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Abstract: The goal of this study was to develop an empirically derived classification system for selective mutism (SM) using parent-report measures of social anxiety, behavior problems, and communication delays. The sample consisted of parents of 130 children with SM. Results from latent profile analysis supported a 3-class solution made up of an anxious-mildly oppositional group, an anxious-communication delayed group, and an exclusively anxious group. Follow-up tests indicated significant group differences on measures of SM symptom severity, externalizing problems, and expressive/receptive language abilities. These results suggest that although social anxiety is typically a prominent feature of SM, children with the disorder are also likely to present with communication delays and/or mild behavior problems. We propose adding diagnostic specifiers to the current SM criteria or adopting a combined categorical and dimensional classification scheme for DSM-V.



March 31, 2008

Professor Mark R. Dadds
Associate Editor
Journal of Clinical Child and Adolescent Psychology
School of Psychology
University of New South Wales
Sydney NSW 2052

Re: Ms. No. JCCAP-D-07-00213
Refining the Classification of Children with Selective Mutism: A Latent Profile Analysis

Dear Dr. Dadds:

Thank you once again for your attention to our manuscript (JCCAP-D-07-00213). We are delighted to be publishing this article in JCCAP.

We made the following changes based on your review of the revised manuscript:

- (a) Added the names, departments, and institutions for all contributors on page 1.
- (b) Checked to make sure that all references cited in the text are included on the Reference list and all references on the list are cited in the text.
- (c) Added a list of people who may be future readers of JCCAP on page 42.
- (d) Added a paragraph on page 21 addressing Reviewer 1's concerns regarding the puzzling lack of correlations between the CBCL and EBCI in our sample.
- (e) Edited for verb tense and APA style throughout, as requested by Reviewer 2.

We hope these changes will result in an acceptable manuscript. Please do not hesitate to contact me at shcohan@gmail.com or (718) 920-5488 if you require any additional changes.

Sincerely,

Sharon Cohan, Ph.D.
Anxiety & Traumatic Stress Research Program
University of California, San Diego

Running Head: SM CLASSIFICATION

Refining the Classification of Children with Selective Mutism: A Latent Profile Analysis

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Refining the Classification of Children with Selective Mutism: A Latent Profile Analysis

Selective mutism (SM) is a poorly understood childhood condition that affects approximately 1% of the population (Bergman, Piacentini, & McCracken, 2002; Elizur & Perednik, 2003). Children with the disorder usually have no difficulty speaking at home with family members or close friends, but do not speak in school or in unfamiliar social situations like birthday parties. There is a growing consensus among clinicians and researchers that SM is an anxiety-related condition (Schwartz & Shipon-Blum, 2005; Sharp, Sherman, & Gross, 2007). High rates of comorbid social phobia have consistently been reported (Black & Uhde, 1995; Dummit, Klein, Tancer, & Asche, 1997; Vecchio & Kearney, 2005), prompting some researchers to hypothesize that the two conditions represent stages in a developmental progression of behaviorally inhibited temperament (Bergman et al.; Ford, Sladeczek, Carlson, & Kratochwill, 1998). There is also evidence that some children with SM exhibit higher rates of behavioral and speech/language problems relative to children with social phobia alone (Manassis et al., 2003; McInnes, Fung, Manassis, Fiksenbaum, & Tannock, 2004; Yeganeh, Beidel, & Turner, 2006). These findings suggest that although social anxiety is typically a prominent feature of SM, children with the disorder may present with a variety of clinical profiles.

SM and Social Anxiety

Descriptive and case-control studies have consistently found evidence for an association between SM and clinically significant social anxiety. Two early descriptive studies of clinically referred children with SM found that almost all of these children met DSM-III-R diagnostic criteria for social phobia or avoidant disorder of childhood (Black & Uhde, 1995; Dummit et al., 1997). Similarly high rates of social phobia and other comorbid anxiety disorders have been reported in studies utilizing DSM-IV criteria. For example, in a recent controlled study Vecchio

and Kearney (2005) found that their entire sample of children with SM met criteria for DSM-IV social phobia and 53% also met criteria for an additional anxiety disorder. Kristensen (2000) reported a lower rate of social phobia (67%) among 54 children with SM recruited from outpatient psychiatry clinics in Norway. Similar results have been reported in studies using community samples (Bergman et al., 2002; Elizur & Perednik, 2003).

Due to the high rates of comorbidity between the two conditions, some theorists have suggested that SM is actually a more severe variant of social phobia (Black & Uhde, 1992). To investigate this hypothesis, Yeganeh, Beidel, Turner, Pina, and Silverman (2003) compared 23 children with comorbid SM and social phobia to 23 age matched children with social phobia alone. Results indicated that the children with SM were rated as significantly more anxious on structured interview and behavioral observation assessments, but they failed to report higher levels of social anxiety on a self-report instrument or during a behavioral task. Yeganeh and colleagues (2006) confirmed these results in a later follow-up study comparing children with SM to those with social phobia and normal controls. Although the children with SM did not consider themselves to be more socially anxious, clinicians rated them as having higher levels of social anxiety relative to children with social phobia alone. These findings led the authors to conclude that children with SM do not necessarily suffer from a more severe or extreme form of social phobia. In another recent study, Manassis and colleagues (2007) found that children with SM scored higher on a self-report measure of social anxiety symptoms as compared to children with anxiety disorders (generalized anxiety disorder, social phobia, separation anxiety disorder). Children in the SM group scored lower than those with anxiety disorders on a self-report measure of general anxiety symptoms, suggesting a specific link between SM and social anxiety.

SM and Oppositional Behavior

Although elevated rates of behavior problems have been reported in several studies of children with SM, the results in this area are contradictory and inconclusive. In an early treatment study of 20 children meeting criteria for DSM-III-R SM, Krohn, Weckstein, and Wright (1992) found that 90% of the sample was described in case records as controlling, negative, or oppositional in both verbal and non-verbal situations. In contrast, Steinhausen and Juzi (1996) reported that symptoms of oppositional defiant or aggressive behavior disorders were present in only 20% of a sample of referred and non-referred children with SM. Yeganeh and colleagues (2006) found that 29% of children with comorbid SM and social phobia met criteria for oppositional defiant disorder, in comparison to only 5% of children with social phobia alone. No differences were found between these two groups and normal controls on a dimensional parent-report measure of behavior problems. Similarly, Vecchio and Kearney (2005) found no significant differences in parent and teacher ratings of externalizing behavior problems among children with SM, children with anxiety disorders, and normal control children.

Cunningham, McHolm, and Boyle (2006) also failed to find significant differences in scores on a parent report measure of oppositional behaviors when comparing children with what they termed “generalized” SM (child does not speak outside the home), “specific” SM (child does not speak to teachers but may speak to parents/peers outside the home), and normal controls. Mixed results were reported by Kristensen (2001), who found that parent-rated externalizing problems were twice as frequent among children with SM as compared to normal controls, but the majority of children with SM obtained scores that were well below those indicative of borderline or clinically significant behavior problems. The varied results in this area have led some to hypothesize that some adults interpret the avoidance behaviors exhibited by children with SM as controlling or oppositional, when they are actually an expression of

overwhelming social anxiety (Kristensen, 2000; Yeganeh et al., 2003). Some preliminary work in this area suggests that the oppositional behavior reported by parents of children with SM may only occur in speech-related situations (Cunningham et al., 2006). Further study is needed to determine whether the oppositional behavior exhibited by children with SM in situations requiring speech is actually driven by an underlying anxiety process.

SM and Communication Delays

Results from descriptive and case-control studies suggest that between 20% and 50% of children with SM experience developmental language delays. These may take the form of diagnosable communication disorders or more subtle communication delays. Several early descriptive studies found evidence of delayed speech, articulation problems, and other communication disorders in more than 30% of clinically referred children with SM (Krohn et al., 1992; Steinhausen & Juzi, 1996; Wilkins, 1985). A slightly higher rate of developmental language disorders was reported by Kristensen (2000), who found that 50% of clinically referred children with SM met criteria for expressive language disorder, mixed receptive-expressive language disorder, or phonological disorder. Similarly, Andersson and Thomsen (1998) found evidence of articulation problems and developmental speech delays in nearly 50% of clinically referred children with SM, in contrast to only 27% of psychiatric controls.

In the first of a series of studies comparing communication problems among children with SM and those with social phobia, Manassis and colleagues (2003) found that children with SM exhibited greater impairments on assessments measuring discrimination of speech sounds and receptive vocabulary skills. Although rates of diagnosed communication disorders were not reported, nearly 43% of the children with SM scored in the clinical range on at least one speech/language measure, whereas none of the children in the social phobia group scored in the

clinical range. Results from a small follow-up study indicated that the children with SM also produced shorter, linguistically simpler, and less detailed narratives when retelling stories to a parent (McInnes et al., 2004). The authors concluded that mild expressive language deficits might be common among children with SM, even when parents describe their children as having normal speech abilities. In a larger controlled study comparing children with SM, children with anxiety disorders, and normal controls, Manassis and colleagues (2007) found that children with SM showed deficits on standardized assessments of receptive vocabulary, phonemic awareness, receptive grammar, and visual memory. These results are consistent with reports that some children with language disorders have a developmental deficit in the processing of auditory and visual information (Tallal, Miller, & Fitch, 1993), but more research is needed to determine whether sensory processing delays are a causal factor in the communication delays found in children with SM.

Refinement of SM Classification

A number of research and clinical issues have led taxonomy experts to advocate for the use of clinical subtypes or diagnostic specifiers, particularly for disorders such as SM that are characterized by a great deal of heterogeneity. The benefits of a more refined taxonomy include differentiating individuals based on shared etiology, delineating different developmental pathways, enhancing communication between clinicians and researchers, and matching individuals to the most appropriate treatments (DiStefano & Kamphaus, 2006; Meyers, McDermott, Webb, & Hagan, 2006; Robins & Guze, 1970). According to the authors of DSM-IV, diagnostic specifiers “provide an opportunity to define a more homogeneous subgrouping of individuals with the disorder who share certain features” (American Psychiatric Association, 2000, p. 1). Despite the fact that such specifiers have been used to address the

heterogeneity found in other DSM-IV diagnostic categories (e.g., major depressive disorder, social phobia), no equivalent classification system has been adopted for SM. The SM literature has repeatedly shown that social anxiety, oppositional behavior, and developmental language delays are associated with the disorder. Therefore, a primary goal of this study was to use psychometrically sound parent report measures of social anxiety, behavior problems, and language delays to inform a more refined taxonomy of SM. Although there may be additional factors that are equally important in the development and maintenance of SM (e.g., sensory processing difficulties, bilingualism), we only included those constructs where there was ample data to take an empirically-informed approach to SM classification. Secondary goals of this study were 1) to explore between-group differences on measures of psychosocial impairment and SM symptom severity, and 2) to evaluate the concurrent validity of the groups by comparing scores on additional measures of internalizing/externalizing behaviors, anxiety, oppositionality, and expressive/receptive communication abilities.

Study Hypotheses

Classification hypotheses. We hypothesized that latent profile analysis of parent report measures would reveal three groups: 1) an exclusively anxious group in which social anxiety was the most prominent feature, 2) an anxious-oppositional group, in which both anxiety and low level behavior problems were prominent, and 3) an anxious-communication delayed group, in which both anxiety and developmental language delays were prominent.

Psychosocial impairment/symptom severity hypotheses. Since the groups hypothesized in the present study have not been directly compared in the past, these analyses were largely exploratory. Based on results from one prior study that found children with comorbid SM and communication disorders exhibited greater emotional stability and higher sociability (Kristensen

& Torgersen, 2002), we hypothesized that 1) children in the anxious-communication delayed group would show the lowest level of psychosocial impairment, 2) children in the exclusively anxious group would show a moderate degree of psychosocial impairment, and 3) children in the anxious-oppositional group would be the most severely impaired. A similar pattern of results was hypothesized with regard to SM symptom severity.

Concurrent validity hypotheses. Elevated rates of internalizing problems have consistently been found in studies of children with SM (Elizur & Perednik, 2003; Kristensen, 2001; Steinhausen & Juzi, 1996), whereas results for externalizing symptoms may depend on the comparison group used (Kristensen, 2001; Yeganeh et al., 2003). Based on this literature and clinical experience, we hypothesized that higher levels of externalizing problems and oppositional behavior problems would be found for children in the anxious-oppositional group, and higher levels of internalizing problems and anxiety problems would be found for children in the exclusively anxious group. To our knowledge, there have been no studies comparing rates of receptive and expressive language deficits in children with SM with different clinical profiles. Based on clinical experience, we hypothesized that those in the exclusively anxious and anxious-oppositional groups would not show evidence of clinically significant speech and language delays, whereas children in the anxious-communication delayed group would show evidence of greater impairment in each of these areas.

Method

Participants and Procedures

This study was completed in collaboration with the Selective Mutism Group~Child Anxiety Network (SMG~CAN), a non-profit advocacy group that organizes national conferences and maintains a popular informational web site. Participants were recruited through

advertisements in SMG~CAN's electronic newsletter and through presentations at conferences hosted by the SMart Center, a treatment and research center headed by the founder of SMG~CAN. Children were eligible for the study if they were between the ages of 5 and 12 years, they met all DSM-IV diagnostic criteria for SM, and their parents had sufficient command of the English language to complete the parent-report questionnaires. Exclusion criteria were a history of previously diagnosed communication disorders or pervasive developmental disorders that could better account for the child's mutism. Interested participants (i.e., parents) were asked to provide informed, written consent prior to initiating study procedures. Parents then completed a brief telephone screen to confirm each child's SM diagnosis using a module from a semi-structured interview for child anxiety disorders and a parent report measure of SM symptom severity. Parents were also asked additional screening questions drawn from the structured interview to assess their child's history of psychosis, anxiety disorders, communication disorders, and pervasive developmental disorder/delay. All respondents were considered to be primary caregivers for the index child.

Based on the screening interview, 13 children with a history of psychosis and/or a communication or pervasive developmental disorder were excluded. In each of these cases, the investigators agreed that comorbid or pre-existing conditions better accounted for the child's mutism. The final sample for these analyses included 130 children with SM (See Table 1 for sample demographics). The excluded children were similar to those included in terms of age ($M = 7.69$ years, $SD = 1.98$, range = 5 – 12 years), ethnicity (84.6% Caucasian), and parental education (58.3% college graduates). Following the initial telephone screen, parents of eligible participants were mailed questionnaires about their child's level of social anxiety, behavior problems, communication delays, SM-related functional impairment, expressive/receptive

language, and internalizing/externalizing symptoms. Parents completed the questionnaires and mailed them back to the investigators in a self-addressed, postage-paid envelope. After all questionnaire measures were received, parents were mailed a thank you letter and a \$25 gift certificate to a major national retailer. The institutional review boards at San Diego State University and the University of California, San Diego approved all study procedures.

Measures

SM diagnosis. Diagnosis of SM was established using a module from the parent report version of the Anxiety Disorders Interview Schedule for Children, (ADIS-IV; Albano & Silverman, 1996), a semi-structured interview designed specifically to evaluate DSM-IV child anxiety disorders. Parents rate their child's level of impairment for each disorder on a 9 point Likert scale (0-8), with a score of 4 or greater indicating a clinically significant problem. The ADIS-IV has demonstrated excellent inter-rater reliability (kappas = .65 – 1.0) and good test-retest reliability ($r = .42 - 1.0$; Albano & Silverman; Kendall, 1994; Silverman, Saavedra, & Pina, 2001). The ADIS-IV has also shown good construct validity in child and adolescent samples and is considered by many to be the “gold standard” clinical interview for child anxiety (Langley, Bergman, & Piacentini, 2002).

SM symptom severity. The Selective Mutism Questionnaire (SMQ; Bergman, Keller, Wood, Piacentini, & McCracken, 2001) was also used to gain further information regarding SM symptom severity. The SMQ is a 36-item parent report measure designed to assess severity of SM in children 3 to 11 years of age. Parents use a 4-point scale to rate the frequency of the child's speaking behavior in certain settings (i.e., school, home/with family, public settings). Total scores on the SMQ correlate highly with overall interference ratings and the measure has shown satisfactory internal consistency ($\alpha = .74$, Bergman et al.). Internal consistency for the

SMQ total score was also high in the present sample ($\alpha = .83$).

Social anxiety. The parent version of the Social Anxiety Scale for Children (SASC-R; La Greca, 1999) is a 22-item parent-report instrument designed to assess social anxiety symptoms. The SASC-R is made up of a total score and three subscales which have demonstrated good internal consistency in samples of anxiety-disordered children ($\alpha = .60 - .90$; Epkins, 2002). Clinical cutoffs derived from community samples of children indicate that total scores of greater than or equal to 54 for girls and greater than or equal to 50 for boys differentiate highly socially anxious children (La Greca). To reduce the number of indicator variables included in our analyses, we relied on the SASC-R total score. Internal consistency for the total score was good in our sample ($\alpha = .90$).

Behavior problems. The Eyberg Child Behavior Inventory (ECBI; Eyberg & Pincus, 1999) is a 36-item parent rating scale for use with children between the ages of 2 and 16 years. Parents use the Intensity scale to rate how often a variety of externalizing/conduct problems occur, and a yes/no Problem scale is also included in the measure. Excellent internal consistency coefficients have been reported for both subscales ($\alpha = .93 - .95$) in a variety of demographic groups (Eyberg & Robinson, 1983). Mean raw scores on the ECBI intensity scale in the re-standardization sample ranged from 36 to 232 ($M = 96.6$, $SD = 35.2$). The ECBI has been found to discriminate between conduct disordered and normal adolescents, with scores of 131 (t -score of 60) or greater on the Intensity scale indicating clinically significant behavior problems (Eyberg & Pincus). To increase statistical power, we chose to use the Intensity Scale for the present study. Internal consistency was excellent in our sample ($\alpha = .94$).

Developmental language delays. The Children's Communication Checklist (CCC-2; Bishop, 2003) is a 70-item parent or teacher report checklist designed to assess linguistic and

pragmatic aspects of communication in children aged 4 to 17 years. Scores from parent reports on the CCC-2 can discriminate children with communication disorders from typically developing children (Norbury, Nash, Baird, & Bishop, 2004). The measure has shown good internal consistency ($\alpha = .66 - .80$; Bishop, 2003) and inter-rater reliability ($r = .79$; Norbury et al.). Scaled score values of less than or equal to 3 and 5 identify children scoring in the 3rd percentile and 10th percentile, respectively (Bishop). Following the approach used by Mannasis and colleagues (2003), we used only the CCC-2 Speech and Syntax subscales. Internal consistency for these subscales was acceptable in our sample ($\alpha = .68 - .91$).

Psychosocial impairment. The Child Anxiety Impact Scale - Parent Version (CAIS-P; Langley, Bergman, McCracken, & Piacentini, 2004) is a 34-item parent report questionnaire designed to assess the extent to which a child's anxiety interferes in a variety of domains of functioning. For this study parents were asked to "rate how much selective mutism (not talking in certain situations) has caused problems for your child in the following areas over the past month." The CAIS-P yields subscale scores for three domains that are summed to yield a total impact score. The measure has shown good internal consistency ($\alpha = .73 - .87$; Langley et al.). We chose to examine the CAIS-P total score as an index of overall SM-related functional impairment. Excellent internal consistency was found for the CAIS-P total score in our sample ($\alpha = .92$).

Internalizing and externalizing symptoms. The Child Behavior Checklist for Ages 1½ - 5 (CBCL; Achenbach & Rescorla, 2000) and the Child Behavior Checklist for Ages 6 - 18 (CBCL; Achenbach & Rescorla, 2001) are parent report behavior inventories that include a broad range of both internalizing and externalizing symptoms. Both instruments yield normalized *t*-scores for two broadband dimensions (internalizing and externalizing symptoms)

and for several DSM-oriented scales. The CBCL has shown satisfactory internal consistency and 15-day test–retest reliability, with *t*-scores above 70 typically indicating clinically significant problems (Achenbach & Rescorla, 2000; 2001). We chose to examine the scores on the two broadband dimensions in addition to the Anxiety Problems and Oppositional Defiant Problems subscales. Internal consistency was excellent for the broadband Internalizing Problems and Externalizing Problems dimensions ($\alpha = .92$ - $.95$) and acceptable for the Anxiety Problems and Oppositional Defiant Problems subscales in our sample ($\alpha = .76$ -. $.80$).

Expressive and receptive language abilities. Data on expressive and receptive language abilities were collected using the Vineland-II Adaptive Behavior Scales – Parent/Caregiver Rating Form (VABS–II; Sparrow, Cicchetti, & Balla, 2005). The VABS–II is a parent report inventory that assesses adaptive behavior across several domains of functioning. We chose to examine scores on the VABS-II Expressive and Receptive Communication subdomains, as these are the areas in which children with SM often show delays. Subdomain scores of 1 to 9 indicate a low level of performance, scores of 10 to 12 indicate below average performance, scores of 13 to 17 indicate average performance, scores of 18 to 20 indicate above average performance, and scores above 21 indicate a high level of performance. Internal consistency in the present sample was good for the Expressive Communication ($\alpha = .84$) and Receptive Communication ($\alpha = .84$) subdomains.

Statistical Analyses

Classification analyses. Latent profile analysis (Bartholomew, 1987) was used to identify classes of SM children with similar combinations of variables related to social anxiety (SASC-R Total Score), behavior problems (ECBI Intensity Scale), and linguistic maturity (CCC-2 Speech & CCC-2 Syntax Subscales). Latent profile analysis is a model-based statistical method for

identifying unmeasured class membership among subjects using continuous indicator variables. This approach has several advantages over standard cluster-analytic procedures, including the use of less arbitrary criteria for choosing classes and the use of more formal fit statistics to decide on the appropriate number of classes (Vermunt & Magidson, 2002). There are also relatively few assumptions in this technique (e.g., no need for normal distributions, modest correlations among indicators). Although three subtypes were hypothesized, we compared models specifying 2, 3, and 4-classes in Mplus (Muthén & Muthén, 2004) to determine the best fitting model for our data.

Psychosocial impairment/symptom severity and concurrent validity analyses.

Group means were examined using the one-way ANOVA procedure in SPSS (SPSS Inc, 2003) to determine if the groups derived from latent profile analysis demonstrated meaningful differences in psychosocial impairment (CAIS-P total score), SM symptom severity (SMQ total score), internalizing/externalizing symptoms (CBCL Internalizing Problems *t*-score, CBCL Externalizing Problems *t*-score, CBCL Anxiety Problems *t*-score, CBCL Oppositional Defiant Problems *t*-score), and expressive/receptive communication abilities (VABS-II Expressive Communication subdomain score, VABS-II Receptive Communication subdomain score). We computed Tukey-adjusted follow up tests of all pairwise comparisons to further assess between-group differences.

Results

Descriptive Statistics

Prior to conducting multivariate analyses, demographic and indicator variables were screened in SPSS for accuracy of data entry, normality, and missing values. All four indicators were normally distributed. Correlations among the indicator variables were generally low and

not statistically significant with the exception of the two CCC-2 subscales. Table 2 presents bivariate correlations for all dependent measures.

Examination of total sample means indicated that the children in this study scored in the clinically significant range for social anxiety (SASC-R $M = 60.80$, $SD = 12.37$) and for syntax problems (CCC-2 Syntax $M = 4.80$, $SD = 3.02$). Children in our sample scored below the cutoff for clinically significant behavior problems (ECBI Intensity $M = 107.17$, $SD = 33.12$, $t = 53$). Further analyses showed no significant differences in mean scores for social anxiety, behavior problems, speech, or syntax based on age or ethnicity. Significant gender differences were found for our measures of speech ($F = 4.27$, partial $\eta^2 = .032$, $p < .05$) and syntax ($F = 4.68$, partial $\eta^2 = .035$, $p < .05$). Boys performed slightly better than did girls with regard to both speech ($M_{Boys} = 9.45$, $M_{Girls} = 8.15$, Cohen's $d = .38$, $p < .05$) and syntax ($M_{Boys} = 5.59$, $M_{Girls} = 4.40$, Cohen's $d = .41$, $p < .05$). Table 3 presents means and standard deviations for all dependent measures.

Classification Results

Multiple statistical indices were calculated in Mplus in order to determine the best fitting model for our data. The Lo-Mendell-Rubin (LMR) adjusted likelihood ratio test was used to evaluate the extent to which the specified model fit better than a model with one less class. Akaike Information Criterion (AIC; Akaike, 1987), Bayesian Information Criterion (BIC; Schwarz, 1978), and Sample-size Adjusted Bayesian Information Criterion (SABIC; Sclove, 1987) values were examined to determine goodness-of-fit (lower values indicate improved fit). Entropy values and mean posterior probabilities for each group were also used as measures of classification accuracy (higher probability values for each group indicate better classification and stronger separation). Selection of the best fitting model is typically based on the smallest of AIC, BIC, or sample-size adjusted BIC, higher entropy values, a significant LMR test, and mean

posterior probabilities closer to 1.0 for each class. Substantive interpretation is also used to guide model selection (Muthén, 2004). Results from recent Monte Carlo studies suggest that BIC is most likely to identify the correct number of latent classes when testing simple models with small sample size ($n < 200$; Nylund, Asparouhov, & Muthén, 2007). Therefore, we relied more heavily on BIC to determine the number of groups in our final model. Tables 4 and 5 present fit statistics and mean posterior probabilities for the 2, 3, and 4-class models.

A significant LRM test indicated that the 2-class model was an improvement over a model specifying only one class. The sample was divided into two roughly equal groups and classification accuracy was high. Although the 2-class model provided some improvement in model fit, lower values for all three fit indices, a statistically significant LMR test, and a higher entropy value indicated that the 3-class model fit our data better than did the 2-class model. The sample was divided into two larger and one smaller group in the 3-class model. Mean posterior probabilities of .90 or greater for each class also indicated that this model performed well in terms of classification accuracy.

In contrast, results for the 4-class model were equivocal. The sample was divided into two smaller and two larger groups. This model appeared to fit better than the 3-class model with regard to lower AIC and SABIC values. BIC was higher for the 4-class model and the LMR test was no longer statistically significant, suggesting that the addition of a fourth class did not provide better fit relative to the 3-class model. Moreover, prediction of class membership and classification accuracy did not improve in the 4-class model. The entropy value was identical to that found in the 3-class model, and mean posterior probabilities were somewhat lower for Classes 2 and 4. Taken together, these statistics suggest that the 3-class model provided the best fit for our data. This model was selected for closer examination and was used for all follow-up

analyses.

In the 3-class model, Class 1 made up 44.6% of the total sample and was characterized by clinically significant scores for social anxiety and borderline clinical scores for behavior problems and syntax. This group was labeled the *anxious-mildly oppositional* group. Class 2 represented 43.1% of the sample and was characterized by clinically significant scores for social anxiety and for syntax, in addition to borderline clinical scores for speech. This group was labeled the *anxious-communication delayed* group. Class 3 represented 12.3% of the sample and was characterized by clinically significant scores for social anxiety. This group was labeled the *exclusively anxious* group. Figure 1 presents conditional response means for each of the indicator variables in the 3-class model.

Functional Impairment and Symptom Severity Results

The one-way ANOVA and Tukey-adjusted pairwise comparison procedures were used in SPSS to evaluate group differences in SM symptom severity and functional impairment. Results indicated no significant differences in SM-related functional impairment, but significant differences were found for SM symptom severity ($F_{2,126} = 3.219$, partial $\eta^2 = .049$, $p < .05$). Pairwise comparisons revealed that the anxious-communication delayed group (Class 2) reported significantly higher SM symptom severity relative to the exclusively anxious group (Class 3) (Cohen's $d = .72$, $p < .05$). Table 3 shows conditional response means for each group on the severity and impairment measures.

Concurrent Validity Results

One-way ANOVAs and Tukey-adjusted pairwise comparisons were also computed to assess group differences in internalizing/externalizing symptoms, anxiety-related problems, oppositional-defiant problems, and expressive/receptive language abilities. Results indicated that

the only significant difference on the CBCL was for the Externalizing Problems dimension ($F_{2,129} = 3.34$, partial $\eta^2 = .052$, $p < .05$). Pairwise comparisons revealed that the anxious-communication delayed group (Class 2) scored significantly higher than did the exclusively anxious group (Cohen's $d = .78$, $p < .05$). The exclusively anxious group (Class 3) also scored lower than the other two groups with regard to Anxiety Problems, but this result was not statistically significant, likely due to the small size of our sample ($F_{2,122} = 2.76$, partial $\eta^2 = .043$, $p = .07$).

Statistically significant between-group differences were found with respect to Expressive Communication ($F_{2,129} = 11.95$, partial $\eta^2 = .158$, $p < .05$) and Receptive Communication ($F_{2,129} = 16.49$, partial $\eta^2 = .206$, $p < .05$). Pairwise comparisons indicated that children in the anxious-mildly oppositional group (Class 1) showed better expressive language abilities as compared to those in the anxious-communication delayed group (Class 2) (Cohen's $d = .90$, $p < .05$). This same pattern of results was found for receptive language abilities (Cohen's $d = 1.00$, $p < .05$). Children in the exclusively anxious group (Class 3) also showed better receptive language abilities relative to those in the anxious-communication delayed group (Class 2) (Cohen's $d = 1.05$, $p < .05$). Table 3 presents conditional response means for all concurrent validity measures.

Discussion

This study was undertaken to refine the classification of children with SM based on empirically derived clinical profiles. Consistent with previous research, all of the children in this study showed clinically significant elevations on a measure of social anxiety, with varying levels of communication delays and mild behavior problems evident across groups. Results from latent profile analysis comparing 2, 3, and 4-class models generally supported a 3-class solution made up of anxious-mildly oppositional, anxious-communication delayed, and exclusively anxious

groups. This model was similar to our hypothesized 3-class model, although the anxious-mildly oppositional group did not show clinically significant levels of behavior problems. This finding is important because it contradicts early studies that described children with SM as controlling and oppositional across settings (e.g., Krohn et al., 1992). More recent work suggests that the oppositionality shown by children with SM is often only present in speech-related situations. It is possible that these children only appear oppositional when in situations of heightened anxiety, such as being pressured to speak in public.

SM and Social Anxiety

A great deal of previous research has linked SM to shyness, social anxiety, and the clinical syndrome of social phobia. This is perhaps the most consistent finding in the last 20 years of SM research. Therefore, we expected a large percentage of our sample to present with clinically significant levels of social anxiety. Consistent with previous studies that found social anxiety to be a nearly universal characteristic of SM children (e.g., Black & Uhde, 1995; Dummit et al., 1997; Kristensen, 2000; Sharp et al., 2007; Vecchio & Kearney 2005), mean scores on a standardized measure of social anxiety were indicative of clinically significant social anxiety for our total sample. In support of our hypotheses, clinically significant social anxiety was also evident in each of the SM subtypes in the 3-class model. These results are in line with the existing literature that supports the notion that social anxiety is an important pathway to the development of SM (Cohan, Price, & Stein, 2006).

Although social anxiety was characteristic of all three groups, we were surprised to find that the exclusively anxious group represented the smallest subgroup of SM children in the present study. Children in this group also showed the lowest levels of SM symptom severity and anxiety-related problems. It is possible that these results simply reflect the fact that exclusively

anxious children have a less complicated clinical presentation relative to the other two groups. This finding may have important clinical implications since the majority of cognitive-behavioral interventions for SM were designed based on anxiety management treatments for social phobia (e.g., Fung, Manassis, Kenny, & Fiskensbaum, 2002). The anxiety management approach to SM treatment is likely to be the most effective for children classified as exclusively anxious, but this group may actually be the smallest segment of treatment-seeking children with SM. Alternative treatment approaches may be needed for children with more severe and complicated clinical profiles.

SM and Behavior Problems

Our results were generally consistent with previous studies reporting that clinically significant behavior problems are present in only a small minority of children with SM (Black & Uhde, 1995; Dummit et al., 1997; Steinhausen & Juzi, 1996; Yeganeh et al., 2006). Sub-clinical levels of oppositional behavior were found in the 3-class model, and these results are consistent with controlled studies finding elevated, but not clinically significant, behavior problems in a small number of children with SM relative to comparison groups of socially phobic (Yeganeh et al., 2003) and normal children (Kristensen, 2001). The extent to which parent-rated oppositional behavior reported in the present and previous studies represents a causal factor in the development of SM, rather than a behavioral expression of fear or anxiety, remains unclear.

Results from the present study did not support the existence of a separate group of children with SM with behavior problems in the absence of social anxiety. Indeed, we found that all of the children with SM with elevated scores on the behavior problems measure were also characterized by high levels of social anxiety. Similar results were reported by Kristensen (2001) who found no evidence of children with SM with significant externalizing behavior problems in

the absence of internalizing behavior problems.

Of note, we found no significant bivariate correlations between the ECBI and the CBCL Externalizing Problems and ODD Problems scales in our sample. These results were surprising, given that high positive correlations have been found for the ECBI and CBCL Externalizing scale in other samples (e.g., $r = .75$; Eyberg & Pincus, 1999). Post-hoc inspection of our data indicated that the ECBI items most frequently endorsed by parents of SM children were: “Dawdles in getting dressed,” “Gets angry when doesn’t get own way,” “Verbally fights with sisters and brothers,” “Slow in getting ready for bed,” and “Refuses to eat food presented.” These types of behaviors are more likely to be observed in the home setting, and they may reflect the child’s need to assert some control over his or her environment. In contrast, the items least likely to be endorsed by SM parents were: “Physically fights with friends own age,” “Steals,” “Verbally fights with friends own age,” “Destroys toys and other objects,” “Teases or provokes other children,” “Hits parents,” and “Lies.” These behaviors are similar to the kinds of aggressive or rule-breaking behaviors that are captured on the CBCL Externalizing and ODD Problems scales. The low levels of these behaviors in our sample may help to explain the lack of significant correlations between the ECBI and CBCL. These results also provide preliminary support for the idea that the types of behavior problems exhibited by children with SM differ substantially from those exhibited by exclusively oppositional or conduct disordered youth.

In our clinical experience, these types of behavior problems are often reported by well-meaning parents who interpret their child’s mutism as stubborn or controlling in nature, and therefore place pressure on the child to speak. These children appear oppositional because they refuse to participate in situations in which they are not comfortable, but as the pressure to speak is reduced and their anxiety diminishes, they often show improvements in both severity of SM

and frequency of behavior problems. This hypothesis is consistent with research showing that controlling or critical parenting results in fearfulness and social withdrawal, particularly among children with behaviorally inhibited temperament (Mills & Rubin, 1998; Rubin, Burgess, & Hastings, 2002). No studies to date have examined the role of parent-child interaction patterns in SM families and additional research is specifically needed to elucidate the relationship between parenting variables and the development or maintenance of the types of oppositional behavior reported by parents of children with SM.

SM and Communication Delays

Also consistent with recent SM research, many of the children in our sample showed evidence of some speech/language delays in addition to clinically significant social anxiety. In support of our hypotheses, concurrent validity analyses indicated that the anxious-communication delayed group scored worse on measures of expressive and receptive communication relative to the other two groups. Children classified as anxious-communication delayed scored in the below-average range on a measure of expressive communication and in the average range on a measure of receptive communication. These results are in line with previous research showing clinically significant deficits in expressive communication in a subset of children with SM (Kristensen, 2000; McInnes et al., 2004; Steinhausen & Juzi, 1996).

Contrary to our hypotheses, children in the anxious-communication delayed group scored higher than those in the exclusively anxious group on measures of SM symptom severity and externalizing problems, possibly indicating that this group was the most severely impaired. These results are inconsistent with previous reports that children with comorbid SM and communication disorders were better adjusted than were children with SM alone (Kristensen & Torgersen, 2002). More research is needed to determine whether children with more complex

clinical presentations exhibit greater degrees of impairment relative to children with SM who do not show evidence of communication delays.

It is important to note that the developmental language delays found in this study are not necessarily of sufficient severity to warrant a DSM-IV diagnosis of either expressive or mixed receptive-expressive language disorder. Parents may misinterpret expressive language problems that children with SM exhibit in anxiety provoking social situations where there is an expectation for speech. Therefore, comorbid speech/language disorders should only be diagnosed if the SM child also shows these deficits when tested in a setting in which he or she is not highly anxious. A creative approach may be needed in order to assess linguistic maturity in the settings (e.g., home) or modalities (e.g., non-verbal) that allow these children to express themselves comfortably. The complex relationship between SM, social anxiety, and developmental language delays is still poorly understood, and our results suggest that more work in this area is needed.

Limitations

The results of the present study should be considered in light of a number of limitations. First, due to the low prevalence of SM in the general population and the need for a large sample, participants were recruited from an SM advocacy organization website and at national conferences hosted by an SM treatment center. It is possible that as a group these children exhibit a more severe or persistent form of SM, leading their parents to seek additional information and support. In addition, the majority of the sample was Caucasian, from two-parent, college-educated, and monolingual households. This is an important limitation given recent suggestions that immigration status and/or bilingualism play a role in at least some cases of SM (Elizur & Perednik, 2003; Toppelberg, Tabors, Coggins, Lum, & Burger, 2005). Future studies are clearly needed to replicate these results in diverse community or epidemiologic samples.

A second limitation is our reliance on telephone screening interviews to confirm SM diagnosis. In-person clinician administered structured interviews, behavioral observations, and speech/language assessments are the gold standard for diagnostic assessment, but we were limited in this regard by the wide geographic distribution of our sample. Still, the majority (92%) of children had a pre-existing SM diagnosis at the time of entry into the study. We also took a conservative approach to screening to compensate for the lack of face-to-face clinical assessments. All questionable screening interviews were reviewed for consensus by the lead author, a licensed clinical psychologist, and a board-certified psychiatrist. Children whose diagnostic status was unclear were not included in the study. This approach was taken to ensure a sample with a primary diagnosis of SM, and children those whose parents reported symptoms consistent with pervasive developmental or communication disorders that could in any way have caused the mutism were excluded.

A third methodological limitation has to do with our use of parent-report measures of child behavior in the absence of corroborating data. Due in part to the young age and variable reading level of the children studied, we chose to rely on parent-report measures. Although there is some possibility that child, teacher, or clinician reports would have yielded different results, we felt that because parents typically observe their children in a wider variety of speaking and non-speaking situations they were in the best position to report on each of the behaviors assessed. Indeed, research suggests that parents of children with SM are more likely than teachers to report oppositional behaviors possibly due to lessened anxiety in the home setting (Kristensen, 2001). There is a chance that some of the parents in this study misinterpreted anxious avoidance as oppositional in nature, causing them to over-report the extent of their children's behavior problems. Similarly, some parents could have over-estimated the severity of

developmental language delays by focusing on expressive language deficits that occurred solely when the child was in an anxiety-provoking social setting. Our results indicate that parents of children in the anxious-communication delayed group viewed their children's mutism as more severe, and it is possible that this group simply reflects a subset of children with SM who have the most difficulty speaking in public, rather than a group with clinically diagnosable communication disorders. Future studies would do well to include additional data from child, teacher, and clinician perspectives when constructing clinical profiles of children with SM.

A final study limitation relates to the size of our sample. Although a sample of 130 children is relatively large compared to the samples in the majority of SM research studies, this is still quite small by the standards of most multivariate statistical procedures. We attempted to address this problem by testing very simple models with a small number of indicator variables. According to sample size guidelines for similar multivariate techniques (Tabachnick & Fidell, 2000), approximately 150 participants would have been needed to sufficiently power this study. Post-hoc power analysis for pairwise comparisons indicated that we had sufficient power to detect large effect sizes and moderate power to detect medium effect sizes.

Implications for Research, Policy, and Practice

In their seminal paper on psychiatric diagnosis, Robins and Guze (1970) concluded that the process of establishing diagnostic validity is “one of continuing self-rectification and increasing refinement leading to more homogeneous diagnostic grouping. Such homogeneous diagnostic grouping provides the soundest base for studies of etiology, pathogenesis, and treatment. The roles of heredity, family interactions, intelligence, education, and sociological factors are most simply, directly, and reliably studied when the group studied is as homogeneous as possible (p. 108).” The present study represents an initial step in developing a more refined

taxonomy for SM and, as such, has the potential to impact research directions, clinical care, and treatment outcomes for children with the disorder.

Contrary to what might be expected based on the literature linking SM and social phobia, exclusively anxious children represented the smallest and group in the present study, with the majority of children classified into the combined anxious-mildly oppositional or anxious-communication delayed groups. This finding suggests although clinically significant social anxiety plays a role in the majority of cases, other factors are also important in understanding children with SM. Several authors have argued that SM would be best classified as an anxiety disorder rather than as a disorder usually first diagnosed in infancy, childhood, or adolescence (e.g., Sharp et al., 2007), however this change could obscure important differences in the clinical profiles of affected children.

If SM is re-classified as an anxiety disorder, a potential solution to this problem would be the addition of specifiers based on the groups identified in the present study. In contrast to *subtypes*, which DSM-IV-TR (American Psychiatric Association, 2000) defines as mutually exclusive and jointly exhaustive subgroups within a diagnostic category, diagnostic *specifiers* are not intended to be mutually exclusive or jointly exhaustive. This approach appears to be the most appropriate for refining the current DSM-IV taxonomy, since it is possible for a given child with SM to exhibit some degree of social anxiety, communication deficits, and/or low-level oppositional behaviors. Diagnostic specifiers have already been adopted for other disorders (e.g., generalized vs. non-generalized social phobia) and a similar approach could easily be applied to SM. For example, a child with SM who showed significant social anxiety in addition to communication delays would be diagnosed with “Selective Mutism, with social anxiety and communication delays,” whereas an exclusively anxious child with SM would be diagnosed with

“Selective Mutism, with social anxiety.” Specifiers such as these would provide clinicians with a more nuanced view of each child’s clinical profile, while simultaneously providing a useful taxonomy for researchers seeking to investigate causal factors in the development and maintenance of SM.

Although there are several potential advantages to including specifiers in future revisions of the diagnostic criteria for SM, the results presented here could also be viewed as supporting a combined categorical and dimensional classification scheme. Several researchers have suggested that exclusively categorical taxonomies such as DSM-IV are insufficient to capture the true nature of psychiatric disorder. Instead, a system integrating categorical and dimensional approaches may better reflect the needs of researchers and clinicians alike (Kraemer, 2007). A combined classification scheme has already been proposed for the anxiety disorders (Shear, Bjelland, Beesdo, Gloster, & Wittchen, 2007), and the results from the present study suggest that such a system would also be ideal to capture the difficulties experienced by children with SM. For example, children meeting the current diagnostic criteria for SM (categorical diagnosis) could also be rated with regard to the severity of social anxiety, behavior problems, and communication delays that they exhibited (dimensional diagnosis). This type of combined system would still allow researchers to examine etiological differences and it would also provide more detailed information to clinicians seeking to match SM children to the most appropriate interventions. Which type of classification scheme is ultimately adopted for DSM-V remains to be seen; either a combined approach or a categorical system informed by diagnostic specifiers would provide a more useful and refined taxonomy for SM.

Taxonomies based on clinical profiles have been useful for researchers examining risk factors for other DSM-IV disorders such as social phobia (Stein, 2006), and such classification

schemes may help to differentiate individuals based on etiology. There is already some evidence to suggest that certain familial, biological and environmental factors are differentially associated with specific SM profiles. For example, existing family history data indicate high rates of anxiety and communication problems in the relatives of children with SM (Andersson & Thomsen, 1998; Kristensen & Torgersen, 2001; Steinhausen & Adamek, 1997). Separate investigations into the etiologies of social anxiety and developmental language delays (Tilfors, 2004; Smith, 2007) suggest that these are also heritable conditions. Taken together, these findings suggest that there may be distinct familial or genetic risk factors for children with SM classified into the exclusively anxious and anxious-communication delayed groups.

In addition, a more refined SM taxonomy would be useful for researchers attempting to elucidate the social or environmental factors that contribute to the development the disorder. For example, parent-child interaction patterns may play an important role in the development or maintenance of SM for children in the anxious-mildly oppositional group. Studies examining the nature of parent-child interactions would be useful to gain a better understanding of the ways in which these socio-environmental factors are involved in the development of SM. Although not a focus of the present study (due in part to our limited sampling frame), socio-cultural factors such as immigration, bilingualism, and acculturation are also important areas for future research.

The findings from the present study also have important treatment implications. Research indicates that multidisciplinary interventions based on the child's presenting problems are among the most successful treatments for children with SM (Cohan, Chavira, & Stein, 2006). Some clinicians have suggested adding different components to standard cognitive-behavioral interventions in order to tailor treatment to more complicated clinical presentations. The adoption of a more refined taxonomy based on clinical profiles may help clinicians to match

children with SM to more appropriate individualized treatments. For example, preliminary evidence suggests that children with SM who have behavior problems do not initially respond as well to cognitive behavioral treatments as do children with a predominantly anxious presentation (Bergman & Keller, 2007). Children who present with oppositional behavior in addition to SM may respond better to interventions that focus on parent management training in addition to managing social anxiety symptoms. For children in the anxious-communication delayed group, interventions that focus on improving expressive language skills may also be needed to augment the standard behavioral and anxiety management approaches to treatment (Mendlowitz, 2007).

The relationships between SM, social anxiety, behavior problems, and communication deficits are complex, and the SM clinical profiles identified in the present study are intended as a starting point for researchers and clinicians to communicate regarding the disorder and its associated features. Although more work is needed to replicate and extend the results found here, we are hopeful that an empirically-informed classification system for SM will eventually be adopted. Such a system would allow researchers to more effectively examine differences in etiology, pathophysiology, course, and outcome, while simultaneously providing information to clinicians seeking to match children with SM to the most appropriate interventions for their individual clinical profile.

Table 1

Sample demographics

Demographic Variable	Descriptive Statistic	
	<i>M</i>	<i>SD</i>
Age		
Range = 5-12 years	6.98	1.98
	<i>n</i>	%
Gender		
Male	44	33.8
Female	86	66.2
Racial/Ethnic Background		
Asian	4	3.1
Caucasian	105	80.8
Hispanic/Latino	5	3.8
Mixed race	14	10.8
Other	2	1.5
Primary language spoken at home		
English	128	98.5
Other	2	1.5
Parental education		
High school graduate	7	5.4
Some college or technical training	25	19.2
College graduate	66	50.8
Graduate school	32	24.6
Geographic location		
Northeastern United States	25	19.2
Southern United States	26	20.0
Midwestern United States	25	19.2
Southwestern United States	16	12.3
Western United States	33	25.4
Canada	5	3.8
Respondent		
Mother	121	93.1
Father	9	6.9
Child raised by		
Biological parents	124	95.4
Adoptive parents	6	4.6

Table 2

Bivariate correlations among dependent measures

	1	2	3	4	5	6	7	8	9	10	11	12
1. Social Anxiety	--	-.08	-.03	-.17	.25*	.09	.41*	.15	.40*	.16	.04	-.07
2. Behavior Problems		--	.01	-.02	-.01	.17	-.13	-.09	-.15	-.09	.08	.13
3. Speech			--	.58*	-.08	-.02	-.14	-.21*	-.18*	-.16	.38*	.47*
4. Syntax				--	-.15	-.03	-.24*	-.28*	-.25*	-.21*	.32*	.43*
5. SM Symptom Severity					--	.17	.30*	.11	.27*	.16	-.03	-.03
6. Functional Impairment						--	.06	-.04	-.02	-.15	-.07	-.01
7. Internalizing Problems							--	.55*	.86*	.50*	-.05*	-.25*
8. Externalizing Problems								--	.47*	.86*	-.06	-.20*
9. Anxiety Problems									--	.43*	-.06	-.22*
10. ODD Problems										--	.00	-.15
11. Expressive Communication											--	.64*
12. Receptive Communication												--

* $p < .05$

Table 3

Means and standard deviations for all dependent measures

Measure	Total Sample		Class 1 (n = 58)		Class 2 (n = 56)		Class 3 (n = 16)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Indicator Variables								
Social Anxiety	60.80	12.37	59.88	12.28	62.50	13.08	58.19	9.73
Behavior Problems	107.17	33.12	112.78	34.55	104.84	32.23	95.00	28.09
Speech	8.59	3.45	10.70	2.03	5.34	1.87	12.37	1.36
Syntax	4.80	3.02	5.14	1.67	2.70	1.44	10.94	1.81
Severity/Impairment Variables								
SM Symptom Severity**	72.15	8.36	72.24	8.58	73.42	7.67	67.50	8.69
Functional Impairment	25.67	12.39	26.63	11.84	25.60	12.22	22.44	14.99
Concurrent Validity Variables								
Internalizing Problems	65.36	9.99	65.17	9.66	66.74	10.41	61.20	9.06
Externalizing Problems**	51.88	10.54	51.65	10.55	53.79	10.33	46.00	9.54
Anxiety Problems	66.51	10.38	66.54	9.14	68.04	11.52	61.00	9.28
ODD Problems	57.41	7.98	56.93	6.89	58.79	9.56	54.33	4.13
Expressive Communication* **	10.68	1.39	11.24	1.23	10.07	1.36	10.81	1.17
Receptive Communication* **	15.65	3.13	16.86	2.78	14.02	2.87	16.94	2.67

Note: Social Anxiety = SASC-R Total Score; Behavior Problems = ECBI Intensity Total Score; Speech = CCC-2 Speech Subscale Score; Syntax = CCC-2 Syntax Subscale Score; SM Symptom Severity = SMQ Total Score; Functional Impairment = CAIS-P Total Score; Internalizing Problems = CBCL Internalizing *t*-score; Externalizing Problems = CBCL Externalizing *t*-score; Anxiety Problems = CBCL Anxiety Problems *t*-score; ODD Problems = CBCL Oppositional Defiant Problems *t*-score; Expressive Communication = VABS-II Expressive Communication Subdomain score; Receptive Communication = VABS-II Receptive Communication Subdomain score.

* Significant pairwise comparison Class 1 vs. Class 2

** Significant pairwise comparison Class 2 vs. Class 3

Table 4

Fit statistics for 2, 3, and 4-class models

Model	Statistic				
	AIC	BIC	SABIC	LMR	Entropy
2-Class	3614	3651	3610	p < 0.01	0.77
3-Class	3581	3633	3576	p < 0.01	0.82
4-Class	3575	3641	3568	p = 0.08	0.82

Note: AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion; SABIC = Sample size Adjusted BIC; LMR = Lo-Mendell-Rubin likelihood ratio test

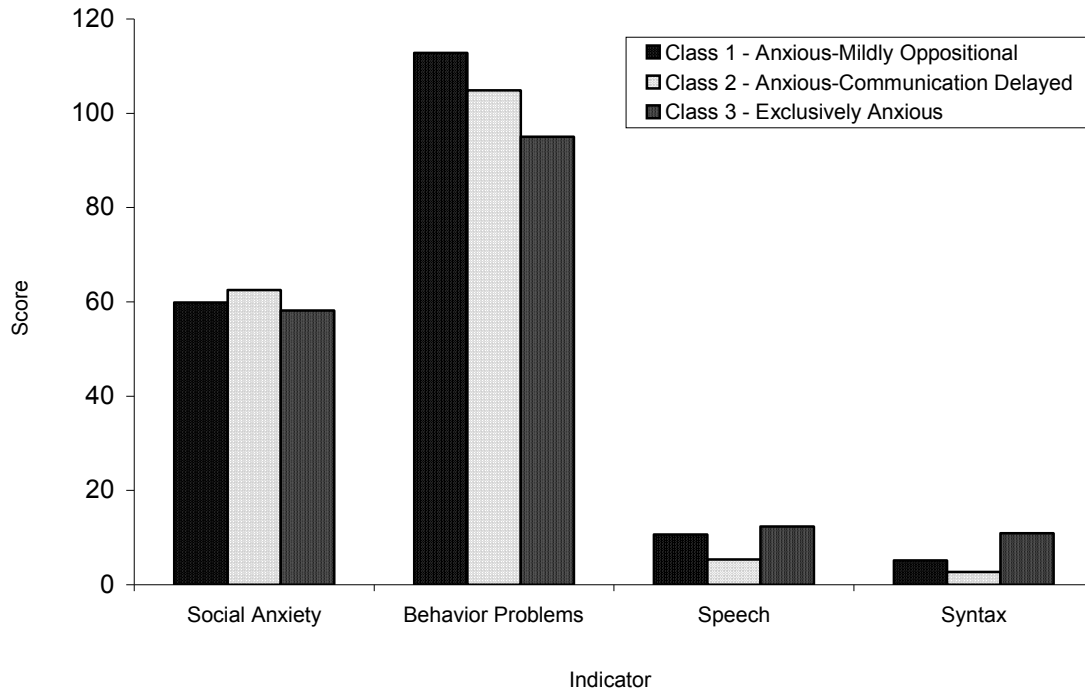
Table 5

Mean posterior probabilities for 2, 3, and 4-class models

Model	Class			
	Class 1	Class 2	Class 3	Class 4
2-Class				
Class 1 ($n = 63$)	.94	.06	--	--
Class 2 ($n = 67$)	.07	.93	--	--
3-Class				
Class 1 ($n = 58$)	.91	.07	.02	--
Class 2 ($n = 56$)	.07	.93	.00	--
Class 3 ($n = 16$)	.11	.00	.90	--
4-Class				
Class 1 ($n = 16$)	.90	.04	.00	.06
Class 2 ($n = 10$)	.04	.84	.00	.12
Class 3 ($n = 51$)	.00	.00	.93	.07
Class 4 ($n = 53$)	.01	.02	.09	.88

Figure 1

Conditional response means for 3-class solution



Note: Social Anxiety = SASC-R Total Score; Behavior Problems = ECBI Intensity Total Score; Speech = CCC-2 Speech Subscale Score; Syntax = CCC-2 Syntax Subscale Score

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