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Trajectories of Social Withdrawal from Grades 1 to 6: Prediction from Early Parenting, Attachment, and Temperament

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Abstract

From 1092 children in the NICHD Study of Early Child Care and Youth Development, we identified three trajectory patterns of social withdrawal from teacher reports in Grades 1-6: A *Normative* consistently low group (86%); a *Decreasing* group (5%) with initially high withdrawal that decreased; and an *Increasing* group (9%) with initially low withdrawal that increased. Prediction models supported the role of early dysregulated temperament, insensitive parenting, and attachment. Preschool shy temperament was a specific pathway to decreasing withdrawal, and poor inhibitory control, to increasing withdrawal. Children on the increasing pathway were more lonely, solitary, and excluded by peers. Results suggest differentiated pathways to varying trajectories of social withdrawal and highlight the importance of identification of longitudinal patterns in relation to risk.

Keywords

social withdrawal; temperament; attachment; parenting

Children who are socially withdrawn miss out on the social experiences and social learning that accompany frequent interaction with peers. These children exhibit social-cognitive deficits and unskilled behavior, they have negative self-perceptions, they are more likely to be rejected and victimized by their peers, and they are more likely to experience loneliness and depression (see Rubin, Burgess, Kennedy, & Stewart, 2003 for a review). As these children develop, they are at risk for subsequent internalizing problems (Morison & Masten, 1991; Ollendick, Greene, Weist, & Oswald, 1990; Rubin, Chen, McDougall, Bowker, & McKinnon, 1995). Thus, an examination of both the precursors and pathways to social withdrawal will enhance our understanding of the processes leading to potential mental health problems.

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Conceptualization of Social Withdrawal

In the present study, we adopted the definition of social withdrawal used by Rubin and Asendorpf (1993): "The consistent display (across situations and over time) of all forms of solitary behavior when encountering familiar and/or unfamiliar peers" (Rubin et al., 2003, p. 376). This "umbrella" definition focuses on the solitary behavior of the child, rather than on the *sources* of such behavior. One source may be the child's individual dispositional or motivational characteristics. For example, some socially withdrawn children are *shy* (also known as *reticent, socially anxious, inhibited*), i.e., inhibited in novel and evaluative social situations. These children are said to have both high social approach- and high social avoidance motivation. That is, these children desire to interact with their peers but their social wariness and anxiety inhibit them from doing so (Asendorpf, 1990, 1991; Rubin and Asendorpf, 1993). Another group of children who are socially withdrawn have a different set of individual characteristics—they are *active-immature* (Rubin & Mills, 1988) (also known as *solitary-active* [Coplan, Rubin, Fox, Calkins, & Stewart, 1994], or *active-isolates* [Harrist, Zaia, Bates, Dodge, & Pettit, 1997]). These children display impulsive and "rambunctious" cognitively immature solitary behavior in the presence of peers.

Another source of socially withdrawn behavior is the interpersonal environment—that is, the *active isolation* (*rejection, exclusion*) of the child by the peer group. Some shy children are excluded by their peers and others are not, and it is the shy excluded (or rejected) children who are at higher risk for internalizing problems (Gazelle & Ladd, 2003; Gazelle & Rudolph, 2004; Ladd, 2006). Although much less is known about "active immature" children than about those who are shy, it would appear that the sources of their withdrawn behavior are both individual and interpersonal—their individual characteristics may make them unattractive play partners (Harrist, Zaia, Bates, Dodge, & Pettit, 1997; Coplan, Wichmann, & Lagacé-Séguin, 2001), resulting eventually in active isolation by the peer group.

Predictors of Social Withdrawal

Long-term longitudinal studies investigating the stability, roots, developmental course, and consequences of social withdrawal are rare. However, it is possible to construct predictive pathways based on theory, as well as the results of shorter-term studies. To that end, Rubin and his colleagues have proposed a conceptual model outlining the pathways from early infant and parent characteristics, to childhood and early-adolescent social withdrawal, and to subsequent internalizing and relationship difficulties (Rubin et al., 2003). In the present study, we tested aspects of this theoretical model.

According to the Rubin model, infant temperament characteristics coupled with parenting behaviors set the stage for the development of socially withdrawn behavior. Specifically, when infants who are dysregulated (i.e., irritable, difficult to soothe) are born to parents who are relatively insensitive, their ability to provide a supportive environment may be compromised further (see Putnam, Sanson, & Rothbart, 2002). Additionally, background sources of stress, such as single-parent status (see Weinraub, Horvath & Gringlas, 2002),

low income (see Magnuson & Duncan, 2002) and the like may serve to diminish parenting capabilities, resulting in relatively insensitive parenting.

The combination of infant dysregulation and insensitive parenting may be particularly potent for the development of insecure attachment. According to attachment theory, children who receive responsive and sensitive parenting from the primary caregiver are able to form positive expectations regarding relationships (Bowlby, 1973; 1982) and to have opportunities to learn the necessary social skills for negotiating the social world (Sroufe, 1988). Such experiences lead to "felt security" in social situations. In contrast, children who are insecurely attached to their primary caregiver(s) are more likely to develop negative self-perceptions and to view subsequent relationships as unpredictable and undependable (Sroufe, 1983). The resultant "felt insecurity" of these children, coupled with continued insensitive parenting and ongoing temperament issues during preschool, may increase the likelihood of difficulties in the social arena in middle childhood.

During the preschool years, temperament characteristics that may contribute to social difficulties can take a number of forms. In the present study we focused on two—preschool *shyness* and *poor inhibitory control*—as individual sources of variation in the expression of social withdrawal. Our focus on these specific temperament characteristics stems from earlier work in which Rubin and Mills (1988) identified "passive-anxious" (shy) and "active-immature" forms of withdrawal (see also Rubin, 1982), to which we referred in our conceptualization of social withdrawal in the preceding text. Given the likelihood that different patterns of social withdrawal may have different temperamental roots, we included both preschool shyness and poor inhibitory control in the models we tested. Each temperament characteristic was included in a separate predictive model—a decision based on their purported links with different, mutually exclusive types of social withdrawal in the extant literature, as well as their lack of shared variance in the present study (see *Method* section).

Stability and Trajectories of Social Withdrawal

We have outlined predicted pathways from early child and parent characteristics to social withdrawal, but another important issue is the stability of social withdrawal over time. That is, once children are identified as socially withdrawn, it is important to know whether these children continue to be withdrawn and therefore more likely to have subsequent difficulties. In the existing literature, 34% to 74% of children identified as socially withdrawn at one time point have remained withdrawn at subsequent time points, with variations likely due to differing conceptualizations, sample characteristics, measurement methods, criteria for identification of extreme groups, time between subsequent measures, and analytic approaches (Moskowitz, Schwartzman, & Ledingham, 1985; Schneider, Richard, Younger & Freeman, 2000; Schneider, Younger, Smith, & Freeman, 1998; Rubin, 1993). Aside from these method-based variations, individual differences in the stability of social withdrawal may depend on interpersonal environmental factors such as peer exclusion and characteristics of friends (Gazelle & Ladd, 2003; Oh et al., in press).

The stability question addresses whether children move in or out of risk categories (i.e., withdrawn or not withdrawn), or whether they maintain their standing in a group over time relative to the rest of the group. However, calculating stability does not permit the evaluation of the developmental pattern of a behavior, nor does it allow the determination of heterogeneity in this pattern. Without such analyses, it is not possible to evaluate which children may have increasing patterns of social-emotional difficulties, nor is it possible to identify potent precursors to such patterns.

With increasing utilization of longitudinal analytic methods to address such questions, the literature on childhood aggression has profited from the identification of groups of children who vary in their trajectories of aggressive behavior, i.e., a normative group with consistently low or declining aggression, a moderate group with decreasing aggression over time, a chronically aggressive group, etc. (e.g., Campbell, Spieker, Burchinal, Poe, & the NICHD Early Child Care Research Network [ECCRN], 2006; Hill, Degnan, Calkins, & Keane, 2006; Nagin & Tremblay, 1999; NICHD Early Child Care Research Network, 2004). Analyses focusing on the predictors of group membership as well as contemporaneous correlates and developmental outcomes associated with them have yielded important findings that have advanced our understanding of which children are at risk for continuing or escalating externalizing problems.

In contrast, there are very few studies that have focused on identifying growth patterns of socially withdrawn behavior or heterogeneity in these patterns. In one such study, Gazelle and Ladd (2003) demonstrated that the trajectory of anxious solitude was stable and high over time (kindergarten through Grade 4) for children who were excluded by their peers, but the trajectory decreased when children were not excluded. In a second study, Oh et al. (in press) found three trajectory patterns of social withdrawal from Grades 5 to 8—*low-stable* (85% of the sample), *increasing* (7%), and *decreasing* (8%). Peer exclusion, friendlessness, and friendship instability characterized children displaying the *increasing* pattern, and lower peer exclusion characterized children with the *decreasing* pattern. The results of these two studies provide initial findings about trajectories of social withdrawal, with a focus on interpersonal sources of heterogeneity in these trajectories. The present study adds to this sparse literature, with a contrasting focus on early child and parent predictors of heterogeneous trajectory patterns.

Overview of the Present Study

In the present study we used data from the NICHD Study of Early Child Care and Youth Development (SECCYD) to identify and understand heterogeneity in patterns of social withdrawal from Grades 1-6 and to evaluate early predictors of these patterns based on the Rubin et al. (2003) model. We used growth mixture modeling (GMM; Muthén & Muthén, 2000) which permits identification of classes of individuals with similar longitudinal trajectories of behavior that are distinctly dissimilar to patterns shown by individuals in other classes. Thus, our first aim was to identify distinct trajectory patterns of social withdrawal from Grades 1-6 and to compare children in the identified trajectory classes on relevant contemporaneous variables throughout this period, as a means of gaining greater understanding of class differences. Based on the aforementioned studies examining

trajectories of social withdrawal, we expected to identify, at minimum, a large group of children who were never socially withdrawn, a group with higher or increasing withdrawal, a group with decreasing withdrawal, and a group with stable high withdrawal during this time period.

Our second aim was to test elements of the Rubin model. We predicted significant pathways to social-withdrawal trajectory groups from dysregulated infant temperament, insensitive parenting, attachment, and preschool temperament. Corresponding to two types of social withdrawal found in other studies (e.g., Rubin & Mills, 1988; Coplan et al., 1994; Harrist et al., 1997), we tested two separate models—one with shyness as the preschool temperament variable and the other with poor inhibitory control.

Finally, we investigated gender differences in the context of our two aims. In general, gender differences in the display of socially withdrawn behavior have not been reported in other studies (Coplan, Gavinski-Molina, Lagacé-Séguin, & Wichmann, 2001; Coplan et al., 1994; Coplan & Rubin, 1998; Rubin, 1982; Rubin, Chen, & Hymel, 1993; see Nelson, Rubin, & Fox, 2005 for an exception). Thus, we did not anticipate finding gender differences in trajectory-group membership. However there are some indications in the literature of greater adverse *consequences* of social withdrawal for boys than for girls (see Rubin & Coplan, 2004; for exceptions, see Gazelle and Rudolph, 2004; Rubin, Wojslawowicz, Burgess, Booth-LaForce, & Rose-Krasnor, 2006)—which may be related to societal expectations about the acceptability of withdrawn behavior in males vs. females. Given the extant literature, we hypothesized that trajectory-group membership and gender would interact, such that boys in the non-normative trajectory groups characterized by higher or increasing social withdrawal would have higher scores on relevant contemporaneous variables (e.g., loneliness) at each age than would girls.

METHOD

Participants

All of the participant families in the NICHD SECCYD were recruited in 1991 from hospitals located in ten locations in the U.S. During selected 24-hour sampling periods all 8,986 women who gave birth were screened, and 5,416 met the eligibility criteria for the study. Families were excluded if the mother was younger than 18 years of age; the family planned to move; there was a multiple birth; the infant had a known disability or remained in the hospital more than 7 days; the mother acknowledged substance abuse; the mother did not speak English; the mother lived more than an hour from the laboratory site or in an extremely unsafe neighborhood as determined by local police. From that group, 1364 families became study participants upon completing a home interview when their infants were one month old. Additional details about recruitment and selection procedures are available in prior publications from the study (see NICHD ECCRN, 2005) and from the study web site (http://secc.rti.org).

Analysis Sample—Of the 1364 original participants in the SECCYD, 272 were not included in the present report due to attrition and missing data. Thus, the analysis sample comprised 1092 children (49% girls), of which 78% were European American, 11% were

African American, 6% were Hispanic, and 5% were other ethnicities. Their mothers were, on average, 28.5 (*SD* = 5.6) years old at the time of the birth, and they had a mean of 14.4 (*SD* = 2.5) years of education. When the study children were one month of age, the mean family income-to-needs ratio was 2.8 (*SD* = 2.6) and 86% of the children were living with both their mothers and fathers. Children who were in the analysis sample, compared with those who were not, were less likely to be African American (11% vs. 18%) but the samples did not differ significantly by the other race/ethnic categories, χ^2 (3, *N* = 1364) = 11.10, *p* = .001. The mothers of the children who were in the analysis sample, compared with those who were not, were older (28.5 vs. 26.6 years), *t* (1362) = 4.81, *p* < .001; they had more years of education (14.4 vs. 13.5), *t* (1361) = 5.72, *p* < .001; their families had a higher income-to-needs ratio (2.92 vs. 2.11), *t* (1272) = 4.36, *p* < .001; and they were more likely to be living with the children's fathers (86% vs. 79%), χ^2 (1, *N* = 1364) = 10.54, *p* = .001. The samples did not differ with respect to child gender.

Procedure

Children were followed from birth through sixth grade. Assessments occurred when the children were 1, 6, 15, 24, 36 and 54 months old, and when they were in kindergarten and Grades 1, 2, 3, 4, 5, and 6. The following sections describe the specific measures used in the analyses and the time points of administration. Additional details about all data collection procedures, psychometric properties of the instruments, and descriptions of how composites were derived and constructed can be found in the study's Manuals of Operation and Instrument Documentation (http://secc.rti.org).

Measures

Measures are presented in sets corresponding to their function in the analytic plan, as follows: (1) teacher-reported social withdrawal from Grades 1-6, used to identify social withdrawal patterns (i.e., trajectory classes), (2) relevant contemporaneous variables used to compare the classes, and (3) early predictors of social-withdrawal class membership.

Social Withdrawal—Although some studies have used sociometric techniques to assess social withdrawal, the use of teacher reports has been widespread and well-validated in the social withdrawal literature (e.g., Coplan, 2000; Gazelle & Ladd, 2003; Gazelle & Rudolph, 2004; Ladd, 2006; Ladd & Burgess, 1999; Ladd, 2006; Rubin & Clark, 1983). Consequently, we assessed social withdrawal via the *Teacher's Report Form* (TRF; Achenbach, 1991), which was completed for the study children every year from Grades 1-6. The TRF is a widely used and well-validated standardized assessment of behavior problems in children from 4-18 years of age. The 120 items on the TRF were rated on 3-point scales from 0 (not true of the child) to 2 (very true of the child). We began with the 9-item TRF "Withdrawn" scale, and omitted 3 items that we viewed to be less relevant than others. Specifically, we included: (42) would rather be alone than with others; (65) refuses to talk; (69) secretive, keeps things to self; (75) shy or timid; (103) unhappy, sad, or depressed; (111) withdrawn, doesn't get involved with others; and we omitted: (80) stares blankly; (88) sulks a lot; and (102) underactive, slow moving, lacks energy. Items were averaged at each time point to form a *social withdrawal* scale. Internal consistency (Cronbach's alpha) of the scale was .72, .71, .74, .75, .77, and .80 in Grades 1-6, respectively. The single item with the

highest item-total correlation at each point was the "withdrawn, doesn't get involved with others" item. The *social withdrawal* scale was highly correlated with the total TRF Withdrawn scale at each time point, with correlations ranging from r = .94 to .96.

Validity—social withdrawal scale: Ideally, evidence for the validity of the social withdrawal composite would come from peer sociometrics or observational data. However, peer sociometric data were not collected as part of the NICHD SECCYD, and observational data of the children's behaviors in school that we did obtain were not sufficiently extensive or especially pertinent to the assessment of social withdrawal. Consequently, we relied on other data provided by teachers in the classroom setting as sources of convergent and discriminant validation for the scale. Specifically, we correlated the Social Withdrawal scale with the Asocial with Peers and the Aggressive with Peers subscales from the Child Behavior Scale (Ladd & Profilet, 1996) at each time point that these data were available (Grades 3-6). Correlations with the Asocial subscale were r = .70, .71, .72, and .74 in Grades 3-6, respectively; and with the Aggressive subscale, r = .11, .07, .08, and .08, respectively. These correlation patterns were slightly but consistently better than those obtained in relation to the total TRF Withdrawn scale (r = .67 to .72 for Asocial and r = .14 to .20 for Aggressive).

As an additional validity check, we analyzed data from another study of fifth-grade children that contained both TRF and peer-sociometric data (see Rubin et al., 2004). We compared withdrawn children who were at the 75th percentile or higher on peer-identified social withdrawal and the bottom 50th percentile or lower on aggression (for grade and gender), based on an extended version of the Revised Class Play (see Burgess, Wojslawowicz, Rubin, Rose-Krasnor, & Booth-LaForce, 2006), with a control group of children who were neither withdrawn nor aggressive. Using *t*-tests, we compared the withdrawn and control groups on the TRF-based social withdrawal index we developed in the present study; also, we compared the groups on the total TRF Withdrawn scale. The peer-identified withdrawn children had significantly higher scores than did the control children on both scales: Social Withdrawal scale, t (124) = 4.14, p < .001; TRF Withdrawn scale, t (124) = 3.96, p < .001. However, the effect size (Cohen's d) was slightly larger for the Social Withdrawal scale than for the TRF Withdrawn scale (.82, vs. .79).

Contemporaneous Variables—Comparison of Trajectory Classes—We compared the social withdrawal classes (derived from the trajectory patterns—see Results) on relevant variables at the beginning, middle, and end of the time period covered by the trajectories (Grades 1-6), as a means of further characterizing trajectory-class members and gaining a greater understanding of class differences. These variables were sociometric status, asocial with peers, excluded by peers, and *loneliness.*

Sociometric status (Grades 1 and 2): These data were collected only in Grades 1 and 2 and therefore were used to characterize the classes at the beginning of the trajectories. Teachers were asked to complete a questionnaire regarding the study child's sociometric status, taking the point of view of the other children in the class. Although the child's classmates usually provide sociometric data, the teacher-report format has been used successfully (see Cillessen, Terry, Coie, & Lochman, 1992). We asked the teacher to select among five

categories that are “typical for social networks of children.” The categories were the standard ones used in the sociometric literature (see Rubin, Bukowski, & Parker, 2006), i.e., popular, rejected, neglected, controversial, and average, but the choices as presented were: “These children are well-liked by many children and disliked by very few;” “These children are disliked by many children and well-liked by very few;” “These children are not noticed by very many children (they receive very few, if any votes for well-liked or disliked questions);” “These children are controversial, in that they receive a large number of both liked and disliked votes;” and “These children fit none of the other four categories and are ‘just average’.”

Asocial with, and excluded by peers (Grades 3 and 6): Mothers completed a 43-item questionnaire designed to assess children's positive and problematic behavior with peers, based primarily on the Child Behavior Scale (Ladd & Profilet, 1996). The *asocial with peers* subscale (alphas = .78 and .77) consists of 5 items rated on a 3-point scale: “Likes to be alone,” “Keeps peers at a distance,” “Is a solitary child,” “Avoids peers,” and “Withdraws from peer activities.” (Note that the *asocial* subscale items are indicative primarily of behavioral solitude rather than lack of social motivation, as the subscale name might imply). The *excluded by peers* subscale (alphas = .81 and .87) comprises 4 items: “Not chosen as playmate by peers,” “Peers avoid my child,” “Is excluded from peers’ activities,” and “Is ignored by peers.” Note that these measures were selected to characterize the classes at the middle and the end of the trajectories, and were not available prior to Grade 3.

Loneliness (Grade 5): The Loneliness and Social Dissatisfaction Questionnaire (Cassidy & Asher, 1992) was administered, to characterize the classes at the end of the trajectory period (Ideally, Grade 6 data would be used but these data were not collected in Grade 6). The total *loneliness* scale (alpha = .91) consists of sixteen items, rated on a 5-point scale, that focus on children's feelings of loneliness, feelings of social adequacy, subjective estimations of peer status, and appraisals of whether important relationship provisions are being met.

Early Predictors of Social Withdrawal Trajectories

Demographics: The background control variables we included were *maternal education* (in years, at 1 month), family *income-to-needs ratio* at 6 months, presence of the *father in the home* at 6 months, and child *gender*.

Dysregulated temperament (6 months): When the study children were 6 months old, mothers completed the 56-item *Revised Infant Temperament Questionnaire* (Carey & McDevitt, 1978), rating each item on a 6-point scale. The *Approach* (11 items, alpha = .77), *Mood* (10 items, alpha = .61), and *Adaptability* (11 items, alpha = .70) subscales were significantly intercorrelated (*r*s = .50 - .67, $p < .001$) and were used in the present report as indicators of dysregulated temperament. Note that a high score indicates greater dysregulation for each subscale.

Secure attachment (24 months): Security of attachment to mother was assessed via the Attachment Q-Sort procedure (Waters & Deane, 1985) at 24 months, based on a 2-hour home observation. Following the home visit, the observer sorted the 90 items of the Q-Set

into nine piles ranging from least to most characteristic of a particular subject, using a pre-defined distribution of 4-6-10-15-20-15-10-6-4. The score for each item, based on its placement in the distribution, was correlated with the Security Criterion Sort to yield a security score for each participant. Interobserver reliability, based on an ANOVA formulation (Winer, 1971), was .96.

Insensitive parenting (6 months): Mother-child interactions were videotaped during 15-min semi-structured tasks. A number of 4-point scales were used to rate the mothers' behavior from the videotapes. We used the ratings for intrusiveness and sensitivity to nondistress (reversed), as indicators of insensitive parenting. Inter-coder reliability estimates (Winer, 1971) were .84 and .76, respectively.

Poor inhibitory control (54 months): Mothers completed 80 items (8 scales) from the *Children's Behavior Questionnaire* (CBQ; Rothbart, Ahadi, & Hershey, 1994). We used the *inhibitory control* subscale (reversed; 10 items, alpha = .75) as one indicator of poor inhibition. A second indicator was the *self-control* subscale (reversed; 10 items, alpha = .79) from the *Social Skills Rating System* (Gresham & Elliott, 1990), a 49-item questionnaire completed by the mother that indexes general social skills and problem behavior.

Shyness (54 months): We used the *shyness* subscale (8 items, alpha = .85) from the CBQ as a measured variable. Note that *shyness* was not related to *inhibitory control* ($r = .05$) or *self-control* ($r = -.01$).

Insensitive parenting (54 months): As at 6 months, mother-child interactions were videotaped during 15-min semi-structured tasks. A number of 7-point scales were used to rate the mothers' behavior; we included *supportive presence* (reversed), *respect for autonomy* (reversed), and *hostility* as indicators of insensitive parenting. Inter-coder reliability estimates (Winer, 1971) were .87, .78, and .78, respectively.

Results

Patterns of Social Withdrawal

Descriptive data for social withdrawal by grade are presented in Table 1, and intercorrelations among the social withdrawal scores, in Table 5. These stability correlations ranged from $r = .21$ (between Grades 1 and 6), and $r = .49$ (between Grades 4 and 5), with a mean r of .36 (all significant at $p < .001$).

For all trajectory analyses and structural equation models (see the Prediction section), missing data were managed with a maximum likelihood (ML) estimation in Mplus 4.0 (Muthén & Muthén, 2004) based on Little and Rubin's (2002) work. Initially, cases were included if they had at least one data point in the trajectory analysis, a strategy that is highly recommended when ML estimation is used (see Schafer & Graham, 2002), yielding an analysis sample of $n = 1092$.

To identify heterogeneity in the pattern of socially withdrawn behavior over time, we performed GMM using Mplus 4.0. Thirty initial sets of random start values were generated

followed by three final stage optimizations (Muthén & Muthén, 2004). The number of latent trajectories was determined iteratively, specifying an increasing number of classes and examining the output, interpretability of the results, meaningfulness of classes, and the Bayesian Information Criterion (BIC) and Akaike statistic (AIC); smaller BIC and AIC values indicate better fitting models (Muthén & Muthén, 2004). Additionally, we used the Lo-Mendell-Rubin likelihood ratio test of model fit; it compares the estimated model with a model with *k* - 1 classes (Lo, Mendell, & Rubin, 2001). The Lo-Mendell-Rubin test yields a *p*-value that is the probability that a model with one less class generated the data, i.e., a low *p*-value indicates the estimated model fits the data better than one with one less class (Muthén & Muthén, 2004). Finally, we report the entropy to inform the decision-making process. Both linear and quadratic models were assessed, with a linear model resulting in the best fit.

During the model testing process it was necessary to constrain the variance of the slope and intercept. Thus, all models were recomputed with this constraint to insure comparable models; the resultant models are thus classified as latent class growth models (Muthén, 2003). A three-class model had the following fit statistics: BIC = 1173, AIC = 1098, and Entropy .91. The two-class model fit statistics are BIC = 1389, AIC = 1329, and entropy = . 89; and the four-class model, BIC = 1046, AIC =956, and entropy = .91. Comparing a four-class model to a three-class model, the Lo-Mendell-Rubin Adjusted LRT test value = 121 (*p* = .08); comparing a three-class model to a two-class model, the Lo-Mendell-Rubin test value = 255, which was statistically significant, *p* = .04. Although the BIC and AIC dropped for the four-class model relative to the three-class model, the Lo-Mendell-Rubin test was not significant when comparing the four- to a three-class model. The additional class in the four-class model consisted of 11 subjects, a sample size too small for the purposes of this study. This small class represented subjects who had a high intercept (1.3) on social withdrawal and a decreasing slope (−.10), similar to a class already represented in the three-class model by a group with an intercept of .8 and decreasing slope of −.11. Thus, we concluded for the purpose of this study, given all the information available, that the three-class model was preferred to the four-class model.

Figure 1 depicts the three class trajectories, with the lines representing the estimated means of social withdrawal from Grades 1-6. One class is denoted as the *Decreasing* class and represents 5% of the sample (*n* = 59). This class entered early elementary school with the highest level of socially withdrawn behavior, which decreased steadily over time. Another class is labeled the *Increasing* class, representing 9% of the sample (*n* = 96). The children in this class started with relatively low levels of social withdrawal but increased steadily over time and ended with the highest level of socially withdrawn behavior by Grade 6. Finally, we labeled the majority class, 86% of the sample (*n* = 937), the *Normative* class. These children had very low levels of socially withdrawn behavior, on average, over time. Class membership (i.e., the most likely class for each subject) was saved as a categorical variable and used in subsequent analyses.

Comparison of Classes

Beyond the visual inspection of trajectory classes depicted in Figure 1, we performed one-way univariate ANOVAs by Class on the social withdrawal scores at each time point, to ascertain whether the observed differences were significant at each point. Descriptive statistics and ANOVA results, including post-hoc Least Significant Difference (LSD) tests, are shown in Table 2. At all time points, both the *Increasing* and *Decreasing* classes had significantly higher social withdrawal scores than did the *Normative* class. In Grades 1 and 2, the *Decreasing* class had significantly higher scores than did the *Increasing* class; in Grades 5 and 6, the opposite pattern was found. In Grade 3, the point at which the lines cross in Figure 1, the social withdrawal scores of the *Increasing* and *Decreasing* classes did not differ significantly.

The trajectory classes were then compared on a set of relevant variables also obtained during the Grade 1 to 6 period—maternal reports of *asocial with peers* and *excluded by peers*; child report of *loneliness*, and teacher reports of *sociometric status*—to characterize the classes further. Correlations between these variables and other study variables are shown in Table 3 and descriptive statistics are shown in Table 4. Data were analyzed via SPSS 13.0 and EM algorithm for missing data.

Sociometric status—For the categorical (popular, rejected, neglected, controversial, average) sociometric data in Grades 1 and 2, we performed chi-square analyses on the cross-tabulation of sociometric-status categories and social-withdrawal classes, which yielded significant results for both Grade 1, χ^2 (8, N = 976) = 67.18, $p < .001$, and Grade 2, χ^2 (8, N = 917) = 52.03, $p < .001$. To evaluate the observed frequency in each cell relative to the expected frequency we used the SLEIPNER software package (Bergman & El-Khouri, 1998), which computes exact one-tailed hypergeometric probabilities of observed cell frequencies based on Fisher's exact test of a 2 × 2 table. Due to the large number of tests per time period, we used a Bonferroni correction for a more conservative p value of .005.

The results of these analyses (all significant at $p < .003$ or less) were as follows: In first grade, children in the *Decreasing* class were less likely to be characterized as *popular* (Observed [O] n = 17; Expected [E] n = 35), and more likely to be characterized as *neglected* (O: n = 22; E: n = 6). In second grade, these children were still less likely to be *popular* (O: n = 26; E: n = 34) and more likely to be *neglected* (O: n = 15; E: n = 4). No other results were significant for this class. In the *Increasing* class, the only significant result in first grade was that these children were less likely to be characterized as *popular* (O: n = 36; E: n = 54). In second grade, they were still less likely to be *popular* (O: n = 37; E: n = 52), but they were also more likely than expected to be characterized as *neglected* (O: n = 14; E: n = 6) and *rejected* (O: n = 9; E: n = 3).

Asocial, excluded, lonely—We performed a series of two-factor Class × Gender fixed-effects ANOVAs on these variables. As shown in Table 4, significant Class main effects were found for all variables, but only one significant effect of Gender (for *loneliness*) and no significant interactions. Posthoc LSD tests indicated that, in Grade 3, the *Increasing* and *Decreasing* groups did not differ from one another, but both were significantly higher than

the *Normative* group on *asocial* and *excluded*. However, in Grade 6, for the *asocial* subscale, the scores were highest for the *Increasing* group, followed by the *Decreasing* group, and then the *Normative* group (all significantly different); for the *excluded* subscale, the *Increasing* group had significantly higher scores than did the other two groups, which did not differ from one another. For the child report of *loneliness* in fifth grade, both the *Decreasing* and *Increasing* classes had significantly higher scores than did the *Normative* class. A significant Gender difference was found for loneliness, with boys having higher scores than girls.

Predicting Class Membership

Next, in accordance with the Rubin et al. (2003) model, we used Structural Equation Modeling (SEM) to predict trajectory class membership from demographics, dysregulated temperament at 6 months, attachment security at 24 months, insensitive parenting at 6 and 54 months, and temperament at 54 months. Note that class membership was not significantly associated with site of data collection (i.e., the 10 geographic study locations), χ^2 (18, N = 1092) = 21.50, p = .26. Consequently, site variables were not used in the models. Descriptive statistics for the predictor variables used in these analyses are shown in Table 1 and intercorrelations among social withdrawal and predictor variables, in Table 5.

Because we were interested in whether the 54-month temperament characteristics—*shyness* vs. *poor inhibitory control*—would be associated with different trajectory patterns, we performed preliminary Class × Gender fixed effects ANOVAs on these variables. We found significant main effects of Class for both variables, F (2, 1086) = 3.31, p = .037 and F (2, 1086) = 4.53, p = .01, respectively. Posthoc LSD tests indicated that the *Decreasing* class had significantly higher scores on *shyness* than did the *Increasing* class; the latter class had higher scores than did the *Normative* class on *poor inhibitory control*. Consequently, we examined two separate structural equation models—one including preschool *shyness* and the other, *poor inhibitory control*.

Because the outcome in these analyses was categorical, i.e., class membership, we first examined the predictive model without the outcome in order to assess model fit. We did this because traditional fit indices are not available when assessing a SEM with a categorical outcome. Additionally, when necessary, data were reverse-coded and some variables were multiplied by a constant to equalize the variance and maintain less than a 1:10 variance ratio between variables (Kline, 1998). The confirmatory factor analysis [CFA] model was specified such that the first factor loading was fixed to one, and latent factors were correlated. Both shyness (measured variable) and poor inhibitory control were included in the model. The factor loadings for the indicators are shown in Table 6, and the factor and variable correlations, in Table 7. The CFA model fit the data well; the Comparative Fit Index [CFI] was .94 and Root Mean Square Error of Approximation [RMSEA] was .06 (90% CI .05, .06), both indicating good model fit (Bentler, 1992; MacCallum, Browne, and Sugawara 1996). Similarly, we proceeded to test the two structural models (one including shyness and the other, poor inhibitory control). The fit for both models was very good: In the model including shyness, CFI = .96 and RMSEA = .05 (90% CI, .04, .06); in the model including poor inhibitory control, CFI = .98 and RMSEA = .04 (90% CI, .03, .04).

Next, the structural models were tested with class membership, the categorical outcome. The models were specified such that the *Normative* class was the reference class. That is, the coefficients can be interpreted as the log odds of membership in either the *Increasing* or *Decreasing* class, relative to the *Normative* class, for each unit increase in the predictor variables. For interpretability we report the odds ratios in Figures 2 and 3. We also included child gender as a control variable to examine whether it was related to class membership in the model. Our initial model-testing indicated that gender was not significant in the model including shyness for the *Decreasing* class relative to the *Normative* class (b =−.30, p = .27) or the *Increasing* class (b = .31, p = .17); similarly gender wasn't significant in the model including poor inhibitory control for the *Decreasing* class relative to the *Normative* class (b = −.32, p = .24) or for the *Increasing* class (b = .23, p = .31). Therefore, child gender was deleted.

The final models are shown in Figures 2 and 3 (with non-significant paths not shown). The results generally confirmed our hypotheses. The demographic factor (income, education, father presence) was negatively correlated with both 6-month insensitive parenting and dysregulated infant temperament. Together, these three factors predicted attachment security at 24 months, with the demographic factor being a positive predictor, and insensitive parenting and dysregulated temperament being negative (and relatively small) predictors of security. Attachment security, demographics, and insensitive early parenting were predictors of insensitive parenting at 54 months, in the expected directions. As hypothesized, insensitive parenting at 54 months predicted membership in both the *Increasing* and the *Decreasing* classes relative to the *Normative* class.

Additionally, secure attachment was negatively related to poor inhibitory control, and dysregulated temperament at 6 months was a positive predictor of both poor inhibitory control and shyness at 54 months. An unexpected result was that the demographic factor was positively related to shyness (Figure 2) but negatively related to poor inhibitory control (Figure 3).

Temperament at 54 months differentiated the patterns of social withdrawal. In the first model (Figure 2) shyness significantly predicted group membership, with an odds ratio of 1.33 indicating the increase in odds of being in the *Decreasing* trajectory group relative to the *Normative* group for each unit increase in shyness. However, preschool shyness was not significantly associated with membership in the *Increasing* group, as expected. Conversely, in the second model (Figure 3), poor inhibitory control significantly predicted group membership, with an odds ratio of 1.26 indicating the increase in odds of being in the *Increasing* group relative to the *Normative* group, for each unit increase in poor inhibitory control. However, poor inhibitory control was not significantly associated with membership in the *Decreasing* group, as expected.

Follow-Up Analyses

A number of follow-up analyses were performed to facilitate comparisons between our results and those reported in other studies, and to explore additional characteristics of the *Increasing* group.

Comparison with other samples—stability—Although the GMM analyses in the present study did not yield a trajectory class with stable high social withdrawal, it is possible that such a group would have been identified if we had used the criterion of 1 *SD* or more above the mean. Consequently, we identified children who were, on average, at least 1 *SD* above the mean during the early grades (1-3) and also during the later grades (4-6). Using this criterion, we found a 14% prevalence of high withdrawal in the early grades (n = 149/1092), which is within the range of 10-26% found in other studies (Coplan, Wichmann, & Lagacé-Séguin, 2001; Harrist et al., 1997; Ladd & Burgess, 1999; Rubin, 1993; Rubin et al., 1993; Rubin et al., 2006; Schneider et al., 1998, 2000). Among the 149 early-withdrawn children in the present study, 50% (n = 74) were also withdrawn in the later grades. In prior studies, 34-74% of socially withdrawn children have remained withdrawn over time (Moskowitz et al., 1985; Schneider et al., 1998, 2000; Rubin, 1993). Finally, other studies have reported correlational stabilities of r = .10 to .62 between measures of social withdrawal at various time points (Asendorpf, 1990; Gazelle & Ladd, 2003; Ladd, 2006; Ladd & Burgess, 1999; Moskowitz et al., 1985; Nelson et al., 2005; Schneider et al., 1998, 2000; Rubin, 1993). In the present study, we found a correlation of r = .59, p < .001, between early and later social withdrawal scores.

Of the 74 children who were withdrawn in both the early and later grades, using the 1 *SD* criterion, an approximately equal percentage were in the *Decreasing* and *Increasing* groups. That is, 42-43% of the *Decreasing* and *Increasing* children had social withdrawal scores that were consistently 1 *SD* or more above the mean, regardless of their decreasing or increasing patterns. Those who did, and did not have withdrawal scores consistently in the 1+ *SD* range over time did not differ on the contemporaneous variables (*asocial, excluded, lonely*) (analyses available from the first author).

In a final set of analyses (available from the first author), we compared children who were stable-withdrawn (i.e., 1+ *SD* above the mean both early and later) with all other children and found that the withdrawn children had significantly higher scores on demographic risks, early dysregulated temperament, insensitive parenting at 6 and 54 months, and lack of security. The groups also differed on poor inhibitory control but they did not differ on shyness at 54 months. This latter result is likely due to the fact that the stable-withdrawn group comprised more children who were in the *Increasing* class (characterized by poor inhibitory control) than in the *Decreasing* class (characterized by shyness).

Increasing-class characteristics—In earlier studies, children who were “active-immature” (Rubin & Mills, 1988), “active isolates” (Harrist et al., 1997), or “solitary-active” (Coplan et al., 1994)—akin to the poor inhibitory control characterizing the children in the *Increasing* class in the present study—were also found to be impulsive and (in some cases) aggressive (Coplan et al., 1994, 2001; Harrist et al., 1997). In fact, the increasing withdrawal observed in these children over time in the present study could be a consequence of continuing social difficulties due to aggressive and/or impulsive behavior. Consequently, we compared the trajectory classes on two such sets of variables.

Aggression scores were obtained from the TRF in Grades 1-6, and *hyperactive-impulsive behavior* scores in Grades 3-6 (data were not available in earlier grades). For the latter

measure, teachers completed a 26-item version of the Disruptive Behavior Disorders Rating Scale (Pelham, Gnagny, Greenslade, & Milich, 1992), which is based on items from the Diagnostic and Statistical Manual of Mental Disorders (4th edition). The 9-item *hyperactive-impulsive* scale (alphas = .91 to .93) was used. A repeated-measures Class × Time ANOVA on the *aggression* scores did not yield a significant effect of Class, F (2, 1089) = 1.60, p = .20, or Class × Time, F (10, 1089) = 0.79, p = .64. Similar results were found for the *hyperactive-impulsive* scores for Class, F (2, 1089) = 1.86, p = .16, and Class × Time, F (6, 1089) = 1.10, p = .36. Therefore, neither aggression nor hyperactive-impulsive behavior characterized the children in the *Increasing* class.

Discussion

Prior studies have focused on identifying children with high-stable social withdrawal, typically defined as being 1+ *SD* above the mean on a consistent basis (Ladd & Burgess, 1999; Moskowitz, Schwartzman, & Ledingham, 1985; Schneider, Richard, Younger & Freeman, 2000; Schneider, Younger, Smith, & Freeman, 1998; Rubin, 1993). Rather than using the 1+ *SD* criterion, which does not take into account either normative developmental changes or heterogeneity in these changes, the present study adds to a small literature on the trajectories of social withdrawal and the variation in these trajectory patterns (Gazelle & Ladd, 2003; Oh et al., in press). Using GMM techniques, we were able to identify three classes of children who differed in their trajectory patterns over time: A large *Normative* group (86%) who were never socially withdrawn, a *Decreasing* group (5%) who started out with relatively high levels of withdrawal in first grade but gradually decreased by sixth grade, and an *Increasing* group (9%) who started out with relatively low withdrawal and increased to much higher levels by sixth grade. Of particular note is that, using a different data set and peer-identified social withdrawal from Grades 5-8, Oh et al. (in press) found three trajectories of withdrawal very similar to ours—low stable (85%—compared with 86% in our sample), increasing (7%—compared with 9% in our sample), and decreasing (8%—compared with 5% in our sample). These recent results provide a relevant source of comparison for our data.

In the literature on aggression, the normative developmental pattern is for aggressive behavior to decline from early childhood onward (Hartup, 1974; Tremblay, 2000) and so analyses of trajectory patterns have been informative about children whose aggressive behavior does not follow this pattern (e.g., Campbell et al., 2006; Hill et al., 2006; Nagin & Tremblay, 1999; NICHD ECCRN, 2004). In contrast, it would appear that there is no "normative" pattern for changes in social withdrawal over time. That is, some children appear to be consistently and stably non-withdrawn while other children, at least in the present study, exhibited increasing or decreasing patterns of withdrawal that were predicted by earlier family and child characteristics. The implications of these results are that the identification of children who are at risk for increasingly problematic levels of social withdrawal and subsequent internalizing problems is more complex than evaluating *early* patterns of withdrawal; identification of such children may rest on assessment of family and child risk factors as well as the child's peer milieu.

Gender differences

We did not expect, nor did we find gender differences in relation to social withdrawal trajectory classes, similar to the results of other studies (Coplan et al., 1994, 2001; Coplan & Rubin, 1998; Rubin, 1982; Rubin, Chen, & Hymel, 1993). However, we did hypothesize that trajectory class and gender would interact such that we would demonstrate more negative correlates of social withdrawal among boys, and this hypothesis was not confirmed. Although some studies have reported such gender effects (Coplan et al., 2001; Gazelle & Ladd, 2003; Nelson et al. 2005; Rubin et al., 1993), others have not (Gazelle & Rudolph, 2004; Rubin et al., 2006).

Predictors of Social Withdrawal Patterns

Based on the theoretical model proposed by Rubin et al. (2003), we tested predictive pathways to the social-withdrawal trajectory classes. The SEM results are consistent with the model in that they support the hypothesized links between dysregulated infant temperament, insensitive parenting, attachment security, preschool temperament, and the social-withdrawal trajectory classes. First, we found significant negative correlations between the demographic factor and insensitive parenting as well as infant dysregulated temperament at 6 months. Together, these factors were inversely related to attachment security at 24 months. Attachment security was inversely predictive of insensitive parenting at 54 months, and insensitive parenting at 54 months significantly predicted membership in both socially withdrawn trajectory groups.

These results support hypothesized links between the quality of parenting and children's socially withdrawn behavior (see also Gerhold, Laucht, Texdorf, Schmidt, & Esser, 2002), and suggest that it is both the continuing nature of the relationship over time and the child's internal working model of the relationship that are significant in fostering or maintaining patterns of social withdrawal. Undoubtedly, the nature and quality of the father-child relationship is important as well (see Miller, Murry, & Brody, 2005). Although we could have included these data in our analyses, the results would have been misleading due to the relation between father absence (and therefore, missing data) and patterns of social withdrawal.

Diverging Pathways

Early child, and parent-child relationship variables predicted both increasing and decreasing trajectory patterns of social withdrawal. However, we found that shy temperament at 54 months was a specific pathway to early social withdrawal that declined over time, but poor inhibitory control at 54 months was a specific pathway to later social withdrawal that increased over time. That is, in the model including preschool shyness, we found that shyness predicted membership in the *Decreasing* group but not the *Increasing* group. Conversely, in the model including poor inhibitory control we found that it predicted membership in the *Increasing* but not the *Decreasing* group.

Increasing withdrawal—In the years prior to school entry, the pathway to increasing social withdrawal is associated with dysregulated infant temperament, insensitive parenting, less-secure child-mother attachment, and poor inhibitory control. Although the children in

the *Increasing* group had relatively low social withdrawal scores in the first grade, they were still significantly higher than the scores of the *Normative* group; this follows logically from the fact that 43% of the *Increasing* group were at least 1 *SD* above the mean on social withdrawal in the early grades. In first grade, the *Increasing* children were less popular than expected; by second grade, when their social withdrawal scores were increasing, they were less popular, more neglected, and more rejected than expected. In third grade they were significantly more solitary (i.e., they had higher scores on the "asocial" scale) and excluded by peers than were the *Normative* children; by sixth grade, they were more solitary and excluded than were the children in both the *Normative* and *Decreasing* groups. Finally, in fifth grade, they reported being more lonely than did the children in the *Normative* group.

Although the children in the *Increasing* group were low on inhibitory control, they were neither more aggressive nor more hyperactive/impulsive than were the children in the other groups, which suggests to us that their continuing social difficulties were not due to these behaviors. Thus, poor inhibitory control in the preschool period may translate into other behaviors in the elementary grades that are disliked by peers (e.g., immature behavior). These result contrasts with prior evidence of angry/defiant behavior (Harrist et al., 1997) and externalizing problems (Coplan et al., 2001) in solitary-active children, although Coplan et al. (1994) found that solitary-active play was related to maternal ratings of impulsivity but not observational indices of disruptiveness or noncompliance.

The pattern of increasing social withdrawal in this group in the present study, coupled with concomitant indications of peer rejection and exclusion beginning as early as second grade, suggest to us that these children's social withdrawal had both individual and interpersonal roots. It is more likely that their social withdrawal was due to immature and/or socially incompetent behavior that eventually lead to active isolation by the peer group, thereby increasing these children's withdrawal over time (Boivin, Hymel, & Bukowski, 1995; Hanish & Guerra, 2000; Harrist et al., 1997; Rubin, Hymel, & Mills, 1989), rather than lack of interest in peers or anxiety about engaging with them (although we cannot dismiss the possibility that these children were anxious as well). Nonetheless, we know from other literature that the additive effects of withdrawal and rejection over time are particularly potent in relation to subsequent outcomes (e.g., Ladd, 2006).

Decreasing withdrawal—The pathway to decreasing social withdrawal also is associated with dysregulated infant temperament, insensitive parenting, and less-secure child-mother attachment, but the children in this trajectory group were temperamentally shy during the preschool period. In first and second grade, these children were less popular and more neglected than expected. In third grade, they were significantly more solitary ("asocial") and excluded by peers than were the *Normative* children, but they did not differ from the *Increasing* children on these variables. However, by sixth grade, they were moderately solitary (significantly less than the *Decreasing* group but significantly more than the *Normative* group) but they did not differ from the *Normative* group on peer exclusion, i.e., they were not being actively isolated by their peers. In fifth grade they were equivalent to the *Increasing* group in their loneliness, which was significantly greater than in the *Normative* group. Of particular note is that some of the children in the *Decreasing* group (42%), despite significant decreases in social withdrawal over time, continued to have levels

of withdrawal that were at least 1 *SD* above the mean. Consequently, it is not surprising that they still differed from the *Normative* group on some variables.

The pattern of relatively high social withdrawal that decreased over time—a pattern that was linked with preschool shyness—could be a function of the children's increasing social experiences in elementary school that fostered ever-improving skills and confidence in interacting with peers. The fact that the *Decreasing* group did not differ from the *Normative* group in terms of peer exclusion in Grade 6 is also noteworthy, particularly in light of prior work (Gazelle & Ladd, 2003; Gazelle & Rudolph, 2004; Ladd, 2006; Oh et al., in press) indicating that peer exclusion serves to maintain or increase social withdrawal over time and to exacerbate internalizing difficulties. Thus, the decreasing trajectory of these shy children who were not excluded by their peers is congruent with these other results.

Remaining Questions and Limitations

Several important questions remain about the predictive models. Notwithstanding the pathways discriminating the two patterns of withdrawal, the two models shared a number of common features. First, dysregulated temperament at 6 months predicted *both* shyness and poor inhibitory control at 54 months. Although this was not our primary focus, these linkages warrant further investigation, particularly in relation to underlying individual differences in self-regulatory processes at the physiological level (see Calkins & Fox, 2002). Second, we designed the models such that dysregulated temperament, insensitive parenting, and attachment security were common pathways to the two patterns of withdrawal; based on the Rubin model, we did not hypothesize differential early characteristics related to these two patterns. It may be the case, for example, that early intrusive vs. overprotective parenting (see Rubin, Cheah, & Fox, 2001) would differentially predict group membership, but the latter aspect of parenting was not assessed in the NICHD SECCYD. This general issue is a limitation of the study related to performing secondary analyses on existing data that were not collected to investigate the development of social withdrawal specifically. Nonetheless, our results provide some validation of elements of the Rubin et al. (2003) model, which arose from synthesizing the results of cross-sectional and short-term longitudinal studies rather than prospectively following a birth cohort as we did in the present study.

A third limitation is that the effect sizes we found were relatively modest, indicating that caution is warranted in interpreting the results. Finally, it is important to note that the NICHD SECCYD is not a nationally representative sample, the highest-risk families were excluded from the study at the beginning, and differential attrition occurred in relation to demographic characteristics. Thus, it is important to interpret our results with these limitations in mind, and to note that a larger proportion of socially withdrawn children and/or differing trajectories of withdrawal might result from a higher-risk, more diverse sample.

Measurement of Social Withdrawal

An additional issue in assessing the stability and trajectories of social withdrawal and in comparing the results of various studies is that some have used observations, others have

used peer sociometric data, and others have used teacher reports to identify socially withdrawn children. In accordance with a number of significant and relatively recent studies of social withdrawal (e.g., Ladd, 2006; Ladd & Burgess, 1999; Gazelle & Ladd, 2003; Gazelle & Rudolph, 2004), we used teacher reports—because data were not collected from the study children's peers and classroom observations did not include a sufficient number of relevant variables. Although some would argue that the absence of these latter sources of data diminishes the validity of our results, a strength of the present approach is that different teachers evaluated the study children in the context of their classroom peers for each grade. Thus, the evaluation of socially withdrawn behavior was relatively independent from year to year. Also, the children's self-perceptions and their mothers' reports of asocial behavior and peer exclusion provided independent evidence that aligned with the teacher reports and that supported the use of our measure.

Conclusion

In conclusion, our results advance the study of social withdrawal in a number of ways. First, by using a cutting-edge statistical technique, we were able to identify diverging trajectories of social withdrawal over time. The varying predictors and contemporaneous variables provided significant information about the origins and processes guiding the increase or decrease of socially withdrawn behavior. Second, the long-term longitudinal nature of the NICHD SECCYD allowed us to evaluate various aspects of the Rubin theoretical model of pathways to social withdrawal. Although smaller studies over shorter time spans have provided valuable evidence that is related to various aspects of the model, our study is unique in that we were able to test and validate parts of the model more directly.

Additionally, we provided a longer-term longitudinal view of the withdrawn children with early poor inhibitory control—probably the so-called "active-immature" impulsive withdrawn children identified by Rubin and Mills (1988), Coplan et al. (1994) and Harrist et al. (1997). The social withdrawal literature in the past 10 years has focused more on shyness/social anxiety or on social withdrawal with, and without accompanying peer exclusion/rejection. Consequently, one of the contributions of the present study is the delineation of a social withdrawal pathway with earlier temperamental roots unrelated to shyness—a pathway worth further study, especially in light of the increasing pattern of withdrawal over time.

Although the body of work on social withdrawal has increased in recent years, continuing investigation of the patterns, predictors, processes, and outcomes of childhood social withdrawal is warranted. To that end, it will be important to track the ongoing consequences of patterns of social withdrawal in mid-adolescence and beyond in the SECCYD sample because other investigators have found that socially withdrawn children are at risk for subsequent problems of an internalizing nature (Morison & Masten, 1991; Ollendick et al., 1990; Rubin et al., 1995). This may be particularly relevant for the *Increasing* group. However, it is noteworthy that the children in the *Decreasing* group were still moderately solitary and significantly more lonely and withdrawn than the children in the *Normative* group in Grades 5/6, despite a declining social withdrawal trajectory. Although it is possible that the children in the *Decreasing* group will continue to improve and to be at lower risk for

mental-health problems in later years, it is also possible that the turmoil of the adolescent years may serve to deflect the decreasing withdrawal pattern of some of these adolescents and to place them at higher risk as well.

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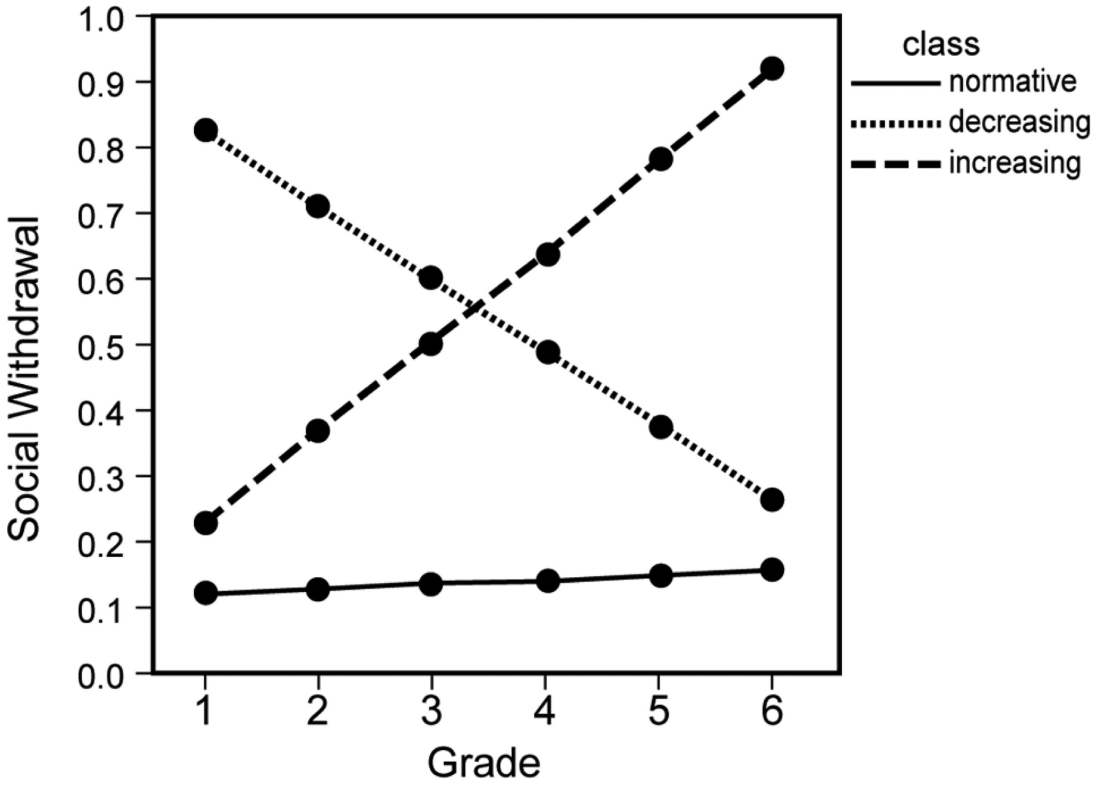

Figure 1.
Estimated means of social withdrawal from Grades 1 through 6 from the GMM analysis, for the *Normative*, *Increasing*, and *Decreasing* classes.

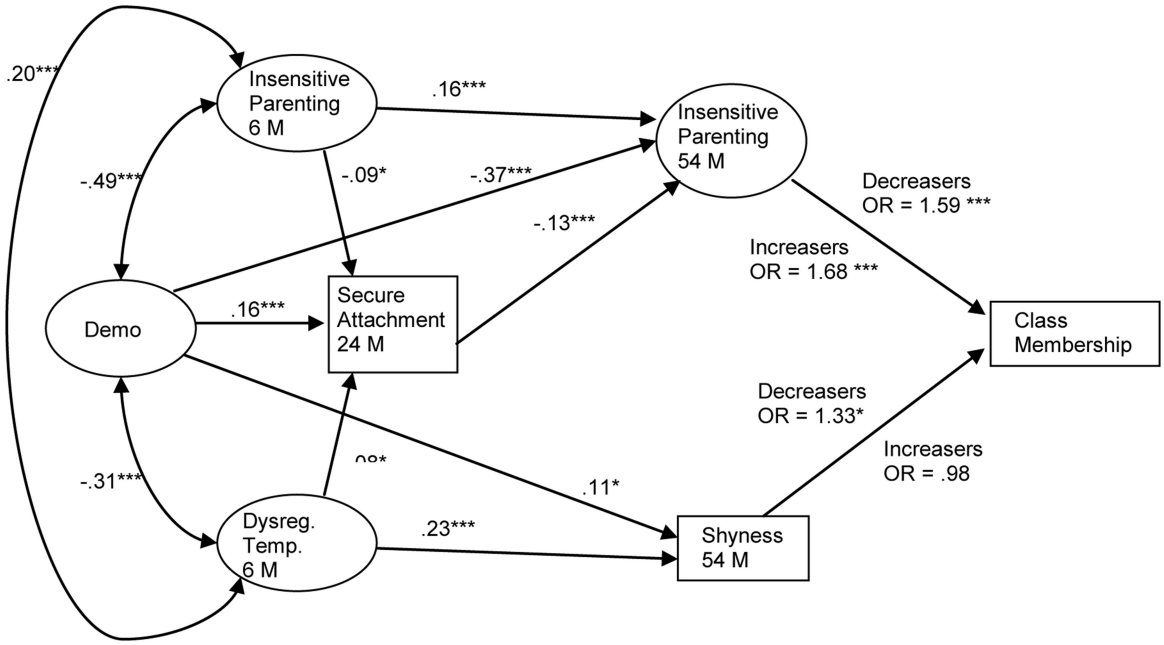

Figure 2.

Multinomial structural equation model predicting social withdrawal trajectory membership class with shyness at 54 months. The *Normative* class is the reference class (non-significant paths are not shown). *$p < .05$; ** $p < .01$; ***$p < .001$.

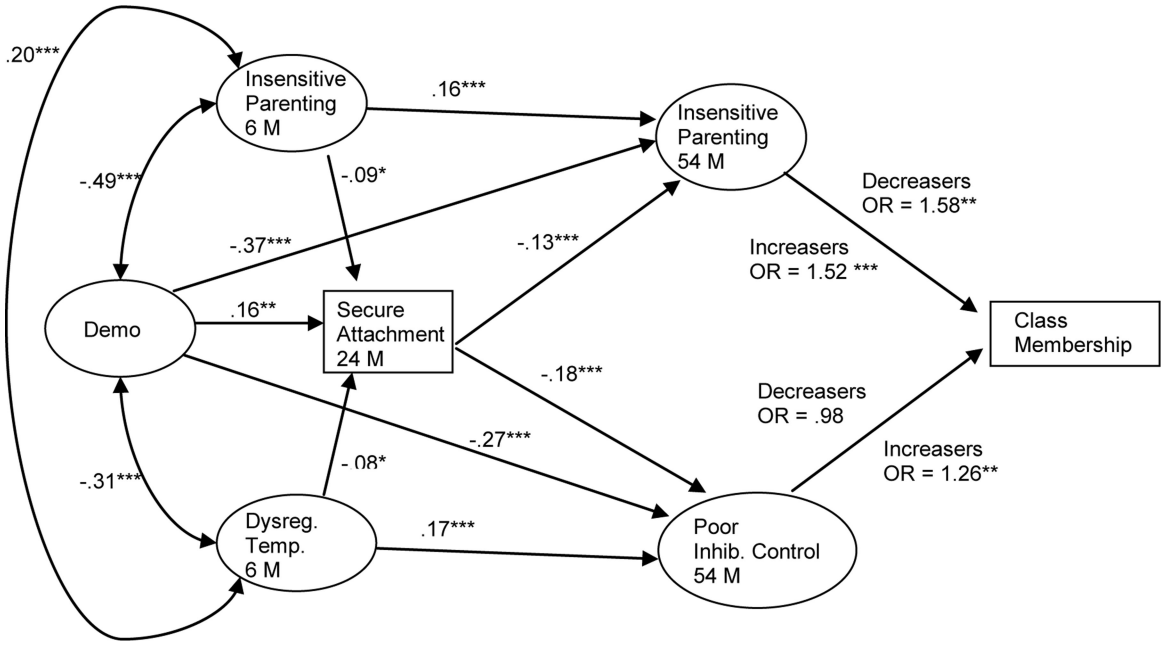

Figure 3.

Multinomial structural equation model predicting social withdrawal trajectory membership class with poor inhibition at 54 months. The *Normative* class is the reference class (non-significant paths are not shown). *$p < .05$; ** $p < .01$; ***$p < .001$.

Table 1

Means and Standard Deviations for Variables Used in Trajectory Analysis and Structural Equation Modeling

	M / %	SD
Social withdrawal trajectory variables		
Grade 1	.17	.26
Grade 2	.17	.25
Grade 3	.23	.30
Grade 4	.23	.30
Grade 5	.22	.30
Grade 6	.22	.31
SEM variables		
Maternal education (1 mo)	14.43	2.46
Income-to-needs ratio (6 mo)	3.63	3.17
Father in the home (6 mo)	86%	.34
Child male (%)	51%	
Approach (6 mo)[a]	2.40	.70
Mood (6 mo)[a]	2.88	.64
Adaptability (6 mo)[a]	2.24	.61
Intrusiveness (6 mo)	1.57	.76
Sensitivity (6 mo)	2.97	.72
Attachment (24 mo)	.29	.20
Shyness (54 mo)	3.52	1.06
Self-control (54 mo)	12.92	2.87
Inhibitory control (54 mo)	4.65	.74
Respect for autonomy (54 mo)	5.22	1.05
Supportive presence (54 mo)	5.17	1.23
Hostility (54 mo)	1.42	.82

Note. Data are in original scale form. Some variables were multiplied by a constant to increase their variance or reverse-coded for structural equation modeling.

[a]High scores on temperament variables at 6 months indicate more difficult temperament.

Table 2

Means, (Standard Deviations), and ANOVA Statistics for Social Withdrawal Scores by Trajectory Class

	Means (standard deviations)				ANOVA	
Grade	**Total (*N* = 1092)**	**Normative class (N) (*n* = 937)**	**Decreasing class (D) (*n* = 59)**	**Increasing class (I) (*n* = 96)**	***F* Statistic**	**Differences**
Grade 1	.17 (.26)	.12 (.17)	.90 (.40)	.22 (.20)	477.51***	D>I>N
Grade 2	.17 (.25)	.12 (.18)	.58 (.45)	.37 (.34)	172.19***	D>I>N
Grade 3	.23 (.30)	.17 (.23)	.51 (.42)	.58 (.44)	134.55***	I,D>N
Grade 4	.23 (.30)	.17 (.22)	.49 (.38)	.67 (.38)	202.84***	I>D>N
Grade 5	.22 (.30)	.15 (.21)	.42 (.39)	.77 (.40)	303.00***	I>D>N
Grade 6	.22 (.31)	.15 (.20)	.34 (.31)	.83 (.44)	354.47***	I>D>N

*** $p < .001$.

Table 3

Correlations Between Contemporaneous Variables and Social Withdrawal, Predictor Scores

	Asocial (Gr. 3)	Exclude (Gr. 3)	Asocial (Gr 6)	Exclude (Gr 6)	Lonely
Social Withdrawal, Grade 1	**0.19**	**0.12**	**0.12**	0.03	**0.16**
Social Withdrawal, Grade 2	**0.23**	**0.16**	**0.21**	**0.15**	**0.23**
Social Withdrawal, Grade 3	**0.26**	**0.14**	**0.22**	**0.10**	**0.17**
Social Withdrawal, Grade 4	**0.26**	**0.17**	**0.28**	**0.20**	**0.25**
Social Withdrawal, Grade 5	**0.20**	**0.13**	**0.25**	**0.20**	**0.27**
Social Withdrawal, Grade 6	**0.25**	**0.16**	**0.30**	**0.20**	**0.18**
Mother's education	0.00	−0.05	−0.02	−0.04	**−0.10**
Income-to-needs ratio	−0.05	**−0.06**	**−0.07**	**−0.08**	**−0.17**
Father lives in child's home	**−0.07**	**−0.15**	−0.06	**−0.07**	**−0.10**
Gender	0.04	0.00	0.05	−0.02	**0.07**
Approach (6 mo)	**0.07**	0.05	0.01	−0.06	0.04
Mood (6 mo)	0.06	0.05	**0.10**	0.04	0.04
Adaptability (6 mo)	**0.07**	0.06	0.04	−0.03	0.03
Intrusiveness (6 mo)	0.03	0.05	−0.02	0.00	0.00
Sensitivity (6 mo)	**−0.08**	**−0.07**	−0.04	−0.04	−0.04
Attachment (24 mo)	**−0.07**	**−0.12**	**−0.11**	**−0.15**	**−0.06**
Shyness (54 mo)	**0.18**	0.02	**0.09**	−0.04	−0.01
Self-control (54 mo)	**−0.08**	**−0.18**	**−0.12**	**−0.15**	**−0.16**
Inhibitory control (54 mo)	**−0.06**	**−0.18**	**−0.18**	**−0.19**	**−0.14**
Respect for autonomy (54 mo)	−0.04	**−0.12**	−0.03	**−0.06**	−0.05
Supportive presence (54 mo)	**−0.07**	**−0.11**	−0.04	**−0.10**	**−0.10**
Hostility (54 mo)	0.04	**0.15**	**0.06**	**0.09**	**0.08**

Note. $N = 1092$. Significant correlations are in bold. For correlations of at least $r = .06$ (absolute value), $p < .05$; for at least $r = .08$, $p < .01$; for at least $r = .11$, $p < .001$.

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Table 4

Means, (Standard Deviations), and ANOVA F Statistics for Contemporaneous Variables by Social Withdrawal Class and Gender

	Means (standard deviations)							*F* Statistic		
Variable	**Total (N = 1092)**	**Normative class (N) (*n* = 937)**		**Decreasing class (D) (*n* = 59)**		**Increasing class (I) (*n* = 96)**		**Class**	**Gender**	**Interaction**
		Girls (G)	**Boys (B)**	**Girls**	**Boys**	**Girls**	**Boys**	**(*df*=2)**	**(*df*=1)**	**(*df*=2)**
Asocial (3rd)	.27 (.34)	.23 (.30)	.25 (.30)	.45 (.45)	.47 (.30)	.46 (.44)	.50 (.48)	34.65*** D,I>N	.47	.04
Excluded (3rd)	.20 (.32)	.18 (.31)	.17 (.31)	.32 (.37)	.37 (.37)	.30 (.33)	.33 (.35)	15.83*** D,I>N	.44	.39
Asocial (6th)	.33 (.36)	.28 (.31)	.30 (.33)	.42 (.35)	.50 (.37)	.60 (.47)	.68 (.54)	47.71*** I>D>N	2.34	.52
Excluded (6th)	.24 (.39)	.22 (.39)	.19 (.36)	.30 (.40)	.26 (.44)	.44 (.43)	.51 (.50)	20.08*** I>N,D	.00	.80
Loneliness (5th)	25.67 (8.73)	24.53 (8.22)	25.26 (7.54)	27.33 (13.08)	32.44 (8.58)	28.61 (10.12)	32.38 (12.69)	26.02*** D,I>N	10.97** B>G	2.96

** $p < .01$

*** $p < .001$.

Table 5

Intercorrelations Among Social Withdrawal and Predictor Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1. Social withdrawal, Grade 1																					
2. Social withdrawal, Grade 2	**0.38**																				
3. Social withdrawal, Grade 3	**0.26**	**0.36**																			
4. Social withdrawal, Grade 4	**0.32**	**0.42**	**0.43**																		
5. Social withdrawal, Grade 5	**0.28**	**0.38**	**0.40**	**0.49**																	
6. Social withdrawal, Grade 6	**0.21**	**0.29**	**0.37**	**0.40**	**0.39**																
7. Mother's education	**−0.10**	**−0.13**	**−0.15**	**−0.14**	**−0.17**	**−0.15**															
8. Income-to-needs ratio	**−0.08**	**−0.12**	**−0.14**	**−0.13**	**−0.16**	**−0.12**	**0.52**														
9. Father lives in child's home	−0.03	**−0.08**	**−0.11**	**−0.13**	**−0.06**	**−0.17**	**0.28**	**0.35**													
10. Gender	−0.03	0.01	0.04	0.01	0.03	0.02	−0.04	−0.05	−0.02												
11. Approach (6 mo)	0.02	0.03	**0.08**	**0.10**	0.04	0.02	**−0.11**	**−0.12**	**−0.11**	**−0.09**											
12. Mood (6 mo)	0.03	0.03	0.05	**0.11**	0.05	0.06	**−0.08**	**−0.09**	**−0.10**	−0.03	**0.50**										
13. Adaptability (6 mo)	0.05	0.03	**0.10**	**0.11**	**0.07**	0.05	**−0.23**	**−0.22**	**−0.18**	−0.02	**0.66**	**0.51**									
14. Intrusiveness (6 mo)	0.05	**0.09**	0.05	0.04	0.05	**0.06**	**−0.28**	**−0.23**	**−0.14**	**0.07**	0.06	**0.08**	**0.15**								
15. Sensitivity (6 mo)	**−0.07**	**−0.12**	**−0.11**	**−0.07**	**−0.08**	**−0.10**	**0.37**	**0.29**	**0.21**	−0.05	**−0.09**	**−0.13**	**−0.19**	**−0.66**							
16. Attachment (24 mo)	**−0.06**	**−0.10**	**−0.10**	**−0.08**	**−0.06**	**−0.10**	**0.17**	**0.14**	**0.14**	**−0.14**	**−0.06**	**−0.12**	**−0.14**	**−0.17**	**0.17**						
17. Shyness (54 mo)	**0.13**	**0.08**	**0.11**	0.06	0.01	−0.01	0.02	0.03	**0.08**	−0.06	**0.19**	**0.12**	**0.15**	0.01	0.02	0.03					
18. Self-control (54 mo)	0.00	−0.01	−0.03	−0.04	−0.04	−0.06	**0.19**	**0.20**	**0.18**	**−0.08**	**−0.12**	**−0.19**	**−0.23**	**−0.12**	**0.14**	**0.21**	−0.01				
19. Inhibitory control (54 mo)	0.00	−0.01	**−0.07**	**−0.09**	**−0.07**	−0.03	**0.19**	**0.21**	**0.11**	**−0.17**	**−0.09**	**−0.18**	**−0.21**	**−0.13**	**0.13**	**0.23**	0.05	**0.61**			
20. Respect for autonomy (54 mo)	**−0.06**	**−0.09**	**−0.12**	**−0.10**	−0.06	**−0.11**	**0.34**	**0.23**	**0.25**	−0.04	**−0.12**	**−0.10**	**−0.18**	**−0.24**	**0.30**	**0.24**	0.05	**0.19**	**0.21**		
21. Supportive presence (54 mo)	**−0.11**	**−0.12**	**−0.13**	**−0.15**	**−0.12**	**−0.17**	**0.37**	**0.26**	**0.26**	0.01	**−0.16**	**−0.15**	**−0.22**	**−0.24**	**0.33**	**0.23**	−0.01	**0.17**	**0.18**	**0.72**	
22. Hostility (54 mo)	0.05	0.05	**0.12**	**0.07**	0.06	**0.13**	**−0.26**	**−0.18**	**−0.23**	0.00	0.05	0.02	**0.10**	**0.20**	**−0.24**	**−0.14**	−0.03	**−0.15**	**−0.14**	**−0.63**	**−0.61**

Note. $N = 1092$. Significant correlations are in bold. For correlations of at least $r = .06$ (absolute value), $p < .05$; for at least $r = .08$, $p < .01$; for at least $r = .11$, $p < .001$.

Table 6

Indicators and Factor Loadings for Confirmatory Factor Model

Factor	Indicator	Standardized factor loading
Fl-Demographics	Mother's education	.74[a]
	Income-to-needs	.69***
	Father in home	.45***
F2- Insensitive parenting, 6 months	Intrusiveness	.72[a]
	Sensitivity to non-distress[b]	.93***
F3- Dysregulated temperament, 6 months	Approach	.77[a]
	Mood	.61***
	Adaptability	.85***
F4- Insensitive parenting, 54 months	Respect for autonomy[b]	.85[a]
	Supportive presence[b]	.84***
	Hostility	.72***
F5- Poor inhibitory control, 54 months	Inhibitory control[b]	.79[a]
	Self-control[b]	.71***

[a] Loading fixed to 1.00.

[b] Scale was reversed.

*** $p < .001$.

Table 7

Factor and Variable Correlation Matrix for Confirmatory Factor Model

Factor/Variable	F1	F2	F3	F4	F5	Security
F1: Demographics	--					
F2: Insensitive parenting, 6 months	−.49***	--				
F3: Dysreg. temperament, 6 months	−.31***	.20***	--			
F4: Insensitive parenting, 54 months	−.49***	.38***	.22***	--		
F5: Poor inhibitory control, 54 months	−.34***	.18***	.28***	.27***	--	
Security, 24 months	.22***	−.18***	−.14***	−.25***	−.27***	--
Shyness, 54 months	.05	−.02	.19***	−.03	−.03	.03

*** $p \leq .001$.