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Kindergarteners' Self-Reported Social Inhibition and Observed Social Reticence: Moderation by Adult-Reported Social Inhibition and Social Anxiety Disorder Symptoms

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Abstract

Prevention of later anxiety problems would best be accomplished by identifying at-risk children early in development. For example, children who develop Social Anxiety Disorder (SAD) may show social withdrawal in the form of social inhibition (i.e., shyness with unfamiliar adults and peers) at school entry. Although the use of children's perceptions of their own social inhibition would provide insight into early risk, the utility of young children's self-reports remains unclear. The current study examined whether children deemed more extreme on social inhibition or social anxiety by adult report provided self-report of social inhibition that related to observed social reticence in the laboratory. Participants included 85 kindergarten children (36 female, 49 male), their parents, and their teachers. Moderation analyses revealed that children's self-reported social inhibition related significantly to observed social reticence under the conditions of high parent-reported social inhibition, high teacher-reported social inhibition, and high SAD symptoms. These results suggest that the most inhibited children are aware of their behavior and can report it in a meaningfully way as young as kindergarten age.

Keywords

Shyness; social inhibition; anxiety; self-report

The great prevalence of social anxiety and its precursors (e.g., shyness, social inhibition) demands accurate assessment early in development to aid in the prevention of these problems. Social anxiety is one of the more prevalent anxiety problems facing children and adolescents (Beesdo, Knappe, & Pine, 2009), affecting upwards of 7.5% of 2- to 5-year-old children (Franz et al., 2013), and social withdrawal, the broader category in which shyness and social inhibition reside, is the most frequent dysfunctional behavior in the internalizing spectrum identified by parents (Achenbach, 1995). The transition to kindergarten is a salient period for the recognition of these problems as children face new social challenges, such as interacting with perhaps the largest group of peers some children have encountered, making and managing friendships, and working with peers in classroom tasks (Early et al, 2002).

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Although parents and teachers are usually relied upon for the assessment of problematic behaviors (Mash & Hunsley, 2007), children may contribute to the early identification of their own risk for anxiety. Historically, informant discrepancies between adults and children have called into question the utility of young children's self-reports, resulting in weighting adult reports more heavily (De Los Reyes and Kazdin, 2005; DiBartolo, Albano, Barlow, & Heimberg, 1998). Rarely have these reports been examined in relation to a more objective assessment, such as observation of social reticence, which is crucial in understanding the potential contribution of child reports. Moreover, the function of children's self-reports in the context of ratings by other reporters remains relatively unknown. Recent theory and empirical work suggests the importance of understanding meaningful differences in discrepancies that have been observed between children and other informants and methods (i.e., observation) (Achenbach, 2011; De Los Reyes, 2011). The current study addresses these gaps by examining the relation of kindergarteners' self-reported social inhibition to observed social reticence in the context of parent- and teacher-report of social inhibition as well as symptoms of Social Anxiety Disorder from a parent interview.

Social Inhibition

Although Social Anxiety Disorder (SAD; also, Social Phobia) is most commonly diagnosed in adolescence, an increasing body of literature suggests that risk for SAD can be identified much earlier in development (Biederman et al., 2001; Hirshfeld-Becker et al., 2007). Dispositional risk for SAD may first be shown by infants and toddlers demonstrating high levels of inhibited temperament (also, fearful temperament or behavioral inhibition; Kagan, Reznick, Clarke, Snidman, & Garcia-Coll, 1984), which is at least partly heritable and biologically based, and is manifested behaviorally as reacting to novelty with wariness, hesitance, and avoidance (Kagan et al., 1984). In school age children, this disposition is typically assessed as social inhibition (also, shyness), which is withdrawn or avoidant behavior in the presence of unfamiliar people (Rubin, Coplan, & Bowker, 2009). Like inhibited temperament, social inhibition is conceptualized as coming from anxiety-based processes within the child, which can be differentiated from withdrawal resulting from external influences (e.g., peer rejection) or lack of interest in social interactions ("social disinterest;" Coplan & Armer, 2007; Rubin et al., 2009). Although inhibition to a variety of stimuli (objects, people, situations) is linked to SAD diagnosis and symptoms (Biederman et al., 2001; Buss et al., 2013; Hirshfeld-Becker et al., 2007), social inhibition is particularly relevant to risk for SAD (Van Ameringen, Mancini, & Oakman, 1998).

Common survey measures of social inhibition and shyness ask about inhibited behavior demonstrated with both unfamiliar peers and adults (e.g., Armstrong, Goldstein, & The MacArthur Working Group on Outcome Assessment, 2003), although some measures focus exclusively on peers (Coplan, Prakash, O'Neil, & Armer, M, 2004). When assessed observationally, the behavioral manifestation of social inhibition has been termed "social reticence" and is demonstrated by watching and hovering near peer activity without interacting (Rubin et al., 2009). Reticent behavior, more than other types of solitary activity, has been theorized to reflect approach-avoidance conflict indicative of anxiety in the presence of social novelty (Asendorf, 1990). Indeed, reticence, but not solitary-passive or solitary-active play, has been related to observed and mother-reported anxiety, hovering, and

wariness (Coplan, Rubin, Fox, Calkins, & Stewart, 1994). Social inhibition and social reticence fall under the larger umbrella of social withdrawal (Rubin et al., 2009). This superordinate term also includes "anxious solitude," which indicates withdrawal behaviors with familiar peers (Gazelle, Workman, & Allan, 2010), but this latter aspect of social withdrawal is not the focus of the current study.

Although social inhibition and social reticence are not inherently problematic, their links to psycho-social indicators of functioning suggest that identifying socially inhibited children for intervention may be important at the beginning of formal schooling, especially because such behaviors are present prior to school entry (Coplan et al., 1994). Social inhibition is linked with SAD, as well as other internalizing, academic, and peer relationship problems (Coplan & Armer, 2007; Coplan, Findlay, & Nelson, 2004; Rubin et al., 2009; Rubin, Wojslawowicz, Rose-Krasnor, Booth-LaForce, & Burgess, 2006), and demonstrates moderate stability from preschool through early adulthood (Rubin et al., 2009; Coplan et al., 1994). Accurate identification of social inhibition, however, remains a difficult task. Because information often varies across sources, conclusions about whether socially avoidant behaviors are problematic for a child may depend upon the informant (De Los Reyes & Kazdin, 2005). Child self-report would provide an expedient assessment of social inhibition and may be particularly predictive of diagnosis and treatment gains should prevention or intervention be sought (Brown-Jacobsen, Wallace, and Whiteside 2011; Panichelli-Mindel, Flannery-Schroeder, Kendall, & Angelosante, 2005). The role of child self-report in the context of other available reporters remains unclear, especially for younger children. Theory and empirical work on informant discrepancies support efforts to gain a more nuanced understanding of children's self-reports of social inhibition.

Informant Discrepancies

Broadly speaking, discrepancies between parent- and child-reports of internalizing problems such as anxiety and social inhibition occur frequently (De Los Reyes & Kazdin, 2005; Edelbrock, Costello, Dulcan, Conover, & Kala, 1986; Reuterskiold, Öst, & Ollendick, 2008) and in patterns that appear similar across cultures (Cosi, Canals, Hernandez-Martinez, & Vigil-Colet, 2010; Rescorla et al., 2013; Salbach-Andrae, Klinkowski, Lenz, & Lehmkuhl, 2009). The direction of discrepancies has varied across studies: some find that children report higher levels than parents (Edelbrock et al., 1986; Karver, 2006), and others find the opposite pattern (DiBartolo et al., 1998; DiBartolo & Grills, 2006; Kemper, Gerhardstein, Repper, & Kistner, 2003). A variety of sample characteristics (e.g. community versus clinic, age, etc.) might account for why parents report higher levels of child internalizing symptoms than children self-report in some samples, and why for other samples the reverse pattern is found. For example, research suggests that in community samples, children tend to report higher levels than parents of internalizing problems (Cantwell, Lewinsohn, Rohde, & Seeley, 1997), whereas in clinic samples, the results have been mixed. Some research indicates that children report higher levels (Edelbrock et al., 1986), but other research indicates that children report lower levels of internalizing problems than parents (Ivens & Rehm, 1988).

Explanations to account for informant discrepancies have relied primarily on one of two perspectives: 1) discrepancies are the result of inaccurate reporting or measurement error (Dadds, Perrin, & Yule, 1998; DiBartolo et al., 1998), and 2) discrepancies represent meaningful differences due to the unique information that informants bring to the assessment, arising because of individual perspectives on particular behaviors in specific contexts (Achenbach, 2011; De Los Reyes, 2011; De Los Reyes & Kazdin, 2005). The former explanation might be invoked to suggest that when young children's reports do not match those of other reporters, they are inaccurate and should be disregarded. The latter explanation is a more recently pioneered perspective on how discrepancies can provide meaningful information for the assessment of socioemotional and clinical problems, due to the different kinds of information that are provided by different informants. De Los Reyes and Kazdin (2005) proposed the Attribution Bias Context Model as a theory-based framework within which to understand informant discrepancies. In this model, parent and child characteristics as well as the context of the behavior relate to variability among reporters. Furthering this theory, De Los Reyes (2011) has argued that informant agreements/discrepancies tend to be stable over time and provide valuable information about the development and maintenance of child psychopathology.

Empirical work supports this position. Discrepancies have been found to relate to characteristics like response bias tendencies (DiBartolo et al., 1998; Stokes, Pogge, Wecksell, & Zaccario, 2011) and psychopathology (De Los Reyes & Kazdin, 2005; Hughes & Gullone, 2010; Youngstrom, Findling, & Calabrese, 2004) in children and parents, and to predict poor treatment outcomes for 7- to 16-year-old children and adolescents (De Los Reyes, Alfano, & Beidel, 2009). Specifically within the anxiety spectrum, the behavioral consequences of different kinds of problems and the contexts in which those behaviors occur might result in different levels of report by different observers. For instance, Brown-Jacobsen and colleagues (2011) found that parents reported higher levels of separation anxiety disorder but children (ages 7 – 18 years) reported higher levels of generalized anxiety disorder (GAD). The behavioral consequences of separation anxiety might have been more salient for parents than children, and vice versa for GAD.

Although evidence suggests that informant discrepancies are the result of meaningful differences in the data contributed by different informants, there remains a question about which informant's report will drive decisions about what constitutes clinically significant concerns, particularly in settings where diagnostic decisions are important. Parent-child disagreement may result in parent-report being weighted more heavily than children's concerns (DiBartolo et al., 1998; Hawley & Weisz, 2003; Kramer et al., 2004; Loeber, Green, & Lahey, 1990). Child-reported social inhibition, however, might offer useful information about potential areas of clinical concern because parents, and even teachers, may not be privy to all contexts in which this behavior occurs. Indeed, convergence between child- and parent-report of anxiety symptoms has been shown to predict both clinician diagnosis and treatment response better than parent-report alone (Brown-Jacobsen et al., 2011; Panichelli-Mindel et al., 2005).

Some research suggests that self-report by younger, versus older, children correlates more highly with parent-report about the child (Choudhury, Pimental, and Kendall, 2003).

However, other research shows better agreement with older than younger children (Grills & Ollendick, 2003; Edelbrock et al., 1986; Reuterskiold et al., 2008) and suggests further evidence may be needed. Specifically, future research might examine children's self-reports in the context of other reporters who see children's behavior across contexts (i.e., both parents and teachers) to understand the nature of convergence or divergence, as suggested by calls for more nuanced understanding of informant discrepancies (De Los Reyes, 2011). In order to understand whether children can contribute to the identification of their own risk for later anxiety at an age when early intervention may be most beneficial, we need to understand the role of children's self-reported social inhibition early in childhood among other reporters.

Research in this area has not commonly used a methodology able to evaluate how reports from multiple informants relate to a distinct, empirical criterion, such as observation. The few notable exceptions that do exist suggest that children, parents, and teachers, as well as convergence among adult reporters, contribute unique information about problem behaviors and their salient contexts (De Los Reyes, Henry, Tolan, & Wakschlag; 2009; DiBartolo & Grills, 2006). Cobham and Rapee (1999) examined the accuracy with which mothers and their 5- to 14-year-old children predicted the proximity with which children would approach a large dog and how much subjective fear children would experience. They found that children and their mothers were equally accurate in predicting how close the children would approach, but that children's predictions of subjective ratings of fear were more accurate in relation to what they actually experienced than their mothers' predictions. Notably, no effects of age existed, suggesting that children at the beginning of formal schooling were equally accurate in predicting their own anxious behavior as older children. No studies have examined multiple reports of social inhibition or SAD symptoms, and how children's self-reports may converge with these, in relation to an observational criterion, which would more clearly indicate the usefulness of children's self-reports in identifying risk for later SAD.

Recent work points to the utility of using moderation analyses to understand convergence or divergence among reporters in line with theory on informant discrepancies. Using polynomial regression analyses, Laird and De Los Reyes (2013) showed that examining the interaction between parent and adolescent report of adolescent-parent conflict, adolescent puberty, and adolescent rule-breaking behavior more precisely identified distinct combinations of reports that related to adolescent depression and antisocial behavior, as compared to using difference scores. In their study, interaction terms accounted for significant variance in adolescent antisocial behavior and depression, above and beyond parent and adolescent reports individually. As one example, adolescent-reported rule-breaking behavior predicted higher levels of antisocial behavior in the context of high, rather than low, parent-reported rule-breaking behavior. We suggest that such an examination of the interactions between child report, on the one hand, and adult reports of social inhibition and interview responses about SAD symptoms, on the other, in relation to observation of social reticence may most appropriately highlight the relevance of child report.

The Current Study

The present study aimed to understand the relation between kindergartners' self-reported social inhibition and laboratory-observed reticence in the context of other reporters' assessments. Specifically, we hypothesized that self-reported social inhibition would relate most strongly to observed reticence when parents and teachers also reported high levels of social inhibition and when parents endorsed a greater number of symptoms of SAD on a clinical interview. In other words, we expected that children who, by adults' perspectives, are shy and inhibited, would be aware of their social inhibition. This investigation contributes to the extant literature in several ways. First, little is known about the self-report of social inhibition in children as young as kindergarten age. Given that adjustment to formal schooling may highlight proneness to social and emotional difficulties and be an opportune time for prevention and early intervention, it is important to understand whether children's self-reports contribute useful information to identification of these problems at this age. Second, although much research has compared children's self-reports to parent-report of adjustment difficulties and diagnostic symptoms, relatively few studies have examined these reports in relation to observational measures. Our focus on the confluence of reports in relation to observed social reticence contributes to the validation of children's self-reports and the growing area of informant discrepancies. We examined the relation between children's self-reported social inhibition in the context of both parents' and teachers' reports of children's social inhibition, as well as in the context of symptoms of SAD, as assessed by parent clinical interview.

Method

Participants

Participants came from a larger longitudinal study (n = 111) of risk for anxiety-spectrum problems across early childhood (Buss et al., 2013). In the larger study, children were assessed at ages 2, 3, 4, and in the kindergarten year. Families were originally recruited through direct mailings based on birth announcements published in local newspapers. The current study focuses on the 85 children (36 [42%] female) whose families participated in at least one aspect of the kindergarten assessment. Children ranged from 61.14 to 80.53 months of age (M = 70.49 mo, SD = 4.07 mo) at the time of the first kindergarten assessment. This sample was predominantly (95.3%) European American (1.2% African American, 1.2% Asian American, 1.2% Hispanic/Latino, and 1.2% not reported) and was, on average, middle class (Hollingshead Index *Mean* = 48.12) but represented the range of socioeconomic status (SES) (*Range* = 17 – 66).

Procedure

All procedures occurred under campus IRB oversight. Families who participated in the larger longitudinal study were contacted shortly before their children entered kindergarten to assess their interest in participating in a multi-part assessment throughout the kindergarten year. When a parent agreed to participate, laboratory staff scheduled an initial laboratory visit (the first of two) for the child and parent during the fall of the kindergarten year. Staff mailed a consent form and battery of questionnaires (including a parent-report measure of

the child's social inhibition) to be completed by the parent prior to the visit (typically within one week), at which children would provide self-report on their social inhibition. Specifically, the child completed the Berkeley Puppet Interview (BPI; Measelle, Ablow, Cowan, & Cowan, 1998), during which she or he reported on socially inhibited behaviors. The parent(s) accompanying the child remained in another room during the interview so as not to influence the child's report, but the child was able to ask for breaks to check in with the parent. Children received a small prize after completing the interview. Children also participated in several tasks that are not included in the current study. Parents also provided consent to contact the child's kindergarten teacher.

In the spring of the kindergarten year, teachers who expressed interest in participating in the study provided consent and completed a questionnaire about participants' social-emotional adjustment, including social inhibition. Also in the spring, parents provided separate consent for children to participate in a laboratory peer-visit, in which groups of 3–4 same-sex participants engaged in a 15-minute free play episode as part of the activities under the Play Observation Scale (POS; Rubin, 2001). Children were provided with a variety of activities and instructed to play "however you like."

In the summer, and after the child reached age 6, a subset of parents (n = 51; based on the goals of the larger study from which these data were derived; Buss et al., 2013) were invited to complete a semi-structured interview about their children's anxiety symptoms after the child's 6th birthday. Participants were selected based upon indicators of heightened risk for Social Anxiety Disorder (e.g., observed fear/withdrawal and parent report in toddlerhood or in kindergarten). Although this putatively restricts variability and creates a relatively homogenous subsample, it also functions to provide a conservative test of the impact of SAD symptoms as a moderator, such that having a high score in this distribution requires being relatively anxious even among anxiety-prone children.

Measures

Children's self-reported social inhibition—During the BPI, the experimenter introduced the child to two identical plush dog puppets (used and recommended by the authors of the BPI) named Iggy and Ziggy, who offered contrasting statements about a particular behavior and then asked the child, "How about you?" The child could answer the question by verbally providing a statement or pointing to a puppet. The puppets alternated in terms of which one spoke first and which on offered positively versus negatively valenced items in order to avoid the child forming an alliance with one puppet. The BPI has previously been shown to be a reliable and valid measure, with subscales relating to similar scales reported by parents and teachers (Measelle et al., 1998). Questions about a variety of behaviors were asked, although the Social Inhibition scale was the focus of the current study. Responses to the items ("When I meet new kids, I'm not shy"/"When I meet new kids, I am shy;" "When I'm around kids I don't know, I get quiet"/"When I'm around kids I don't know, I don't get quiet;" "It makes me nervous and shy to ask other kids to play"/"It doesn't make me nervous to ask other kids to play;" "I worry if other kids will like me"/"I don't worry if other kids will like me;" "When I meet new grown-ups, I'm not shy"/"When I meet new grown-ups, I am shy;" "When I'm around people I don't know, I don't feel

scared"/"When I'm around people I don't know, I feel scared") were scored on a 1 to 7 scale, with direct agreement with a puppet scored as 2 (choosing the response not indicative of social inhibition) or 6 (choosing the response indicative of social inhibition), embellished responses scored as 1 or 7 for the appropriate direction (e.g., "I never/always do that"), tempered responses (e.g., "I don't get very quiet"/"I'm kind of quiet") scored as 3 or 5, and neutral responses (e.g., "I do both of those things") that did not change after an additional prompt scored as 4. Raters established inter-rater reliability on practice cases prior to coding participants and double-scored 20% of cases throughout coding to prevent drift (ICC = .98). Each coder remained blind to the other's scores when completing reliability coding. When discrepancies became apparent after comparing reliability scoring on a particular case, coders met to discuss the source of discrepancies to maximize agreement on future cases. The 6 items comprising the social inhibition scale demonstrated internal consistency that was somewhat low (alpha = .64). We examined scale alphas when individual items were deleted as well as a principle components analysis (PCA) of items. These analyses suggested that one item ("When I'm around kids I don't know, I get quiet"/"When I'm around kids I don't know, I don't get quiet") did not inter-relate with the other items as well as the others. Specifically, two components emerged in the PCA (explaining 37.42% and 17.68% of the variance, respectively). The other five items loaded at or above .50 on the first component, and this item loading at .32 on the first component and at .79 on a second component. This item was dropped, and the remaining five items demonstrated a somewhat higher alpha (.67). A second PCA revealed that all items loaded at or above .48 on a single component explaining 43.72% of the variance. The alpha for the current study is consistent with internal consistency found with kindergarteners in the validation study of the BPI (alphas = .63 to .78, Measelle et al., 1998). Therefore, the mean of the remaining five items comprised the final variable of self-reported social inhibition.

Parent and teacher report of social inhibition—During the kindergarten year, mothers and teachers completed the Social Inhibition scale of the McArthur Health Behavior Questionnaire (HBQ; Armstrong, et al., 2003), which has been found to be a valid and reliable measure of symptoms and impairments in functioning in 4–8 year-old children. The three items assessing social inhibition (e.g., "Shy with other children") were scored on a 3 point Likert-style scale (0 = *rarely applies*, 1 = *applies somewhat*, 2 = *certainly applies*). The mean of items was computed for parents (alpha = .77) and teachers (alpha = .69).

Mothers also completed the Child Social Preference Scale (CSPS; Coplan, Prakash et al., 2004), which differentiates between shyness/social inhibition and social disinterest. This 11-item measure asks parents to read items reflecting isolation from peers and rate how much their own child shows the behavior on a 1 (*not at all*) to 5 (*a lot*) scale. The current study utilized the Shyness subscale (7 items; e.g., "My child seems to want to play with other children, but is sometimes nervous to"), which has previously been shown to be internally consistent (alpha = .86) and to relate to observed social reticence (Coplan, Prakash et al., 2004). Internal consistency in the current study was similarly high (alpha = .87). The mean of items comprised the final score.

The parent-report HBQ Social Inhibition scale and CSPS Shyness scale were correlated ($r[75] = .51$, $p < .001$), and a principal components analysis suggested they comprised one

component that explained 75.15% of the variance in the measures (each loading = .87). This principal component was used as the final measure of *parent-reported social inhibition*. Because only the HBQ was available from teachers, the mean of HBQ items comprised *teacher-reported social inhibition*.

Parent interview for social anxiety symptoms—Select parents (n = 51) were interviewed with the Anxiety Disorders Interview Schedule (ADIS) Child Version (Silverman & Albano, 1996). The current study utilizes responses to the Social Anxiety Disorder portion of the interview, which establishes evidence for three criteria of the disorder: (1) fear of social/performance situations, (2) avoidance of or marked distress when faced with these situations, and (3) interference of these problems with the child's functioning. Interviewers were trained to administer the interview by a licensed clinical psychologist, with whom they established adequate reliability (kappa = .80 across criteria [rather than individual questions or the overall diagnosis] of all assessed disorders, including SAD) on practice cases prior to interviewing participants. The licensed clinical psychologist reviewed 20% of video-recorded interviews to ensure fidelity to the interview and reliable scoring, and interviewers double-scored 10% of each other's cases while blind to original scoring to ensure high inter-rater reliability (kappa = .97). The current study used a count (0–3) of the number of SAD criteria met.

Observation of social reticence—Reticence was scored using the guidelines established in the Play Observation Scale (Rubin, 2001). Each 10-second epoch of the 15-minute free play was scored by trained coders for a participant's predominant type of play. Reticent behaviors were scored when the child engaged in unoccupied (e.g., staring into space, wandering without purpose) or onlooking (watching other children's activities without joining in) behavior, suggesting the child was interested in other children's activities but did not join in. This follows both theory (Asendorpf, 1990) and empirical work (Coplan et al., 1994; Coplan et al., 2004; Rubin et al., 2002) linking the aggregate of these two specific behaviors to social approach-social avoidance conflict, social inhibition, and constructs pertinent to children's anxiety-spectrum development. Coders maintained adequate inter-rater reliability throughout coding (% agreement [total agreements divided by total observations being compared] = .93, kappa = .61 [see Feinstein & Cicchetti, 1990 for disadvantages associated with kappa as a measure of reliability when data include a disproportionate number of zero values], calculated on 10% of cases with each contributing 80–90 observation points). The final measure of *social reticence* resulted from taking the proportion of codable epochs (90% of all possible epochs) in which the child's predominant behavior was unoccupied or onlooking. This measure of reticence has been theorized to reflect social approach-social avoidance conflict (Asendorpf, 1990) and shown to be related to temperamental inhibition and risk for later anxiety-spectrum problems (e.g., Coplan et al., 1994; Rubin, Burgess, & Hastings, 2002; Rubin et al., 2009) and has previously been used to validate other reports of social functioning (e.g., Rubin & Clark, 1983).

Results

Missing Data

Of the 85 families who participated in the kindergarten assessment, 2 did not have parent-report, 31 did not have teacher-report, 11 did not have children's self-report, and 15 did not have observed reticence, resulting in 17.65% of these observations missing. *T*-tests performed between those who had complete data versus those who did not revealed no differences in socioeconomic status or non-missing kindergarten measures (*t*s < 1.70, *p*s > .05). A non-significant Little's MCAR test ($\chi^2_{[42]} = 50.63$, $p > .05$) suggested that missingness was consistent with the missing completely at random pattern. Following current guidelines for modern approaches to handling missing data (e.g., Graham, 2009), multiple imputation was used to impute missing data. All kindergarten measures as well as child gender (included as an auxiliary variable [Graham, 2009] so that effects of gender on imputed variables could be most accurately determined) were included in the algorithm, and data were imputed across 20 imputations. All analyses, with one exception noted below, use this imputed data set ($n = 85$ for all variables), with each variable's imputations averaged into a single variable to facilitate the computation of model fit statistics and probing of interactions.

Given that only a subset of participants completed the ADIS based on pre-selected criteria, ADIS scores were not imputed. Rather, primary analyses involving the ADIS used this reduced sample ($n = 51$). Compared to mothers who were not interviewed, mothers who completed the ADIS interview had higher scores on the principal component of parent-reported social inhibition (interviewees: $M = 0.22$, $SD = 1.03$; non-interviewees: $M = -0.32$, $SD = 0.77$; $t = -2.63$, $p = .010$), and children of interviewed mothers were scored higher on social reticence from the peer visit ($M = 1.06$, $SD = 0.06$) compared to children of mothers who were not interviewed ($M = 1.04$, $SD = 0.03$). This is not surprising given that interviewees were chosen based on children demonstrating increased risk for anxiety on parent-report and observational measures. They did not differ on teacher-reported ($t = -0.38$, $p = .704$) or self-reported social inhibition ($t = -1.41$, $p = .164$), nor did they differ on the demographic characteristics of SES ($t = -0.10$, $p = .920$) or gender ($\chi^2 = 2.01$, $p = .157$).

Preliminary Analyses

Descriptive statistics were computed prior to imputation and are presented in Table 1. Observed social reticence was somewhat skewed (skew = 2.57), so it was subjected to a square root transformation, which decreased the skew (skew = 2.30). No other transformations further reduced skew. Bivariate relations, assessed with imputed variables, are also presented in Table 1. Notably, self-reported social inhibition did not relate to the other sources at the bivariate level. Parent and teacher report had a moderate relation. Possibly, differences in the size of bivariate relations among reporters was due to shared method variance attributable to parents and teachers completing the same questionnaire. Recall, however, that parents completed an additional questionnaire that was used in creating a principal component. Parent-reported social inhibition related fairly substantially to observed social reticence. Expectedly, parent-reported social inhibition and Social Anxiety Disorder criteria derived from the ADIS were also related. Primary study variables

did not relate to SES, child age, or child gender, so these variables were not considered further.

Moderation Analyses

The interactions between self-reported social inhibition and each of the other sources in relation to observed social reticence were tested in multiple regression analyses. Given the significant associations among potential moderators, they were tested in separate models. Following Laird and Des Los Reyes (2013), quadratic effects for children's self-reported social inhibition and adult reports (parent- and teacher-report, SAD symptoms from parent interviews in relevant analysis) were included in their respective models. If they were not included, unmodeled quadratic effects could then influence the interaction term (Cohen, Cohen, West, & Aiken, 2003; Ganzach, 1997). Specifically, when predictors are correlated (as they are in our study), their quadratic terms will be correlated with the interaction term. It is possible that when the true relation between a predictor and outcome is curvilinear and this is not modeled, a spurious interaction effect is detected. Modeling the variance associated with quadratic effects parses it from the interaction term, allowing for the detection of an interaction effect that does not overlap with this variance.

Variables were centered at their means prior to creating interaction and quadratic terms. All terms were entered simultaneously. Significant interactions were probed by recentering the moderator at standard values (−1 and +1 SD) in addition to the mean and examining the simple slope for self-reported social inhibition. Notably, no quadratic effects emerged as significant for children's self-reports, so only linear simple slopes were examined. Cohen's f^2 and squared semi-partial correlations (sr^2) are included as measures of effect size for models and individual coefficients, respectively.

A summary of the regression analyses is presented in Table 2, and simple slopes of significant interactions are presented in Figure 1. In Model 1 (R^2 = .53, F[5, 79] = 17.77, p < .001, f^2 = 1.13), parent-reported social inhibition moderated the relation between children's self-reported social inhibition and observed social reticence, and this interaction added significant variance to what the model predicted in social reticence (ΔR^2 = .04, F[1, 79] = 7.31, p = .008, f^2 = 0.04). Specifically, children's self-reports did not relate to observation at low values of parent-report (β = −0.02, t = −0.18, p = .860, sr^2= .0002), but they did relate at mean (Table 1) and high values (β = 0.40, t = 3.43, p = .001; sr^2 = .070) of parent-reported social inhibition. Given that parent-report related so strongly to observed reticence at the bivariate level, it was important to determine whether children's self-reported social inhibition contributed to the strength with which parent-report related to social reticence. Therefore, we re-probed this interaction to determine what effect child self-report had on the relation between parent-reported social inhibition and observed reticence. Although significant across levels, the association between parent-reported social inhibition and observed reticence increased from low (β = 0.29, t = 2.39, p = .019, sr^2 = .034) to mean (β = 0.50, t = 5.95, p < .001, sr^2 = .211) to high (β = 0.71, t = 6.62, p < .001, sr^2 = .261) values of children's self-reported social inhibition, indicating that the strength of parent report seemed to also improve as it converged more strongly with child self-report, and that

the highest levels of social reticence occurred when both reporters indicated high levels of social inhibition.

In Model 2 (R^2 = .20, F[5, 79] = 3.98, p = .003, f^2 = 0.25), teacher report acted as a significant moderator, and this interaction added significant variance to what the model predicted in social reticence (ΔR^2 = .13, F[1, 79] = 12.38, p = .001; f^2 = 0.15). Probing of the interaction revealed that self-reported social inhibition did not relate to observed social reticence at low (β = −0.16, t = −1.08, p = .282, sr^2 = .012) or mean values (Table 1) of teacher report, but it did relate at high values (β = 0.56, t = 3.62, p = .001, sr^2 = .133).

In Model 3 (R^2 = .19, F[5, 44] = 2.00, p = .098, f^2 = 0.23), a significant interaction also occurred between self-reported social inhibition and SAD symptoms, and this interaction added significant variance to what the model predicted in social reticence (ΔR^2 = .08, F[1, 44] = 4.11, p = .049, f^2 = 0.09). Self-reported social inhibition did not relate to observed reticence at low (β = −0.08, t = −0.37, p = .714, sr^2 = .003), or mean values of SAD symptoms (Table 1) but it related to observation at high (β = 0.70, t = 2.36, p = .023, sr^2 = .103) SAD symptoms. These results suggest that when other reporters endorse higher levels of children's social inhibition, children's reports of their own social inhibition more strongly related to observed social reticence.

Discussion

The current study aimed to understand the extent to which and under what conditions kindergarteners' self-reported social inhibition related to observed social reticence. Specifically, we examined bivariate relations and also focused on severity of social inhibition and SAD symptoms contributed by other reporters (parents and teachers) as moderators of this relation.

In bivariate relations, children's self-perceptions of social inhibition did not relate to other informants' reports of social inhibition or SAD symptoms. This is consistent with previous work demonstrating low associations between children's self-reports and parent-report of psychological symptoms and adjustment (De Los Reyes & Kazdin, 2005). The current study augments these findings by focusing on children at the beginning of formal schooling. Parent- and teacher-report, on the other hand, related to each other. It is possible that parents' reports correlated more highly with teachers' reports due to shared method variance, as they completed one questionnaire in common. However, parent-reported social inhibition was a principal component representing shared variance between two questionnaires, one of which teachers did not complete, and parent-report related most highly to observed social reticence. These two results suggest it may not have been simply shared method variance that determined higher agreement between the adult-reporters than between either of them and children's interview responses. More complex analyses suggest more nuanced relations among these constructs.

Moderation occurred such that children's self-reported social inhibition related to observed social reticence at higher levels of parent- and teacher-reported social inhibition and parent-reported social anxiety symptoms. In other words, when adults perceived children to be

higher in risk for social anxiety as indicated by higher ratings of social inhibition, or higher in current symptoms of social anxiety, children's self-perceptions were reflected in their observable behavior. This appears to reflect a confluence of agreement about which children are the most socially inhibited. Recent research has suggested that this type of congruence may most strongly indicate psychopathological processes (Laird & De Los Reyes, 2013). In addition to psychopathological processes, another cause of congruence may stem from children's awareness of adults' concerns about their socially inhibited behavior. Self-awareness may be a consequence of exposure to parents' and teachers' discussions of their social inhibition.

Questions exist in the literature as to the validity of children's self-reports of psychological symptoms and adjustment, especially at younger ages (De Los Reyes & Kazdin, 2005; DiBartolo et al., 1998). The current study suggests that some children as young as kindergarten age can recognize when they are socially inhibited. This is important for the identification of children at risk for anxiety-spectrum problems both within research and clinical contexts. Specifically, some of the children who are most at risk seem to be able to report their internal experiences of anxiety-based social withdrawal relatively accurately, suggesting their reports may be useful for early identification of prevention targets. However, given that high levels of self-reported social inhibition by themselves did not relate to higher levels of observed social reticence, not all at-risk children may be captured by self-report. It will be important for future work to determine whether other moderators strengthen the relation between self-report and observation for these other children.

Another way to interpret these results is in the framework of informant discrepancies. In the theoretical Attribution Bias Context model delineated by De Los Reyes and Kazdin (2005), discrepancies are understood to reflect the influence of the context of the behavior as well as individual characteristics that contribute to reporting. Rather than reflecting measurement error or unreliability, the extent of agreement or disagreement is meaningful and may be modeled to understand problem behavior. As a statistical approach to empirically test the meaning of convergence versus divergence of reports, Laird and De Los Reyes (2013) used interaction terms to understand how one informant's report relates to an outcome in the context of another person's report. In their study, parent-adolescent congruence in externalizing behaviors related to higher levels of adolescent antisocial behavior. The current study found similar results, but within the internalizing domain. Congruence related to observed social reticence, whereas discrepancies related to lower reticence. The extent of congruence related meaningfully to observed social reticence, above and beyond each individual informant.

The importance of this may best be seen when considering self- and parent-report of social inhibition in relation to observed social reticence. Given the substantial bivariate correlation between parent-reported social inhibition and observed social reticence, it would be reasonable to question whether children's self-reports can augment information provided solely by parents. Given the absence of a bivariate relation between children's self-reports and observed social reticence and the existence of a significant interaction between child- and parent-report, the contribution of children's self-reports is likely not additive, but multiplicative. Indeed, in addition to parent-report providing a context in which child self-

report related meaningfully to observation, child-report influenced the strength with which parent-report related to observation. Parent-report was most highly associated with observed social reticence when children also reported high levels of social inhibition. In other words, across levels of children's self-report, parent-report may be very helpful in identifying socially reticent children who may be at risk for anxiety problems, but it is *most* helpful when child-report also converges. This is consistent with previous work showing that parent-child convergence predicted clinicians' anxiety diagnoses and anxiety treatment outcomes more strongly than parent-report alone (Brown-Jacobsen et al., 2011; De Los Reyes et al., 2009). This may reflect that congruence among reporters depends on social inhibition, which originates internally, being externalized and measurable not only by adults, but also by objective observers. Similarly to the conclusions drawn by Laird and De Los Reyes (2013) in the realm of externalizing problems, we suggest that reports of social inhibition (and perhaps anxious behavior more broadly) should not be relied upon from only one informant or only considered additively. Rather, they should be interpreted in the context of each other. We note, however, that unlike studies in which the primary aim is to quantify informant discrepancies and use them to predict a psychological outcome, the current study focused on the relation between children's self-reports and an observable outcome, in the context of severity as provided by other reporters.

Certainly, results from the current study should be interpreted in light of some methodological limitations. The existence of missing data was not ideal. Although we used modern approaches to dealing with missing values, this does not replace a more complete data set. Participants in the current study were recruited from the community, so generalizability to clinical populations may be limited. Although this was purposeful so we could assess variation in risk for later problems, replication of these results with clinically-referred anxious children may be informative for understanding the utility of using young children's self-reports in a clinical setting. Relatedly, we limited our examination of SAD symptoms to children selected for increased risk for anxiety based on previous assessments. Although this is helpful in the sense that being "high" in SAD symptoms meant being extreme among other children seemingly at-risk for anxiety, it is unknown whether the moderating effect of SAD symptoms would be replicated in a clinical sample. These results should be interpreted for SAD symptoms identified among anxiety-prone children, and not for a general or clinical population. Further, the current sample represented a mostly European American, middle class population. Investigation of these relations in more diverse samples is necessary before generalizing to other populations. Teacher-report and one measure of parent-report of social inhibition included only three items each, which may have limited variability in responses. Assessments of social inhibition, social reticence, and SAD symptoms took place at various time points across the kindergarten year. Future studies that examine all constructs at the same time point may minimize any ambiguity about how this timing may have affected results.

The literature would benefit from future studies that address these limitations as well as other interesting issues. For example, following children further into the school years may elucidate whether children whose self-reports related to their observed behavior are indeed at greater risk of developing symptoms of anxiety disorders and related problems. Moreover,

studies examining how children's self-perceptions of social withdrawal can be incorporated into the development of intervention and prevention programs that target children's social withdrawal are needed to assess the applicability of these findings. Finally, our measure of observed social reticence remained somewhat skewed in its distribution, even after statistical transformation. Therefore, this should be considered in interpreting results.

In summary, these results suggest that it may be important to consider the severity of social inhibition and anxiety-spectrum problems in evaluating children's self-reports of their behavior. Although not all children perceive their shyness in a manner consistent with other observations, children most at risk for social anxiety may be adequate reporters of anxiety as young as kindergarten age.

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References

Achenbach, TM. Developmental issues in assessment, taxonomy, and diagnosis of child and adolescent psychopathology. In: Cicchetti, D.; Cohen, DJ., editors. Developmental psychopathology. New York: Wiley; 1995. p. 57-80.

Achenbach TM. Commentary: Definitely more than measurement error: But how should we understand and deal with informant discrepancies? Journal of Clinical Child & Adolescent Psychology. 2011; 40(1):80–86. [PubMed: 21229445]

Armstrong, JM.; Goldstein, LH. The MacArthur Working Group on Outcome Assessment. Manual for the MacArthur Health and Behavior Questionnaire. Kupfer, David J., chair, editor. MacArthur Foundation Research Network on Psychopathology and Development, University of Pittsburgh; 2003.

Asendorpf J. Beyond social withdrawal: Shyness, unsociability, and peer avoidance. Human Development. 1990; 33:250–259.

Beesdo K, Knappe S, Pine DS. Anxiety and anxiety disorders in children and adolescents: Developmental issues and implications for DSM-V. Psychiatric Clinics of North America. 2009; 32:483–524. [PubMed: 19716988]

Biederman J, Hirshfeld-Becker DR, Rosenbaum JF, Herot C, Friedman D, Snidman N, Faraone SV. Further evidence of association between behavioral inhibition and social anxiety in children. American Journal of Psychiatry. 2001; 158:1673–1679. [PubMed: 11579001]

Brown-Jacobsen AM, Wallace DP, Whiteside SP. Multimethod, multi-informant agreement, and positive predictive value in the identification of child anxiety disorders using the SCAS and ADIS-C. Assessment. 2011; 18:382–392. [PubMed: 20644080]

Buss KA, Davis EL, Kiel EJ, Brooker RJ, Beekman C, Early MC. Dysregulated fear predicts social wariness and social anxiety symptoms during kindergarten. Journal of Clinical Child and Adolescent Psychology. 2013; 42:603–616. [PubMed: 23458273]

Cantwell DP, Lewinsohn PM, Rohde P, Seeley JR. Correspondence between adolescent report and parent report of psychiatric diagnostic data. Journal of the American Academy of Child & Adolescent Psychiatry. 1997; 36(5):610–619. [PubMed: 9136495]

Choudhury MS, Pimentel SS, Kendall PC. Childhood anxiety disorders: Parent- child (dis)agreement using a structured interview for the DSM-IV. Journal of the American Academy of Child and Adolescent Psychiatry. 2003; 42:957–964. [PubMed: 12874498]

Cobham VE, Rapee RM. Accuracy of predicting a child's response to potential threat: A comparison of children and their mothers. Australian Journal of Psychology. 1999; 51:25–28.

Cohen, J.; Cohen, P.; West, SG.; Aiken, LS. Applied multiple regression/correlation analysis for the behavioral sciences. 3. New York, NY: Routledge; 2003.

Coplan RJ, Armer M. A "multitude" of solitude: a closer look at social withdrawal and nonsocial play in early childhood. Child Development Perspectives. 2007; 1(1):26–32.

Coplan RJ, Findlay LC, Nelson LJ. Characteristics of preschoolers with lower perceived competence. Journal of Abnormal Child Psychology. 2004; 32(4):399–408. [PubMed: 15305545]

Coplan RJ, Prakash K, O'Neil K, Armer M. Do you "want" to play? Distinguishing between conflicted shyness and social disinterest in early childhood. Developmental Psychology. 2004; 40:244–258. [PubMed: 14979764]

Coplan RJ, Rubin KH, Fox NA, Calkins SD, Stewart SL. Being alone, playing alone, and acting alone: Distinguishing among reticence and passive and active solitude in young children. Child Development. 1994; 65:129–137. [PubMed: 8131643]

Cosi S, Canals J, Hernandez-Martinez C, Vigil-Colet A. Parent-child agreement in SCARED and its relationship to anxiety symptoms. Journal of Anxiety Disorders. 2010; 24:129–133. [PubMed: 19864109]

Dadds MR, Perrin S, Yule W. Social desirability and self-reported anxiety in children: An analysis of the RCMAS lie scale. Journal of Abnormal Child Psychology. 1998; 26:311–317. [PubMed: 9700522]

De Los Reyes A. Introduction to the special section: More than measurement error: discovering meaning behind informant discrepancies in clinical assessments of children and adolescents. Journal of Clinical Child & Adolescent Psychology. 2011; 40:1–9. [PubMed: 21229439]

De Los Reyes A, Alfano CA, Beidel DC. The relations among measurements of informant discrepancies within a multisite trial of treatments for childhood social phobia. Journal of Abnormal Child Psychology. 2010; 38(3):395–404. [PubMed: 20013046]

De Los Reyes A, Henry DB, Tolan PH, Wakschlag LS. Linking informant discrepancies to observed variations in young children's disruptive behavior. Journal of Abnormal Child Psychology. 2009; 37(5):637–652. [PubMed: 19247829]

De Los Reyes A, Kazdin AE. Informant discrepancies in the assessment of childhood psychopathology: A critical review, theoretical framework, and recommendations for further study. Psychological Bulletin. 2005; 131(4):483–509. [PubMed: 16060799]

DiBartolo PM, Albano AM, Barlow DH, Heimberg RG. Cross-informant agreement in the assessment of social phobia in youth. Journal of Abnormal Child Psychology. 1998; 26(3):213–220. [PubMed: 9650627]

DiBartolo PM, Grills AE. Who is best at prediciting children's anxiety in response to a social evaluative task? A comparison of child, parent, and teacher reports. Anxiety Disorders. 2006; 20:630–645.

Early DM, Rimm-Kaufman SE, Cox MJ, Saluja G, Pianta RC, Bradley RH, Payne CC. Maternal sensitivity and child wariness in the transition to kindergarten. Parenting: Science and Practice. 2002; 2:355–377.

Edelbrock C, Costello AJ, Dulcan MK, Conover NC, Kala R. Parent-child agreement on child psychiatric symptoms assessed via structured interview. Journal of Child Psychology and Psychiatry. 1986; 27:181–190. [PubMed: 3958075]

Feinstein AR, Cicchetti DV. High agreement but low kappa: I. The problems of two paradoxes. Journal of Clinical Epidemiology. 1990; 43:543–549. [PubMed: 2348207]

Franz L, Angold A, Copeland W, Costello EJ, Towe-Goodman N, Egger H. Preschool anxiety disorders in pediatric primary care: Prevalence and comorbidity. Journal of the American Academy of Child and Adolescent Psychiatry. 2013; 52:1294–1303. [PubMed: 24290462]

Ganzach Y. Misleading interaction and curvilinear terms. Psychological Methods. 1997; 2:235–247.

Gazelle H, Workman JO, Allan W. Anxious solitude and clinical disorder in middle childhood: bridging developmental and clinical approaches to childhood social anxiety. Journal of Abnormal Child Psychology. 2010; 38:1–17. [PubMed: 19707867]

Graham JW. Missing data analysis: Making it work in the real world. Annual Review of Psychology. 2009; 60:549–576.

Grills AE, Ollendick TH. Multiple informant agreement and the anxiety disorders interview schedule for parents and children. Journal of the American Academy of Child and Adolescent Psychiatry. 2003; 42:30–40. [PubMed: 12500074]

Hawley KM, Weisz JR. Child, parent and therapist (dis)agreement on target problems in outpatient therapy: The therapist's dilemma and its implications. Journal of Consulting and Clinical Psychology. 2003; 71(1):62. [PubMed: 12602426]

Hirshfeld-Becker DR, Biederman J, Henin A, Faraone SV, Davis S, Harrington K, Rosenbaum JF. Behavioral inhibition in preschool children at risk is a specific predictor of middle childhood social anxiety: A five-year follow-up. Journal of Developmental and Behavioral Pediatrics. 2007; 28:225–233. [PubMed: 17565290]

Hughes EK, Gullone E. Discrepancies between adolescent, mother, and father reports of adolescent internalizing symptom levels and their association with parent symptoms. Journal of Clinical Psychology. 2010; 66(9):978–995. [PubMed: 20694961]

Ivens C, Rehm LP. Assessment of childhood depression: correspondence between reports by child, mother, and father. Journal of the American Academy of Child & Adolescent Psychiatry. 1988; 27(6):738–741. [PubMed: 3198560]

Kagan J, Reznick JS, Clarke C, Snidman N, Garcia-Coll C. Behavioral inhibition to the unfamiliar. Child Development. 1984; 55:2212–2225.

Karver MS. Determinants of multiple informant agreement on child and adolescent behavior. Journal of Abnormal Child Psychology. 2006; 34(2):251–262. [PubMed: 16514552]

Kemper TS, Gerhardstein R, Repper KK, Kistner JA. Mother-child agreement on reports of internalizing symptoms among children referred for evaluation of ADHD. Journal of Psychopathology and Behavioral Assessment. 2003; 25(4):239–250.

Kramer TL, Phillips SD, Hargis MB, Miller TL, Burns BJ, Robbins JM. Disagreement between parent and adolescent reports of functional impairment. Journal of Child Psychology and Psychiatry. 2004; 45(2):248–259. [PubMed: 14982239]

Laird RD, De Los Reyes A. Testing informant discrepancies as predictors of early adolescent psychopathology: Why difference scores cannot tell you what you want to know and how polynomial regression may. Journal of Abnormal Child Psychology. 2013; 41:1–14. [PubMed: 22773360]

Loeber R, Green SM, Lahey BB. Mental health professionals' perception of the utility of children, mothers, and teachers as informants on childhood psychopathology. Journal of Clinical Child Psychology. 1990; 19(2):136–143.

Mash, EJ.; Hunsley, J. Assessment of child and family disturbance: A developmental-systems approach. In: Mash, EJ.; Barkley, RA., editors. Assessment of childhood disorders. 4. New York, NY: Guilford Press; 2007. p. 3-50.

Measelle JR, Ablow JC, Cowan PA, Cowan CP. Assessing young children's views of their academic, social, and emotional lives: An evaluation of the self-perception scales of the Berkeley Puppet Interview. Child Development. 1998; 69:1556–1576. [PubMed: 9914640]

Panichelli-Mindel SM, Flannery-Schroeder E, Kendall PC, Angelosante AG. Disclosure of distress among anxiety-disordered youth: Differences in treatment outcome. Journal of Anxiety Disorders. 2005; 19:403–422. [PubMed: 15721572]

Rescorla LA, Ginzburg S, Achenbach TM, Ivanova MY, Almqvist F, Begovac I, Verhulst FC. Cross-informant agreement between parent-reported and adolescent self-reported problems in 25 societies. Journal of Clinical Child & Adolescent Psychology. 2013; 42(2):262–273. [PubMed: 23009025]

Reuterskiöld L, Öst LG, Ollendick T. Exploring child and parent factors in the diagnostic agreement on the anxiety disorders interview schedule. Journal of Psychopathology and Behavioral Assessment. 2008; 30(4):279–290.

Rubin, KH. The Play Observation Scale (POS). College Park, MD: University of Maryland, Center for Children, Relationships, and Culture; 2001.

Rubin KH, Burgess KB, Hastings PD. Stability and social-behavioral consequences of toddlers' inhibited temperament and parenting behaviors. Child Development. 2002; 73:483–495. [PubMed: 11949904]

Rubin KH, Clark ML. Preschool teachers' ratings of behavioral problems: Observational, sociometric, and social-cognitive correlates. Journal of Abnormal Child Psychology. 1983; 11:273–286. [PubMed: 6619438]

Rubin KH, Coplan RJ, Bowker JC. Social withdrawal in childhood. Annual Review of Psychology. 2009; 60:141–171.

Rubin KH, Wojslawowicz JC, Rose-Krasnor L, Booth-LaForce C, Burgess KB. The best friendships of shy/withdrawn children: Prevalence, stability, and relationship quality. Journal of Abnormal Child Psychology. 2006; 34(2):143–157. [PubMed: 16485175]

Salbach-Andrae H, Klinkowski N, Lenz K, Lehmkuhl U. Agreement between youth-reported and parent-reported psychopathology in a referred sample. European Child & Adolescent Psychiatry. 2009; 18(3):136–143. [PubMed: 19129966]

Silverman, WK.; Albano, AM. Anxiety Disorders Interview Schedule for DSM-IV: Child and parent versions. New York: Oxford University Press; 1996.

Stokes J, Pogge D, Wecksell B, Zaccario M. Parent–child discrepancies in report of psychopathology: The contributions of response bias and parenting stress. Journal of Personality Assessment. 2011; 93(5):527–536. [PubMed: 21859293]

Van Ameringen M, Mancini C, Oakman JM. The relationship between behavioral inhibition and shyness to anxiety disorder. Journal of Nervous and Mental Disease. 1998; 186:425–431. [PubMed: 9680044]

Youngstrom EA, Findling RL, Calabrese JR. Effects of adolescent manic symptoms on agreement between youth, parent, and teacher ratings of behavior problems. Journal of Affective Disorders. 2004; 82:S5–S16. [PubMed: 15571790]

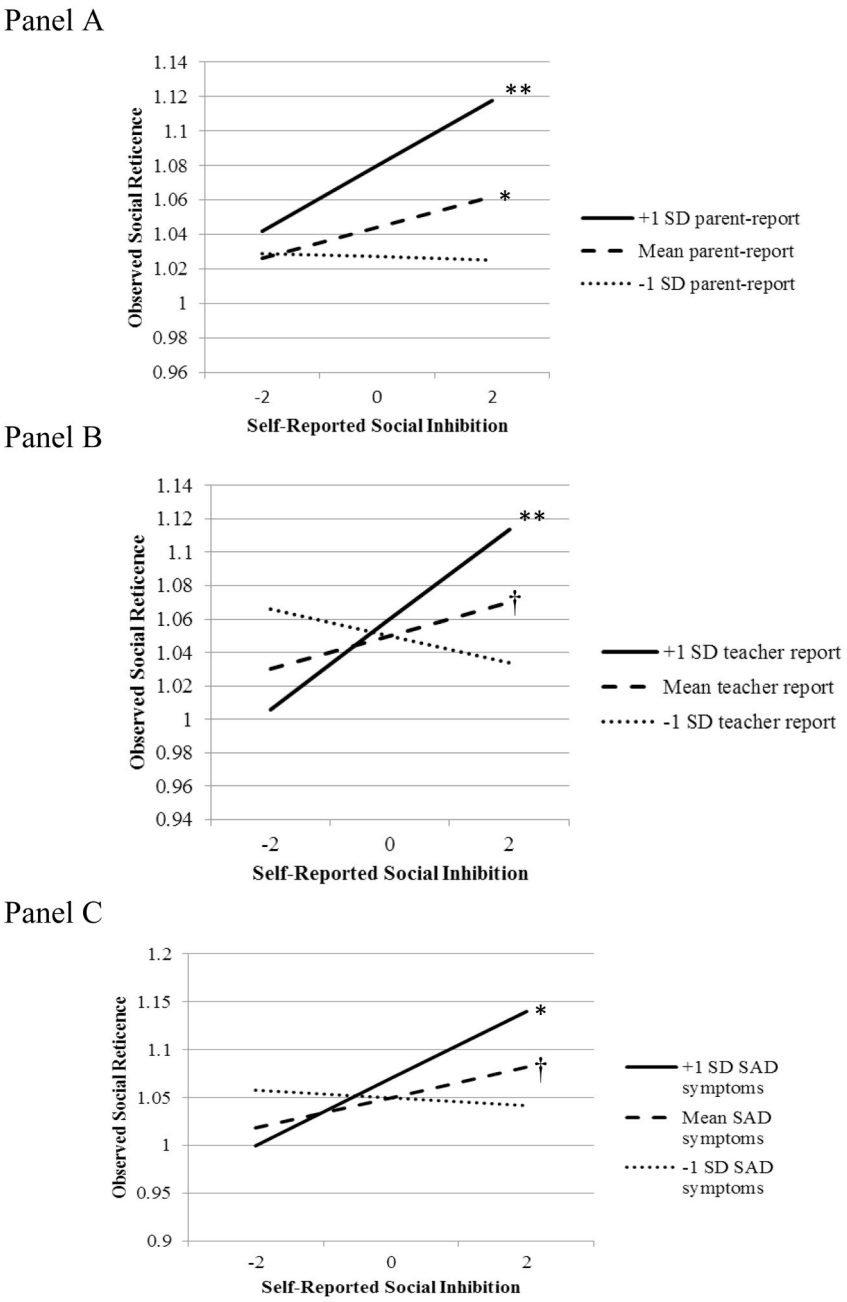

Figure 1.

Interactions between kindergarteners' self-reported social inhibition and parent-report (Panel A), teacher-report (Panel B), and Social Anxiety Disorder (SAD) symptoms obtained from a parent interview (Panel C). Quadratic effects of child report and the moderator were included in all models. All three interactions were significant. Probing revealed that children's self-reported social inhibition related to observed social reticence at high levels of these moderators.

$^{\dagger}p < .10$, $*p < .05$, $**p < .01$.

Table 1

Descriptive Statistics and Bivariate Relations for Primary Study Variables

Variable	*Mean* (*SD*)	*Range*	2	3	4	5
1. Self-reported social inhibition	3.42 (1.21)	1.80 – 6.40	−.13	.04	.12	.21
2. Parent-reported social inhibition	0.00 (1.00)	−1.58 – 3.20	--	.44***	.61***	.35*
3. Teacher-reported social	0.47 (0.45)	0.00 – 1.67		--	.16	.09
4. Observed social reticence	1.05 (0.06)	1.00 – 1.29			--	.23
5. Social Anxiety Disorder criteria	1.16 (1.07)	0.00 – 3.00				--

Note. Descriptive statistics were computed prior to multiple imputation of missing values. Parent-reported social inhibition represents the principal component among two survey measures. Observed social reticence was subjected to a square root transformation after the addition of a constant prior to the calculation of descriptive statistics. Correlations were computed after this transformation and imputation of missing data (n = 85 for all correlations except for those involving SAD criteria, which had n = 51).

* $p < .05$,

*** $p < .001$

Table 2

Summary of Multiple Regression Models Predicting Reticence

Variable	*b* (*SE*)	β	*t*-test	*p*-value	sr^2
Model 1					
Intercept	1.04 (0.01)		170.91	<.001	
Self-report	0.01 (0.00)	0.19	2.23	.029	.030
Self report squared	−0.00 (0.00)	−0.03	−0.34	.737	.001
Parent-report	0.03 (0.01)	0.50	5.95	<.001	.211
Parent-report squared	0.01 (0.00)	0.30	3.57	.001	.076
Self-report X Parent-report	0.01 (0.00)	0.22	2.70	.008	.044
Model 2					
Intercept	1.05 (0.01)		135.66	<.001	
Self-report	0.01 (0.01)	0.20	1.80	.076	.033
Self-report squared	−0.00 (0.00)	−0.13	−1.16	.251	.013
Teacher-report	0.02 (0.02)	0.12	0.98	.328	.010
Teacher-report squared	0.05 (0.02)	0.24	2.05	.043	.042
Self-report X Teacher-report	0.05 (0.01)	0.36	3.52	.001	.125
Model 3					
Intercept	1.05 (0.02)		65.25	<.001	
Self-report	0.02 (0.01)	0.31	1.80	.079	.060
Self-report squared	0.00 (0.01)	0.04	0.19	.850	.001
SAD symptoms	0.01 (0.01)	0.17	1.06	.295	.021
SAD symptoms squared	0.00 (0.01)	0.12	0.77	.448	.012
Self-report X SAD symptoms	0.02 (0.01)	0.37	2.03	.049	.076

Note. Observed social reticence was scored as the proportion of epochs in which unoccupied/onlooking behavior was predominant. A constant of 1 was added to the variable and then a square-root transformation was applied. As such, seemingly small increments of predicted change may indicate a meaningful increase in this score. Squared terms indicate the quadratic effect of the relevant variable. sr^2 is the squared semi-partial correlation of the coefficient and provides effect size.