Research

Narrative Skills in Children With Selective Mutism: An Exploratory Study

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Selective mutism (SM) is a rare and complex disorder associated with anxiety symptoms and speech–language deficits; however, the nature of these language deficits has not been studied systematically. A novel cross-disciplinary assessment protocol was used to assess anxiety and nonverbal cognitive, receptive language, and expressive narrative abilities in 7 children with SM and a comparison group of 7 children with social phobia (SP). The children with SM produced significantly shorter narratives than children with SP, despite showing normal nonverbal cognitive and receptive language abilities. The findings suggest that SM may involve subtle expressive language deficits that may influence academic performance and raise additional questions for further research. The assessment procedure developed for this study may be potentially useful for language clinicians.

Key Words: selective mutism, anxiety, language ability, expressive narrative skills

Selective mutism (SM) is a rare and perplexing disorder in which the child does not speak in specific social situations (e.g., school, public places) despite speaking normally in others (e.g., home). Initially termed elective mutism (Tramer, 1934), a child’s persistent avoidance of speaking was first considered to be a form of defiance or passive oppositional behavior in response to either an overprotective or controlling parental style. The term elective mutism has been retained in the International Statistical Classification of Diseases and Related Health Problems (World Health Organization, 1994), which is the main diagnostic reference used outside North America.

The American Psychiatric Association (1994) replaced the term in the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM–IV) with selective mutism to denote an emphasis on situations in which the child avoids speaking. The cardinal symptom of SM is the child’s persistent failure to speak in selected situations that cannot be attributed to serious primary communication deficits, pervasive developmental disorder, or lack of language ability required for the situation. SM occurs cross-culturally and affects children from all social strata. Its prevalence has been reported at between .2% and .7% in children (Bradley & Sloman, 1975; Kolvin & Fundudis, 1981; Kopp & Gillberg, 1997; Kumpulainen, Rasanen, Raaska, & Somppi, 1998), with a gender ratio of 1.5:1 to 2:1 in favor of girls (Black & Uhde, 1995; Kristensen, 2000). Recently, a teacher-identified school-based sample yielded a prevalence of .71% (Bergman, Piacentini, & McCracken, 2002), suggesting that SM may not be as rare as previously reported. The etiology of SM is not well understood; however, two key factors have been consistently associated with the disorder: (a) anxiety, especially social anxiety, and (b) language deficits associated with developmental delays.

Diagnosis of SM is usually made on school entry or during the preschool years and requires symptoms to have been present for at least 1 month (not including the 1st month after school entry) to a degree that impairs the child’s social functioning outside the home. The child with SM is typically described as extremely shy, often with a history of sensitive temperament during infancy (Joseph, 1999). Family histories are frequently positive for parents or close relatives exhibiting significant shyness, anxiety disorders, and/or SM (Kristensen & Torgerson, 2001). Kristensen and Torgerson (2002) also found that parents of children with SM and co-occurring communication disorders showed different temperament profiles with...
respect to emotional stability and sociability compared with parents of children with SM but without communication problems. Another risk factor is the combined circumstance of immigration and second-language learning in children who are extremely shy or anxious (Bradley & Sloman, 1975; Elizur & Perednik, 2003). A number of studies have linked longer duration of SM symptoms with poorer prognosis and response to treatment (e.g., Kolvin & Fundudis, 1981; Steinhausen & Juzi, 1996). Considering the heterogeneity of outcomes associated with SM, Wilkins (1985) suggested two classifications of SM: a transient form, which is more prevalent in younger children whose symptoms resolve during the 1st year at school, and a more persistent form in children older than 5, which lasts for more than 6 months and is present in more than one environment. 

SM symptoms may be chronic in up to 50% of cases (Steinhausen & Juzi, 1996) and can be debilitating both socially and academically. Children with SM may be shunned by peers as being odd or treated inappropriately by overprotective peers who communicate for them and may also show poor development of academic skills stemming from their lack of verbal participation in class (Giddan, Ross, Sechler, & Becker, 1997). Systematic studies of long-term outcomes associated with SM are scarce; however, one recent follow-up study found that 60% of a sample of 41 young adults who were diagnosed with SM as children reported that they continued to experience problems with self-confidence, independence, achievement, and social communication skills (Remschmidt, Poller, Herpertz-Dahlman, Hennighausen, & Gutenbruner, 2001).

Clinically, children with SM present as a heterogeneous group, often showing co-occurring delays in cognitive, speech–language, and/or motor development, reported in both large clinical samples and in case studies (Cleator & Hand, 2001; Kolvin & Fundudis, 1981; Kristen, 2000; Steinhausen & Juzi, 1996). This heterogeneity complicates both the study of specific etiological factors associated with the disorder and the development of appropriate and effective interventions. Considering that between 30% and 50% of children with SM are reported to have speech–language disorders or delayed speech–language development (Kolvin & Fundudis, 1981; Kristen, 2000; Steinhausen & Juzi, 1996), SM children can be expected to be at risk for learning and social difficulties and may require specific language intervention. As most studies to date such as the ones cited above have reported only presence or absence of speech–language impairments based on parental report, the nature or extent of language impairments associated with SM remains undetermined. For example, it is not clear whether SM children have pragmatic language deficits that extend beyond their avoidance of communicating in specific situations, whether their deficits are primarily expressive in nature, or whether a range of receptive and expressive language deficits can be observed. This lack of information regarding profiles of language impairments associated with SM creates a critical information gap for clinicians involved in assessment and treatment of these children.

Although SM occupies its own category as an “Other Disorder of Childhood” in the DSM–IV, the most recent clinical conceptualization of SM associates the disorder within the spectrum of anxiety disorders, based on evidence that anxiety is a pervasive symptom in SM children and that SM symptoms overlap with those of social phobia (SP; Anstendig, 1999; Black & Uhde, 1992; 1995; Dummit et al., 1997; Johnson & Wintgens, 2001; Kristen, 2000; Leonard & Dow, 1995; Schum, 2002; Steinhausen & Juzi, 1996). Evidence regarding this notion is mixed (Manassis et al., 2003; Yeganeh, Beidel, Turner, Pina, & Silverman, 2003); however, the commonality of anxiety symptoms between the two groups makes children with SP an appropriate comparison group for studies of language and cognitive abilities in children with SM. SP is characterized by significant fear and distress associated with social contact including speaking with strangers and can be chronic, extending into adulthood (Beidel & Turner, 1998).

One hypothesis currently under study is that SM represents a severe form of SP that develops in early childhood (Black & Uhde, 1995; Dummit et al., 1997). According to this view, anxiety in the child with SP is associated with high avoidance of entering situations involving social contact, whereas the child with SM is willing to enter a social situation (e.g., classroom) but does so silently, with anxiety associated specifically with vocalizing or communicating verbally.

### Assessing Language Skills in Children with SM

Comprehensive clinical assessment of children with SM requires a multidisciplinary approach. Dow, Sonies, Sheib, Moss, and Leonard (1995) recommended that in addition to psychiatric, neurological, and developmental evaluations, clinical evaluations include a speech–language assessment. However, determining the SM child’s receptive and expressive language abilities in nonmute situations can be clinically challenging. Assessment of nonverbal cognition and receptive language abilities may be accomplished using selected standardized tests that do not require spoken responses, once rapport is established with the child (Cleator & Hand, 2001; Dow et al., 1995); however, reliable assessment of expressive language ability is more difficult due to the nature of SM. Evaluation of a child’s expressive language ability typically requires examination of several representative language samples across different situations and communication partners, as well as elicitation of verbal responses on standardized assessments. However, obtaining spoken responses and spontaneous language samples is particularly challenging with SM children since they avoid speaking with people outside their immediate family and the home is often the only setting in which they will speak freely. Clinicians must often rely on anecdotal parent reports of the child’s speech and language abilities, at best supplemented by informal audio- or videotaped samples of the child in conversation with others. However, as some parents may tend to overestimate their children’s actual language proficiency, inaccurate conclusions may be drawn about his or her developmental language status, especially if a child will not cooperate with standardized language testing (M. T. Stein, Rapin, & Yapko, 2001). Another problem related to...
information gathering during diagnosis is that informal home recordings of conversations and language during play may not provide language samples that are adequate for comprehensive analysis. For older children in particular, these informal samples may not include higher level language skills that are associated with more advanced academic skills such as providing oral explanations in class, comprehending textbook language, and writing stories and essays. Therefore, more direct and systematic methods of language assessment are needed.

One integral part of a comprehensive language assessment is evaluation of children’s narrative abilities (Westby, Van Dongen, & Maggart, 1989). Narratives are functionally important in children’s everyday communication, for example, in describing the day’s events or in telling stories, and are a clinically useful indicator of their pragmatic competence. In addition to revealing the child’s basic language production skills, spoken narratives also indicate development and use of higher level aspects of discourse such as complex sentences and cohesive devices. Studies of oral and written narrative performance in children with language impairments have found weaknesses in use of syntactic structures and in global organization of narratives (Gillam & Carlile, 1997; Gillam & Johnston, 1992). These factors, particularly grammatical complexity, have also been found to characterize the oral narratives of good compared with poor readers and have been associated with a more literate language style (Greenhalgh & Strong, 2001; Gummersall & Strong, 1999; Klecan-Aker, 1985). Therefore, children’s use of complex linguistic structures during narrative production may be an important signal of their linguistic maturity.

The content of children’s narratives also provides insight into their perceptions and understanding of events and human interactions as they occur in both stories and everyday experience (Hadley, 1998). Spoken narratives are often evaluated according to the story grammar taxonomy of N. Stein and Glenn (1979), which has been used frequently in studies of narrative skills of children with language impairments (Strong, 1998; Westby et al., 1989). Story grammar specifies story elements that are functionally important to the narrative genre, such as the setting of the story, events that are associated with the protagonists’ attempts to overcome problems and achieve goals, and the consequences of their actions. Children’s narratives are typically analyzed to determine how many essential story components they express, either in original stories or in the retelling of stories they have heard or read. Omission of story elements in children’s narratives may signal problems with both the linguistic and ideational factors associated with narrative production. For example, Liles, Duffy, Merritt, and Purcell (1995) found that language-impaired children’s omissions of story elements were associated with poor use of cohesive forms to link story details as well as with problems in understanding the temporal, cause–effect, or interpersonal relationships in stories. Language-impaired children have also been found to express less information regarding emotional states and motives of the story characters and/or protagonist, which are defined in story grammar terms as initiating events and internal responses (see Table 1). These omissions have been interpreted as reflecting weak understanding of the goal directedness of the protagonist’s actions and how the protagonist’s actions lead to causal sequences in stories (Klecan-Aker & Kelty, 1990; Merritt & Liles, 1987; Ripich & Griffith, 1988; Roth & Spekman, 1986). For children with psychiatric disorders, evaluation of narrative content may also have implications for clinical interpretations of behavioral symptoms such as avoidance and anxiety, since through stories, children are exposed to and can reflect on a wide range of social interactions and consequences. Whether presence of anxiety affects how their stories are formulated and what is included in the content has yet to be examined in this population.

One of the most frequently used clinical procedures to assess narrative abilities is to ask the child to retell a story

<table>
<thead>
<tr>
<th>Story element</th>
<th>Function</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setting</td>
<td>Introduces characters, objects, location, time,</td>
<td>One day, there was a boy named Mike who got a surprise package.</td>
</tr>
<tr>
<td>Initiating event</td>
<td>Identifies obstacle or problem that causes the</td>
<td>Mike put the baby frog down next to the big frog.</td>
</tr>
<tr>
<td>Internal response</td>
<td>Describes emotional responses, goals, thoughts,</td>
<td>The big frog was not happy to see the baby frog.</td>
</tr>
<tr>
<td>Attempt</td>
<td>Describes actions taken by the characters to solve</td>
<td>Soon, the big frog kicked the baby frog.</td>
</tr>
<tr>
<td>Consequence</td>
<td>Identifies repercussions of the characters’ attempts to overcome the problem</td>
<td>Mike told the big frog that he was very naughty.</td>
</tr>
<tr>
<td>Reaction</td>
<td>Describes emotions, thoughts, actions of characters at the end of the story</td>
<td>The big frog promised to be nice to the baby frog from now on.</td>
</tr>
</tbody>
</table>

Note. Internal response, attempt, consequence, and reaction are story grammar elements associated with awareness and regulation of emotional responses, goal-directed behavior, and awareness of contingencies between attempts and outcomes (Francis, Fine, & Tannock, 2001). Examples from audiotaped story script for One Frog Too Many (Mayer, 1975) from the Strong Narrative Assessment Procedure (pp. 139–140) by Carol J. Strong, 1998, Eau Claire, WI: Thinking Publications (1-800-225-4769; www.ThinkingPublications.com). Copyright 1998 by Thinking Publications. Adapted with permission.
in his or her own words. Wordless picture books such as the series of frog stories by Mayer (1967, 1969, 1975) frequently have been used to study narrative abilities in normal and clinical populations from the standpoint of story grammar analysis (Berman, Slobin, & Aksu-Koç, 1994; Francis, Fine, & Tannock, 2001; Renz et al., 2003; Strong, 1998; see Table 1). For the present study of language abilities in children with SM, our main objectives were (a) to test the feasibility of using a parent-elicited story-retelling procedure to obtain samples of expressive language in school-age children with SM and (b) to explore expressive narrative abilities in children with SM and a comparison group of children with SP. Two narrative samples were elicited by parents, one at home and one in a clinic setting. It was hypothesized that if SM involved both anxiety and language deficits, the children with SM would exhibit weaker expressive narrative abilities in both settings compared with the children with SP.

### Method

#### Sample

Seven children with SM and 7 children with SP participated in the current study and were selected from a larger clinical sample of children with SM (n = 14) and SP (n = 9) who were participants in a study of anxiety, language and cognitive skills, and achievement in children with SM (Manassis et al., 2003) and were recruited through an outpatient anxiety disorders clinic in a large metropolitan children’s hospital. Inclusion criteria were that participants were between 7 and 14 years of age, had attained normal scores on the cognitive and receptive language tests in the assessment protocol, and did not have other co-occurring psychiatric diagnoses (e.g., depression) or previously identified speech-language or learning disabilities. The SM group comprised 4 children with current SM diagnosis and 3 with long-standing SM diagnosis but resolving symptoms. The SM and SP groups contained equivalent numbers of boys and girls, $\chi^2(n = 14) = 0.27, p > .5$, and did not differ in age, performance IQ, or receptive language skills (see Table 2).

Diagnosis of children in each group was initially confirmed through a semistructured interview administered by a child psychiatrist (Daniel Fung) based on DSM–IV criteria (American Psychiatric Association, 1994) for SM and SP and through parent responses on a computerized structured diagnostic interview based on DSM–IV criteria (Diagnostic Interview for Children and Adolescents—IV; Reich, Welner, Herjanic, & Multihealth Systems staff, 1997). None of the children were taking medication for anxiety or depression at the time of their participation in the study.

The rationale for using a subset of the larger SM sample in the present investigation was based on the goal of comparing expressive narrative abilities in children with SM and SP who did not differ in age, nonverbal cognitive skills, or receptive language ability. As several of the children with SM from the larger sample were younger than the youngest child with SP and showed evidence of speech–language deficits, this factor would have precluded interpretation of any differences found. Furthermore, the mean age of the larger group of children with SP (n = 9) was higher than that of the SM group (n = 14), which is consistent with SP tending to be a later diagnosed disorder compared with SM. Moreover, the older children with SP would presumably have had better developed language skills than the oldest children in the SM group, therefore again potentially confounding comparison of narrative skills between the groups.

#### Measures

**Anxiety and selective mutism measures.** Ratings of anxiety were obtained from the child participants, their parents, and their teachers using standardized symptom-rating scales. The Multidimensional Anxiety Scale for Children (MASC; March, 1997) and Revised Children’s Manifest Anxiety Scale (RCMAS; Reynolds & Richmond, 1985) provided child self-ratings of anxiety symptoms. The Conners Rating Scales—Revised (CRS–R Parent, Teacher; Conners, 1997) provided parent and teacher ratings of the child’s behavior at home and at school. Standardized t scores from the Anxiety index of the CRS–R were used in data analyses. The Selective Mutism Questionnaire (SMQ; Bergman, Holloway, & Piacentini, 1999) was used to obtain parent ratings of symptoms of SM in home, school, and public situations. This recently developed non-standardized instrument surveys children’s typical speaking behavior with familiar and unfamiliar communication partners, with respect to the usual amount of talking occurring in each setting. Ratings ranging from 1 to 4 are assigned by parents, with low numerical ratings indicating the lowest frequency of talking and thus the greatest degree of impairment associated with SM.

**Standardized cognitive and language measures.** Nonverbal cognitive and receptive language abilities were assessed using a protocol of standardized tests that did not require verbal responses. Nonverbal cognitive ability was assessed using the performance subtests from the Wechsler Intelligence Scale for Children—III (WISC–III; Wechsler, 1994) and a nonverbal test of working memory ability. The WISC–III performance subtests were administered using standard format, and the composite Performance IQ score was determined for each child.

For working memory, since conventional verbal elicitation tasks could not be administered with the SM children (e.g., repeating digits forward and backward; sentence span tasks), an analogous task assessing nonverbal visuospatial working memory was administered. Most models of working memory specify a storage component, in which information is maintained during processing, and a manipulation component, which coordinates complex mental activities, such as reordering information (Miyake & Shah, 1999). Therefore, both of these aspects of working memory were assessed separately. The Finger Windows subtest from the Wide Range Assessment of Memory and Learning (WRAML; Adams & Sheslow, 1990) assesses memory span for sequences of spatial locations and was used as an indicator of the maintenance component of working memory. The examiner shows the child a series of
holes introduced as “windows,” which are randomly spaced on a board held vertically in front of them. The child is then asked to reproduce the sequence by pointing his or her finger through the same windows. Items gradually increase in length from sets of two to sets of six windows, thereby tapping spatial memory span. In this study, children were also asked to reproduce the spatial sequences in backward order in a separate trial, tapping the manipulation component of working memory. As there are no norms for backward administration of the task, raw scores indicating number of correct items for both the forward and backward administrations were used in analyses.

Language measures included both direct assessments of receptive language and parent ratings of speech–language skills. During the parent interview, parents rated their children’s articulation and syntactic maturity using subscales of the Children’s Communication Checklist (CCC; Bishop, 1998), a nonstandardized parent checklist for speech–language abilities. Ratings were converted to z scores for data analysis. Three standardized receptive language tests that did not require verbal responses were administered to each child to assess vocabulary knowledge (Peabody Picture Vocabulary Test—III; PPVT–III; Dunn & Dunn, 1997); comprehension of spoken directions (Concepts and Directions subtest from the Clinical Evaluation of Language Fundamentals—3; CELF–3; Semel, Wiig, & Secord, 1995); and phonemic awareness abilities (Lindamood Auditory Conceptualization Test; LACT; Lindamood & Lindamood, 1974). Both the PPVT–III and CELF–3 are well standardized receptive language tests, are easily administered, and have acceptable psychometric properties. In the PPVT–III, the child points to one of four pictures that matches a word spoken by the examiner. In the Concepts and Directions subtest of the CELF–3, the child points to a series of items in a visual array in response to spoken instructions that vary in length, syntactic complexity, and use of conceptual vocabulary. The LACT is an age and grade criterion-referenced task that assesses phonemic awareness skills, which are strongly predictive of decoding ability and reading achievement (Wagner & Torgeson, 1987). The LACT assesses the child’s ability to perceive the number and order of spoken phonemes, through adding, deleting, or

### Table 2. Anxiety ratings and nonverbal cognitive and receptive language scores.

| Measure | Selectively mute (n = 7) | Social phobic (n = 7) | Group comparison
<table>
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<tr>
<td></td>
<td>M  SD</td>
<td>M  SD</td>
<td>Mann–Whitney U Z  p</td>
</tr>
<tr>
<td>Age</td>
<td>9.7 1.8</td>
<td>11.1 1.9</td>
<td>–1.60 .11</td>
</tr>
<tr>
<td>Anxiety ratings (CRS–R)a</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parent-rated anxiety</td>
<td>66.1 13.9</td>
<td>69.4 13.6</td>
<td>–0.45 .65</td>
</tr>
<tr>
<td>Teacher-rated anxiety</td>
<td>63.6 7.0</td>
<td>66.1 15.3</td>
<td>–0.93 .35</td>
</tr>
<tr>
<td>Child-rated anxiety</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MASCa</td>
<td>50.3 8.5</td>
<td>50.4 11.2</td>
<td>–0.19 .85</td>
</tr>
<tr>
<td>RCMASa</td>
<td>39.1 11.7</td>
<td>44 12.2</td>
<td>–0.90 .37</td>
</tr>
<tr>
<td>Selective mutism ratings (SMQ)b</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Home (parent ratings)</td>
<td>3.1 0.6</td>
<td>3.5 0.4</td>
<td>–1.40 .17</td>
</tr>
<tr>
<td>School</td>
<td>2.1 0.9</td>
<td>2.6 0.5</td>
<td>–2.00** .04</td>
</tr>
<tr>
<td>Public</td>
<td>2.3 0.9</td>
<td>2.2 0.8</td>
<td>–0.07 .94</td>
</tr>
<tr>
<td>Nonverbal cognitive measures</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performance IQ (WISC–III)</td>
<td>108.8 15.3</td>
<td>106.3 18.9</td>
<td>0 1.0</td>
</tr>
<tr>
<td>Working memory (WRAML)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Finger Windows Forwardb</td>
<td>10.2 3.2</td>
<td>11.3 3.8</td>
<td>–0.57 .57</td>
</tr>
<tr>
<td>Finger Windows Backward</td>
<td>13.8 2.9</td>
<td>14.0 6.2</td>
<td>–0.22 .83</td>
</tr>
<tr>
<td>Language measures (CCC parent ratings)d</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speech</td>
<td>.33 .9</td>
<td>–.3 1.3</td>
<td>–.66 .51</td>
</tr>
<tr>
<td>Syntax</td>
<td>.02 .8</td>
<td>0 0</td>
<td>–1.18 .24</td>
</tr>
<tr>
<td>Receptive vocabulary (PPVT–III)</td>
<td>101.0 19.0</td>
<td>111.7 20.5</td>
<td>–0.90 .37</td>
</tr>
<tr>
<td>Concepts and Directions (CELF–3)e</td>
<td>12.7 2.7</td>
<td>13.0 2.9</td>
<td>–0.33 .75</td>
</tr>
<tr>
<td>Phonemic Awareness (LACT)b</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Part 1</td>
<td>14.7 0.8</td>
<td>15.6 0.8</td>
<td>–1.8* .06</td>
</tr>
<tr>
<td>Part 2</td>
<td>9.3 1.0</td>
<td>9.4 2.1</td>
<td>–0.07 .94</td>
</tr>
<tr>
<td>Story comprehension (clinic; SNAP)b</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Facts</td>
<td>4.9 0.4</td>
<td>4.1 1.2</td>
<td>–1.32 .17</td>
</tr>
<tr>
<td>Inferences</td>
<td>4.0 1.0</td>
<td>3.7 1.5</td>
<td>–0.22 .84</td>
</tr>
</tbody>
</table>

Note. CRS–R = Conners Rating Scales—Revised; MASC = Multidimensional Anxiety Scale for Children; RCMAS = Revised Children’s Manifest Anxiety Scale; SMQ = Selective Mutism Questionnaire; WISC–III = Wechsler Intelligence Scale for Children—Third edition; WRAML = Wide Range Assessment of Memory and Learning; CCC = Children’s Communicative Checklist; PPVT–III = Peabody Picture Vocabulary Test—III; CELF–3 = Clinical Evaluation of Language Fundamentals—Third edition; LACT = Lindamood Auditory Conceptualization Test; SNAP = Strong Narrative Assessment Procedure. The SMQ was reverse scored.

aRaw scores/ratings. bStandard scores (M = 100, SD = 15). cStandard scores (M = 10, SD = 3). dStandard scores (M = 50, SD = 15). eStandard scores (M = 100, SD = 15). *p < .07. **p < .05.
reordering phonemes from spoken nonsense syllables. No verbal responses are required; the child uses colored blocks to represent the number of phonemes, order, and specific changes in phoneme patterns in spoken syllables (e.g., changing from /dep/ to /ped/ requires reordering colored blocks from red–yellow–blue to blue–yellow–red). Since the converted grade-referenced scores are not continuous, raw scores indicating number of items correct were used for data analyses.

**Expressive language measure.** Narrative samples were elicited using the Strong Narrative Assessment Procedure (SNAP; Strong, 1998), a nonstandardized task in which the child retells stories that are presented on audiotape with an accompanying wordless picture book. Three test stories from the SNAP were used: *A Boy, a Dog, and a Frog* (Mayer, 1967), *Frog, Where Are You?* (Mayer, 1969), and *One Frog Too Many* (Mayer, 1975). The frog stories were considered to be ideally suited to investigation of narrative performance in children with SM and SP in this study, since they are informal, do not challenge the child with print, and promote reformulation of target story elements in the child’s own words. All the stories are reported to have similar structural complexity, length, number of scenes, and number of characters (Strong, 1998). The child is asked to listen to a taped “frog story” over headphones, narrated by an adult male speaker, and follow the pictures; a frog’s croak signals the child to turn the page. At the end of the story, the child removes the headphones and retells it to a naive listener (i.e., someone who did not hear the story; in this study, the parent) in his or her own words without referring to the pictures. Listening comprehension is also assessed after the story retelling, with questions regarding facts and inferences. Each story takes about 3.5 min to listen to and has approximately 45 communication units (C-units) and 400 words. Each story is also pre-analyzed for story grammar elements in each episode. Story grammar elements are defined and illustrated in Table 1.

**Assessment Procedure**

Children and their parents attended one session with the assessment team, which comprised a psychiatrist, a psychometrist, and a speech-language pathologist. Testing took place in a hospital clinic laboratory and took approximately 3.5–4 hr with frequent breaks provided between tests and a generous lunch break to promote optimal motivation and performance. During the first part of the assessment, the psychiatrist interviewed the parents while the child completed the standardized language and cognitive tests separately with the speech-language pathologist and psychometrist. Before their appointment, parents were sent a copy of one of the audiotaped frog stories and book, a blank audiotape, and a description of the elicitation procedure from the SNAP, with instructions to audiotape their child’s retelling of the story and answers to the comprehension questions at home and bring the tape to the hospital for their clinic appointment. After administration of the standardized tests in the protocol, a narrative sample plus answers to the comprehension questions was then obtained from each participant in the clinic room with the parent as listener. The same parent elicited both the home and clinic samples, which helped to ensure that the elicitation conditions were consistent across the two settings. The three frog stories were randomly assigned to each participant between the home and clinic settings to reduce the possibility of a story effect. All sessions were audiotaped for later analysis.

**Data Analyses**

**Narrative analysis.** Each child’s audiotaped narrative samples were transcribed for analysis of (a) length, (b) linguistic complexity, and (c) inclusion of story grammar elements. In keeping with the SNAP guidelines (Strong, 1998), the samples were first segmented into C-units, where a C-unit minimally comprised a subject and one main verb and could contain subordinate clauses. Story length was determined by counts of C-units and total number of words per story. Reliability of C-unit segmentation and counts was checked by a second experienced rater, who was unaware of the participant’s diagnosis, for 15% of the samples, which were randomly selected. Interrater comparisons showed 92% agreement.

Linguistic complexity was determined by calculating the number of words per C-unit and counting the total number of subordinate clauses in each sample to determine the proportion of subordinate clauses produced per C-unit. Presence of subordinate clauses was considered to indicate greater proficiency using complex sentences. Total clause counts were also divided into the number of right-branching clauses (i.e., the boy started to run when he saw the frog) and left-branching clauses (i.e., when the boy saw the frog, he started to run) to allow a closer inspection of syntactic maturity, considering that left-branching clauses are a later acquired syntactic pattern. Relative productivity of left-branching clauses was calculated by dividing the mean number of left-branching clauses by the total number of complex clauses for each group.

Story grammar analysis was carried out according to the SNAP, which involved determining the number of occurrences of each type of story element expressed in the child’s retell (i.e., settings, initiating events; see Table 1) relative to the total possible occurrences of that element in the taped story. Counts of story grammar elements were converted to proportion scores for group comparisons.

Because of the small sample size in this exploratory study, group comparisons regarding the standardized and narrative measures were carried out using nonparametric analyses. Alpha level was adjusted to the .01 level given the number of statistical tests performed. Effect sizes are also reported because they are not influenced by sample size and may indicate trends that are not statistically significant due to low power. Effect sizes (Cohen’s d) were calculated from group means and standard deviations according to the formula \[ d = \frac{M_1 - M_2}{SD_{pooled}} \] where \( SD_{pooled} \) is the square root of \( SD_1^2 + SD_2^2/2 \). Effect sizes between 0.5 and 0.7 are considered to be moderately large, with effect sizes >0.8 considered to be large (Newton & Rudestam, 1999).
Results

Table 2 contains means and results of group comparisons using the Mann–Whitney test regarding scores on the anxiety measures (CRS–R, MASC, and RCMA), the SMQ, the nonverbal cognitive measures (WISC–III Performance IQ and Finger Windows from the WRAML), the receptive language measures (PPVT–III, Concepts and Directions subtest of the CELF–3, and LACT), parent ratings of articulation and syntax (CCC), and story comprehension questions for the stories heard in the clinic setting. As expected, the SM group had significantly lower parent ratings than the SP group on the SMQ for the school setting only. Otherwise, there were no other group differences on the descriptive measures, with the exception of a trend toward significant differences on Part 1 of the LACT (SM < SP) in which children are asked to show the number and order of a series of individually spoken phonemes.

Table 3 contains means for measures of narrative length, linguistic complexity, and proportion scores, indicating inclusion of story grammar elements for both the home-elicited and clinic-elicited samples, and results of group comparisons, which are reported separately for each setting. In the home-elicited samples, the two groups did not differ statistically on the length variables (number of words and number of C-units), although the effect sizes were large (>0.90). Regarding linguistic complexity, there were no statistically significant differences between the SM and SP groups; however, large effect sizes for overall use of subordinate clauses and use of left-branching clauses suggested a trend toward the SM group’s narratives being less complex linguistically. Relative overall productivity was examined informally. Approximately 20% of C-units produced by the SM group contained complex clauses, compared with 26% of the C-units produced in the SP group’s narratives. However, only 17.6% of the SM group’s complex clauses were left branching, compared with 34.9% of the complex clauses in the SP group.

Regarding story grammar analyses, there were no significant group differences; however, large effect sizes (>1.0) were evident (SM < SP) for inclusion of internal responses and initiating events in the narrative samples, suggesting that in a larger sample, performance differences might be demonstrable statistically.

Group comparisons for samples elicited in the clinic with the parent yielded a generally similar pattern of results, except that the group differences (SM < SP) for length were statistically significant. Large effect sizes (>0.90) were again evident in group comparisons regarding use of subordinate clauses (SM < SP), particularly left-branching clauses, with moderate-to-large effect sizes (>0.60) for counts of right-branching clauses and number of C-units containing subordinate clauses. Relative overall productivity calculations showed that 16% of the C-units produced by the SM group contained subordinate clauses, compared with 23% of the C-units produced in the SP group’s narratives. The SM group’s relative use of left-branching clauses increased to 35.9% in the clinic samples compared with the SP group, which continued to show about 35% of their complex clauses as left branching. For analyses of story grammar components, no statistically significant differences were evident; however, again, there were large effect sizes in group comparisons (SM < SP) of inclusion of initiating events and internal responses in the home samples and for inclusion of settings and internal responses in the clinic samples.

### Table 3. Group means for narrative length, linguistic complexity, and story grammar elements.

<table>
<thead>
<tr>
<th>Narrative measures</th>
<th>SM (n = 7) M</th>
<th>SD</th>
<th>SP (n = 7) M</th>
<th>SD</th>
<th>Z</th>
<th>d</th>
<th>Group difference Mann–Whitney U</th>
<th>SM (n = 7) M</th>
<th>SD</th>
<th>SP (n = 7) M</th>
<th>SD</th>
<th>Z</th>
<th>d</th>
<th>Group difference Mann–Whitney U</th>
</tr>
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<tbody>
<tr>
<td>Narrative length</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Total words</td>
<td>236.4</td>
<td>76.9</td>
<td>327.0</td>
<td>120.4</td>
<td>–1.58</td>
<td>0.90</td>
<td></td>
<td>194.6</td>
<td>59.3</td>
<td>363.4</td>
<td>117.8</td>
<td>–2.59**</td>
<td>1.80</td>
<td></td>
</tr>
<tr>
<td>Total C-units</td>
<td>25.7</td>
<td>6.8</td>
<td>34.1</td>
<td>10.0</td>
<td>–1.68</td>
<td>0.98</td>
<td></td>
<td>23.1</td>
<td>5.4</td>
<td>39.1</td>
<td>10.4</td>
<td>–2.78**</td>
<td>1.90</td>
<td></td>
</tr>
<tr>
<td>Linguistic complexity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. words/C-unit</td>
<td>9.0</td>
<td>1.3</td>
<td>9.5</td>
<td>1.4</td>
<td>–1.00</td>
<td>0.37</td>
<td></td>
<td>8.7</td>
<td>0.7</td>
<td>9.2</td>
<td>1.0</td>
<td>–0.58</td>
<td>0.58</td>
<td></td>
</tr>
<tr>
<td>Complex clauses</td>
<td>5.1</td>
<td>3.0</td>
<td>8.6</td>
<td>2.5</td>
<td>–2.06</td>
<td>1.27</td>
<td></td>
<td>3.9</td>
<td>2.2</td>
<td>8.9</td>
<td>6.5</td>
<td>–1.87</td>
<td>1.03</td>
<td></td>
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<tr>
<td>Right-branching clauses</td>
<td>4.3</td>
<td>2.5</td>
<td>5.6</td>
<td>2.5</td>
<td>–1.00</td>
<td>0.52</td>
<td></td>
<td>2.4</td>
<td>1.1</td>
<td>5.7</td>
<td>5.9</td>
<td>–1.18</td>
<td>0.78</td>
<td></td>
</tr>
<tr>
<td>Left-branching clauses</td>
<td>0.9</td>
<td>1.5</td>
<td>3.0</td>
<td>1.5</td>
<td>–2.26</td>
<td>1.40</td>
<td></td>
<td>1.4</td>
<td>1.3</td>
<td>3.1</td>
<td>2.2</td>
<td>–1.57</td>
<td>0.94</td>
<td></td>
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<tr>
<td>No. clauses/C-unit</td>
<td>0.2</td>
<td>0.1</td>
<td>0.3</td>
<td>0.1</td>
<td>–1.37</td>
<td>0.92</td>
<td></td>
<td>0.2</td>
<td>0.1</td>
<td>0.2</td>
<td>0.2</td>
<td>–0.89</td>
<td>0.60</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Settings</td>
<td>.59</td>
<td>.19</td>
<td>.54</td>
<td>.22</td>
<td>–0.65</td>
<td>0.24</td>
<td></td>
<td>.54</td>
<td>.22</td>
<td>.75</td>
<td>.18</td>
<td>–1.86</td>
<td>1.04</td>
<td></td>
</tr>
<tr>
<td>Initiating events</td>
<td>.67</td>
<td>.24</td>
<td>.89</td>
<td>.20</td>
<td>–1.68</td>
<td>1.06</td>
<td></td>
<td>.71</td>
<td>.26</td>
<td>.80</td>
<td>.21</td>
<td>–0.57</td>
<td>0.38</td>
<td></td>
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<tr>
<td>Internal responses</td>
<td>.28</td>
<td>.25</td>
<td>.54</td>
<td>.23</td>
<td>–1.66</td>
<td>1.10</td>
<td></td>
<td>.18</td>
<td>.17</td>
<td>.43</td>
<td>.34</td>
<td>–1.48</td>
<td>0.92</td>
<td></td>
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<tr>
<td>Attempts</td>
<td>.61</td>
<td>.30</td>
<td>.69</td>
<td>.24</td>
<td>–0.26</td>
<td>0.29</td>
<td></td>
<td>.48</td>
<td>.19</td>
<td>.56</td>
<td>.18</td>
<td>–0.78</td>
<td>0.43</td>
<td></td>
</tr>
<tr>
<td>Consequences</td>
<td>.61</td>
<td>.24</td>
<td>.72</td>
<td>.24</td>
<td>–1.04</td>
<td>0.46</td>
<td></td>
<td>.60</td>
<td>.27</td>
<td>.71</td>
<td>.23</td>
<td>–0.09</td>
<td>0.44</td>
<td></td>
</tr>
<tr>
<td>Reactions</td>
<td>.60</td>
<td>.24</td>
<td>.72</td>
<td>.24</td>
<td>–1.04</td>
<td>0.50</td>
<td></td>
<td>.36</td>
<td>.48</td>
<td>.36</td>
<td>.48</td>
<td>0.00</td>
<td>0.00</td>
<td></td>
</tr>
</tbody>
</table>

*Note. C-unit = communication unit. Proportion scores indicate occurrence of each story element in each retell relative to total occurrences of that element in the complete story.***p < .01.
Discussion

Both the design of the clinical assessment protocol used in this study and findings regarding the narrative samples have relevance for speech-language pathologists and other clinicians involved with children with SM. First, we found the multidisciplinary assessment protocol to be effective in gathering a range of standardized and descriptive clinical information with relatively few clinical contact hours, a task which is often clinically challenging with children with SM. As well, the nonstandardized SNAP was effective in eliciting expressive language samples both in and out of the home setting, which were appropriate for detailed analysis.

In support of our hypothesis, this sample of children with SM produced shorter, linguistically simpler, and less detailed narratives than the children with SP when retelling stories to a parent in both home and clinic settings, despite showing normal receptive language abilities and nonverbal cognitive ability. Although group differences were statistically significant only for the length variables, effect-size calculations suggested that in a larger sample yielding more power, these differences would be more robust. Interestingly, in addition to producing fewer C-units and words in their narratives, the SM group also appeared to produce fewer subordinate clauses, even in the home setting, suggesting that their syntactic skills may be less well developed than those of the SP group. They also appeared to produce proportionately fewer left-branching clauses in their home samples than the children with SP, which is surprising considering that their best language performance would be expected to occur in the home setting. This finding suggests that both anxiety and mild expressive language deficits may be components of SM even when speech–language delay has been ruled out on standardized tests.

Also of note is that the group differences were evident in an SM sample that was older (mean age 9.7 years) than children who are typically referred for school speech–language services, and the SM group included 3 whose SM symptoms were reported to be improving. As many school services focus on SM children in primary grades, these findings suggest that subtle language deficits may be present in SM children in middle grades who have no other overt evidence of language impairment (i.e., in nonmute situations). Considering that these children have experienced temporary or extended periods of mutism in school and other settings, their reduced experience with age-appropriate social and didactic interactions may limit their overall development of higher level language skills.

Furthermore, the potential academic and social outcomes of a combination of weak or subclinical language skills plus continuing functional impairment from chronic SM symptoms (including anxiety) may be more serious than those associated with weak language skills alone.

Direct comparison of narrative performance for each group across the two settings was not one of our primary objectives, and given the fixed task order used in this study (i.e., home then clinic), we were not able to address this issue through statistical testing; however, we consider it to be critical for future studies. Informal examination of the data revealed different patterns of productivity of complex sentences between the two groups across settings. Given that the unfamiliarity of the clinic setting would most likely impose some degree of anxiety for speaking for the children with SM, one could expect them to show poorer performance in the clinic compared with the home setting, even though they remained with their parents. However, the SM group increased their proportionate use of left-branching clauses between home and clinic, possibly due to being more familiar with the task with no additional situational anxiety imposed by a different listener. The SP group maintained about the same level of complexity in their home and clinic samples, and their second attempt at the task did not appear to improve their use of complex structures.

Regarding the content of the narrative samples, although no significant group differences were found, large effect sizes in group comparisons suggested that differences would emerge in a larger sample. The findings suggested that this sample of children with SM described fewer settings, initiating events, and internal responses in their narratives than the children with SP, which is a pattern consistent with previously reported findings regarding language-impaired children’s narrative performance. The findings also raise a number of questions regarding potential processes underlying the less frequent inclusion of these story elements by the SM group. For example, were the omissions due to children with SM having poorer awareness of characters’ motivations, actions (initiating events), or emotional reactions (internal responses) in the stories? Were they in general less proficient in adjusting the amount of detail for a naive listener’s needs? Or did their propensity to talk less limit narrative length, resulting in fewer C-units and therefore fewer overall story details? Alternatively, might their apparently weaker syntactic skills have limited their ability to describe certain types of story details that require use of subordination to connect complex concepts across sentences (e.g., cause–effect or temporal relationships)? This possibility is consistent with the idea that certain story elements denote more complex conceptual relationships and may require higher level cognitive and language skills to communicate proficiently (Ripich & Griffith, 1988; Roth & Spekman, 1986; see also Francis et al., 2001).

Clinical Relevance

The finding that this small group of SM children with normal receptive language and cognitive skills produced narratives that were poorer in length, linguistic complexity, and some aspects of content underscores the need to carefully assess language and cognitive abilities in this population (Dow et al., 1995). Furthermore, the lack of group differences on the nonverbal intellectual and memory measures strengthens interpretation of results. Working memory, particularly, is important for performance of complex language tasks and was a useful addition to the test protocol. Given the success in this study of having parents systematically elicit a narrative sample at
home, it may also be possible to train them to administer age-appropriate verbal working memory tasks at home such as the sentence span task (Daneman & Carpenter, 1980) or digit span tasks (e.g., CELF-4; Semel, Wiig, & Secord, 2003), which could be used to complement less intrusive nonverbal assessments completed in the clinic or school, so that verbal and nonverbal memory skills could be more thoroughly profiled.

Our protocol included the Finger Windows task from the WRAML (Adams & Sheslow, 1990) to assess memory for visuospatial sequences, which served as a measure of nonverbal working memory. Although not typically a skill assessed by speech-language pathologists, the ease of administration of this task makes it ideal for assessing memory span and working memory skills in children who are noncommunicative or who have limited oral language skills. Unfortunately, the lack of normative data for the backward administration of the Finger Windows task precludes determining whether this sample of SM and SP children had visuospatial working memory deficits in relation to performance of normally developing age peers. Verbal working memory skills have received increasing attention recently as being highly relevant to assessment of language performance in children (Montgomery, 2003); however, the role of spatial memory abilities has been less of a focus regarding children with language impairments. The findings of a relationship between spatial memory and language production processes in adults (Hermer-Vasquez, Moffet, & Monkholm, 2001) and that spatial working memory was predictive of a number of language-related academic competencies in elementary-age children (Gathercole & Pickering, 2000) suggest that there may be sound rationale for including measures of spatial abilities in clinical assessments, over and above their utility as nonverbal measures, and that spatial memory ability may play a larger role in language performance than previously considered.

**Mechanisms Underlying Selective Mutism—Considerations for Future Research**

These exploratory findings should be interpreted as preliminary and with caution given the small sample size. Furthermore, while the apparent homogeneity of this SM group with respect to basic language and cognitive skills allowed more confidence in interpreting their narrative abilities, the results may not generalize to larger SM groups, which would likely include children with co-occurring speech–language and/or mild developmental delays (Kristensen, 2000). Also, as there was no normal group, the clinical significance of the SM group’s shorter and simpler narratives cannot be determined from this study. Future studies of language proficiency in children with SM should include both typically developing children and other clinical comparison groups, for example, children with language impairment but no SM and/or children with generalized anxiety disorder, whose anxiety is not restricted only to social situations.

Since this was an exploratory study, we used relatively simple measures of linguistic length and structure in analyzing the narrative samples. A useful addition to analyses for future studies would be to include measures of grammatical accuracy, use of discourse devices for cohesion and reference, and more detailed analysis of syntactic complexity and productivity. Another important limitation was the lack of descriptive information from the children’s teachers. This study used one teacher behavior rating scale (CRS–R), which—although a useful screen for learning problems, social problems, and anxiety—does not address the unique symptoms and functional deficits of children with SM. In our follow-up to the present study, which is a multisite investigation of language and cognitive skills in children with SM, we are attempting to address this issue by including a semistructured teacher interview in the protocol.

Determining the possible neurodevelopmental and behavioral processes associated with SM is challenging for clinical researchers. Although recent literature has focused on the relationship between SM and anxiety (Anstendig, 1999; Dummit et al., 1997; Kristensen, 2000), symptoms of SM also resemble those of behavioral inhibition, which is a temperament style in children that has been studied extensively by Kagan, Reznick, and Snidman (1987). Behavioral inhibition is characterized by extreme shyness and avoidance of novelty and has also been linked to anxiety disorders in older children (Biederman et al., 1990). One of the most common indicators of behavioral inhibition during early school years is the lack of spontaneous speech when in the presence of an unfamiliar person. Inhibited children have also been found to show greater musculoskeletal tension, including vocal cord tension, especially in high-anxiety situations. Interestingly, Dummit et al. (1997) reported that some of their SM cases tended to use a high-pitched, tense-sounding voice in nonmute situations, suggesting another possible area of overlap with children who show behavioral avoidance and anxiety. Future investigations of speech–language profiles of children with SM should therefore include examination of prosodic aspects of language production that may be associated with anxiety, such as speech rate, fluency, and vocal pitch and inflection, as well as nonverbal aspects of communication such as gesture and joint attention during interactions.

The methodology and findings of this study may also have implications for future studies of effectiveness of medications sometimes used in treatment of SM. A number of controlled medication trials have found selective serotonin reuptake inhibitors (SSRIs; e.g., fluoxetine) to be effective in reducing anxiety in SM children (Black & Uhde, 1992; 1995; Dummit et al., 1997); however, medication effects on other symptoms associated with the disorder have not been examined. Recently, using a similar procedure for sampling narratives under different treatment conditions (active stimulant medication vs. placebo), Francis et al. (2001) demonstrated a beneficial and selective effect of stimulant medication on inclusion of internal responses and attempts in elicited narratives of children with attention-deficit/hyperactivity disorder (ADHD). These story elements were considered to be associated with executive functions such as planning and
problem solving, skills which are often deficient in ADHD children but may improve with medication.

This study raises several intriguing questions regarding child anxiety and language development that merit further investigation. Our findings did not show higher ratings of anxiety in the children with SM, contrary to the prediction that SM is a more anxious variant of SP but rather support the notion that SM is a unique disorder involving language development. Recently, there has been an increased awareness among clinicians regarding the frequent co-occurrence of language impairments in children with psychiatric disorders (Cohen, Davine, Horodezky, Lipsett, & Isaacson, 1993; Vallance, Im, & Cohen, 1999). With respect to anxiety disorders in children, an important longitudinal study has recently linked early identified language impairments with later occurring social anxiety symptoms in adolescents (Beitchman et al., 2001). However, the nature of developmental relationships between constructs such as anxiety and language ability and how they manifest in various childhood disorders, affect different stages of development, and whether other moderating variables affect their presentation are still not well understood.

SM may exemplify an important interface between child psychopathology and speech–language disorders. In addition to longitudinal studies such as the one by Beitchman et al. (2001), more detailed cross-sectional investigations are also needed that further explore associations among anxiety, cognition, and language abilities at different points during development. For example, it is not clear how SM influences the course of language development through middle childhood and adolescence, the years during which higher level language skills develop and are critical for academic success. Furthermore, it is not clear whether early appearing anxiety symptoms in young children affect their language development or predispose them toward developing SM symptoms. Other prognostic questions concerning SM are whether language development resumes a normal course as symptoms resolve and whether and how SM in early childhood affects social communication and behavior in later years. More important is the need for cooperative clinical efforts among speech-language pathologists and mental health clinicians such as psychiatrists and psychologists in addressing the communicative and psychiatric issues of children with SM during formulation of clinical and educational interventions. Comprehensive, multidisciplinary analysis of developmental status and needs in children with SM will help to ensure development of more effective approaches to long-term management.

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treatment approach. The ASHA Leader, 7, 4–6.

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