 36% to 70% with family friends and babysitters.

What factors predict therapeutic outcomes in children with SM who received S-CAT?

Family compliance ratings were obtained at each therapeutic visit and ranged from 1 (*poor*) to 10 (*excellent*). Mean compliance ratings of 7 or above indicated good treatment compliance outside therapy with 65% of families reaching that level. Those families with good compliance ratings at the end of therapy had better treatment outcomes as measured by SMQ mean total scores ($n=26$, $M=1.60$, $SD=0.46$) than those with lower compliance ratings ($n=14$, $M=0.98$, $SD=0.50$); $t(38)=3.94$, $p<.001$). These two groups did not differ in SMQ mean total scores at the start of therapy $t(38)=1.78$, $p=.082$.

Initial symptom severity, measured by the SMQ at pretest, revealed a statistically significant and substantial correlation with the SMQ Follow-up measure, indicating that children with less symptom severity made greater treatment gains (see Table 4).

Duration of SM (measured in years at the start of treatment) was not correlated with SMQ Follow-up, indicating that the amount of time having SM was not related to treatment outcome (Table 4).

A multiple regression conducted to identify the best linear combination of factors to predict participants' SMQ Follow-up scores revealed an adjusted R^2 of .83, indicating that 83% of the variance in SMQ Follow-up scores was explained by the model. Beta weights suggest that both SMQ pretest and S-CAT family compliance scores were significant predictors of SMQ scores at follow-up, but duration of children's mutism was not a significant predictor of SMQ scores. Assumptions of linearity, collinearity, normally distributed errors, and uncorrelated errors were checked and met. Means, SD s, intercorrelations, and regression statistics are in Table 4.

Do children with SM show less anxiety and withdrawal after S-CAT?

Selected CBCL scores measured children's emotional characteristics of anxiety and withdrawal. Table 5 presents means, SD s, t -test results, p -values, effect sizes, and dfs . There was a significant decrease in CBCL anxiety and withdrawal ratings measured by parents (medium effect size) after therapy. Ratings by teachers did not show a significant change in anxiety or withdrawal at school. The correlation between parent and teacher ratings of anxiety was not significant ($r(29)=.05$, $p=.787$). However, a weak-moderate correlation between parent and teacher ratings of withdrawal was found ($r(29)=.39$, $p=.038$).

Table 3. Percentages and means for 33 children regarding specific speaking tasks (items) on SMQ at Pre-treatment, End-of-Treatment, and 6-Week Follow-up.

Speaking task	Pre-Tx	Post 3, end of Tx	Follow-up, 6 weeks after last office visit (15 weeks after Tx started)	χ^2 (rANOVA)
	Percentage speaking often or always, mean (SD)			
<i>In school</i>				
1. Speaks to most peers	12.2%	36.3%	36.4%	$\chi^2(2, n=33)=6.37$ $p=.041$
	0.53 (0.88)	1.02 (1.08)	1.15 (1.09)	$F(1.63, 52.28)=16.93$ $p<.001; \eta^2p=.35$
2. Speaks to selected peers	33.3%	42.4%	54.5%	$\chi^2(2, n=33)=3.04$ $p=.218$
	0.92 (1.12)	1.38 (1.11)	1.48 (1.18)	$F(1.69, 54.15)=12.10$ $p<.001; \eta^2p=.27$
3. Answers teacher when called	24.2%	42.4%	45.5%	$\chi^2(2, n=33)=3.71$ $p=.156$
	0.71 (1.10)	1.29 (1.10)	1.24 (1.14)	$F(2, 64)=11.98$ $p<.001; \eta^2p=.27$
4. Asks teacher questions	6.1%	24.3%	27.3%	$\chi^2(2, n=33)=5.60$ $p=.060$
	0.35 (0.59)	0.88 (0.95)	1.00 (0.99)	$F(2, 64)=13.53$ $p<.001; \eta^2p=.30$
5. Speaks to most teachers/staff	6.1%	30.3%	24.2%	$\chi^2(2, n=33)=10.99$ $p=.004$
	0.30 (0.59)	0.86 (0.88)	0.86 (0.88)	$F(2, 64)=14.67$ $p<.001; \eta^2p=.31$
6. Speaks to group in front of class	6.0%	18.2%	27.3%	$\chi^2(2, n=33)=5.26$ $p=.072$
	0.38 (0.70)	0.56 (0.88)	0.85 (1.06)	$F(1.44, 46.13)=9.77$ $p=001; \eta^2p=.23$
<i>With family</i>				
7. Speaks to family living at home	100%	100%	100%	$\chi^2(2, n=33)=n.a.$ <i>n.s.</i>
	2.94 (0.24)	2.97 (0.17)	2.94 (0.24)	$F(2, 64)=.24$ $p=.784; \eta^2p=.01$
8. Speaks to family in unfamiliar places	84.9%	90.9%	94.0%	$\chi^2(2, n=33)=1.56$ $p=.459$
	2.30 (0.73)	2.58 (0.66)	2.7 (0.59)	$F(2, 64)=4.97$ $p=.01; \eta^2p=.13$
9. Speaks to family not living at home	72.7%	87.9%	87.9%	$\chi^2(2, n=33)=3.55$ $p=.169$
	1.96 (0.77)	2.32 (0.66)	2.32 (0.66)	$F(2, 64)=8.93$ $p<.001; \eta^2p=.22$
10. Speaks on phone to parents and siblings	84.9%	81.9%	78.8%	$\chi^2(2, n=33)=.407$ $p=.816$
	2.27 (0.88)	2.55 (0.87)	2.33 (1.02)	$F(2, 64)=3.83$ $p=.027; \eta^2p=.11$

(Continued)

Table 3. (Continued)

Speaking task	Pre-Tx	Post 3, end of Tx	Follow-up, 6 weeks after last office visit (15 weeks after Tx started)	χ^2 (rANOVA)
	Percentage speaking often or always, mean (SD)			
11. Speaks with family friends	27.2%	60.6%	54.5%	$\chi^2(2, n = 33) = 8.34$ $p = .015$ $F(2, 64) = 9.91$ $p < .001$; $\eta^2 p = .24$
	1.14 (0.74)	1.73 (0.91)	1.67 (0.95)	
12. Speaks to babysitter	36.4%	63.7%	69.7%	$\chi^2(2, n = 33) = 8.47$ $p = .014$ $F(1.39, 44.44) = 12.95$ $p < .001$; $\eta^2 p = .29$
	1.06 (1.14)	1.76 (1.35)	1.88 (1.32)	
<i>In social situations (outside school)</i>				
13. Speaks with children: doesn't know	6.0%	21.2%	30.3%	$\chi^2(2, n = 33) = 7.30$ $p = .026$ $F(2, 64) = 12.43$ $p < .001$; $\eta^2 p = .28$
	0.42 (0.71)	0.97 (0.80)	1.08 (1.02)	
14. Speaks with family friends: doesn't know	0.0%	9.1%	21.2%	$\chi^2(2, n = 33) = 8.23$ $p = .016$ $F(2, 64) = 24.56$ $p < .001$; $\eta^2 p = .43$
	0.18 (0.39)	0.82 (0.72)	1.02 (0.73)	
15. Speaks with doctor/dentist	9.1%	24.2%	24.3%	$\chi^2(2, n = 33) = 3.26$ $p = .196$ $F(2, 64) = 10.85$ $p < .001$; $\eta^2 p = .25$
	0.42 (0.66)	0.79 (0.82)	0.95 (1.09)	
16. Speaks to store clerks/waiters	6.1%	45.5%	63.6%	$\chi^2(2, n = 33) = 24.17$ $p < .001$ $F(1.54, 49.16) = 41.82$ $p < .001$; $\eta^2 p = .57$
	0.47 (0.64)	1.42 (0.78)	1.79 (0.95)	
17. Speaks at clubs/teams	3.0%	15.2%	21.2%	$\chi^2(2, n = 33) = 4.96$ $p = .084$ $F(2, 64) = 12.58$ $p < .001$; $\eta^2 p = .28$
	0.24 (0.50)	0.65 (0.76)	0.80 (0.81)	

SMQ: Selective Mutism Questionnaire; rANOVA: repeated-measures analysis of variance.

Do children with SM improve in language comprehension and expression after S-CAT?

The ability to comprehend language, measured by answering questions about stories (TNL-C), revealed means within normal limits before and after treatment. Pretest–posttest comparison of comprehension revealed no significant difference. However, expressive language as measured by retelling and generating stories (TNL-O) was more than 1 *SD* below age-matched peers both before and after treatment (even with parents as sole communicative partners during testing). In all, 68% (27/40) of our sample exhibited expressive language impairment. This percentage contrasts with 5% found in the general school-age population. A pretest–posttest comparison for expressive language revealed no significant difference. Table 5 presents

Table 4. Regression analysis for SMQ Total Scores with means and standard deviations (*SDs*) for predictors and outcome variable (Follow-up 6 weeks after treatment ended, *N* = 33).

Variable (score range)	<i>M</i> (<i>SD</i>)	SMQ, Pre-Tx (<i>r</i>)	S-CAT, Compl. (<i>r</i>)	Duration, years of SM (<i>r</i>)	SMQ, Follow-up (<i>r</i>)	<i>B</i>	<i>SEB</i>	β	<i>t</i>	<i>p</i>
SMQ, Pre-Tx (0–3)	0.98 (.39)	1.00	0.42	0.27	0.85	0.91	0.11	.67	8.00	<.001
S-CAT, Compl. (1–10)	7.38 (1.29)	0.42	1.00	0.21	0.67	2.55	0.58	.36	4.41	<.001
Duration, years of SM (1–9 years)	3.66 (1.45)	0.27	0.21	1.00	0.36	0.65	0.48	.10	1.33	.193
SMQ, Follow-up (0–3)	1.44 (0.53)	0.85	0.67	0.36	1.00					

SMQ: Selective Mutism Questionnaire; S-CAT: Social Communication Anxiety Treatment; Compl.: Family compliance. Adjusted $R^2 = .83$ ($F(3, 32) = 51.38$, $p < .001$).

Table 5. Paired differences for anxiety, withdrawal, and narrative language before and after treatment.

Measure	Prior to treatment—Pre-Tx, <i>M</i> (<i>SD</i>)	End of treatment—Post 3, <i>M</i> (<i>SD</i>)	<i>df</i>	<i>t</i>	<i>p</i>	<i>d</i>
CBCL–Parent Anxiety, <i>n</i> = 37 (<i>M</i> = 50; <i>SD</i> = 10)	58.38 (7.79)	55.43 (6.09)	36	2.44	.020*	.42**
CBCL–Teacher Anxiety, <i>n</i> = 30 (<i>M</i> = 50; <i>SD</i> = 10)	58.73 (7.61)	56.70 (8.69)	29	1.58	.124	.25*
CBCL–Parent Withdrawal, <i>n</i> = 37 (<i>M</i> = 50; <i>SD</i> = 10)	64.41 (5.88)	61.68 (6.33)	36	2.47	.019*	.45**
CBCL–Teacher Withdrawal, <i>n</i> = 30 (<i>M</i> = 50; <i>SD</i> = 10)	62.97 (9.42)	60.70 (9.55)	29	1.74	.093	.24*
TNL–Narrative Comprehension, <i>n</i> = 39 (<i>M</i> = 10; <i>SD</i> = 3)	9.46 (2.92)	9.90 (3.30)	38	0.89	.378	.14
TNL–Oral Narration, <i>n</i> = 39 (<i>M</i> = 10; <i>SD</i> = 3)	6.08 (3.16)	5.85 (3.37)	38	0.55	.588	.07

SD: standard deviation; CBCL: Child Behavior Checklist; TNL: Test of Narrative Language.

Cohen's *d*: *small; **medium; ***large.

* $p < .05$; ** $p < .01$; *** $p < .001$.

means, *SDs*, *t*-test results, *p*-values, effect sizes, and other relevant numbers from the assessments.

Discussion

Our primary outcome measure was the SMQ, currently the only validated measure for SM. The majority of children in our study exhibited higher levels of speaking after S-CAT therapy. Children made progress quickly, after only 3 weeks of treatment, and continued in an upward trend. By the end of treatment, 95% showed gains in speaking frequency in school, in public/social settings with people with whom they had not previously spoken, and also at home with babysitters and family friends.

In addition to increased speaking frequency, we expected that relief from SM symptoms would also bring relief from anxiety and withdrawal, which we found on parent CBCL ratings. This suggests that S-CAT had an impact on emotional aspects of functioning as well as speaking frequency. Teachers did not report reductions in anxiety or withdrawal as parents did. A similar discrepancy regarding anxiety was found by Bergman et al. (2013). This may be explained by the fact that teachers observed children in their most challenging setting (school), while parents observed their children in more comfortable settings. It also may have been difficult for teachers to identify

anxiety and withdrawal in the classroom where children sat quietly among peers. In addition, achieving statistical significance regarding teacher reports may have been limited by reduced sample data from teachers who were unavailable during the summer months.

It is worth noting that instructions on the CBCL varied in the time period under consideration for parents and teachers. Parents were asked to rate children based upon the following statement: "For each item that describes your child now or within the past 6 months ..."; whereas teachers were asked to rate children based upon a different statement: "For each item that describes the pupil now or within the past 2 months ...". Variations in instructions may have created an issue with the measurement. The fact that parents responded differently on the posttest (end of treatment) than the pretest suggests that they interpreted the instructions as pertaining to that moment in time. However, a finding of no difference from the teachers' ratings between pretest and posttest is ambiguous regarding how they interpreted the instructions. It could be that teachers were interpreting the question to include the past 2 months, which would have included the time before therapy started or took effect. If so, that could explain a finding of no difference between pretest and posttest scores.

Efforts to isolate contributing factors to S-CAT outcomes produced two major findings: (1) Severity of symptoms at pretest significantly predicted outcomes by the last therapy session, corroborating Keeton and Crosby-Budinger (2012) that children with lower symptom severity have better outcomes; and (2) Children with better family homework compliance showed greater treatment gains, corroborating Khanna and Kendall (2009) who found that involving parents enhances and maintains outcomes. At the start of treatment, there was no difference in SM symptom severity between the groups whose families would later differ in compliance. By the last treatment session, those with better homework compliance performed much better on SMQ mean total scores with greater speaking frequency than those with poorer compliance. In fact, 7 of 14 in the poor compliance group did not respond to follow-up attempts, whereas all 26 in the good compliance group completed SMQs at follow-up. Family compliance with S-CAT assignments was important because ToC is a substantive component of S-CAT wherein parents support the work of the therapist by generalizing treatment gains to settings outside therapy.

Because the disorder of SM involves children's lack of speaking in uncomfortable environments, it was crucial to obtain family compliance in taking treatment goals into a variety of settings where talking was necessary. That was the biggest challenge and the biggest achievement in implementing S-CAT. As compliance was of major importance in treatment success, we conjecture about what may have influenced it. We found no relationship between mother's education level and homework compliance. Anecdotal evidence from the therapist suggests a family lack of time due to work and commitments to other children. In addition, stress on family, marital issues, and parental coordination may have created compliance challenges. A few families were thought to globally lack commitment. These families provided the fewest updates, canceled counselor calls, and failed to follow-up with school services. Further investigation is needed to determine what other factors may predict parents' participation. Possibilities include parents' beliefs about therapy, knowledge about this particular therapy, parenting style, or personality characteristics.

Although 7 of 20 previous studies identified by Stone et al. (2002) found duration of SM to be an important variable in determining treatment success, we did not. One reason may be that our sample (ages 5–12) did not include the wider age-range employed in previous studies, possibly reducing correlations. Furthermore, the majority of our children (27/40) were 2–3 years old when diagnosed with SM, and 24 had symptoms lasting 4 years or less. These factors reduced variability of SM duration and consequent correlations. Nevertheless, our model captured most of the variance (83%) in predicting treatment outcomes.

What sets our study apart from others using the SMQ (Bergman et al., 2013; Oerbeck et al., 2014) is a relatively larger sample of 40 children (33 at follow-up) achieving favorable outcomes in only 9 weeks. We believe S-CAT therapy worked quickly for a number of reasons: (1) Children started treatment at their current level of communication on the SM-SCCS (see Appendix 1); (2) activities were chosen to progress children along the scale guided by the children's comfort level supported by scripted speech to minimize the need to process language; (3) the therapist's nonchalant approach minimized expectations and pressure to speak; (4) charting was used to track progress and obtain rewards for accomplishing goals; (5) interactive games were generalized from individualized communication to small group settings at home, school, and in public, increasing exposure early in treatment; (6) ToC was introduced early as parents and children were educated about SM and were also given choices in developing interview activities with guidance for tracking success outside the therapy room; (7) parents were heavily involved in the therapy process and received ongoing support from the therapist and staff with emails and phone calls; and (8) motivation was an integral element of treatment. Families and children were motivated by reduced anxiety, having fun playing interactive games, tracking their accomplishments, earning prizes, feeling in control, and vocalizing in more places with more people.

We consider a number of possible limitations in this research. Because this was an open-label clinical trial (without a randomized control group), the standard internal validity threats of history, maturation, regression to the mean, attrition, instrumentation, and testing are addressed: (1) Children did not share a common *history* throughout treatment that could have accounted for improvements in speaking. Rather, there was diversity of experiences including time of year, schools attended, and city/state of residence; (2) *Maturation* during the brief time of 9 weeks is an unlikely explanation of speaking frequency improvements. Previous studies (Bergman et al., 2013; Oerbeck et al., 2014) found no evidence of remission in their randomized control groups and even found decreased speaking frequency over a 12-week period without treatment. In our study, language ability remained stable over the study period, thereby also ruling out language development as an explanation for increased talking frequency; (3) *Attrition* was not a major problem as there was 100% participation (and 7 children unavailable for follow-up were not different in demographic characteristics or symptomatology from the 33 who continued); (4) The threat of *instrumentation* was controlled by using standardized and psychometrically sound measures with the exception of possible misinterpretation of instructions by parents and teachers on CBCL measures of anxiety and withdrawal; (5) The threat of *testing* was unlikely as parents would not easily recall responses to 177 items after a lapse of 3 weeks. Nevertheless, there is the possibility of a Hawthorne effect. There is also the possibility of *regression to the mean* as children came from an extreme group with social communication anxiety. While we have addressed obvious issues that fall within those threats listed above, a control group would have been a more effective way of controlling a multitude of confounds.

There are also some limitations regarding external validity. There was only one therapist (who developed the therapy). Conversely, having one therapist improves the chances for consistency, commitment, and treatment fidelity across patients. The sample of SM children and their parents was geographically limited to the Mid-Atlantic region, and only included families seeking services at a private clinic and who received treatment at no charge because they agreed to be study participants.

Given the favorable outcomes, this study is a strong pilot for taking the next step in securing S-CAT as an evidence-based intervention. Future studies should demonstrate that delivery of S-CAT is generalizable to other therapists and more varied patients. Furthermore, an RCT with treatment and control groups is needed to document the fullest effect of S-CAT. We speculate that the most valuable result of treatment was children's sense of being able to take care of their needs

through communicating, whether it was to use the restroom, to ask a teacher for help to zipper a jacket, or to open a lunch box. This treatment helped children vocalize their needs.

Acknowledgements

The authors of this paper were not involved in the treatment of patients. The authors wish to thank Dr Shipon-Blum who permitted us access to her patients and facility. The authors also wish to thank Simon Moon, PhD, for his statistical support; Phil Fizur and Linda Kudla for assistance with data; and Lisa Swartzentruber for review of patient files. We greatly appreciate the families of children with selective mutism who took part in this research.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This study was supported by a private foundation grant from the Selective Mutism Research Institute.

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Appendix I

SELECTIVE MUTISM-STAGES OF SOCIAL COMMUNICATION COMFORT SCALE© SM-SCCS

NON-COMMUNICATIVE—neither nonverbal nor verbal.
No social engagement

STAGE 0—No Responding No Initiating

Child stands motionless (stiff body language), expressionless, averts eye gaze, appears “frozen”
MUTE OR seemingly **IGNORES** person while interacting or speaking to other(s). **MUTE towards others**

For communication to occur, SOCIAL ENGAGEMENT must occur

COMMUNICATIVE (Nonverbal and/or Verbal*)

*TO ADVANCE FROM ONE STAGE OF COMMUNICATION TO THE NEXT, INCREASING SOCIAL COMFORT NEEDS TO OCCUR.

STAGE 1—Nonverbal Communication (NV)

1A Responding—pointing, nodding, writing, sign language, gesturing, use of “objects” (e.g. whistles, bells, Non-voice augmentative device (e.g. communication boards/cards, symbols, photos)

1B Initiating—getting someone’s attention via pointing, gesturing, writing, use of “objects” to get attention (e.g. whistles, bells, Non-voice augmentative device (e.g. communication boards/cards, symbols, photos)

STAGE 2—Transition into Verbal Communication (TV)

2A Responding—Via any sounds, (e.g. grunts, animal sounds, letter sounds, moans, etc.): Verbal Intermediary or Whisper Buddy; Augmentative Device with sound (e.g. simple message switch, multiple voice message device, tape recorder, video, etc.)

2B Initiating—Getting someone’s attention via any sounds (e.g. grunts, animal sounds, letter sounds, moans, etc.): Verbal Intermediary or Whisper Buddy; Augmentative Device with sound (e.g. simple message switch, multiple voice message device, tape recorder, video, etc)

STAGE 3—Verbal Communication (VC)

3A Responding—Approximate speech/direct speech (e.g. altered or made-up language, baby talk, reading/rehearsing script, soft whispering, speaking)

3B Initiating—Approximate speech/direct speech (e.g. altered or made-up language, baby talk, reading/rehearsing script, soft whispering, speaking)

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